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- VFAST Transactions on Islamic Studies
- VFAST Transactions on Software Engineering

Joint venture of

Abdul Wali Khan University Mardan, Pakistan & Recep Tayyip Erdoğan University, Rize, Turkey
PREFACE

Distinguished Delegates and Guests!

The organizing committee warmly welcomes the distinguished delegates and guests to the 2nd International Conference on Computational & Social Sciences (ICCSS-14) held from August 26-28, 2014 in Recep Tayyip Erdoğan University, Rize, Turkey. ICCSS-14 is sponsored by Abdul Wali Khan University Mardan, Pakistan, Recep Tayyip Erdoğan University, Rize, Turkey and supported by scholars from universities all around the globe. The major aim of the conference is to provide an animating opportunity to the participants to interact with international experts in a variety of fields: Computer, Mathematics, Social and Life Sciences. The conference has solicited and gathered technical research submissions related to aspects of major conference themes and tracks. The papers published in the proceeding have been peer reviewed by reviewers drawn for the scientific committee, external reviewers and editorial board.

The quality of the ICCSS-14, guaranteed by the attendance of an unparalleled number of experts of international repute–can be assessed when reading the contents of the proceedings. The conference is therefore a unique event, where attendees will be able to appreciate the latest results in their field of expertise and will acquire additional knowledge in other fields. The program has been structured to favor interactions among attendees hailing from diverse horizons; scientifically, geographically; both from academia and industry.

We would wish to thank the Patron-in-Chiefs, Conference Chairs, Co-chairs, keynote speaker, researchers, organization staff, and the members of the other committees for their faithful contribution. We are also grateful to those who have contributed to the success of ICCSS-14. We hope that participants and interested readers will benefit scientifically from the proceedings and also find it stimulating in the process. Finally, we would like to wish you success in your technical presentations and social networking.

We hope you have a unique, rewarding and enjoyable time at ICCSS-14 in Rize, Turkey.

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August 26-28, 2014
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IMPACT OF COMPUTING ON SOCIETY—PAKISTAN PERSPECTIVE

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ABSTRACT. Despite initial reluctant response to global Information Technology revolution characterized by Eastern Inertia, Pakistan society made a rapid, concerted, and deliberate effort to catch up with the latest trends and tools in the area. The inevitable haste denied Pakistani society the much needed and educated socio-psychological adjustments. This paper proposes to examine the intrinsic flaws in societal customization to the thus emerging scenario. It also endeavours to present possible post-damage means to thwart the baneful effects of the phenomenon.

Keywords: Society; Societal; Shock; Future Shock; Culture Shock; Computing.

Introduction. Man’s quest for change has marked his existence on planet earth since the beginning of time. From Stone Age to the modern 4-G and 5-G digital civilization man’s search for new venues continues unabated. The eastern societies have exhibited a delayed and reluctant response to global desire for change and alteration. Eastern averseness to change as characterized by Eastern Inertia, though widely spread cannot be termed as an exclusive phenomenon emanating from East’s geographical limits.

The West also suffered from similar conservative traditionalist commitment through thousands of years. Aristotle’s unchallenged and unquestioned influence for more than 2,000 years represented a kind of reverential inertia in the West. His concept of science, especially the physical branch of it, coloured the philosophies of the West in the medieval era. He continued to shape the contours of Western thought pattern even in the Renaissance period. His contentions and theories were questioned, modified or even discarded in the age of Enlightenment. He remained the most powerful and influential reference of scholarly, scientific, and philosophical dialogue till the 19th century.[1] The Western apathy continued unabated when strong voices of the Lake Poets and their Pantisocracy joined intellectual muscles with Rousseau in their belief that civilization, industry, development, and progress amount to an attempt to conquer nature and their these phenomena corrupt human happiness. Rousseau strongly urged the world to return to the “state of nature.”[2] They were probably of the view that technological progress is inversely proportional to human happiness. The Western concerns on the possible backlash of computational and scientific adventures remain unabated. Alvin Toffler3 and Stephen Hawking have been coming up with similar possibilities of incompatibilities and mismatches. In Stephen Hawking view computer viruses are “a form of life and that humans should use genetic engineering to avoid being outsmarted by computers,[4] He has been continually expressing concerns that “that life on earth is at risk due to "a sudden nuclear war, a genetically engineered virus or other dangers we have not yet thought of.”[5]

The response in the East towards scientific development, innovations, inventions, theories, and movements was, however, even more profound and concrete. Voices of emotions in the West were silenced more
conveniently by the roars of engines and machines. The East was able to stress its potent inertia more effectively and categorically. Allama Iqbal, the Poet of the East and the National Poet of Pakistan, observed that machines are detrimental to human emotions, as had been propounded earlier by Bertrand Russell in his “Machines and the Emotions.” Allama Muhammad Iqbal wrote that

ٖٗدٗلٗکٗےٗلٗہٗمٗوٗتٗمٗشٗینٗوٗںٗکٗیٗحِکٗوٗمٗت

Hai Dil Ke Liye Mout Machinon Ki Hukumat

Ehsas-e-Marawwat Ko Kuchal Dete Hain Aalaat

(Death to the heart, machines stand sovereign,
Engines that crush all sense of human kindness)

2. Computing in Pakistan. One of the prime reasons for the feeling of deprivation among the Muslims of India was their economic disadvantageous status. Their relative economic dispossession in the post-1857 era was due largely to their disinclination towards the modern educational movements with British/Western connotations. They considered these movements detrimental to their traditionalist curricular and academic patterns. Upon the emergence of Pakistan 1947 the trend of distaste, though much diluted in intensity, did not tangibly and perceptibly halt. It is somewhat ironic to note that computing and a full-fledged war struck Pakistan almost simultaneously in 1965. The first formal step towards promotion of computing education when one of the leading universities of the country—Quaid-i-Azam University, Islamabad started a degree programme in computer science. In the year 1980, the Foundation for Advancement of Science and Technology (FAST) was founded and established by BCCI financier Hasan Abidi. The foundation contributed significantly towards the promotion of computer science. Its institutions matured into a University in 2000. Other institutions which now number around 150 followed suit and hence computing emerged as an option and one of the sought after disciplines for the youth in the 1990s. The Higher Education Commission setup an accreditation authority, National Computing Education Accreditation Council (NCEAC) to monitor and evaluate issues related to computer education in the country. The NCEAC is responsible for “the accreditation of institutions and their departments, faculties and disciplines by giving them appropriate ratings and define the organization’s objectives, functions and duties to be performed. It will periodically evaluate, scrutinize and monitor the standards followed in different Universities, Degree Awarding Institutions and their affiliated colleges offering computing degree programs.”

2.1. The 2nd Phase of Computing in Pakistan. The second phase of the digital revolution in Pakistan started off in the immediate proximity of the dawn of the 21st century. Incongruously, once again the revitalization of computing education and technologies coincided with a war of even greater magnitude than the one fought in 1965—the War on Terror in the wake of the emergence of the new world order of unipolarity. This particular simultaneousness caused palpably mutual and reciprocal impact on the war-prone society and the emergence of a digitally active society. The virtual aspect of computing and communication devices, tools, and techniques facilitated the avoidance of outdoor activity among the youth on the turn of the century with wide-spread feelings of insecurity and vulnerability. The cozy domestic environment of Alvin Toffler’s “electronic cottage” came handy to the generation, especially when the outer world was no more congenial and well-protected. It suited their need and matched their taste.

2.2. Computing and Society. The social media, which proceeded a jubilant electronic media tempest further helped the youth to interact with the unsafe outer world, to vent their emotions, to share their knowledge and feelings, and to remain active at least in theoretical terms. They found it convenient to sit back in the confines of safe homes and resolve emotional, academic, professional, and social issues which confront the youth of different age groups.

It was not only the fear of external and internal threats or challenges that made the appeal for Pakistan youth in the computing and computer related education. It was also because of different social and economic factors which generally shape the contours a society.
2.3. Computing and Gender Interaction. The Eastern societies in general and Pakistani society in particular have very marked historically strong and traditionally potent patriarchal connotations. This patriarchal disposition and outlook is based primarily on the geo-strategic orientations of the region inhibited now by the people of Pakistan—earlier referred to as the North-West India. This region has remained through centuries prone to external invasions and attacks. The geo-strategic compulsions and determinants rendered the society an exclusivist unit dominated by the male members. The seclusionist patterns of the society left very marginal room for gender mixing and interaction on regular or random bases. The societal outlook afforded negligibly frequent opportunities to members of opposite genders to communicate conveniently.

However, with the emergence of the social media, wireless telecommunication means, and inexpensive/less-expensive telecom services, a society which had been characterized by minimal occasions and prospects to commune, became most open, pluralistic, and communicative. The barriers of gender, which had stayed strongly and deeply for thousands of years, were broken in one decade of digital society. The paucity or absence of many relevant cyber laws, norms, and rules, the gender proximities in the virtual world did not correspond well with the actual world of social norms, culture, and tradition. The social change brought about by the electronic media only acted as catalyst towards the formation of a society which freely mixed only in the digital panorama. The actual transformation of the society did not, however, take place as markedly and evidently as it did in the virtual arena. Virtual reality overpowered society in the sense of the world.

Paradoxically, the impact of the simultaneous war in the region (war on terror) harboured extremist propensities in the society. The political and social polarization had palpable influence on the cultural disposition of the society. The evolution and growth of a parallel extremist radicalization created a situation of cultural and future shocks. Interestingly the conservative radical elements also did not continue to stay aloof from techno-communicative developments. All segments and parties in the multi-oriented society were rendered active participants of social media internet society. All stayed firmly committed to their notions on gender equality, fundamental rights, and world view. The social media failed to soften the rigidity of views and further heightened the intensity of diversity of opinion.

Simultaneity
Diversity of opinion is the first step towards the creation of pluralistic, prosperous, and egalitarian society. However, in Pakistan’s case centuries old traditions and premature notions did not go well with each other. Dialogue resulted in dispute and did not serve the purpose of resolving disputes to arrive at consensus. To make the state of affairs further deteriorate, the abundance of computing facilities, availability of wide-spread internet connectivity, and paucity of educated monitoring, adolescence transformed into youth and maturity rather more speedily than the society had been used to.

The rarity and scarceness of outdoor recreational facilities, gender mixing probabilities, pastime activities, and socially restrictive norms made Pakistan society an excessive user of computing and digital tools. The impact has been addictive. The entire phenomenon lead to an escapist youth who seek admiration and resolution of challenges at the doorstep through mechanical and computational means.

The unfortunate aspect of the episode is the deterioration of family bond and closeness. Pakistani society has generally been marked by the spirit of joint-family systems. The joint responses are fast on the path of disintegrations. Physical proximity has become meaningless in the digital society of the internet age. Free and unchecked interactions at times cause the emergence and spread of unwanted and undesirable matter which cause emotional and psychological consequences and pain to members of the society. At times financial and physical losses are also involuntarily and unknowingly incurred.

Conclusion. The emergence of computing age and the digital revolution has positive and baneful effects on every society in different ways and manner. Pakistan society is no exception. It does not mean that the fault lies in the phenomenal development in the IT and telecom sectors all around the globe. Innovations, through history have always created a stir in the societal outlook. The intellectual elite of the society are responsible to resist the transformation of this stir into total societal chaos, bedlam and disorder. While benefiting from the fruit of progress the society needs to devise techniques to avoid the accompanying thorns. It is pertinent for a society to not only respond positively to the change brought about by scientific development but also prepare
schemes and processes to thwart the baneful effects which may ensue. Pakistan’s reaction/response to scientific change has been at the outset slow and reluctant but upon wide-spread acceptance, popularity, or productivity, Pakistan, as a society responds to it rather impulsively. A society must take into account a holistic picture of a technological shift and then present a pragmatic and educated response to its all encompassing dimensions.

REFERENCES

CHEMICALLY REACTING UNSTEADY MHD OSCILLATORY SLIP FLOW OF A MICROPOLAR FLUID IN A PLANER CHANNEL WITH VARYING CONCENTRATION

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ABSTRACT. The study examines the problem of unsteady MHD mixed convection in a micropolar fluid with oscillatory flow of an electrically conducting optically thin fluid through a planer channel filled with saturated porous medium. The effect of buoyancy, heat source, thermal radiation and chemical reaction are taken into account embedded with slip boundary condition, varying temperature and concentration. The closed-form analytical solutions are obtained for the momentum, angular momentum, energy and concentration equations. The influence of the various parameters entering into the problem in the velocity, temperature and concentration fields are discussed with the help of graphs. Finally the effects of the pertinent parameters on the skin friction, couple stress and the rate of heat transfer coefficient at the plate are discussed.

Keywords: Micropolar fluid; Oscillatory flow; thermal radiation; chemical reaction; heat and mass transfer; planer channel.

I. ntrroduction. Oscillatory flows has known to result in higher rates of heat and mass transfer, many studies have been done to understand its characteristics in different systems such as reciprocating engines, pulse combustors and chemical reactors. Cooper et al.[1] have made a detailed study on fluid mechanics of oscillatory and modulated flows and associated applications in heat and mass transfer. Fusegi [2] have numerically studied the influence of convective heat transfer from periodic open cavities in a channel with oscillatory flow. Cheng et al. [3] and Hamadah and Wirtz [4] have studied the mixed convection in a vertical channel with symmetric and asymmetric heating of the walls. Barletta [5] has studied the fully developed combined free and forced convection flow in a vertical channel with viscous dissipation. Umavathi et al. [6] have numerically investigated the problem of mixed convection in a vertical channel filled with a porous medium including the effect of inertial forces is studied by taking into account the effect of viscous and Darcy dissipation. Prathap kumar et al. [7] have analyzed the problem of fully developed combined free and forced convective flow in a fluid saturated porous medium channel bounded by two vertical parallel plates. Pop et al. [8] have investigated the steady fully developed mixed convection flow in a vertical channel with constant temperature walls when there is a heat generated by an exothermic reaction inside the channel. Gomaa and Taweel [9] have examined the effect of oscillatory motion on heat transfer about vertical flat surfaces. The heat transfer enhancement of oscillatory flow in channel with periodically upper and lower walls mounted obstacles has been analyzed by Abdellkader and Lounes [10]. MHD has attracted the attention of many researchers and industrialists due to its rich applications in cosmic fluid dynamics, meteorology, motion of Earth's core and solar physics. El-Hakiem [11] has examined the influence of MHD oscillatory flow on free convectionradiation through a porous medium with constant suction velocity. Makinde and Mhone [12] have...
investigated the problem of heat transfer to MHD oscillatory flow in a channel filled with porous medium. The effect of slip condition on unsteady MHD oscillatory flow of a viscous fluid in a planer channel has been analyzed by Mehmood and Ali [13]. The wide range of technological and industrial applications have stimulated considerable amount of interest in the study of heat and mass transfer in convection flows. Convection in porous media has applications in geothermal energy recovery, oil extraction, thermal energy storage and flow through filtering devices. Gholizadeh [14] has investigated the MHD oscillatory flow past a vertical porous plate through porous medium in the presence of thermal and mass diffusion with constant heat source. The work of Makinde [15] is of particular interest since it demonstrated the possibility of achieving significant unsteady incompressible flow in a porous channel. Makinde and Aziz [16] have analyzed the MHD mixed convection from a vertical plate embedded in porous medium with convective boundary condition.

The role of thermal radiation is of major importance in engineering areas occurring at high temperatures and knowledge of radiative heat transfer becomes very important in nuclear power plants, gas turbines and the various propulsion devices for aircraft, missiles and space vehicles. Hakeem and Sathiyanathan [17] have examined the radiation effect of an oscillatory flow through a porous medium. Srinivas and Muthuraj [18] have studied the effects of thermal radiation and space porosity on MHD mixed convection flow in a vertical channel. Pal and Talukdar [19] have analyzed the unsteady MHD convective heat and mass transfer in a vertical permeable plate with thermal radiation. The study of heat and mass transfer with chemical reaction is of great practical importance to engineers and scientists because of its almost universal occurrence in many branches of science and engineering. Bakr [20] have studied the effects of chemical reaction on oscillatory plate velocity and constant heat source in a rotating frame of reference. Bakr and Raizah [21] have analyzed the unsteady MHD mixed convection flow of a viscous dissipating micropolar fluids in a boundary layer slip flow regime with Joule heating. The influence of chemical reaction on unsteady MHD mixed convective flow over a moving vertical porous plate has been examined by Prakash et al. [22]. To the best of the author’s knowledge, studies pertaining to oscillatory flow of a micropolar fluid investigations in a planer channel with variable temperature and concentration have not received much attention. Therefore, the main goal here is to study the chemical reaction effects on unsteady MHD oscillatory slip flow in an optically thin fluid through a planer channel in the presence of a temperature-dependent heat source. The closed form solutions for velocity, temperature, skin friction, concentration, Nusselt number, and Sherwood number are presented. The effects of pertinent parameters on fluid flow and heat and mass transfer characteristics are studied in detail. This work is presented as follows. First, the problem is formulated, and then the solution of the problem is presented. Following are results and discussion, and finally, conclusions are summarized.

2. Formulation Of The Problem. We consider the unsteady mixed convection flow of a micropolar fluid, two dimensional slip flow of an electrically conducting, heat generating, optically thin and chemically reacting oscillatory fluid flow in a planer channel filled with porous medium in the presence of thermal radiation with temperature and concentration variation. Take a Cartesian coordinate system (X,Y) where X – axis is taken along the flow and Y – axis is taken normal to the flow direction. A uniform transverse magnetic field of magnitude $B_0$ is applied in the presence of thermal and solutal buoyancy effects in the direction of Y – axis. Under these assumptions, the governing equations of the problem become:

$$\frac{\partial V}{\partial Y} = 0$$  \hspace{1cm} (1)

$$\frac{\partial U}{\partial t} = -\frac{1}{\rho} \frac{\partial P^*}{\partial X} + (\nu + \nu_v) \frac{\partial^2 U}{\partial Y^2} + g_0 \beta_T (T - T_i)$$

$$+ g_0 \beta_c (C - C_i) - \left( \frac{\sigma B_0^2}{\rho K} + \frac{v}{K^*} \right) U - \nu_v \frac{\partial W}{\partial Y}$$

$$\frac{\partial W}{\partial t} = \frac{\gamma}{\rho \lambda^*} \frac{\partial^2 W}{\partial Y^2}$$  \hspace{1cm} (2)
\[
\frac{\partial T^*}{\partial t} = \frac{k}{\rho C_p} \frac{\partial^2 T^*}{\partial y^2} - \frac{1}{\rho C_p} \frac{\partial q_*}{\partial y} + \frac{Q(T - T_0)}{\rho C_p}
\]

\[
\frac{\partial C^*}{\partial t} = D_m \frac{\partial^2 C^*}{\partial y^2} - K_k (C - C_1)
\]

\[
U = L \frac{\partial U}{\partial Y}, W = -n \frac{\partial U}{\partial Y}, \quad T = T_0 + \delta_T \frac{\partial T}{\partial Y},
\]

\[
C = C_1 + \delta_c \frac{\partial C}{\partial Y} \quad \text{at} \quad Y = 0
\]

\[
U = W = 0, T = T_1 + \delta_T \frac{\partial T}{\partial Y}, C = C_2 + \delta_c \frac{\partial C}{\partial Y} \quad \text{at} \quad Y = d
\]

Thus the radiative heat flux term (Cogley et al. [22]) is given by

\[
q_* = 4(T_1 - T) I'
\]

Introducing the following dimensionless variables

\[
y = \frac{Y}{d}, \quad x = \frac{X}{d}, \quad U = \frac{U}{U_0}, \quad t = \frac{t U_0}{d}, \quad \delta_c = \frac{\delta_c}{d}, \quad \theta = \frac{T - T_0}{T_1 - T_0}, \quad \phi = \frac{C - C_1}{C_2 - C_1}, \quad Pr = \frac{\mu c_p}{\kappa}, \quad P = \frac{d P_w}{\mu U_0},
\]

\[
Gc = \frac{g \beta_n (C_2 - C_1) d^2}{\nu U_0}, \quad Sc = \frac{D}{U_0 d}, \quad M_t = \frac{\sigma B_0 d^3}{\mu}, \quad K = \frac{K^*}{d}, \quad Re = \frac{U_0 d}{\nu}, \quad P e = \frac{\rho C_p U_0 d}{k}, \quad \alpha = \frac{\lambda}{\kappa}, \quad Gr = \frac{g \beta_n (T_2 - T_1) d^3}{\nu U_0}.
\]

In view of the above non-dimensional variables, the basic field Eqs. (2)–(7) can be expressed in non-dimensional form as

\[
\text{Re} \frac{\partial u}{\partial t} = -\frac{\partial P}{\partial x} + \frac{1}{k} \frac{\partial^2 u}{\partial y^2} + \text{Gr} \theta + \text{Gc} \phi -
\]

\[
\left(M + \frac{1}{K}\right) u + 2 \Delta \frac{\partial \omega}{\partial y}
\]

\[
\frac{\partial \omega}{\partial t} = \eta \frac{\partial^2 \omega}{\partial y^2}
\]

\[
\text{Pe} \frac{\partial \theta}{\partial t} = \frac{\partial^2 \theta}{\partial y^2} - (F + \alpha) \theta + D u \frac{\partial^2 \theta}{\partial y^2}
\]

\[
\frac{\partial \phi}{\partial t} = \frac{1}{Sc} \frac{\partial^2 \phi}{\partial y^2} - R \phi + Sr \frac{\partial^2 \phi}{\partial y^2}
\]

The boundary conditions (6) can be written in non-dimensional forms as:

\[
u = \gamma \frac{\partial u}{\partial Y}, \quad \omega = -n \frac{\partial u}{\partial Y}, \quad \theta = \delta_T \frac{\partial \theta}{\partial Y}, \quad \phi = \delta_c \frac{\partial \phi}{\partial Y} \quad \text{at} \quad Y = 0
\]

\[
u = \omega = 0, \theta = 1 + \delta_T \frac{\partial \theta}{\partial Y}, \quad \phi = 1 + \delta_c \frac{\partial \phi}{\partial Y} \quad \text{at} \quad Y = 1
\]

3. Method Of Solution. In this section we present the analytical solution for Eqs. (9) and (12) with boundary conditions (13) for purely oscillatory flow, let us take
\[-\frac{\partial P}{\partial x} = Ae^{i\omega}, u(y,t) = u_0(y)e^{i\omega}, \omega(y,t) = \omega_0(y)e^{i\omega}\]  \hspace{1cm} (14)

\[\theta(y,t) = \theta_0(y)e^{i\omega}, \phi(y,t) = \phi_0(y)e^{i\omega}\]

Substituting Eqs. (14) into the Eqs. (9)-(13) and comparing the harmonic and non-harmonic terms, we get:

\[(1+\Delta)u'' - A_1^2 u_0 = -\lambda - Gr \theta_0 - Gc \phi_0 - 2\Delta \omega_0\; \hspace{1cm} (15)\]

\[\omega_0'' - A_1^2 \omega_0 = 0\]  \hspace{1cm} (16)

\[\theta_0'' - A_1^2 \theta_0 = A_2 \phi_0''\]  \hspace{1cm} (17)

\[\phi_0'' - A_1^2 \phi_0 = A_3 \theta_0''\]  \hspace{1cm} (18)

Here primes denote differentiation with respect to \( y \). However, this expansion of the solution is meaningful only if the reduced equations are ordinary differential equations of the independent variable \( y \).

In addition, the corresponding boundary conditions can be written as

\[u_0 = \gamma u_0', \omega_0 = -\frac{1}{2}u_0', \theta_0 = \delta_1 \theta_0', \phi_0 = \delta_2 \phi_0' \hspace{.5cm} \text{at} \hspace{.5cm} y = 0\]  \hspace{1cm} (19)

\[u_0 = 0, \omega_0 = 0, \theta_0 = 1 + \delta_3 \theta_0', \phi_0 = 1 + \delta_4 \phi_0' \hspace{.5cm} \text{as} \hspace{.5cm} y = 1\]

Solving Eqs. (15)-(18) subject to the boundary conditions (19) we obtain

\[u = (h_0 + h_1 e^{-ay} + h_2 e^{ay} + h_3 e^{ay} + h_4 e^{ay} + h_5 e^{ay} + h_6 e^{ay} + h_7 e^{ay} + h_8 e^{ay} + h_9 e^{ay})e^{i\omega t}\]  \hspace{1cm} (20)

\[\omega = A_2 e^{i\omega} (h_1 e^{ay} - h_2 e^{-ay})\]  \hspace{1cm} (21)

\[\theta = (h_0 e^{ay} + h_1 e^{ay} + h_2 e^{ay})e^{i\omega t}\]  \hspace{1cm} (22)

\[\phi = (h_0 e^{ay} + h_1 e^{ay} + h_2 e^{ay})e^{i\omega t}\]  \hspace{1cm} (23)

where the constants are given in Appendix. The physical quantities of engineering interest are shear stress, couple stress coefficient, the coefficient of the rate of heat transfer and the rate of mass transfer at any point in the fluid can be characterized by

\[\tau = \frac{\tau}{\mu U_0} = [1 + \Delta (1 + \frac{i}{2})]u'(0); \quad C_w = \frac{\partial \omega}{\partial y};\]  \hspace{1cm} (24)

\[Nu = \frac{Nu d}{T_1 - T_0} = -\theta'; \quad Sh = \frac{Sh' d}{C_1 - C_0} = -\phi'.\]

The skin friction, the Nusselt number and the Sherwood number at the walls \( y = 0 \) and \( y = 1 \) are given by couple stress coefficient at the wall \( C_w \) is given by

\[\tau_0 = -u|_{y=0} \hspace{1cm} \tau_1 = -u|_{y=1}\]

\[C_{w0} = \omega|_{y=0} \hspace{1cm} C_{w1} = \omega|_{y=1}\]

\[Nu_0 = -\theta|_{y=0} \hspace{1cm} Nu_1 = -\theta|_{y=1}\]

\[Sh_0 = -\phi|_{y=0} \hspace{1cm} Sh_1 = -\phi|_{y=1}\]  \hspace{1cm} (25)

4. Results and discussion. System of equations (16) to (19) subject to the boundary conditions (20) are highly coupled and solved analytically. In order to understand the physical solution, the numerical values of concentration, transverse velocity, angular velocity and temperature are presented. Numerical evaluation for the analytical solution of this problem is performed and the results are illustrated graphically in Figs. 1–16 to
show the interesting features of significant parameters on velocity, temperature and concentration distributions in the planer channel. Throughout the computations we employ

In Figure 1, the effect of $\Delta$ on the translational velocity $u$ and angular velocity $\omega$ for a stationary porous plate is shown. It is observed that, as the viscosity ratio parameter $\Delta$ is increased, $u$ is decreases and $\omega$ is increased. Figure 2 illustrates that the presence of transverse magnetic field produces a resistive force on the fluid flow. This force is called the Lorentz force, which slows down the motion of the fluid. It is obvious that the increases in the frequencies of oscillation decrease the velocity and this is presented in Fig. 3. Figure 4 displays that the increases in the permeability coefficient of porous medium act against the porosity of the porous medium which increase the fluid velocity. Figure 5 illustrates that increase in the radiation parameter increases the temperature distribution because large values of radiation parameter oppose the conduction over radiation, thereby which increases the buoyancy force and increases the thickness of the thermal boundary layer. Figure 6 represents that the increase in the heat source parameter significantly increase the thermal buoyancy effects which raise fluid temperature. Increase in temperature variation parameter coincides with the decrease of heat transfer and the curves could be seen in Fig. 7 It is observed from Fig. 8 that the effect of raising Peclet number develop the thermal conductivities and therefore heat is able to diffuse away and the heat transfer falls monotonically. Figure 9 shows that we obtain a destructive type chemical reaction because the concentration decreases for increasing the chemical reaction parameter which indicates that the diffusion rates can be tremendously changed by the chemical reaction. Figs. 10 illustrate that concentration variation parameter are used to increase the mass transfer. In Figure 11-13, the effect of $K$, $M$ and $Pe$ on angular velocity $\omega$ for a stationary porous plate is shown. It is observed that, as the angular velocity $\omega$ is increased, $K$ is decreases and $M$ and $Pe$ is increased.

REFERENCES


APPENDIX

\[ A_1 = \sqrt{\frac{M + i\omega Re - \frac{1}{K}}{K}}, \quad A_2 = \sqrt{F + \alpha i\omega Pe} \]

\[ A_3 = \sqrt{\frac{i\omega + K}{Sc}}, \quad A_4 = \frac{A_1}{\sqrt{1 + \Delta}}, \quad h_1 = \frac{h_2 (A_3 \delta c - 1)}{(1 + A_3 \delta c)} \]

\[ h_2 = \frac{e^{-\Delta} (A_3 \delta c - 1)(1 + A_3 \delta c) + e^{\Delta}(1 - A_3 \delta c)(1 + A_3 \delta c)}{A_3 \delta c + 1}, \quad h_7 = \frac{\lambda}{A_1}, \quad h_8 = \frac{-Gr h_3}{(1 + \Delta)A_2^2 - A_1^2}, \quad h_4 = \frac{B_9 + B_8 h_5}{B_7}, \]

\[ h_9 = \frac{-Gr h_4}{(1 + \Delta)A_2^2 - A_1^2}, \quad h_4 = \frac{A_2 \delta c + 1}{e^{-\Delta_2} (A_2 \delta c - 1)(1 + A_2 \delta c) + e^{\Delta_2}(1 - A_2 \delta c)(1 + A_2 \delta c)} \]

\[ h_1 = \frac{-Ge h_2}{(1 + \Delta)A_2^2 - A_1^2}, \quad h_1 = \frac{-Ge h_2}{(1 + \Delta)A_2^2 - A_1^2}, \quad h_2 = \frac{2\Delta A_4}{(1 + \Delta)A_2^2 - A_1^2} \]

\[ B_1 = h_7 + h_8 e^{-\Delta} + A_9 e^{\Delta} + h_10 e^{-\Delta} + A_11 e^{\Delta}, \quad B_6 = 1 - e^{2\Delta} (1 - n A_4 h_12) + n h_13 A_4 \]

\[ B_2 = h_7 + h_8 (1 + \gamma A_2) + h_9 (1 - \gamma A_2) + h_10 (1 + \gamma A_3) + h_11 (1 - \gamma A_3) \]

\[ B_3 = n (A_2 h_8 - A_2 h_9 + A_3 h_10 - A_3 h_11) \]
\[ B_5 = h_1 e^{2A_4} (1 + \gamma A_4) + h_3 (\gamma A_4 - 1), \]
\[ h_{10} = \frac{-A c h_1}{(1 + \Delta) A_3^2 - A_1^2}, \]
\[ B_7 = B_4 (1 + \gamma A_4) - B_5 e^{-A_5}, \]
\[ h_3 = \frac{-2A_4}{(1 + \Delta) A_4^2 - A_1^2}, \]
\[ B_8 = B_4 (\gamma A_5 - 1) + B_5 e^{-A_5}, \]
\[ B_9 = B_1 B_5 - B_2 B_4, \]
\[ B_{10} = n B_4 A_5 - B_6 e^{-A_5}, \]
\[ B_{11} = n B_4 A_5 + B_6 e^{-A_5}, \]
\[ B_{12} = B_1 B_6 - B_3 B_4, \]
\[ h_{15} = \frac{B_{10} B_9 - B_{12} B_7}{B_{11} B_7 - B_8 B_{10}}, \]
\[ h_5 = -h_6 e^{2A_4}, \]
\[ h_6 = \frac{B_1 + h_4 e^{-A_5} + h_{15} e^{-A_5}}{B_4}. \]

Fig. 1 Velocity profiles for different \( \Delta \)

Fig. 2 Velocity profiles for different \( M \)

Fig. 3 Velocity profiles for different \( w \)

Fig. 4 Velocity profiles for different \( K \)
Fig. 5 Temperature profiles for different $F$.

Fig. 6 Temperature profiles for different $\alpha$.

Fig. 7 Temperature profiles for different $\Delta T$.

Fig. 8 Temperature profiles for different $Pe$. 

Fig. 9 Temperature profiles for different T.
Fig. 11 Angular velocity profiles for different Pe.
OCCLUDED RED BLOOD CELLS SPLITTING VIA BOUNDARIES ANALYSIS AND LINES DRAWING IN MICROSCOPIC THIN BLOOD SMEAR DIGITAL IMAGES

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ABSTRACT. Occluded Red Blood Cells are observed frequently in the thin blood smear digital images. Separating the occluded Red Blood Cells from the single Red Blood Cells and further the splitting of occluded Red Blood Cells into single Red Blood Cells is a challenging job in the computer assisted diagnosis of blood for any disorder in many diseases like Complete Blood Count Test, Anemia, Leukemia and Malaria etc. The mentioned problem is also highly laborious in manual microscopy for the hematologist. Many techniques currently existed for the solution but suffered from both under and over splitting problems when highly complex occlusions of Red Blood Cells occurred. Also the existed techniques are not computationally efficient. In this, paper we address the mentioned problems in realistic, efficient and automated way by considering the boundaries of the occluded Red Blood Cells through convex hulls to divide the boundaries on the basis of distance calculation in a very simple and efficient way split the occlusions according to the number of Red Blood Cells. Further, we draw lines using Digital differential analyzer graphics line drawing algorithm at the two respective end points to give cuts to split the occluded Red Blood Cell. The test results of the proposed technique using standard online data set of thin blood smear digital images (provided by Centers of diseases Control and prevention, USA) are presented in this paper by qualitatively analysis through ground truth with visual inspection.

Keywords: Occluded RBCs, Thin Blood Smears, Anemia, Concavity Regions, Automatic diagnosing, convex hulls, Concavity Points.

1. Introduction. In the last decade, automated microscopy has got much attention of the researchers for the purposes that the manual microscopy is still considered as a Gold Standard in the diagnosing of various disorders in blood. Due to ease of availability and low cost still preserve the right of Gold standard with manual microscopy but it must also be not ignorable that the process requires high expertise and is too laborious. In automated microscopy of blood the main and most challenging job is that of occluded Red Blood Cells, White Blood Cells etc. The occlusions of Red Blood Cells are further divided by this study into two types i.e. Clumps of Red Blood Cells and Overlaps of Red Blood Cells. The word clump means glue and is used for the situation
in which the Red Blood Cells glued each other and formed long chains. The formation of clumps of Red Blood Cells occurs due to iron deficiency in blood and is the frequent observed in diseases like Anaemia, Leukaemia, Malaria and many other diseases. The degree of severance of these diseases highly dependant on the number of Red Blood Cells e.g. in Malaria the Parasitemia is the ratio of infected Red Blood Cells to all Red Blood Cells observed on the slide. In automated diagnosing, the accuracy of diseases in which counting of Red Blood Cells is involved are highly affected by clumps of Red Blood Cells due to the consideration of a clump as one single object while a single clump may encompasses more than six Red Blood Cells. Also important information is hidden in these clumps. On the other hand overlapped Red Blood Cells are few in numbers not more then four Red Blood Cells combination and formation is just due to improper slide preparation. Both of these problems affect the counting accuracy in manual as well as automated microscopy while their cleavage in a proper, easy and computationally less expensive way is the need of the day.

2. Literature Review. Recently, too many efforts have been made by researchers to develop algorithms for splitting the clumped and overlapped Red Blood Cells i.e. the clustered Red Blood Cells and show a high degree of success but still there are gaps which are not addressed or addressed in computationally expensive and some cases impossible ways. The approaches adopted by previous studies to combat the problems are divided into the following categories i.e. Morphological operation based includes erosion, dilation or opening closing to split the clusters of Red Blood Cells [1],[2],[3]. However, the main problem in morphological based approach is that it works well in overlap of Red Blood Cells not more then two cells but in reality we have some clumps which are very long chains. Concavity based approaches deal the problems in the way to find out the concavity regions and some cases the concavity points and split the clustered Red Blood Cells through lines cuts or circles drawing or ellipses drawing as stated in the studies of [4], [5], [6], [7], [8], [9], [10], [11] and [12]. The concavity based approaches gives good results but in some cases they are computationally very expensive. Watershed based techniques includes all form of watershed algorithm based etc as presented by the studies of [13], [14], [15], [14], [16], [17] and [18]. Watershed based approach have certain degree of success but in dense clumps it results in over segmentation while in some cases also suffered from the problem of under segmentation. Edges or contour based techniques can gives solution in the form of analysing split edges and linkages of contours etc as mentioned in the works of [19], [20] and [21]. This approach working well but required model based on some templates and burden some both in execution as well as in implementation. Model based approach gives various models in the form of circles through various theories like Gestalt, geometrical theories etc as presented in the work of [22], [23] and [24]. The problem in this approach seems to be unrealistic as due to its highly complex nature and implementation. Also it is computationally too much expensive. While some studies do not consider the clumps and overlaps of Red Blood Cells for splitting but they relay on guessing Area based estimation approaches as mentioned in the works of [25] and [26]. The problem in this approach is that in some cases we want to note the disorder as well in the Red Blood Cell in such case this approach will fails while also the areas of Red Blood Cells by most of the studies considered as circular, which is not true as because morphology of the Red Blood Cells highly changes due to any disorder. Circular Hough Transform based approaches as mentioned by [27], [28], [29] and [30] mainly considered the Red Blood Cells as circles which is not true as mentioned above.

3. Proposed Methodology. In this study we first separate the single Red Blood Cells from occluded Red Blood Cells for the purpose of efficiency. Separation is considered by this study on the basis of double check due to the varying sizes of Red Blood Cells. The whole idea of this study is depicted in the flow diagram Figure 1while the simulated image of the whole process is presented as Figure 2. The original input image is converted to binary by considering histogram and on the basis of the histogram an appropriate value for thresholding is calculated, the values less then the threshold value is replaced as 0s while the greater values are replaced with 1s. After this small areas are removed as noise while holes in the RBCs are filled. The formations of holes in the RBCs are due to the similarity of the center of the RBCs with the background and because of hemoglobin as RBCs have no nucleus. Next, we find out the convex hulls of all the Red Blood Cells through Equation mentioned as 1, for the purposes to increase the accuracy. The separation of the single and occluded Red Blood Cells has been made using two methods to increase the accuracy and enhance consistency. The first method is the comparison of areas (Number of pixels defining the object) through a median central tendency measure, all the areas of the RBCs are divided by the median value and the results
are combined in array as values near to or one are considered as single RBCs while values results greater are considered as occluded RBCs, next these masks are passed to the pixels IDX list of the original image for the purpose to obtain two images one as single having non-occluded RBCs image while the other as occluded Red Blood Cells having only occluded Red Blood Cells. In the same way, for the second check we consider Elongation instead of Area through Equation presented as 2, while the rest of the process is the same. We performed the double check because of variation in the sizes of Red Blood Cells the area is not enough to take decision.

Figure 1 Diagramatic Representation of the overall Research Methodology

Figure 2 The simulated diagrammatic representation of the whole process
After separation of single and occluded RBCs, the next process is that of splitting the occlusions (clumped and overlapped) of Red Blood Cells. In the splitting process we first trace the boundaries of all occluded Red Blood Cells, first we divide the boundary into halves using equation 3, then taking the first point of the boundary as \( P1(x_1,y_1) \) while, \( P2(x_2,y_2) \) is the last point of the first half of the boundary. After, finding the points \( P1 \) and \( P2 \) we calculate the distance between \( P1 \) and \( P2 \) using equation 4, once find out the distance the next process is to divide the boundary according to the number of Red Blood Cells in each occlusion and take these division points and the distances between the consecutive points using equation 5. The same points are marked on the other half of boundary and then using Digital Differential Analyzer graphics algorithm to draw lines in between respective end points and this way after applying a slight erosion (Morphological operator) the occlusions are cleaved into single Red Blood Cells. The idea is simulated in the diagram depicted as Figure 3.

\[
\sum_{i=1}^{\mid X \mid} \alpha_i x_i \mid (\forall i : \alpha_i \geq 0) & \sum_{i=1}^{\mid X \mid} \alpha_i = 1 \tag{1}
\]

where, \( \mid X \mid \) = finite set of points, \( \alpha_i \) is point \( X \) while \( \alpha_i \) is weight assigned to \( X \), the sum of the weights must be equal to 1 mean normalized.

\[
\text{Elongation} = \frac{\text{Length}}{\text{Breadth}} \tag{2}
\]

where, Length=Major Axis while Breadth=Minor Axis

\[
\text{Index} = \frac{\text{Length(Boundary)}}{2} \tag{3}
\]

where, boundary is the boundary of clumped or overlapped RBCs and index is the index of boundary containing its points.
\[
D = \sqrt{\frac{(x_2 - x_1)^2 + (y_2 - y_1)^2}{2}}
\]  
(4)

\[
\text{No.of.Parts} = \frac{D}{\text{No.ofRBCs}}
\]  
(5)

where, Number of RBCs we can found while dividing the convex hull area by the median area of single RBC.

4. **Results.** In this sect we are presenting the results obtained from the implementation of the above concepts through visual inspection with ground truth marked by experts. The experimentation has been carried out on 20 images dataset obtained from DPDx [31].

**First Input Image**

- Figure 4 Matlab Results a) presents original RGB input image b) presents the single RBCs resulted as separation from occluded RBCs c) Occluded RBCs d) Cleaved RBCs after giving cuts through lines by considering boundary points

Figure 4 Matlab Results a) presents original RGB input image b) presents the single RBCs resulted as separation from occluded RBCs c) Occluded RBCs d) Cleaved RBCs after giving cuts through lines by considering boundary points
Figure 5  Matlab Results a) presents original RGB input image b) presents the single RBCs resulted as separation from occluded RBCs c) Occluded RBCs d) Cleaved RBCs after giving cuts through lines by considering boundary points

Conclusion. The occlusions splitting is an intermediate process of many computers diagnosing studies of blood and needs to be solved in an efficient and careful way because human health is involved. In this paper we produce a concept which is simple and efficient. As previously, researchers approached to the problem of occlusion of RBC successfully but computationally non-efficient ways. This study considers the mentioned point and solves the problem in a robust and real way. The proposed method is tested on a 20 images dataset obtained from DPDx [31] and we found mostly the results are good while in some high clumps i.e. more than 10 RBCs occlusion we noted a little deviation but this due to the non-smoothen boundaries. In the future goals of this study,
we suggest that to smooth the boundaries through any mean as will further improve the accuracy because in high occlusion the proposed method is sensitive to noise.

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ABSTRACT: Ports always play an important role in economic and strategic fields of a country. Inter-regional dependency of trade enhances importance of ports. Pakistan, having tremendous geo-strategic location enjoying an edge on other countries of the region, Gwader port, located in south-western province of Pakistan became the most wanted port of the region right after its construction. The port at Gwader is located on the confluence of two main regions, the oil rich Central Asia and emerging consumer market South Asia. The port is located on a point which provides a strategic depth to Pakistan against adversaries. The port has the ability to check Sea Lanes Of Communication during war and peace. Due to geo-strategic importance of the port all regional and extra-regional players have keen interest in it. Central Asia is owning to export its riches through it while United States of America with diverse demands wants to ensure its presence over here. Each player has its own objectives with different approach to accomplish. Having tremendous importance the port has become a flash-point and Pakistan has to reconsider the situation in terms of its priorities.

Key words: Gwader Port, Maritime security, Economic potential, Fleets, Trade, KKH, SLOC

Introduction: Ports play a significant role in national security by providing bases for operation to its naval forces. The availability of numerous ports in a country enhances its capabilities in war and peace. On the other hand single base reliance imposes serious limitations to tackle the problems. A maritime security expert Velo is of the opinion that large number of bases is of tremendous benefits for organization, operation and redeployment of one’s own shipping force. The main disadvantage of a single base is that the forces during war-time use the same facility both for attack and retreat. The opponent forces can easily check a fleet which uses a single base for its operation. The establishment of Gwader port has two main strategic and security advantages. The first one is Pakistan navy has got the opportunity to operate from three different locations, i.e. Ormara, Karachi and Gwader. Secondly, dependence on two co-located ports closed to India reduced. Pakistan is located on the confluence of two major regions i.e. South Asia which is the world biggest consumer market and Central Asia, rich in natural resources. Pakistan as such can serve both the regions simultaneously and can enhance its strategic depth. This paper emphasize on politico-strategic importance of Gwader port, when Central Asia was rediscovered and its riches got world’s attention. Proper planning is need of the hour so that Gwader port shall compete with Iranian ports i.e. Chahbahar and Bandar Abbas and Omanean port Salala. Due to the unique strategic location of Gwader port regional and extra-regional players have conversions and diversions of interests which enhances its importance.

Geo-strategic importance: Former President and military General Parveez Musharraf has announced this entire region as a funnel. The extensive area of Central Asia and China is declared as top of the funnel and then becomes narrowed through Afghanistan and Pakistan and then open in Gwader. He confirmed this as economic funnel of the entire region.
Gwader port is 460km away from India; this increased length of distance from its border favors to enhances strategic depth of Pakistan. With a deep Sea port at Gwader, Pakistan has an eagle-eye on the SLOCs from Persian Gulf to the Strait of Hormuz. A Naval base at Ormara and Gwader will increase Pakistan’s importance at international level. China wants to ensure its presence here to check USA and India’s manoeuvres at the Arabian Sea. Sino-Pak Naval connection will be such an effort to monitor India’s naval asset here. This will make marketable ships transportation harmless at Indian Ocean. iii If the Strait of Malacca is congested by America in any untoward situation Gwader will help China and West Asia as their substitute port. Militarily and Strategically, Gwader enables China to check the SLOCs from the Persian Gulf from where China’s 60% energy comes. It will provide China with position to watch out India’s activities in the Persian Gulf and gulf of Adan.iv

**Interests of regional players:** Pakistan is strategically located in the neighborhood of Persian Gulf from where about 17 million barrels of oil transported through Strait of Hormuz on daily bases5 that enhances its significance in geo-economic sphere. Pakistan’s sea trade composes of about 90% and its SLOCs passes through Indian Ocean.iii Development of Gwader deep sea port in the north of Pakistan is another significant factor of Pakistan interest in the region. CIA realized the significance of Baluchistan’s coast where the port of Gwader is made, in 1980s quoting “its strategic location near oil routes from the Persian Gulf.” vii Realizing the importance of these waters Soviet Union before her dismemberment strongly desired to expand its sovereignty over here. viii Iran and Pakistan knew the Russian desire to have a warm water port and the same is explained by CIA’s assessment report.ix

Keeping in view the importance of this port, the chairman of Gwader port authority Rear Admiral Sarfaraz Khan said “It was a long-standing desire of these states to reach warm waters and now we have ourselves offered this opportunity to them.” x Due to its strategic importance Pakistan offers investment to international community in the port. Pakistan has very strong relations in the Indian Ocean countries. The same is reiterated by the former president of Pakistan General Pervaiz Musharraf by saying “China has been our most consistent ally over the past 30 years,” he extended that “Washington’s interest is likely to diminish.” xi Pakistan and USA’s relations are just like roller-coaster ride, remain closely aligned during Nixon and Reagan administration and cool to tense during Johnson, carter and Clinton’s administration. xii The USA’s response and interest in the port project will have deep effect on the stabilization and operation of the area’s strategic situation.

China as regional and growing international power can check US-Indian domination in Indian Ocean by being at Gwaderxiii and it will facilitate China to be naval power. The Chinese growing trade need the road link which will handle its trade to Central Asia, Middle East and Africa. That road links will reduce the sea distance from 10000 km to 250 km.Gwader offer a substitute trade route to China for its western province of Xinjiang. Using Gwader deep Sea port as a trade route will provide a tactical position to China in Caspian region. Chinese economy is growing with a rapid speed of 9 percent every year and its GNP ranging to 7.3 percent. Its trade volume is US $1.76 trillion and foreign reserves are US $ 600 billion. China captures 70%, world market of electronics goods, toys and shoes. On the basis of this stable and potential growth, China is expecting to be the world largest economy in 2025.

As per demand, Chinese policy makers searching new markets and alternate trading routes for future. For its sustainable economic growth china need to have secure trading routes and permanent involvement in global economic affairs. Gwader deep-sea port is best option for that purpose, where China can watch international SLOCs and can access all important regions. Strengthening geo-strategic ties with Pakistan, China provide full pledge assistance in Gwader port. It can rightly say that Sino-Pak relations cannot be seen in the context of dollars and pounds. Gwader port will benefit China in various strategic and economic fields.

A) Xinjiang, largely populated province of China having borders with Pakistan, Afghanistan and eastern Central Asia. Uighurs ethnic group of that province called for self-determination on the grounds of cultural, lingual and religion. As it has border with Muslim states, China wants to resolve the problem with economic development by go west policy. For Chinese economic development, especially for Xinjiang province, Gwader port is indespensible due to its shortest approach to Gulf of Aden and Parisian Gulf which are 2500kmfrom Xinjiang through silk route.

B) China can use the port of Gwader as watch point for US activities in Persian Gulf and can also check India’s naval bases from here. The Gulf SLOCs, from where China’s 60% of energy requirements transport, can be watched from Gwader. The presence of Chinese navy in Arabian Sea will boost Pakistan coastal defense. China a trustworthy friend always helped Pakistan in promoting its defense capability and FF-17 aircraft which were built indigenously with her help on 23 Nov 2009 is the best example.
C) The activities of India in Gulf of Aden and Persian Gulf always is a matter of great concern for China. According to Zahor nanqi, Chinese army want to enhance control over Indian and Pacific Ocean through ‘high Sea defense’ policy by the ‘string of pearl strategy’ he abstracted the statement from a top secret memorandum issued by Chinese director of the general staff logistic department of navy. The Indian dominant position can be checked by the naval base at the mouth of Indian Ocean. The port at Gwader is the most appropriate approach to the market of Africa and Gulf region. The Chinese vessels passing through South of China Sea, Strait of Malacca, Pacific Rim and Sri Lanka cover a distance of 10,000km while passing through Gwader the distance will reduce to 2500kms. If the current route of Malacca Strait has been closed for her access, Gwader port will be an alternate. Looking forward China’s remarkable growth rate it is estimated that it will equalize its economy with world’s largest economy (USA) by 2020. She has long term economic and politico-strategic interests in Indian Ocean. China has strong concerns about energy security and oil transport era but she continue to dominate her strategic thinking. Mearchiemer conclude that if Chinese grow its economic power and become an economic powerhouse it will automatically convert it into military power. The Chinese military power will endanger the interests of her neighbors as well as American commitments in the region. The Chinese People’s liberation Army Navy (PLAN) under the revised doctrine of pursuing “modern warfare under high technology conditions on the high seas,” the PLAN emerging a blue-water aptitude by 2015-2020. She induced at least two aircraft carrier groups for Pacific and Indian Oceans. The reports of 1992 of PLA’s general logistic department plans that capability of Chinese navy will be expended construction of three large bases by 1998, naval visits to Indian Ocean and more repeated port requests to foreign states in the region.

For China, West Asia, Africa, South Asia and Europe is closer than the U.S. Pacific Ocean, through Indian Ocean. Present Chinese position doesn’t allow her to play effective role in Indian Ocean but she will have a considerable role in the region due to her interest and growing naval power. To establish a new world order in the present unipolar world, China wants to have the role of a major participant. She can’t achieve her goal with-out having influence in the Indian Ocean region. The most serious challenge faced by Chinese in the region is American presence in South, Central and South-East Asia. It will create difficulties for China to achieve her economic and security objectives in the future. China is well aware of the strategic reality that’s why to protect her sea interest she is engaged in economic, diplomatic and military activities to develop maritime infrastructure. Two major interests for China to safeguard her interest in the region are stability and regional balance of South Asia and healthy development of Pakistan. If Pakistan considers any American request for naval base, especially at Gwader it will badly affect China’s desire to have an increasing role in the region. That’s why China remains in-touch with Islamabad and at last she succeeded to get control of Gwader port. Pakistan handed over Gwader port to China on 18th Feb 2013.

Central Asia is known as a central piece in international arena due to its resource. The energy of Caspian region has become field of interest for regional and extra regional players. And each of them wants to get maximum of that treasure. Central Asia has rich resource based economies with pragmatic foreign policy. Presently the regional and extra-regional players want to get benefits from CARs resources.

The Central Asian States need pipelines for their resources to export but still depend on Russia in this prospect. For their sustainable economic development CARs needs outlet for huge reserve of resources which will decrease Russian influence in economic setup. The two available routes are Chahbahar, Iran and Gwader, Pakistan. Due to international community’s concerns about Iranian port, Gwader emerged as a viable option. Pakistan realized CARs as potential economic hub that’s why she established trade and diplomatic relation with these states. In order to make her profile in CARs Pakistan revive the old platform of Regional Corporation for Development (RCD), and merged it into Economic Cooperation Organization (ECO) after extending its membership to Central Asian Republics. Pakistan is always eager to provide them opportunity to take advantage of Arabian Sea. The following factors highlight Grader’s significance for CARs.

(a) CARs need a viable route for their pipelines and Gwader located on the mouth of Straits of Hurmoz is a suitable option.
(b) The roads linkages in Pakistan can bridge the geographical gap between Center and South Asia.
(c) CARs communication is still under the control of Russia because of old Moscow based means. The newly independent states could not compete with Gazpron of Russia they need alternative route to get rid of Moscow influence. Two alternate are there Iran and Pakistan. Western market doesn’t like trade through Iranian route that’s why Pakistan is best option for Central Asian republics in search of new market for its proven natural resources.
Afghanistan is a landlocked country having no functional economy. The agrarian-based economy of Afghanistan even failed to provide the basic food requirement to its citizen that’s why they rely on foreign donated food for their survival. The Tokyo conference held on January 2002 collect a grant of U.S $4.5 billion for Afghanistan while World Bank estimated the requirement of about U.S $10 to 30 billion for five years. Care international having two years of reconstruction experience, estimated in 2003, the required funds approximately U.S $15 to 30 billion for five years. Pakistan due to its geographic location has very bright chance to play an active role in reconstruction period through Gwader port when the activities of reconstruction will start in Afghanistan. The Trans Afghan Pipeline (TAP) will be a prize to Afghan people which will bring about U.S $300 million as royalty to the country. Afghan transit trade was prior held at Karachi port and now it will be handled by Gwader port. The finance minister of Afghanistan Ashraf Ghani offers the support of his country for Gwader port’s development. He said that it will be a gateway to regional prosperity.

Though Afghanistan is full of natural resources but not fully exploited and it have few exports i.e. steel, agriculture and textiles etc. the country is likely be depended on the aids and imports from the donor countries for which she is depending on transit agreements with Pakistan. Pakistan can get the benefits from imports and exports of Afghanistan by providing it a safe transit route through Gwader port. The following factors show significance of Gwader port for Afghanistan.

- Gwader provide shortest and economical access for Afghanistan to Indian Ocean.
- Afghanistan share cultural, religious and economic linkages with local Pthans in Pakistan.
- The landlocked Afghanistan need immediate access to warm water for its development and Gwader is most suitable option.
- USA wants Afghanistan to trade through Pakistan not through Iran.
- Afghanistan will get all port related facilities at Gwader.

Gwader port will be successful if, South Asia, Central Asia and China use it. Afghanistan’s involvement is indispensable for its success. Both countries have the opportunity to develop their economies through this port. Central Asia is rich in natural resources it is estimated that CARs contain 250 billion barrels of oil and large gas reservoirs. That region is full of other resources as will which is badly needed to energy hungry world. Number pipelines and other projects are under consideration but all these depend on stability in Afghanistan. Gwader is the only way for Afghanistan to reach warm water.

About 80% of international oil tankers left the shores of Persian Gulf intended to other world’s ports. Due to geographical location the entire northern shores of Persian Gulf belong to Iran, this enable Iran to control the Straits of Hormuz. This straits remains an issue several times a year when Iran hold war exercise at the Gulf’s mouth. Iran is also concerned of its economic interests linked with Indian Ocean. Natural gas supply to India through Indian Ocean via pipeline is a mega project of Iran. If CAR’s natural resources got its way through Iran, the Iranian port of Chahbahar will became a hub of economic activities. Iran’s location to influence CARs and its desire to over-come its problems with West face many hurdles. Iran is a best option for some of CARs. Turkmenistan looks for Iran as route for oil and gas export. Many of oil industrialists see Iran as a feasible option but USA is forced for alternative routes. America promotes many pipeline projects in different directions from Caspian Area, clearly apart from Iran. Even she warns Pakistan that if Pakistan imports gas from Iran U.S will impose economic sanction. Historically, Pakistan had very warm relations with Iran. But in Central Asian Republic both have their own interest, like both are candidates of transit trade and route for CARs which will eventually undermine their relations. Furthermore, amplified Indian Influence in Iran is measured as encircling Pakistan. In this condition Pakistan has to start positive engagement with Iran to protect its regional interest.

India may be the only state of the Indian Ocean, having military strength, economic potential and political well to control this huge expense of water. It hasn’t any important land access to the rest of world. India is greatly depends on crude oil and petroleum products imported from the region of Persian Gulf. The Indian oil reservoirs are declining in its production with the passage of time which enhances its dependence on import of oil. Indian import about 60 percent of its oil needs. To meet with her growing energy requirements India seek to improve her economic relations with Central Asian Republics in cooperation with Iran and wish to access that market. The Caspian region energy, transit through Pakistan is a critical setback to India as she has continuous strained relations with Pakistan on the issue of Kashmir. The strategic doctrine of India revolves around the protection of her maritime assets/resources, like coastal platform/rigs of oil and SLOCs to safeguard uninterrupted flow of trade. Indian strategy is to be a potential maritime force to counter any possible aggression to safeguard her SLOCs. According to Joseph S. Nye, India has impressive military ability in South Asia but not in Asian prospect. Dealing
with Afghanistan, India has two basic objectives of foreign policy. Firstly, to prevent Pakistan from West Asian expansion and secondly to use Afghanistan as bridge to CARs. xi

American strategic officials are taking India as “future investment,” especially after the hostile and dangerous condition for U.S military presence in Middle East. India will replace the traditional allies like South Korea, Saudi Arabia and Japan, if their relations become fragile. Keeping in view its strategic importance she is spending more on her defense sector. Defense economist estimated that if the same 4 % of GNP is continue by India on defense, its military capital will reach 62 % of China with in fifteen years which is now 48 percent. xii To show her mussels India is expending herself to near abroad. She is actively involved in Afghanistan which is of great concern for Pakistan.

**Interest of extra-regional players:** Although the heavy military presence of American navy ended with the end of cold war in Arabian Sea, but still the policy makers were in preparation of two MTWs (major theater wars) in the Persian Gulf and Northeast Asia. xiii That’s why in May 1997 the navy reserved its 12 Carrier Battle Groups and 12 Amphibious Ready Groups (ARGs) in the Quadrennial Defense Review (QDR). American academic circle has its own ambition. Koburger Jr projected in his book that the American navy should have 7 super carriers plus reserves and a sealift capability of 12 Marine Expeditionary Units. xiv America want to keep the Ocean open for all nations, in evidence one can see the presence of American Middle Eastern forces in Persian Gulf since 1949. xv In 1992 Pentagon drafted a new strategy for adaptation due to which it protect the Uni-polarity of the world by discouraging the emergence of a new rival. xvi The question is, do the Uni-polar world is stable? xvi According to Charles Krauthammer, the Uni-polar world will be peaceful and durable but the U.S isn’t doing enough. xvii The Chinese emerging power is always of concern for U.S. and it is to mention that as the Chinese power will grow the China-U.S hostilities will go on. Although both of them are trying their level best to avoid situation which will lead to destabilization of region. xix

The main ally of America in Middle East, Saudi Arabia has about one-fourth of the total world oil which is 261 billion barrels and that is proven reserves. About 1 trillion barrels are eventually recoverable oil. 1 Soon after the oil embargo of Arab in 1973-74, the Western countries in general and America in particular adopted the Strategic Petroleum Reserves as the first line of national defense in case of any oil crisis. President G. Bush made an extraordinary decision in November 2001 to fill the Strategic Petroleum Reserve up-to its full volume 700 million barrels li which shows American keen interest in the region and her concern about oil politics. She imports 54 % of her oil need in 2001, 30 % of which came from the Persian Gulf. li An uninterrupted oil supply is needed for its strategic security and economic prosperity. After September 11, 2001 America want to find new alternatives for Middle Eastern oil and the natural resources of Central Asian Republics are best option for strategic alternative of oil supply of U.S. Gwader port of Pakistan provides a probable outlet for the natural resources of Central Asian Republics via Afghanistan. The United States energy information department recognized the strategic geopolitical position of Afghanistan as a probable transit route for natural gas and oil transport from CARs to Arabian Sea just a few days earlier than September 11 attacks. lii America hope to keep her economic interests alive even after its operation in Afghanistan, as the report of the New York Times, December 15, 2002, stated that “The State Department is discovering the prospective for post-Taliban energy plans in the region.”lix The future of American influence, directing of Central Asian Republics resources through this area is related to the future of Afghanistan. After September 11 attacks the circumstances favors America, she not even got back her old ally Pakistan in her camp but also match its substitute strategic oil supply plans. A reasonable number of oil tycoons of America support Central Asian Republics, oil supply via Iran, but the policy makers reject any pipeline transit through energy competitor Iran, which will alternately give it unnecessary influence in the region. liii Indian Ocean and Persian Gulf are the areas which are priority of U.S.A’s policy makers for its foreseeable future. Due to irritation in Middle Eastern States and decrease in U.S ground forces, the naval presence of U.S forces in the region will increase in future. The presence of American troops will have straight relevance on the project of Gwader port and will have affirmative effects. In 1980 president Carter declare in his state of the union address which later known as ‘Carter Doctrine’ that “Any attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America and such assault will be repelled by any means necessary including military force.”liv The region of Indian Ocean will remain the area of interest for United State policy makers. For Americans it is ‘shaping environment’ in various regions, as declared by quadrennial defense review of Pentagon. lv America guaranteed the stabilization of region and will assured the success of the project of Gwader port, now Pakistan need to initiate policies that can incite such assurance.
During 2002, Western Europe imported average of 2.3 million BBL/d of oil from Persian Gulf.\textsuperscript{iviii} The members of European Union possess only 0.6 % of world’s proven oil reserves and about 2.0 % of world’s proven natural gas. It is estimated that Europe will import two-third of its total energy requirements by 2020.\textsuperscript{ix} The policies of EU, in general toward Indian Ocean based on reconciliation and settlement of security problems with the use of “soft power”\textsuperscript{x} European states strongly realized that they must have a strategic alternate of oil resources which will reduce their dependency on a single area source. Like other states, European Union is also attracted by the Central Asian States as source of energy and she support gas and oil pipeline to European Union from CARs through Turkey. But there are some problems in the way of this project like, instability in Kurdish part of Turkey, separatist strains in Georgia and conflict over Cyprus nearby the Mediterranean port of Ceyhan of Turkey.\textsuperscript{xi} In this situation European Union will probably favor pipeline to Indian Ocean through Pakistan or Iran. There are slight proofs of efforts on the part of European Union to improve ties with the nations involved in the project of Gwader port. The last decade in evident of stable relationship of Europe and China and the European Union don’t seem worried about the presence of China in Indian Ocean.

**Conclusion:** The Gwader deep deep-sea port is visualized to be a regional hub which will serve the commercial traffic from and to Central Asia, Xinjiang, Middle East, Afghanistan, the South East Asia and Persian Gulf. This hub port is strategically located between the overwhelmingly populated South Asia, oil-rich Western Asia and the new merging economies and resources rich Central Asia.\textsuperscript{xii} It is located on the confluence of important regions that’s why it would boosts Pakistan’s importance in the region. The deep-sea port of Gwader emerges as a place of great strategic importance; increase Pakistan’s significance in the whole region from the gulf of Persia to the Indian Ocean to Southeast Asia to Fareast.\textsuperscript{xiii}

The port of Gwader is need of the time to lessen the freight burden on already existing ports of Pakistan. It also provides the landlocked Central Asian states with port facilities, along-side with economic gains, Pakistan can get political gains as well.\textsuperscript{xiv} Afghanistan will be one of the direct beneficiaries of Gwader port for her trade and will get royalties of gas and oil pipes when materialized. The port will bring prosperity to entire region due to its trade potential. The region will use the port as an easily accessible and cheap transit route. To keep smooth economic progress at port, Pakistan needs to engage Afghanistan in the process.\textsuperscript{xv}

The isolation of Pakistan in international trade will be ended with the re-discovering of ancient East-West trade routes with the establishment of Gwader port. Pakistan from the time of its inception is facing relatively an isolation in international trade but the new expansion to China will farther enhance its importance. A major force suffocating policies that might promote continent-wide transport and trade is a poverty of strategic imagination in many quarters.\textsuperscript{xvi} With the construction of Gwader port at Balochistan coast and the high ways which connect Afghanistan to Pakistan will reduce the distance between Pakistan and Central Asian states by 500km approximately. Continues instability of Persian Gulf induced Asian Development Bank to consider the strategic Gwader port as alternate.\textsuperscript{xvii} The new developments in the region especially in the economic field would lead to enhance the geo-strategic importance of Pakistan. To reach into the warm waters was pivotal point of Soviet Union policy and to influence the world she want to control Indian Ocean. Gwader can provide round the year communication and transportation facility to the world and can rightly be declared as gate-way to landlocked Central Asian states.

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DYNAMIC ROUTE PLANNING USING HYBRID (ACO-NPSO) ALGORITHM IN A GRID ENVIRONMENT

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ABSTRACT. Route planning is an important challenge in time critical systems. It has been observed that the conventional route planning approaches are not suitable for real-time route planning which involves dynamic environment. Such methods have shown to perform well in static or known environments that do not involve satisfying multiple constraints. Efficient solutions based on swarm intelligence algorithms and genetic algorithms have been proposed for dynamic environment. In this research, we take up the route planning problem in dynamic environment, and present a hybrid (ACO-NPSO) algorithm which takes into consideration multiple constraints. The constraints to be satisfied are shortest distance and obstacle avoidance. NPSO is an improved version of basic PSO algorithm which controls the inertia weight of the PSO algorithm. The proposed hybrid algorithm unifies the features of above mentioned algorithms such that NPSO is employed to obtain optimized parametric values of ACO algorithm which are in turn used in ACO algorithm. A comparison of the proposed technique with other swarm intelligence Algorithms has also been performed. The result showed the effectiveness of the proposed algorithm as it provides better and shorter routes as compared to original ACO algorithm. Plus the result obtained from the proposed technique comes out much quickly as compared to ACO algorithm.

Keywords: Dynamic Route planning, ACO, NPSO, PSO, Inertia weight

1. Introduction. Developing Time critical systems play a very important role in our lives. These systems include ambulance system, Navigation system, Unmanned Aerial Vehicle (UAV) system, Fire Evacuation system etc. Time needs to be saved in such systems and decision has to be made in a very short time. The optimization of time and other factors are needed to be done in order to find the correct solutions. The route planning is heavily involved in such problems. The Selection of path should satisfy or optimize the constraints. The path selection can be done manually if you know your environment very well or if the problem size is small. For large areas or city, path planning without using some navigation system is literally impossible. Because in such problems multiple constraints like Shortest travel time, Shortest Path, Easiness of driving, lesser traffic etc. gets involved. So efficient path planning solutions should satisfy such constraints and give efficient and effective routes in a timely manner. Path planning can be done with the help of static methods or
Dynamic methods. Static methods like Dijkstra, A* etc. provide much optimized solutions in Static environments. But these methods fail to deliver in dynamic environments. Path planning in Dynamic environments is a difficult task as compared to static or non–changing environments where problem size doesn’t change or the requirements and constraints remain constant in number. In Dynamic environments the requirements are constantly changing and the problem size gets bigger and bigger. Due to these challenges the dynamic route planning is considered as a NP-Hard [1] problem. Route planning in dynamic environment requires a robust and efficient technique which should satisfy the multiple constraints and provide solutions in time. Plus it should cater the dynamic nature of the environment size and parameters involved. A comprehensive analysis of the presently developed algorithms and methods with the proposed technique will be done in order to prove the feasibility of the proposed technique.

In order to cater the constantly changing problem size and parameters in dynamic environment a robust and effective technique is proposed in this research. Both Static and Dynamic route planning is implemented in this research. In static environment the parameters are not changing and the location of source and destination remain fixed. In order to introduce dynamicity in the proposed method the location of the destination gets changed after running certain number of iterations. The Proposed method will also cater multiple constraints that are involved in the dynamic route planning. Finding the shortest distance between source and destination is based on Euclidean distance formula. Obstacles are generated randomly in the environment and the generated routes should avoid them. Algorithms like A* can be used in the route generation as an obstacle avoidance measure. The fitness of the routes gets reduced due to presence of the obstacles in them. Feasible routes are those which are not only shortest in distance but also avoid obstacles effectively and efficiently. The implementation will be done in a grid because in a grid environment route generation is simple and efficient. Plus in a grid environment it is easier to locate the obstacles. The whole problem area can be represented as a 2-dimensional grid. A hybrid swarm based approach is proposed in this research which basically utilizes the virtues of swarm intelligence algorithms. This hybrid algorithm or method will not only perform obstacle avoidance but will also provide feasible shortest routes between source and destination.

2. **Novel Particle Swarm Optimization Algorithm (NPSO).** Novel Particle Swarm Optimization (NPSO) algorithm [2] is an improved variant of PSO algorithm [7]. NPSO tries to solve to problem of local optima, convergence velocity and premature convergence that occurred in original Particle Swarm Optimization (PSO) algorithm and Linear Decreasing Weight Particle Swarm Optimization (LDWPSO) algorithm. NPSO dynamically updates the inertia weight which is dependent on fitness function and number of iterations set for the algorithm. PSO performance gets improved due to changing of inertia weight. The algorithm also changes the convergence speed of the particles. Eq.1 shows the inertia weight equation of NPSO algorithm:

\[
\begin{align*}
W^k_{i} = & \nu^{max}_{i} - (\nu^{max}_{i} - \nu^{min}_{i}) \cdot \left( \frac{\mu \cdot \text{iter}}{\mu \cdot \text{iter}_{max}} \right)^{0.5} \cdot \left( \frac{F_{b}^{k}}{F_{fit}^{k}} \right)^{m} \\
\end{align*}
\]

Eq.1

Fb\(^k\) is the global optimal solution and Fit\(_i^k\) is the optimal solution of the \(i\)th-particle. Current iteration is denoted by iter and iter\(_{max}\) is the maximum iteration set. \(m\) is a constant. It was experimentally determined that the value of \(m\) should be 2 in order to achieve optimal performance of algorithm. NPSO was evaluated with three test benchmark functions. The three test functions were Sphere function, Rastrigin function and Ackley function. All three Test functions were non-linear in nature. After the testing the results showed that the local optima problem of the algorithm gets resolved and Algorithm also enhances the particles to converge quickly and thus it increased the performance of the algorithm.
3. Ant Colony Optimization Algorithm (ACO): Many Ant Colony Algorithm gets its inspiration from swarm intelligence. Real life Ants are skilled in finding the shortest route between two points and show a tremendous cooperative behavior in search of food items. ACO tries to emulate their behavior and tries to find the feasible routes between two points. It also shows a fantastic quality of parallelism and gives good optimal routes. ACO[3] is an intelligent algorithm and it was proposed by Italian scholar Marco Dorigo. The first step involved in the ACO algorithm is the identification of links or edges. Then random generation of Ants is done and the selection of links or edges is based on the probabilistic objective function. The Eq.2 shows the ACO objective function:

$$P_{ij} = \frac{[\tau_{ij}]^\alpha [\eta_{ij}]^\beta}{\sum_{k \in S} [\tau_{ik}]^\alpha [\eta_{ik}]^\beta}$$

Eq.2

$T_{ij}$ is the amount of pheromone on the edge. $\eta_{ij} = 1/d_{ij}$ is a heuristic value $\alpha$ and $\beta$ are constants that determines the relative influences of the pheromone value and that of the heuristic value on the decision of the ant. When each ant completes a route or solution, local pheromone is updated based on the following equation:

$$u_{ij} = u_{ij} + Q/L$$

Eq.3

The amount of pheromone added to such an edge is $Q/L$, where $L$ is the length of the tour that was found and $Q$ is a constant. But before this is done old pheromone is evaporated based on Eq.4

$$\tau_{ij} = \tau_{ij} \cdot \rho$$

Eq.4

$\rho$ is a constant whose value is usually less than 1. Pheromone evaporation is done in order to avoid old pheromone influencing the future selection of routes. After pheromone updation, the selection of global best solution is done. If the convergence criterion is met then the global best solution is considered as a final solution, else the steps mentioned above are repeated again.

4. Proposed Solution. In The aim of this research is to solve the problem of route finding in a grid environment. The algorithm proposed in this research is a hybrid (ACO-NPSO) algorithm. The algorithm is a combination of Novel Particle Swarm Optimization (NPSO) algorithm and Ant Colony Optimization (ACO) [3]. Finding shortest route between source and destination and obstacle avoidance are the constraints involved in this problem. NPSO is a variant of original PSO algorithm which as explained in [2] updates the inertia weight values. The inertia weight controls the difference between local best and global best solution. Reducing the inertia weight will bring the two closer to each other. In this way fast convergence of the particles will be obtained. Similarly it avoids the problem of local optima which occurs in the original PSO algorithm. The NPSO will be used to optimize the parameters of ACO algorithm which will be used in path planning in grid environment. The bitmap method will help in distinguishing between the area which is occupied by obstacles and those which are not. As in [4] the problem domain is divided into environmental modeling and Path planning. Environmental Modeling is done with the help of bitmap method. The Bitmap Method will help in identification of obstacles that are currently present in the environment by assigning 0 bit value to them. The 1-bit value will be assigned to that portion which is not occupied by the obstacles. The Path planning will be done by ACO. NPSO is used to optimize the parameters of ACO. In [4] PSO was used to optimize the parameters of ACO. This research will use NPSO which is a better variant of PSO as proposed
by [2] in optimization of parameters of ACO. Firstly few iterations of ACO algorithm will be run on randomly set parameters. The values of ACO parameters are very important and play a vital role in the performance of ACO. The NPSO will be used to determine the values of parameters of ACO for which the NPSO will give the best optimal routes. These values of parameters will be used directly in ACO to achieve fast convergence. Fig.1 shows the flowchart of the proposed technique:

The ACO is generally more applicable for those problems that demand crisp results and PSO is efficient for those problems that are fuzzy in nature. PSO computational complexity is very low and it can be easily applied in scientific research and engineering problems. But PSO suffers from the problem of local optima and slow convergence so that’s why NPSO is used in this research which avoids such problems. ACO has the virtue of inherit parallelism and it is efficient to solve optimization problems. ACO convergence time is unpredictable but convergence is guaranteed [6]. ACO as compared to GA takes less number of iterations in dynamic complex environment. Plus ACO takes less time to converge to a solution. Similarly the ACO easily adapts itself to complex, dynamic environments as compared to GA [5]. The hybrid Algorithm (ACO-NPSO) is proposed to take into account the qualities of ACO and NPSO algorithms and apply it to solve the path planning problem in a grid environment.

5. Experimentation and Results. Novel Particle Swarm Optimization (NPSO) algorithm was implemented in java and number of experiments was conducted with different parameters settings. 25, 50, 75, 100, 125, 150, 175, 200, 300, 400 and 500 iterations were run. Particle size was set to be 10 and 20. Swarm Size varied from 10 to 100. The fitness function was based on the Euclidean distance between source and destination and obstacle avoidance. In order to bring dynamicity in the environment, the position of destination was randomly changed after 50 iterations of the algorithm. The obstacles are randomly generated in the environment. NetBeans IDN 7.2 is used to perform the implementation of the NPSO algorithm. The experimentation was done on Dell Inspiron-5520 Laptop with 1 TB Hard Disk and 8GB RAM. The optimal result usually comes out to be in small number of iteration with smaller swarm size. Table 1 shows the Routes generated by Novel PSO algorithm using different parameter settings.
Table 1: Routes generated by Novel PSO algorithm using different parameter settings

The ACO algorithm has been implemented in java. The IDE used was NetBeans 7.3.1. A Series of experimentation were performed in static and dynamic environment. In static environment the final destination did not changed and the overall environment remains the same. For dynamic environment, final destination changes randomly after certain number algorithm iterations. The Experimentation was conducted using different parameter settings. The grid sizes used were 20*20, 40*40 and 60*60. The algorithm iterations used were 5, 10, 20, 40, 60 and 100. The numbers of ants used in the algorithm were 5, 10, 15, 20 and 30. The Alpha and Beta values varied from 0.1 to 1. The min, max and Avg shows the minimum, maximum and average length found by the algorithm. Best solutions are those which are shortest in length. Some of the experimentation results are as follows

<table>
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<tr>
<th>Iterations</th>
<th>Particle Size</th>
<th>Swarm Size</th>
<th>Grid Size</th>
<th>fittest value</th>
<th>FSP1</th>
<th>FSP2</th>
<th>FSP3</th>
<th>FSP4</th>
<th>FSP5</th>
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<td>10</td>
<td>10</td>
<td>200*200</td>
<td>438</td>
<td>1,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
<td>200,180</td>
</tr>
</tbody>
</table>

Table 2: Optimized Routes generated by ACO algorithm using alpha=1.0, Grid Size=20*20.

Table 3: Optimized Routes generated by ACO algorithm using alpha=1.0, Grid Size=40*40.

Table 4: Optimized Routes generated by ACO algorithm using alpha=1.0, Grid Size=60*60.
The hybrid Algorithm is a combination of ACO and NPSO algorithm. Through NPSO algorithm the optimized values of alpha and beta are obtained. These optimized values are used in ACO algorithm to achieve optimized results. The grid sizes used in this experimentation are 20*20, 40*40 and 60*60. For creating dynamism in the algorithm the final destinations changes randomly after running a certain number of iterations. For Example for every 50 iterations set for the algorithm, the final destination changes after every 10 iterations of the algorithm. The Alpha and Beta values are obtained from NPSO algorithm to perform the experimentation. The iterations used are 5, 10, 20, 40, 60 and 100. The ants deployed for this experimentation are 5, 10, 20 and 30. The following tables show a 5 run average comparison of Hybrid (ACO-NPSO) performance with the ACO algorithm. The result showed the feasibility and effectiveness of the hybrid algorithm as better results are obtained using this hybrid approach as compared to using ACO algorithm for route planning.

<table>
<thead>
<tr>
<th>Iterations</th>
<th>Ant</th>
<th>ACO</th>
<th>Hybrid(ACO-NPSO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>67.0</td>
<td>62.6</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>55.4</td>
<td>54.0</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>49.2</td>
<td>43.6</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
<td>43.0</td>
<td>41.0</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
<td>42.0</td>
<td>38.4</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
<td>41.4</td>
<td>39.8</td>
</tr>
</tbody>
</table>

Table 5: Grid Size=20*20, Alpha=0.3, Beta=0.3

<table>
<thead>
<tr>
<th>Iterations</th>
<th>Ant</th>
<th>ACO</th>
<th>Hybrid(ACO-NPSO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>240.2</td>
<td>224.0</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>172.2</td>
<td>162.2</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>188.0</td>
<td>147.6</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
<td>180.2</td>
<td>141.8</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
<td>161.4</td>
<td>132.8</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
<td>148.2</td>
<td>120.6</td>
</tr>
</tbody>
</table>

Table 6: Grid Size=40*40, Alpha=0.3, Beta=0.3

<table>
<thead>
<tr>
<th>Iterations</th>
<th>Ant</th>
<th>ACO</th>
<th>Hybrid(ACO-NPSO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>404.4</td>
<td>394.8</td>
</tr>
<tr>
<td>10</td>
<td>10</td>
<td>405.8</td>
<td>329.6</td>
</tr>
<tr>
<td>20</td>
<td>20</td>
<td>339.8</td>
<td>308.4</td>
</tr>
<tr>
<td>40</td>
<td>30</td>
<td>318.8</td>
<td>294.2</td>
</tr>
<tr>
<td>60</td>
<td>30</td>
<td>309.8</td>
<td>250.2</td>
</tr>
<tr>
<td>100</td>
<td>30</td>
<td>295.4</td>
<td>267.2</td>
</tr>
</tbody>
</table>

Table 7: Grid Size=60*60, Alpha=0.3, Beta=0.3

A comparison of other swarm Intelligence algorithms and Proposed hybrid (ACO-NPSO) has been performed. The Algorithms used in this experimentation are ACO, PSO, NPSO and Hybrid (ACO-NPSO). The grid size used for the Experimentation is 20*20. The obstacles were 5%, 10% and 20% of the problem area. For ACO and Hybrid (ACO-PSO) the alpha and beta values selected are 1.0 and 0.1 respectively. 100
iterations were run for each algorithm. The Best Route length is compared in all of these algorithms. The result of the experimentation is as follows:

<table>
<thead>
<tr>
<th>Obstacles</th>
<th>PSO</th>
<th>NPSO</th>
<th>ACO</th>
<th>Hybrid(ACO-NPSO)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>50</td>
<td>49</td>
<td>41</td>
<td>34</td>
</tr>
<tr>
<td>10%</td>
<td>52</td>
<td>51</td>
<td>44</td>
<td>36</td>
</tr>
<tr>
<td>20%</td>
<td>53</td>
<td>52</td>
<td>45</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 8: Performance Comparison of Swarm Intelligence Algorithms with Hybrid (ACO-NPSO) Algorithm

Fig.2 shows the final best route generated by Hybrid (ACO-NPSO) algorithm. 50 iterations of the algorithm were run. The alpha and beta used were 0.3 and 0.3 respectively. The red boxes are the obstacles that are present in the environment. The green boxes indicate the final path obtained from the algorithm. The yellow and blue boxes are the source and destination.

6. Conclusion and Future Works. A hybrid (ACO-NPSO) algorithm is proposed in this research. This hybrid Algorithm tries to resolve the dynamic route planning problem. The NPSO is an improved version of PSO algorithm. PSO local optima problem is not present in NPSO. The ACO algorithm is well equipped to resolve the optimization problems. ACO and NPSO algorithm combine to form this hybrid Algorithm. The NPSO, ACO and Hybrid ACO-NPSO algorithms are implemented in java. The experimentation was carried out using different parameters settings. A comparison with other swarm intelligence algorithms with the
The proposed method is also performed. The result of the experiments proved the effectiveness of the proposed technique as proposed technique enabled ACO algorithm to perform better. This major benefit of using a hybrid algorithm (ACO-NPSO) is that it helps in setting the optimized values of alpha and beta parameters in ACO algorithm. As Parameter settings in ACO algorithm is very time consuming so by using this technique the optimized values of alpha and beta were quickly found out. So this technique can be used in all those areas where ACO algorithm is applied. This technique will help in rapid and quick route planning. Some of the potential areas or fields where this technique can be applied are Mine Detection, Fire Evacuation System, Courier Services, Ambulance Systems, Navigation Systems & Public Transport Systems.

REFERENCES

IDENTIFICATION OF THE FACTORS OF QUALITY TEACHER TRAINING AND DEVELOPMENT OF A MODEL PROGRAM IN PAKISTAN

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ABSTRACT: The tendency to emulate developed countries in applying their “state of-the-art” programs without creating the requisite infrastructural base, conceptual and technical expertise, socio-cultural milieu, and financial strength is always problematic. Pakistan’s teacher training program is a typical example. The problem is confounded by the academically poor, relatively less-privileged and baffled students which these programs are constrained to admit. The notoriety of abysmally poor quality of teachers training programs warranted this study “an identification of factors of quality of teacher training and development of a model program for Pakistan”. An instrument developed by Yackulic and Noonan for their study on quality indicators of teacher training in Canada (2001) was adapted as questionnaire. Program admission requirements; knowledge of basic skills (language art and math); knowledge of human growth and development; received the highest ranking, in seriatim, as factors of quality of teacher training.

Keywords: Teacher Education, Quality, Model

Introduction: In order to meet the growing demands of teachers at various levels, the teacher education system in Pakistan has gone through significant quantitative expansion, yet the quality of teachers’ preparation has been overlooked and compromised. The preparation of teachers is critically important because a country’s modernization and development depend on the quality of its education system that is indebted to the quality of teacher education. There is a direct link between education and national development. For this, educational programs have to be reorganized and teachers are the main actors in this reorganization and transformation. It is, therefore, essential that teacher education programs be designed in such a way that the prospective teachers acquire all the relevant skills (Yackulic & Noonan, 2003). In Pakistan, it suffers from three major shortcomings. Firstly, it tends to imitate American teacher education, which, according to their own standards is under criticism for being deficient in developing teacher abilities for effective practice. Secondly, fragments of periodic experiments of American teacher have seeped into Pakistan’s teacher preparation programs. It has resultantly become an amalgam of incompatible ingredients which forces it to become too theoretical. Thirdly, Pakistan teacher education is woefully oblivious to the ground realities of schools and offers no answers to the problems posed by inhospitable conditions in which the teacher is required to work. It is grossly wasteful to seek to apply fancy concepts and approaches evolved in advanced countries in a developing country like Pakistan, which neither has the matching structures, nor the experiences and nor financial capability to sustain them. The ability of education and training systems to fulfill their roles effectively depends on whether educational institutions synchronize with the socio-cultural contexts and on whether teachers develop and deliver educational content in ways that meet the needs of today’s and tomorrow’s
citizens. Policy-makers and society at large have high expectations of teachers as professionals, role models and community leaders.

National Education Policy (1998-2010) observes: “The qualitative dimension of teacher education program has received marginal attention resulting in the mass production of teachers with a shallow understanding of both the content and methodology of education. The existing teacher training system in Pakistan is not adequately responsive to the demands for quality education.” (Govt. of Pakistan, 1998, p. 47-48). Commenting on the current state of teacher education in Pakistan, a report published by UNESCO concerning teacher education in Pakistan points out that “absence of quality has to be tackled urgently in a context where teacher, learner interactions are mediated by a supportive management, as well as by an enabling policy environment” (UNESCO, 2006, p.12). In Pakistan, the teacher education programs do not significantly raise the level of knowledge and skills of teachers so that there is any measurable impact on the students’ learning (Situation Analysis of Teacher Education in Pakistan, 2006). Researches reveal that the quality of teacher education has seriously been neglected both in content and methodology in Pakistan (Sheikh, 2000). Likewise the research reveals that the standard of education can be improved by preparing competent and effective teachers (Bhat and Ganihar, 2006).

Throughout the world, various training programs make choices, as to which indicators they should use as their preferred means of measuring their efforts to achieve quality and what relative priority should be placed on the chosen indicators. These indicators can be used to gauge the quality of teachers training with special references to national needs, aspirations, as well as global trends. These indicators, factors, or elements may be drawn from the commonly accepted knowledge base of teacher training programs. However; caution needs to be exercised in making comparisons between the various teacher training systems owing to the structural as well as socio-cultural differences in various countries. It is, therefore, essential and indispensable that teacher-training programs be organized in such a way that the prospective teachers acquire all the relevant skills.

The circumstances demanded that a thorough investigation be made to explore the factors that ensured the quality of teacher education and to identify the indicators of a successful teacher training program. On the basis of the findings of such a study, a model was intended to be developed for teacher training in Pakistan. Training programs in some professional fields are known for their high quality training. Medical education, training of civil servants, military training, and business administration education are generally regarded as good quality training programs in Pakistan. It might be instructive to look into these training programs closely to identify the elements, emphases and practices, which contribute to their quality and to determine if some lessons could be learned from them to improve the quality of teacher training and teaching profession. Since independence, studies have been conducted on different aspects of teacher education in Pakistan. But no study has so far been conducted on the indicators of quality of these programs despite the fact that this aspect deserves deep consideration. The researcher, realized the importance of quality of the factors of teacher education and the dearth of studies on this vital aspect, felt motivated to undertake this research study entitled “Identification of the factors of quality teacher training and development of a model program in Pakistan”.

The objectives of this study were:
1. to identify the factors constituting quality in various components of a teacher education program and determine their relative importance
2. to find out main features contributing to the quality of selected professional education and training programs in Pakistan.
3. to synthesize the identified factors of quality of teacher education and main features contributing to quality of selected professional education programs in Pakistan.
4. based upon the above synthesis, develop a model teacher education program for Pakistan.

**Review of Literature**: The quality of education is directly related to the quality of instruction in the classrooms. The teacher is considered as the most crucial determinant of the quality of classroom instruction. The academic qualifications, knowledge of the subject matter, skills of teaching and the commitment of the teacher have a strong impact on the teaching learning process (Govt. of Pakistan, 1998). Teachers cannot be replaced with any type of instructional materials, and are far more important than grand buildings, rich curricula and expensive equipment. Big libraries and well-equipped laboratories are of no use until and unless there are good teachers to make an appropriate use of them. The academic and professional training of teachers has a direct and positive bearing on the quality of their performance and consequently, on the achievement of the learners (Avalos & Hadded, 1999)
Quality teachers are described as having some combination of the attributes of mastery of pedagogical knowledge and subject area content knowledge, skills and attitudes necessary for effective teaching, strong understanding of human growth and child development, effective communication skills, strong sense of ethics, and capacity for renewal and ongoing learning (Cobb, Darling Hammond and Murangi, 1999). The education system and programs of teacher education in advanced countries have evolved through long years of deliberations and hard work. Those countries have gradually established the structures, processes and financial capabilities for different levels and types of education. In spite of their long experience and investment, there is widespread dissatisfaction with the current state of teacher training. In the Newsweek magazine’s special education edition (October, 1990) editor Richard Smith noted cases “indicative of a chronic shortcoming in teacher preparation; the failure to train teachers, to empower them with abilities and disposition necessary for conducting affective practice”.

In 1947, there were normal schools for the training of primary teachers in Pakistan. The teacher training schools were later upgraded to colleges for elementary teachers.

Following were the teacher training programs in Pakistan.

<table>
<thead>
<tr>
<th>Names of the program</th>
<th>Duration</th>
<th>Qualification for admission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. J.V (junior vernacular)</td>
<td>One year</td>
<td>Middle (8 year schooling)</td>
</tr>
<tr>
<td>2. S.V (senior vernacular)</td>
<td>One year</td>
<td>Matric (10 year schooling)</td>
</tr>
<tr>
<td>3. C.T (certificate in teaching)</td>
<td>One year</td>
<td>F.A/Fsc (12 year schooling)</td>
</tr>
<tr>
<td>4. O.T (oriental teaching)</td>
<td>One year</td>
<td>F.A (12 year schooling)</td>
</tr>
<tr>
<td>5. B.T (bachelor in teaching)</td>
<td>One year</td>
<td>B.A (14 year schooling)</td>
</tr>
<tr>
<td>6. B.Ed (bachelor in education)</td>
<td>One year</td>
<td>B.A (14 year schooling)</td>
</tr>
<tr>
<td>7. M.Ed (master in education)</td>
<td>Two year</td>
<td>B.Ed (14 year schooling)</td>
</tr>
<tr>
<td>8. M.A (master of arts in education)</td>
<td>Two year</td>
<td>B.A (14 year schooling)</td>
</tr>
<tr>
<td>9. B.S/(B.Ed.Hons)</td>
<td>Four year</td>
<td>F.A/FSc (12 year schooling)</td>
</tr>
<tr>
<td>10. MS (M.Phil, education)</td>
<td>Two year</td>
<td>M.Ed/M.A (16 year schooling)</td>
</tr>
<tr>
<td>11. Ph.D (education)</td>
<td>Four year</td>
<td>B.S/(B.Ed.Hons)/ MS/M.Phil,</td>
</tr>
</tbody>
</table>

In 1956, the name of J.V was changed to PTC (primary teaching certificate) and the qualification increased from Middle to Matric. (Govt. of Pakistan, 1956.) At secondary level, 14+1 model was applied for the teacher training. The name of B.T was changed to B.Ed (Bachelor of education). Teacher education programs are offered in Government Colleges of Elementary Teachers, Government Colleges of Education, Institutes of Education and Research, and Departments of Education in universities. The Institutes of Education and Research and most Departments of Education in universities also offer M.S/M.Phil and Ph.D program to produce teacher educators, education leaders and scientists.

There are a number of qualities listed in review, some of them are: (1). Demonstrates an empathy with pupil thinking, anticipate misconceptions and allow pupils to develop understanding in a variety of ways. (2). Observe pupils in class for signs that they are failing to keep up, are bored, or are not understanding. (3). Shows flexibility in responding to pupil needs. (4). Genuinely wants pupils to learn, understand and develop critical thinking abilities, as well as master content or learn skills. (5). Encourages pupils to take an active role in working through difficulties and
takes time to work through concepts in detail with those who have difficulties. (6). Shows enthusiasm for subject, professional area and teaching role, motivates pupils as they look forward to come to that class. (7). Easy going, relaxed with an open manner, brings a relaxed atmosphere to the classroom. (8). Communicates effectively. (9). Resourceful and positive and adopts a problem-solving approach. (10). Creative and imaginative and has an open attitude to change. (11). Systematic and well organized, focused, determined and hard working. (12). Demonstrates empathy and fairness caring and approachable (Highland Council of Education, Culture and Sport Service, 2007).

Saeed, M. (2003) in the paper “Assessing Quality in Education” explores the various aspects of quality education with reference to the Pakistani situation in particular and some developing countries in general. It elaborates the concept of quality, which is a complicated term to exactly define. Quality refers to efficiency, efficacy and excellence of a program, activity or process. It is a relative term and is associated with its goals. The extent of the achievement of goals and objectives determines the level of quality in a certain educational activity. In the national perspective, it includes how the aspect of quality was emphasized in the different national education policies and in the international perspective; it asserts some examples from international countries, especially from South Asia, Africa, and Latin America. It discusses the quality teachers, learners, content, environment, processes and outcomes.

**Table 1: Qualities of professional teaching and training programs in Pakistan (Derived From the Literature)**

The nine program standards included criteria for program development, staff, facilities, candidates, curricula, duration, structures and procedures, teaching and learning approaches, and assessment. Canada seems to have followed U.S example where each state has established its own teacher education performance standards. National Professional standards for teachers in Pakistan were also announced in 2009 by the Ministry of Education. The list of professional standards for initial preparation of teachers in Pakistan includes subject matter knowledge; human growth and development; knowledge of Islamic ethical values/social life skills; instructional planning and strategies; assessment; learning environment; effective communication and proficient use of information communication technologies; collaboration and partnership; continuous professional development and code of conduct; teaching of English as second/foreign language (ESL/EFL) (Govt. of Pakistan, 2009).

**Methodology of the Study:** This descriptive study is aiming at the identification of factors of quality teacher training and development model in Pakistan. This descriptive research was designed to describe numerically the current views of working teacher educators about the quality indicators of teacher training and development model in Pakistan. In order to answer the questions concerning the status of the subject of the study, data were collected through questionnaire survey. This is in accordance with the broad definitions of descriptive research and quantitative research given by Gay (2005).

In the first instance, international experiences in teacher education were closely examined through a review of literature and the factors commonly mentioned as contributing to its quality were delineated. An instrument of a previous research on quality indicators for teacher training in Canada was adapted to survey the views of the teacher educators in Pakistan on factors of quality of teacher training program. This was the major part of the study.

Population of the study was the faculty of all the public sector universities having education department in Pakistan, and the faculty of Government Elementary Colleges for Teacher Training in Punjab Province. For this survey the views of teacher educators, all the public sector institutions engaged in the preparation of school teachers and the teacher educators working therein constituted the population of the study.

Multistage random sampling technique was applied to select the institutions and the respondents of the study. At first stage, 16 universities were selected out of 57, 10 education universities campuses and 33 Government Colleges for Elementary Teachers situated in Punjab. At second stage of sample selection, the researcher selected the respondents of the study from the selected institution. All the faculty members working in the education department of the 16 universities were taken as a sample. This was done because the researcher wanted detailed information about the quality factors for Teacher Training Programme. The researcher randomly selected six faculty members from each Government elementary teacher training college and Education University campuses. This was done to give equal weitage to all the teacher training institutions and Education University Campuses. Multi-stage
random sampling technique was applied to ensure the generalization of the results of the study. The detail about the respondents of the study is as under:

Table 2: Sample Detail

**Research Instrument:** During the review of the literature the researcher came across a research paper “Quality Indicators for Teacher Training in Canada” written by Yackulic & Noonan, University of Saskatchewan (2001). One part of the instrument used therein neatly matched the requirements of the researcher for the present study. It was adapted as a questionnaire to elicit the views of the sampled teacher educators.

The main questionnaire, however, attempted to ask questions about 29 factors of quality, presumed to be vital in the teacher education programs. The questionnaire was designed on the five point rating scale: Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree, with numerical values of 5, 4, 3, 2, 1, respectively. For pilot testing of the questionnaires, four institutions consisting two universities, one campus of University of Education and one Government College for Elementary Teacher were personally visited, where the questionnaires were administered to 40 teacher educators, 10 teacher educators in each institution.

The teacher educators at pilot testing phase were requested to give their suggestions freely for the improvement of the questionnaires regarding the content, format and language so as to make the questions simple and understandable. The questionnaires were revised to incorporate their suggestions. Through pilot study it was observed that the questionnaires were appropriate. The reliability of the questionnaires in pilot testing on Cronbach’s Alpha which gave reliability values of 0.75 and 0.77. The content validity of the questionnaires was examined and approved by a team of senior teacher educators of the Department of Education, International Islamic University Islamabad. The final versions of the questionnaires are at Annexure (a).

**Data Collection and Analyses:** The researcher found data collection rather difficult. Most of the institutions had to be visited again and again. The researcher distributed 480 questionnaires among teacher educators constituting the sample to get the 100% response. It was possible to collect 400 filled questionnaires from the respective respondents. The measures of relative position are meant to give meaning to a raw score by comparison with some reference groups. The relative position of each factor of the quality of teacher education programs was compared with the help of following measures: Weighted scores, Mean value, Standard Score, Percentiles, Percentile Ranks, Document analyses.

The data of the study were organized, analyzed and the findings were drawn. The responses of the teacher educators regarding the value they attached to the different factors of quality of teacher education programs were organized. It includes distribution of frequencies of responses on a five-point scale in which teacher educators rated each factor of quality as Strongly Agree, Agree, Undecided, Disagree, and Strongly Disagree with numerical point value of 5, 4, 3, 2, and 1, respectively.

Table 3: Analyses of the suggested factors of quality of teacher education Program

Table 4: Weighted score, Mean value, and Standard /T score, Ranking and Percentile Responses of Teacher Educators on the Factors of Quality of Teacher Education Programs

**Code: 11. Program admission requirements:** Program admission requirements received the highest rating as a factor of the quality of teacher education programs. An overwhelming majority of teacher educators, i.e. (85.50) percent expressed their strong agreement/agreement with this factor of quality. There were 46 (14%) respondents who did not agree or strongly disagreed with program admission requirements as a factor of quality. Program admission requirements ranked first as a factor of the quality of teacher education programs with a total weighted score of 1630 and mean value of 4.075 and standard/T score of 70. The percentile rank of program admission requirements was 98.34.
Code: 23. Student teacher knowledge of basic skills (language arts and math): The second highest rating was given to student teacher knowledge of basic skills (language arts and math) by respondents as 257 out of 400 (64.25%) of them indicated their strong agreement/agreement with this factor of quality. But 124 (24.31%) respondents disagreed/strongly disagreed that student teacher knowledge of basic skills (language arts and math) was a factor of the quality of teacher education programs. This factor obtained a weighted score of 1490 mean value of 3.72, and standard/T score of 64. On the basis of which it was ranked second. The percentile rank of this factor was 94.9.

Code 21: Student teacher knowledge of human growth and development: The number of respondents who strongly agreed/agreed that student teacher knowledge of human growth and development was a factor of quality of teacher education program was 285 (71%) and those who strongly disagreed/disagreed were 104(26.00%). The total weighted score of this factor was 1490 and its mean value was 3.72. Its standard/T score was 64. This factor was also ranked second among 29 factors of quality teacher education program with a percentile rank of 94.9 and was tied with the factor student teacher knowledge of basic skills (language arts and math).

Code: 26. Student teacher knowledge of student variability and exceptionality: On student teacher knowledge of student variability and exceptionality, strong agreement/agreement was given by 276 (69%) respondents as a factor of the quality of teacher education programs. However 107 (26.75%) respondents strongly disagreed/disagreed that this was a factor of the quality of teacher education programs. The total weighted score of this factor was 1461 with a mean value of 3.65, And standard/T score of 63. It was placed at rank 03. The percentile rank of this factor was 91.4.

Code: 22. Student teacher knowledge of the principles of learning: The respondents who strongly agreed/agreed that student teacher knowledge of the principle of learning was a factor of quality of teacher education program numbered 276 (69%) while those who strongly disagreed/disagreed were 115(28.75%). The total weighted score and mean value obtained by this factor were 1456 and 3.64, and standard/T score of 63. It was placed at rank 04. The percentile rank of the factor was 88.0.

Code: 25. Student teacher skills in basic teaching approaches: Student teacher skills in basic teaching approaches as a factor of quality of teacher education programs was strongly agreed/agreed by 260 (65.00%) respondents. But 124 (31.00%) respondents disagreed/strongly disagreed that student teacher skills in basic teaching approaches were a factor of the quality of teacher education programs. The total weighted score and mean value obtained by this factor were 1444 and 3.61 respectively. Its standard/T score was 62. It was ranked 05. The percentile rank of this factor was 84.5.

Code: 27. Student teacher knowledge of teaching technology: At rank 06 was student teacher knowledge of teaching technology, which was strongly agreed/agreed by 250 (62.50%) respondents as a factor of the quality of teacher education programs. Those who disagreed/strongly disagreed with this factor of the quality of teacher education numbered 133 (33.25%). This factor received a weighted score of 1416 and mean value of 3.54, and standard/T score of 61. Its percentile rank was 81.0.

Code: 15. Use of technology enhanced learning program components: To the question whether the use of technology enhanced learning was a factor of quality of teacher education programs, 264 (66.00%) respondents strongly agreed/agreed whereas 120 (30.00%) respondent disagreed/strongly disagreed. The weighted score of this factor was 1412 and its mean value was 3.53. Its standard/T score was 61. It was ranked 07. The percentile rank of this factor was 77.5.
Code: 28. Student teacher knowledge of classroom management skills: Out of 400 respondents, 254(63.5%) strongly agreed/agreed that student teacher classroom management skills were a factor of the quality of teacher education programs. Whereas 137 (34.25) respondents disagreed/strongly disagreed with student teacher classroom management skills as a factor of quality. The weighted score for the factor was 1388. It means value was 3.47, and the standard/T score was 60. The rank assigned was 08 and its percentile rank was 71.5.

Code: 29. Student teacher classroom assessment skills: The number of respondents who strongly agreed/agreed that student teacher classroom assessment skills were a factor of quality of teacher education programs was 262 (65.50%). As against 136(34.00%) respondents disagreed/strongly disagreed with it as a factor of quality. The weighted score and mean value obtained by this factor were 1382 and 3.45 respectively, and standard/T score of 60, thereby ranking 9th the percentile rank was 70.7.

Code: 17. Access to suitable field experiences placements: Access to suitable field experience placements was strongly agreed/agreed by 251 (62.75%) respondents. However, 138 (34.50%) disagreed/strongly disagreed implying that this was not a factor of quality of teacher education programs. With a weighted score of 1369 and a mean value of 3.42, and standard/T score of 59, this factor was placed at rank 10 and percentile rank was 67.3.

Code: 19. Length of field experience: Regarding length of field experience as a factor of quality of teacher education programs, 244 (61.00%) respondents strongly agreed/agreed. On the other hand, 130(32.25%) respondents disagreed/strongly disagreed that length of field experience was a factor of quality. This factor received a weighted score of 1362, mean value of 3.40 and standard/T score of 59. On the basis of which it was ranked 11th and percentile rank was 63.8.

Code: 18. Extent of involvement of practicing teachers during field experience: In respect of extent of involvement of practicing teachers during field experience, 240 (65.50%) respondents strongly agreed/agreed, that it was a factor of quality of teacher education programs against which 145 (36.25%) respondents disagreed/strongly disagreed meaning thereby that to them, it was not a factor of quality. This factor received a weighted score of 1348 and mean value of 3.37 and standard/T score of 58. It came at rank 12 and its percentile rank was 60.4.

Code: 24. Student teacher knowledge of independent learning: Student teacher knowledge of independent learning as a factor of quality of teacher education programs was supported with strong agreement/agreement by 205(51.25%) respondents. However, it was opposed as a factor of quality with disagreement/strong disagreement by 180 (45%) respondents. This factor attained a weighted score of 1293, mean value of 3.23 and standard/T score of 57. It ranked 13 and its percentile rank was 56.9.

Code: 14. Quality of curricula used in the program: Quality of curricula used in the program was strongly agreed/agreed by 159 (39.00%) respondents, but rejected by 228 (57.00%) respondents with disagreement/strong disagreement as a factor of quality in teacher education programs, with a weighted score of 1096 and mean value of 2.74. And standard/T score of 48 this factor ranked 14th. Its percentile rank was 53.3.

Code: 13. Quality of instruction in the program: Quality of instruction in the program as a factor of quality of teacher education program was supported with strong agreement/agreed by150 (37.50 %) respondents. However, it was opposed as a factor of quality with disagreement/strong disagreement by 60.00% respondents. This factor attained a weighted score of 1082, mean value of 2.70 and standard/T score of 47, and was ranked at number 15. It obtained a percentile rank of 50.0.

Code: 10. Quality of facilities: Quality of facilities was endorsed with strongly agreed/agreed by 147 (36.75%) respondents, but rejected by 232 (58 %) respondents with disagreement/strong disagreement as a factor of quality
in teacher education programs, with a weighted score of 1079 and mean value of 2.69 and standard/T score of 47. This factor ranked 16 and percentile rank was 46.3.

**Code: 12. Length of program:** At rank 17 was length of program, strongly agreed/agreed by 143 (31%) respondents as a factor of the quality of teacher education programs. Those who disagreed /strongly disagreed that this was a factor of quality numbered 248 (62.00%). This factor received a weighted score of 1057 and mean value of 2.64 and standard/T score of 46. The percentile rank was 43.0.

**Code: 08. Extent of library holdings:** Out of 400 respondents, 126 (31.50%) strongly agreed/agreed that extent of library holdings was a factor of the quality of teacher education programs. On the other hand, 248 (62%) respondents disagreed /strongly disagreed that extent of library holdings was a factor of quality. This factor received a weighted score of 1027 and mean value of 2.56 and standard/T score of 45. The rank assigned to this factor was 18.

**Code: 16. Extent of technical support for technology enhanced learning:** Only 114 (28.50%) respondents strongly agreed/agreed that extent of technical support for technology enhanced learning was a factor of the quality of teacher education programs. Comparatively as many as 272(68.00%) respondents disagreed/strongly disagreed with it as a factor of quality. This factor received a weighted score of 1004. Its mean value was 2.51. Its standard/T score was 44 and it was ranked 19th, and its percentile rank was 36.3.

**Code: 07. Availability of specialized programs:** At rank 20 was availability of specialized programs, strongly agreed/agreed by 125 (31.25%) respondents as a factor of the quality of teacher education programs. Those who disagreed /strongly disagreed that this was a factor of quality numbered 264 (66%). Its standard/T score was 43. This factor received a weighted score of 986 and mean value of 2.46. Its percentile rank was 32.8.

**Code: 09. Availability of scholarships:** The number of respondents was 108 (27%), who indicated their strong agreement /agreement with availability of scholarships as a factor of the quality of teacher education Program. On the other hand, a great majority, i.e. 288 (72%) of respondents expressed disagreement /strong disagreement against the availability of scholarships as a factor of the quality of teacher education programs. The weighted score for this factor was 932. Its mean value was 2.33 and standard/T score of 41. Its rank was 21. The percentile rank was 29.3.

**Code: 01 per student funding allocated to the program:** At rank 22, per student funding allocated to the program, was strongly agreed/agreed by 104 (26%) respondents as a factor of the quality of teacher education programs. Those who disagreed /strongly disagreed that this was a factor of quality numbered 283(70.75%). This factor received a weighted score of 914 and mean value of 2.28 and standard/T score of 40. The percentile rank was 25.9.

**Code: 02. Faculty- student ratio:** The number of respondents who strongly agreed /agreed that faculty- student ratio was a factor of the quality of teacher education programs was 108 (27.00%) whereas those who disagreed /strongly disagreed were 281 (71.25%). The weighted score of this factor was 886 and its mean value was 2.21. It received standard/T score of 39. It was ranked 23rd. The percentile rank was 22.4

**Code: 20. Employment success of graduates:** Very small number of respondents .82 (20.50%)strongly agreed/agreed that the Employment success of graduates was a factor of the quality of teacher education programs as opposed to as large a number of respondents as 306 (76.50%) who disagreed/strongly disagreed with it. The weighted score for this factor was 886. Its mean value was 2.21 and the standard / T score was 39. It ranked 23rd. The percentile rank was 22.4.
Code: 03. Proportion of faculty with completed doctorates: There were 82 (20.50%) respondents who strongly agreed/agreed that the proportion of faculty with completed doctorates was a factor of the quality of teacher education programs. On the contrary, 305 (76.25%) respondents disagreed/strongly disagreed, which meant that the proportion of faculty with completed doctorates could not be regarded as a factor of the quality of teacher education programs. This factor obtained a weighted score of 872 and a mean value of 2.18. Its standard/T score was 39 and it ranked 24. The percentile rank was 19.0.

Code: 04. Research productivity of faculty: A total of 88 (22.00%) respondents strongly agreed/agreed that research productivity was a factor of the quality of teacher education programs. Against them, an overwhelming majority of respondents, 304 (76.00%) disagreed/strongly disagreed implying that this was not a factor of quality of teacher education programs. With a weighted score of 760 and mean value of 1.90 and standard/T score of 33. This factor was placed at rank 25. Its percentile rank was 15.5.

Code: 05. Institutional commitment to equity: This factor was strongly agreed/agreed by 64 (16.00%) respondents that institutional commitment to equity was a factor of the quality of teacher education program, but was disagreed/strongly disagreed by 327 (81.75%) respondents. The weighted score for this factor was 742 and its mean value was 1.85 and the standard/T score was 32. Its rank was 26. The percentile rank was 27.00.

Code: 06. Extent of involvement of stakeholders in program design: The respondents who strongly agreed/agreed that extent of involvement of stakeholders in program design was a factor of the quality of teacher education programs numbered 40 (10.00%). However, a large majority of respondents, 351 (87.75%), disagreed/strongly disagreed and rejected it as a factor of the quality of teacher education programs. This factor received a weighted score of 734, mean value of 1.83 and standard/T score of 32 and rank of 27. The percentile rank was 8.3. On the basis of the strength of the above ratings, the factors of quality of teacher education programs can be divided into the following five groups:

Discussion: This study has revealed that most teacher educators regard admission requirements as the most important factor of quality of teacher education programs in Pakistan. This is in line with the generally held belief that quality of education and training program, to a great measure, depends upon the quality of intake of its students. Since the generally perceived high quality programs are heavily prized socially and economically, they attract the top achievers as their candidates. Teacher education programs on the other hand, cannot expect to attain such status and recognition in the prevailing circumstances and in the foreseeable future. The prevailing salary and service condition for school teachers do not attract academically talented candidates to those programs. Low social and self esteem are further hurdles to quality pre-service preparation or continuous professional development of teachers (Govt. of Pakistan, 2009). In their study, Cobb, Darling-Hammond and Murangi (1985) concluded that teaching often does not enjoy the privilege of being able to select the best qualified candidates. Factors influencing recruitment include the status of the teaching profession and economic resources of the system. Casey (2005), reviewing the researches on teacher education admission criteria, observed that relationship of admission criteria to the knowledge, skills and attitudes, the beginning teacher need in their preparation provided by the programs are rarely made explicit.

Basic skills in language art and math were rated as the next most important factor of quality of teacher training programs. Realizing that a teacher’s success in the classroom is primarily determined by his ability to communicate effectively with his students, a strong teacher training program would place high premium on this factor. In Pakistan, this problem is further complicated due to a rather confused policy about medium of instruction. In most teacher training institutions, the medium of instruction is English but when the prospective teachers start teaching in schools, they tend to resort to Urdu or the regional language. During their preparation, they struggle to learn to communicate in a language with which they have basic difficulties.

In their views on ten performance standards as factors of quality of teacher training programs, communication and technology in which teachers use knowledge of effective verbal, nonverbal and media communication techniques to foster active inquiry, collaboration and supportive interaction in the classroom, was given sixth place by teacher educators.
Knowledge of human growth and development and of student variability and exceptionality figured as the third and fourth top factors of quality of teacher education programs in this study. How children learn and develop and how teachers can provide learning opportunities that support their intellectual, social and personal development; and diverse learners, teacher’s understanding how students differ in their approaches to learning and creating instructional opportunities that are adapted to diverse learners, came at third and fifth position respectively in the ten performance standards studied as factors of quality of teacher training programs. Most teacher education programs in Pakistan offer courses in human growth and development and educational psychology. However, how much effort is made to provide the student teacher, actual practice in preparing profile of individual pupil’s physical, intellectual, social and emotional development status and needs and in creating learning opportunities that meet individual needs is a big question. Even if their practical skills are developed during their preparation as teachers, how much of these can be applied when they begin teaching in school in the existing circumstances which by no means are friendly.

The next four top factors of quality of teacher training rated on the basis of views of teacher educators were knowledge of principles of learning (rank 4), basic teaching approaches (rank 5). Teaching technology (rank 6) and use of technology enhanced training (rank 7). On ten performance standards also, content technology, multi instructional strategies and communication technology were rated second, fourth and sixth respectively, as factors of quality of teacher training programs. Indeed it is the knowledge of these factors which differentiates trained from untrained teachers. Zehn and Kohler (1993) asserted that teacher training is focused on methods courses and content specialty. In Pakistan such courses form the core of teacher training programs but the quality and emphasis of these courses vary greatly. The irony is that even these courses which by their very nature and demand should be essentially practical are generally delivered theoretically. Practice provided in the use of numerous teaching methods and techniques is usually meager and insignificant. It is rare that the student teacher is provided with practical exercise in content pedagogy i.e the ability to understand the central concepts, tools of inquiry, and structures of the discipline(s) that he or she would teach and to create meaningful experiences using a variety of instructional strategies to encourage pupils development of reading, writing, critical thinking and problem solving skills.

The second group of factors of quality receiving next highest favorable responses (ranging between 65% and 51.2%) of teacher educators included classroom management (rank 8), and assessment skills, (rank 9); access to suitable field experiences placement (rank 10), length of field experience (rank 11), and extent of involvement of practicing teacher during field experience (rank 13). Out of ten performance standards, planning (i.e. teacher plans instruction based upon knowledge of subject matter, students, the community and curriculum goals), was placed at the first place, motivation and management (i.e. teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self motivation) came at the eight place, and assessment (i.e teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the student) was given the ninth place. Regina M.Oliver and Daniel R.Reschly (2007) in their paper on “Effective classroom Management: Teacher preparation and professional development reviewed researchers on classroom management and reported that effective teachers have higher rates of positive student responses to their instruction. Effective classroom management requires a comprehensive approach that includes structuring the school and classroom environment actively seeking students engagement, implementing classroom rules and routines enacting procedures that encourage appropriate behavior, using behavior reduction strategies, and collecting and using data to monitor student behavior, and modifying classroom management procedures.

All teacher training programs in Pakistan include courses in classroom management and assessment. These courses seldom receive the keen attention and hard practical work that they demand. Generally, these courses are covered in routine manner, dealing mostly with theoretical aspects. Very little, if any, practice is not given to the student teacher in identifying and tackling different management problems in real classroom situation of a school nor is adequate practice made available in constructing and administering assessment instruments, and interpreting, reporting and using results of evaluation for promoting pupil learning.

Access to suitable field experience placement, length of field experience and extent of involvement of practicing teachers during field experience are the factors which are regarded or expected to function as the kingpin of a teacher training program. Student teaching practice, as field experience is commonly known, is seen as an essential element to teacher preparation. Its duration varies widely which is determined by nature of the teacher training program and the teaching level. Student teaching practice is usually arranged at the completion of the course work and toward the end of the teacher training program. Teachers preparing in Germany, undergo two full year of internship that include seminars and classroom experience. College and school based faculties observe and evaluate at least 25 lessons. At the end, candidates go through a variety of portfolio and paper assignments prior to teaching (Waldrop, 1991). In the New Zealand and Australia, the cooperating teacher, associate teacher, or tutoring teacher is
responsible for mentoring and evaluating student teacher during several four-week sessions. In Germany, the US, Canada and Singapore both school and college/university-based faculty assesses students. The component which often is identified as characteristic of a good teacher education program is the need for early and numerous opportunities to practice teaching in field based experiences. A notable complaint from teacher education graduates is the existence of a large gap between theory taught and actual classroom practice and utility of coursework. Furthermore, the lack of connection between theory and practice seems to increase after teacher candidates have spent some time in the classroom (Armstrong, 2009).

Even worse rating was obtained by factors like availability of specialized programs, availability of scholarships, per-student funding allocated to program, faculty-student ratio, and employment success of graduates, proportion of faculty with completed doctorates. These were rejected as factors of quality of teacher education programs by 66.4% to 76.2% respondents and were accepted by only 20.7% to 31.2% respondents. Among 29 proposed factors of quality of teacher education programs, these factors ranked 19th to 24th. Goldhaber and Brener(1997) found that a teacher’s advanced degree was not generally associated with increased student learning from eighth to tenth grade.

The group that received the lowest number of favorable responses included research productivity of faculty, institutional commitment to equity and extent of involvement of stakeholders in program design as factors of quality. As high as 68.0% to 87.7%, respondents were negatively disposed towards these factors. Support facilities did not find favors with respondents. How learning environment and teaching conditions affect student achievement and teacher’s morale is explained by Hanushek and Luggle (2000) study that teachers might be willing to take lower salaries in exchange for better working conditions. There is no serious effort in the 60 year history to address the critical question of reluctance of teacher education to the improvement of quality of education. The necessary link between teacher education and school education is incising. The teaching and learning practice prevalent in the public school classroom in Pakistan clearly shows the huge gap between teacher education and school education system. Policy and five year plan has made lofty claim and false provisions for developing teacher education without region to ground realities (Ali, 2011).

The curriculum of Education: AED (Associate Degree in Education) and B.Ed(Hons)Elementary and Secondary: Revised 2010 approaches by Higher Education Commission Islamabad, Pakistan and National Professional Standards for Teacher in Pakistan (2009), announced by Policy and Planning Wing, Ministry of Education Government of Pakistan, Islamabad are clear manifestations of adopting American exemplars in Pakistan. Whereas the four-year undergraduate program of Teacher Education and Teacher Education Performance standards of various states in USA can be safely assumed to synchronize with, their public school system there seems to be little appreciation of huge disparity between the recent interventions in teacher education and ground realities of public school, most of which do not even meet the basic minimum requirements of physical infrastructure. It may be argued that teacher education in Pakistan cannot remain oblivious of the advancements taking place in this field at international scene. The counter argument is that Pakistan should bring its public school system up to the international standards to take advantage of the international developments in teacher education. Now that the curriculum of teacher in Pakistan is given by the Higher Education Commission and professional standards for teacher have been prescribed under the Ministry of Education, the room for maneuverability is extremely limited under the prevailing conditions of public schools.

**Proposed Practical Teacher Training Model:** A model is a plan or a pattern or a framework which can be used to design a program, a procedure, or a product. This teacher training model attempts to present a framework for designing a program for preparing prospective teachers in Pakistan. Presentation of this model is necessitated by certain realities. The present state of the field of teacher education is a reflection of numerous initiatives and interventions made internationally, particularly in the US, where scholars, researchers and the practitioners of the teaching profession can take pride in the extensive work and developments that have taken place in this field. The fact remain that there runs an undercurrent of dissatisfaction generally with the teacher training programs as offered presently and other alternatives such as adding a fifth year to existing four-year undergraduate teacher education program, reducing the number of courses in education, and on-the-job training are being seriously considered. The usual criticism is that too many and too frequent conceptual and structural interventions have made the programs diffused and dispersed which have denied the profession to evolve into a solid tradition of practice. On the contrary, the virtues of practical pedagogy of the earliest programs of the normal school have been lost. The devastating conclusion of the report of the Able Foundation (2001) that teacher certification was neither an
efficient nor an effective means to ensure a competent teaching force and that the attributes of effective teacher were more likely to be found outside the domain of the school of education has raised many questions.

Teacher education in Pakistan is believed to be of abysmally low quality, although efforts have continued to be made to reform and modernize it by copying the international initiatives. The most recent examples are the introduction of four-year undergraduate teacher education program, despite the fact that its efficacy is being questioned internationally. The introduction of national professional standards for teachers in Pakistan to initiate American or Australian examples, without taking into account poor school conditions is another such decision. The more such international experiences are copied, the void between the public school and teacher training widens. In the past few years, many new universities and institutions have come into being. Many of such institutions have departments of education which offer teacher education programs. With little experience in establishing and running such programs and with inadequate and suspect quality of teaching faculty, this proliferation has aggravated the situation further. Ground realities of the public school system recede more and more into the dark.

The candidates who opt to become teachers do so because they fail to find a place elsewhere. They come to teacher education program with intellectual, socio-cultural, economic and academic deficiencies and low self-esteem. Loading them with the courses and activities designed for the Western youth who have grown in intellect, culture, social relation, and academics with the growth of their public schools and teacher education programs, only adds to their misery. Disconnect between their studies, their academic and intellectual possession, the environment, and the conditions of the public schools where they would be required to teach haunt them throughout. It is imperative to shape their preparation as teacher in a manner which their academic, intellectual and cultural background can sustain, and builds their self image, and becomes relevant to their surroundings and their job in schools.

There is the disquieting state of the public schools, particularly in rural areas. There are glaring disparities in the number of available teachers, provision of facilities such as number of classrooms, drinking water, furniture, electricity, toilets. Shortage of English, Mathematics and Science teachers and absence of science laboratories in secondary schools is a nagging problem. The teacher education programs in Pakistan seldom prepare the teacher to cope with such conditions. Training of the beginning teachers should enable them to be functional in difficult circumstances.

A Revised (2010) 4-year B. Ed (Hones) Elementary and Secondary curriculum have been given out by the Higher Education Commission. All teacher education programs are required to follow this curriculum. The constraints imposed by the revised curriculum need to be respected and the proposal for a teacher training model has to be carried out within these constraints. However the curriculum document allows flexibility to reorganize course, according to the local needs and available resources and facilities.

The basic contention of the proposed practical teacher training model is to teach school subjects effectively. The focus should remain on developing specific skills in teaching the subject matter. Any course or material that interferes with this prime objective is superfluous and should be discarded. The first consideration of the proposed model is to simplify the content of training by reducing the theoretical and conceptual load that is not directly related to the development of teaching skills.

The second contention is that training should emphasize development of doing skills instead of knowledge skills. A person who can do his job well is more confident, knowledgeable, and positively disposed than the one who merely knows about the job but cannot perform it successfully. The majority of the teachers is exposed to many concepts during training but not given adequate practice in performance. Resultantly, they remain handicapped throughout their careers.

The third contention is that teacher training cannot become relevant if it is far removed from teaching in public schools. The present gap between teacher training and school teaching should be closed by taking training to the site. If teachers are prepared in schools not only will the prospective teachers benefit, but also the practicing teachers, the entire training program could thus assume the form of field experience.

Proposed Practical Teacher Training Model
(See Figure 1)

Conclusions
1. Admission requirements received the highest percentile rank and topped the list of factors of quality of teacher education program. The generally perceived high quality program of civil services training, military training, medical education and business education placed great emphasis on admission requirements and
used stringent criterion for selection of their candidates. Unfortunately, the situation of admission of academically poor students is likely to change in teacher training programs in the foreseeable future. Selecting the best from the available lot is the only feasible option.

2. Factors involving development of skills and practical competencies were given preferential rating such as basic skills in language arts and mathematics, skills in basic teaching approaches, use of technology enhanced learning component, classroom management skills, classroom assessment skills and suitable field experience, length of field experience, were more precisely the requisite skills for successful practice of the teaching profession. Quality programs of civil services training, military training, medical education and business education also placed great emphasis on training and were aimed to develop skills to deal effectively with practical problems of the field. Development of specific practical skills presently insignificant seems to be the necessary desired focus of the teacher training programs to improve their quality.

3. Factors requiring direct practical application were also rated high. The knowledge of human growth and development, knowledge of student variability and exceptionality, knowledge of principles of learning, knowledge of teaching technology and Involvement of practicing teachers during field experience not as theoretical concepts but as practical skills also appear as important predictors of quality of teacher education programs.

Based upon the above consideration, a practical teacher training model for Pakistan is proposed with the objectives of reducing academic and intellectual, theoretical and conceptual demands on the students, equipping them with specific essential skills identified through a survey of teacher educators and building their confidence to successfully practice the profession of teaching even in the existing difficult conditions of public school system in Pakistan. The model assumes that the mastery of the selected school subjects and basic skills of language art, such as communication and presentation skills and basic mathematics, will be provided and developed in the relevant departments and outside the department of education.

The actual model envisages close collaboration, consultation, planning and organization, and logistics management between the departments of education /teacher training institution and the cooperating /participating /practicing schools.

All training will be provided through field experience. Access to suitable field experience placement, length of actual field experience, and involvement of practicing teachers in the field experience of the prospective teachers is the central component and is to be established first of all. Skills for studying and determining human (child) growth and development differentiating students’ variability and exceptionality and application of principles of learning will be developed, through field experience in the first round.

In the second round, skills of the prospective teachers teaching approaches, teaching technology and technology enhanced learning will be developed through field experience. The prospective teachers will learn and practice through third round of field experience in the actual classrooms of the cooperating school specific and specialized methods of teaching elective school subject 1. Similarly, the fourth round of field experience of the prospective teacher will be devoted to developing and practicing specialized methods of teaching selected school subject 2. Classroom management skills, organization and procedures, and behavior management skills will be developed in the fifth round of field experience.

In the sixth and the last round, classroom assessment skill, including construction and administration of tests, grading and reporting will be developed in the prospective teachers through field experience in actual classrooms of the cooperating schools.

5.4 Recommendations

1. The proposed practical teacher training model may be presented in a seminar of teacher educators, school administrators and practicing teachers. The model may be refined on the basis of the feedback of the seminar.

2. The refined model may be pilot-tested in a limited scale. The result of pilot-testing may be carefully recorded. The model may be further improved if necessary.

3. The results of the pilot-testing and improved version of the proposed practical teacher training model may be presented to Higher Education Commission for consideration.
Further Research: Research studies on the following themes may be undertaken to provide greater insight into the issues related to teacher training.

1. A co-relational study of trained and untrained teachers and students achievement
2. Relationship of teachers training and teachers’ classroom behavior.
3. A comparative study of teacher training methods in advanced and developing countries.

REFERENCES


ADAPTIVE TRACK GENERATION FOR CAR RACING GAME USING EVOLUTIONARY ALGORITHM

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ABSTRACT. This paper presents an adaptive track generation technique based on evolutionary algorithm. The proposed car racing game will have unpredictable and challenging tracks for the player based on player profiling. The game will have unlimited number of new tracks and the element of surprise and attraction for the player. For providing the surprise element which all other racing games lack and everlasting attraction of challenges for players, this paper describes the use of Evolutionary Algorithm for the track generation and uses player modeling techniques for allocating suitable tracks to the player based on his performance. The proposed technique performs well in car racing game and can be further extended to strategy based games. The interest of the player remains consistent with new stages with new unknown tracks and hurdles.

Keywords: Players Experience; Genetic Algorithms (GA); Human Computer Interactions (HCI); Unpredictable Tracks; Logic and Analytical Module.

1. Introduction. This research explores the possibility of an interactive racing game based on the Evolutionary Algorithm to retain the interest of players by presenting them with unpredictable and unknown new environments. It will provide everlasting element of surprise and joy to the players. The gaming world specially the racing game genre has already been evolved very much in past few decades from the origin of this genre. Highly interactive and realistic racing games have been developed to attract the user and provide user with the profound entertainment and fun while exploring the race, but all these highly interactive games lack the absolute element of surprise and does not provide with unlimited number of tracks and challenges.

This paper describes the complete game design along with different methodologies and techniques used in the development of such games. The detailed description of the evolutionary technique for track generation is described in subsequent sections with the implementation details.
2. Background & Literature Work. Game industry is being much flourished over the past few years. Lots of games have been developed specially of racing game’s genre. But due to the competition for the game developers, many games are not able to retain the gained user interest and fail to flourish in the game industry in long term. The main reason for failure of these games is that after they capture player’s interest, aren’t able to provide challenging environment which is every player’s need.

The main purpose of any game is to let the players enjoy and have fun no matter how many times they have played the game. Racing Games genre is the traditional all time favorite game genre that every youngster looks for and loves to play. The main aim of any game is to provide its players everlasting enjoyable environment and challenges.

The study shows that all the racing games that have been developed so far have predefined tracks and levels, which can make the players bored of playing so many times on same tracks and levels, if they play game very often [1].

To provide everlasting pursuits and challenging environment (close to infinite tracks) to the players, so that the game will make the players want to play game ceaselessly, player should be provided unpredictable challenges to keep his/her interest focused. For giving everlasting challenges and fun, our game will create and provide evolutionary tracks every time whenever a player gets through any track. Once a track is successfully finished, new unpredictable track with new challenges (generated by evolutionary algorithm) will be generated on the basis of player’s expertise. In this way every time player doesn’t need to run on the same track which he/she has already mastered and got bored of. The game will captivate player’s interest towards new challenges and fun every time he/she will enter the game. [1]. [2].

To solve the problem of providing new and exciting challenges the Evolutionary algorithms gave a full support. The use of logic-based AI in games has a history as long as artificial intelligence itself, and computational intelligence in games is now an established field. But the use of the Artificial Intelligence techniques for providing the player satisfaction is relatively a new idea. In the Togelius,J paper [1] the authors presents the various approaches to solve the problem at hand i.e. to provide the satisfaction of player through evolutionary challenges and everlasting goals. The approaches include sensors, neural networks and evolutionary algorithms. In the sensors approach game attributes take the form of sensors. The control methods are then based on these special sensors. For example in our game problem the sensors would be speed of the car, average velocity, and average distance. In the second approach the control methods are based on neural networks. These networks are all standard fully connected feed forward nets (MLPs) with the transfer function. Only the weights of the networks are changed by evolution or back propagation, but the topology remains fixed. The third approach the paper represents is evolutionary algorithm. Our research project is based on this particular approach. We choose the Genetic evolutionary to provide the player satisfaction through provision of new and evolutionary tracks. Details of algorithm are discussed further.

3. Goals and Objectives. The main goal for this research is to be able to make an Evolutionary Racing Game which will never let the player lose his/her interest and will present the user with new and unpredictable challenges and fun. The goals and objectives of this game are described below:

- Providing highly interactive graphical user interface
- Calculating player expertise and on the basis of player expertise defining player profile
- Creating Unlimited and Unseen tracks by Evolutionary Algorithm
- Generating genetic evolutionary and unpredictable tracks based upon user expertise
- Defining the car controls and physics that have been used in the game
- Providing interactive platform for players to play the game e.g. Mobile based (Android) or PC games

4. Scope. The scope of this game is divided in two parts the design scope and the application scope.
4.1. **Design Scope.** The design scope of this research is based upon the literature review and brainstorming, and evaluating the best design for game engine. It is visionary scope that tells us how we imagine and visualize this game. The design scope of this game includes:

- Simple yet pioneering game interface
- User profiling featuring customized user personal information
- Innovative themes for scenes in the game
- Graphical interface for tracks and scenes
- Physics and mathematical modeling for design
- Graphical modes of racing including both the cars and the racing bikes
- Complete design with HCI (human computer interaction) principles.

4.2. **Application Scope.** The application scope of this game includes the scope of implementation and execution of the project. Specifying the scope of how we will implement different modules, what will be the level of implementation of the game?

The main application scope is described as:

- Game will be implemented in modern platform i.e. Unity 3D
- User profiling based on user expertise during game play
- Implementation of evolutionary algorithm and related artificial intelligence techniques
- Development of fitness levels for mapping evolutionary generated tracks with user profile
- Single player mode implementation
- Up to date user profiling as expertise improvement

5. **Game Architecture.**

5.1.1. **Game System.** In this Game which is “Racing Game based upon Evolutionary Algorithm” our main aim is to develop a Game Engine that will be generating evolutionary tracks, each time a player will complete a race track and demand for a new challenge the game engine should be able to evolve the current track and generate evolved tracks and present the user with most suitable in regards to player’s performance. The evolution of tracks that our game engine will incorporate will be using Genetic Algorithm (GA).

Therefore, the major part of this Game’s Engine will be Track Evolution Using Genetic Algorithm. So, the system’s focus for this major part will be on:

- Defining Genetic Algorithm’s Components
- Defining the Track Chromosome that will evolve the tracks just like Biological Gene Evolution and generated chromosome
- Defining the best suitable Fitness Function and Algorithms to testify the track, i.e. whether the generated track is appropriate for race or not, discarding the inappropriate and impossible to race tracks
- The choice of track that will be presented to player from the evolved track set, based upon the Player’s performance either player wants to play the track of same level or is he/she is striving for more challenging hard tracks by showing his/her best level expertise
- The Game engine will also be maintaining the Player’s profile and will be calculating it and updating it based upon algorithms defined for profiling in the system each time player will race
- Complete integration of all the above modules and optimization is also a very important part of the Game engine

5.1.2 **Software System.** The Software used for the development of the overall game development is Unity 3D. Unity 3D is a game engine for developing highly integrated and interactive 3D games. System’s Modules and then integration of all these modules with game representation is done with unity 3D game engine.

Game Engine is a Game Development Ecosystem; it provides powerful rendering engines and API’s for good and interactive Game interface. It provides great performance and also work-flow. It gives fully integrated set of tools and workflow for 3D or 2D game development, easy multiplatform publishing.

5.2. **Game System Architecture.** The architecture of this Game follows a path and modular structure as shown in Figure 1. It defines the internal structure of how the game’s program work and revolutionize the
track generation process. The main functionalities of the game or program’s architecture is creating and managing user profiles and generating the evolutionary tracks to achieve the goal of our Game project. The game follows the 3-tier architecture of Software development.

As mentioned in the above shown player work model, the new track will be accessible when the player has already completed the current track. The detailed description of these architectural components of our project is given as:

The Game follows the standard, 3–tier Architectural design [3].

- The interface layer provides the player with Game play and highly interactive graphical game view. It also contains the event listeners that helps the Player interact with the Game and enables the player controls during race
- Logic layer of Game System includes all the major logical functionalities and modules that are part of the game system
  - EA (evolutionary algorithm) Module that is very fundamental part of this game project and is used in the Track evolution and new track generation, this module is also responsible for evaluating the player profile and handling all other game objects that are needed to be handled intelligently during race
  - This layer also includes Mathematical and Analytical Module that includes mathematical functionalities and all other physics fundamental that are mapped in race for player car control and game track are integrated with other modules for setting the complete race environment
  - All other modules and Game objects including Sounds or Audio Controller and all other utilities used by system are handled in this module
- The data layer records the Player Profiling and tracks data of track components and from track generation

![3-tier Game System Architecture Figure](image)

6. **Game Design.** The Game Design of this game is very simple and consists of few modules which are based on overall game’s structure and architecture. The basic Game design consists of three major parts which have been mentioned in the Game’s Architecture shown above i.e.

- **Graphical Interface**
- **Logic and Analytical Module**
- **Data Module.**

Graphical module covers all the graphical work that is part of the game’s system from Display Scenes for different options till the rendering of the Race Track and its environment.

The detailed Game System design can be these game modules, which are given as:
A. Track Generation Module Using Evolutionary Algorithms
B. Player Work – flow Model
C. Analytical Logic Module
D. Graphics Module

These modules are described below:

6.1. **Track Generation Module Using Evolutionary Algorithm.** The Track Generation module is very important module of our project, as the main goal of this project is to provide the player the unseen and unpredictable, unlimited number of tracks using Evolutionary Algorithm [2].

Evolutionary Algorithms (EA) are a subset of evolutionary computation, a generic population – based meta-heuristic optimization algorithms. EA uses techniques which are inspired by natural biological evolution techniques i.e. reproduction, mutation, recombination and selection. Genetic algorithms (GA) are very famous technique of EA, which provides very simple yet optimized solution for particular problem. Therefore, we have chosen the Genetic Algorithms for Track generation in this game as Genetic Algorithms provides the solution from the basic and atomic units which evolve by the GA process and provide the optimized solution. As our game requires the evolution of Tracks so that no two tracks should be same as no two DNA are same in the natural process of genetic evolution. A typical genetic algorithm requires [2]:

1. Genetic Representation (genes and chromosome) of the solution domain
2. Fitness Function to evaluate the solution domain.

The basic structure of track generation which follows the structure of genetic algorithm is given as:

- Defining the Track components as Genetic representation of Track (Genes and Chromosomes)
- Generating Track Sets and Evolving Tracks through genetic operators (Population, Mutation and Crossovers)
- Applying Fitness and selecting the best fittest track from the candidate tracks (Fitness Evaluation)

6.1.1. **Defining Genetic Representation of Track Components.** A *Gene is a single component* which controls the property of an individual. In our game a gene represents a single track component i.e. Right Turn, left turn, straight line or a sharp edge etc. Given below is a single component or a gene as:

```
Right Curve
```

In our game we supported six components which are

- i. Horizontal Straight line
- ii. Vertical Straight line
- iii. Left Curve
- iv. Right Curve
- v. Left Sharp Edge
- vi. Right Sharp Edge

So, a track consists of combination of these track components representing a chromosome. A *Chromosome* is a set of genes which represents a possible solution of any problem; therefore, in our game a single chromosome is a combination of track components/genes. Theoretic representation of a chromosome for this game i.e. track can be described as:

```
Right Curve H. Straigh V. Straigh Left Curve Right Edge
```

So, this representation of track has been mapped in the code scripts of GA in terms of number through 1-6 each number representing a single component and at the time on run time rendering in the game scene the
track prefabs and components that has been specially created using Meshes are rendering accordingly.

6.1.2. Generating Track Population. In a genetic algorithm, a population is a set of candidate solutions (tracks in our game) called individuals that can provide the optimum solution to an optimization problem, which are evolved toward better solutions. Each candidate solution has a set of properties which can be mutated and altered. For our game we have decided to create a population i.e. set of tracks (chromosomes) of size 50 which means a population will be having 50 tracks.

6.1.3. Evolving Tracks. The generated population is evolved for generating the optimized best solution for the given problem. The tracks are evolved by genetic operators which are mutation and cross over. In genetic algorithms, crossover is a genetic operator used to vary the programming of a chromosome which is analogous to the natural reproduction and biological crossover. For evolving the tracks using crossover operator we have defined a crossover point in the chromosome (track) which is chosen to be the middle component, and then by that point crossover is done. By theoretic diagrams explanations it can be understood as follows;

Parent 1

<table>
<thead>
<tr>
<th>Right Curve</th>
<th>V. Straight</th>
<th>Left Edge</th>
<th>H. Straight</th>
</tr>
</thead>
</table>

Parent 2

<table>
<thead>
<tr>
<th>Right Edge</th>
<th>Left Curve</th>
<th>V. Straight</th>
<th>H. Straight</th>
</tr>
</thead>
</table>

This results in two evolved child solutions or tracks Child 1 and Child 2 respectively given as;

Child 1

<table>
<thead>
<tr>
<th>Right Curve</th>
<th>V. Straight</th>
<th>V. Straight</th>
<th>H. Straight</th>
</tr>
</thead>
</table>

Child 2

<table>
<thead>
<tr>
<th>Left Edge</th>
<th>H. Straight</th>
<th>Right Edge</th>
<th>Left Curve</th>
</tr>
</thead>
</table>

After the crossover the tracks are being mutated so that the result could be more modified and evolved. Mutation takes a single chromosome and randomly changes one of a single gene value. In terms of our game randomly changing a track component is called mutation.

6.1.4. Fitness Function and Selection of fittest Track. Fitness Function defines the criteria for the fittest and possible candidate solution for the given problem. For track generation when the track has been evolved it is possible that those tracks might not be even playable, such track cannot become the candidate solutions for next track that would be presented to the player for race. Therefore, to measure this validity of tracks should be checked. In this game project it has been checked carefully that track components which can make a non-playable track. Track fitness evaluates the best fittest track from the candidate population set that should be selected for representing to the player.

Fitness Function: The fitness function has been defined in accordance with the player rank (which is updated after every race completion). Our fitness function replicates the following criteria for selecting the best track
for respective player rank.

If the current rank is beginner then fittest of the tracks is the one which does not provide too much difficulty level for the player and represents a track which contains less than 30% of curves or edges.

If the current rank is intermediate then fittest of the tracks is the one which does not provide too much difficulty level or too much easiness for the player and represents a track which contains 50% of curves or edges and 50% of the straight lines.

If the current rank is expert then fittest of the tracks is the one which does not provide too much easy level for the player and represents a track which contains less than 30% of straight lines.

Therefore, after the fitness evaluation, the track with best fitness result is being selected and is represented to the player for race.

The step by step approach of all this process is given in Figure 2.

![Figure 2](image)

**Figure 2. Step by Step Process of Track generation**

6.2. **Player’s Work Flow Model.** The Player Work Flow model describes the player’s navigation that he/she can do in the game as well as the options or tasks that can be done by the player. The player’s work flow can be visualized by the given model below in Figure 3:

![Figure 3](image)

**Figure 3. Player’s Work Flow Model**

6.3. **Analytical Module.** The Analytical Logic Module in the game will perform the following functionalities:

- Mapping of Mathematical and Physics Formulae in evaluating player profile while the player will be racing; collision detection, speed and moves etc.
- Physics Model to optimize the tracks, and defining the fitness function for track evaluation
- Car Modeling Using Mathematical Models and Physics techniques
• Graphical Interface optimization of scenes, views and axis orientations by geometrical Models
• A simplified physics model allows the car to move in a realistic way. At each level, a bunch of forces are combined to result in acceleration
• The car physics react to some external inputs which will allow for the computation of the forces applied to the vehicle. These inputs are translated from an input device if the car is controlled by a human

6.4. **Graphical Module.** Graphical Module is a module which will map all the Game objects; Cars, Tracks and Race etc. in a graphical user interface screen so that user can interact with them and have a race. Major parts of Graphic module will include:

- Game Objects and Game Assets
- Game Scenes
- Rendering Models

These are the fundamental and most important parts of graphical module, apart from these there are some other modules and sub – modules of the Graphical System prior to development.

7. **Implementation.** The Implementation of the Game which is based upon the above mentioned Game design and policies. For the development of this game we have chosen Unity 3D as the software for development, and implementing all the modules described included the car control and graphics which will provide a graphical interface to the tracks that has been generated.

The Major Focus in the implementation is upon the implementation of the Evolutionary Genetic Module that will be responsible for the new challenging Track Generation. Second major task after the implementation of Evolutionary Module is the integration of that module in the basic Game architecture that has been specified by the shown with the help of prototype.

7.1. **Unity 3D.** Unity 3D is a Cross platform game engine with its well-defined IDE. It is used for creating games for platforms like PC games or Web or Mobile games. The reason for us to choose this platform is to be able to make a good 3D game and also due to its cross platform feature we will be able to provide our game for different platform in near future without making the game all over again [5].

7.2. **Rendering.** One of the main features that this game engine provides is the graphics engine and its ability to render the 3d scenes. We are using its powerful graphics engine to generate the tracks which will be decided on run time based on the genetic algorithm. We are using meshes to render and create the 3d track on run times which is our most important graphics module i.e. to be able to create and render the track on screen which is to be created on run time. Apart from the track, creating the scenes and other graphical works are to be done also with the help of unity’s graphics engine.

7.3. **Scripting.** Unity’s scripting is done with the built on Mono-Develop, which is an open source implementation of the .NET framework. We have used this feature to write the code for different modules in our game. Mainly we have used C# language and also used JavaScript as well. The major parts that include to be implemented via scripts are:

- Complete Genetic Algorithm’s implementation
- Physics and Car controls
- Scene management
- Different controlling scripts for objects
- Shaders and rendering for graphics

Apart from these many other controlling factors including the filling which is to be for saving the Game’s data is also done via scripts.

7.4. **Assets.** Unity 3D provides the support of using the built in assets or creating own materials and game objects. Assets are a very important part of this game engine, even all the scripting is also being saved in the
assets folder of the project. All the game’s objects and related controls are in assets and one can also re-use once created game object or component easily [6].

7.5. Physics Engine Support. Unity provides us a powerful Physics engine that is mainly used for the game’s physics. Player car control also uses this engine for running the car, and all the controlling of car movement as well as the colliders which are used for collision detection and other physics related work are used with the help of this engine.

7.6. Cross Platform. As mentioned Unity 3d provides us with its powerful feature of multi-platform ability, therefore the current game is a pc standalone project so that we could test and manage the resources and computational performance of the game due to the use of genetic algorithm. And for the future work, with the help of unity we can provide the game for other platforms without creating the game all over again.

REFERENCES

A COMPARATIVE STUDY OF DATA MINING TECHNIQUES FOR HCV PATIENTS’ DATA

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ABSTRACT. Hepatitis C is one of the most widespread sources of the liver failure and cancer and represents a major public health problem. Data mining techniques play’s significant role in the field of Health informatics. Therefore we have applied different data mining techniques which include Naïve Bayesian Classification, Decision Tree and Fuzzy C-means on hepatitis C patients’ data for observing the factors of high prevalence of the risk of hepatitis C virus. Machine learning warehouse of University of California is the source from which the dataset has been obtained. Missing values are adjusted using mean value attribute method and the dimensions are trimmed down using PCA which capitulate the seven attributes including class attribute. It has been presented that the results obtained by the algorithms in this paper are better than the other techniques of the compared research papers.

Keywords: Hepatitis C Virus (HCV), Data Mining, Clustering, Classification, Naïve Bayesian Classification, Decision Tree and Fuzzy C Mean (FCM).

1. Introduction. Hepatitis is an inflammation of the liver based on different aetiologies. Clinician distinguished acute from chronic hepatitis [1]. Liver is the body's largest single organ and is necessary for life. The liver get swelled or redish and characterized by the occurrence of inflammatory cells in the tissue of organ due to Hepatitis C. The condition can be self-limiting or can steps forward to fibrosis (scarring) and cirrhosis [2].

1.1. Introduction to Hepatitis C. HCV can be found in blood and possibly in many other body organs, but its favorite hideout is the liver. As the body frequently attempts to demolish the virus in the liver due to which inflammation of the liver occurs. Most people who have been infected with HCV do not have clinically recognized episode of acute hepatitis, but still go on to develop chronic hepatitis C [3].

Thair Nu Phyu [8] presented a comprehensive analysis of different classification methods including Bayesian networks, case-based reasoning, decision tree induction, genetic algorithm and fuzzy logic techniques k-nearest neighbour classifier. T.Karthikeyan and P.Thangaraju [9] provided the study on various classification algorithms namely, Bayes, NaiveBayes, Bayes.BayesNet, Bayes. NaiveBayesUpdatable, J48, Randomforest, and Multi Layer Perceptron. From the UC Irvine machine learning repository, It examines the hepatitis patients. Accuracy and time were the results of classification model. It has been concluded that for hepatitis patients the Naive Bayes performance is superior than other classification technique.

1.2. Data set description. The data of Hepatitis C patients’ has been taken from University of California repository [10]. The data contains 20 attributes (including a class attribute) and 155 instance out of which 32 belongs to death cases and rest of them belongs to live cases. Since there are missing values in data which has been filled using the technique mean value attribute [11]; and the dimensions has been reduced by using Principal Component Analysis [5], to seven attributes (including a class attribute), Table 1 provides the description of these attributes.

1.3. Dividing data into training and test data. The dataset contains 155 instances, which is divided into training and test data. For this purpose we separated the dataset into life and death cases, and then generated a random number for taking 60% data from life cases and 60% data from death cases which has been considered as training set while remaining 40% of both cases are considered as test data sets.

Table 1. Description of attributes selected after data preparation and data reduction step

<table>
<thead>
<tr>
<th>Attribute Name</th>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class</td>
<td>Live or Death</td>
<td>Die/ Live</td>
</tr>
<tr>
<td>AGE</td>
<td>Scaled Attribute</td>
<td>In the dataset, smallest age is 7 and largest age is 78.</td>
</tr>
<tr>
<td>BILIRUBIN</td>
<td>Continuous</td>
<td>A pigment fundamentally derived from the go down of haemoglobin from red blood cells damaged in the spleen</td>
</tr>
<tr>
<td>ALK PHOSPHATE</td>
<td>Scaled Attribute</td>
<td>It is an enzyme exists in the blood.</td>
</tr>
<tr>
<td>SGOT</td>
<td>Scaled Attribute</td>
<td>Serum glutamic oxaloacetic transaminase is an enzyme generally exists in serum. Also, it is present in heart.</td>
</tr>
<tr>
<td>ALBUMIN</td>
<td>Continuous</td>
<td>Serum albumin is the chief protein of blood plasma as well as of other serous solutions.</td>
</tr>
<tr>
<td>PROTIME</td>
<td>Scaled Attribute</td>
<td>Prothrombin is a predecessor of thrombin which is produced in the liver.</td>
</tr>
</tbody>
</table>
2. Naïve Bayesian Classification. Naïve Bayesian is one of the most efficient and effective supervised learning algorithm which is based on Bayes’ theorem. Naïve Bayesian helps to find the uncertainty of the model (new instance) in a principled way by the determination of outcomes’ probabilities (training set). Also it is accurate and fast on the application to huge database [12].

\[
P(H | X) = \frac{P(X | H)P(H)}{P(X)}
\]

(1)

Where:
- \(X\): be a data sample and \(P(X)\) is its probability for identifying the class label.
- \(H\): a hypothesis for identifying the belonging of \(X\) in class \(C\) and \(P \,(H)\) is its probability.
- \(P(X \mid H)\) is the conditional probability of \(X\) given \(H\).

Naïve Bayesian classification use different approaches for categorical and continuous valued attribute. Since in this paper the data contains continuous valued attribute therefore we have discuss about Gaussian distribution used by the Naïve Bayesian algorithm, beside this the technique has been applied in two ways, 1st it is applied on the existing data set and then it is applied on transformed data. Table 3 shows the accuracy of both cases.

2.1. Algorithm applied on Hepatitis C patients’ data.

Step 1: Find the Class Probabilities \(P(C_i)\) on training set.

\[
P(C_i) = \frac{\sum \text{instances } \in C_i}{\sum \text{instances}}
\]

(2)

Step 2: Find the mean (\(\mu\)) and standard deviation (\(\sigma\)) of every attributes except the class attribute on training set.

\[
\mu = \frac{1}{n} \sum_{i=1}^{n} x_i \quad \sigma = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \mu)^2}
\]

(3)

Step 3: Find the conditional independence on test data using Gaussian distribution.

\[
P(x_i \mid C_i) = \mathcal{N}(x_i \mid \mu_{ci}, \sigma_{ci}) = \frac{1}{\sqrt{2\pi\sigma}} e^{-\frac{(x_i - \mu_{ci})^2}{2\sigma^2}}
\]

(4)

Where \(x_i\) are the attribute values for instances \(x\); \(\mu_{ci}\) and \(\sigma_{ci}\) are the mean and standard deviation respectively of the attribute values for training instances of class \(C_i\).

Step 4: Calculate the Posterior Probabilities

\[
P(C_i \mid X) = P(X \mid C_i) \ast P(C_i)
\]

(5)

Step 5: The classifier will predict that \(x \in C_i\) iff

\[
P(C_i \mid X) > P(C_j \mid X)
\]

Where \(1 \leq j \leq m, j \neq i; m\) is the number of classes

Step 6: Validate the Results using

\[
\text{Accuracy} = \frac{\text{TruePositive + TrueNegative}}{\text{Total}} \ast 100
\]

(7)

2.2. Applying transformation on data sets. In order to improve the results we have applied transformation technique on attribute level. For this the attribute Bilirubin has been transformed with Logistic regression which is one of the method to describe the association among a categorical response variable and a set of predictor variables [13]. The other attribute like Alk Phosphate, Sgot, Albumin, Protimie are transformed by taking the log of values. After applying the transformation, attributes have been scaled through multiplying the attributes by 100 and then Naïve Bayesian Classification has been applied as describe earlier.
2.3. Accuracy of the result

Table 2. Cases and accuracy of Naïve Bayesian Implementation

<table>
<thead>
<tr>
<th>Cases</th>
<th>Accuracy of the result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Applying Any Treatment to the Data Set</td>
<td>95.102%</td>
</tr>
<tr>
<td>After Applying Transformation and Scaling</td>
<td>96.7347%</td>
</tr>
</tbody>
</table>

3. DECISION TREE. These programs used a set of training cases in the construction of a decision tree T. to exactly describe information gain; first a measure is to be defined normally used in information theory, termed as entropy which measures the disorderness in the information that describes the impurity of an arbitrary collection of examples.

\[
\text{Entropy}(S) = -pp\log_2 pp - pn\log_2 pn
\]

where \( pp \) is the ratio of constructive examples in \( S \) and \( pn \) is the proportion of pessimistic examples in \( S \) [14].

The information gain, \( \text{Gain}(S, A) \) of a feature \( A \), relative to set of examples \( S \), is defined as

\[
\text{Gain}(S, A) = \text{Entropy}(S) - \sum_{V \in \text{Values}(A)} \frac{|S_v|}{|S|} \text{Entropy}(S_v)
\]

where \( \text{Values}(A) \) is the set of all possible values for attribute \( A \), and \( S_v \) is the subset of \( S \) for which attribute \( A \) has value \( v \) (i.e., \( S_v = \{ s \in S \mid A(s) = v \} \)).

\( \text{Gain}(S, A) \) is the expected caused of reduction in entropy by finding the value of feature \( A \). The method of choosing a new feature and categorization the prepared examples is recurring for each non-terminal successor knob, this time we use only the prepared examples associated with that knob. Features that have been included higher in the tree are disqualified, so that every feature can show at most once along any pathway through the tree. This method repeat for each new knob until either every feature has already been incorporated along this pathway through the tree, or the prepared examples associated with this knob, all have the same target feature value (i.e., their disorderness is reduced to zero).

![Decision Tree](image)

Figure 2. Decision Tree

We have applied MIN-MAX and Difference transformations on our data set which provides the accuracy of 96% accurate result. Min-max normalization is used to transform the data values for number attribute into the range \([0, 1]\) and in Difference transformations each category of the predictor variable except the first category is compared to the average effect of previous categories also known as reverse Helmert contrasts [15].

Table 3 shows the accuracy obtained by the Decision Tree technique after executing the algorithm more than twenty numbers of time.
Table 3. Result obtained

<table>
<thead>
<tr>
<th>Correctly classified instances</th>
<th>Incorrectly classified instances</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>90</td>
<td>3</td>
<td>96</td>
</tr>
</tbody>
</table>

4. Fuzzy C-Mean Clustering (FCM). Fuzzy c-means is one of the technique of clustering which permit one part of data to fit in to two or more clusters. The existence in the kth cluster \( w_k(x) \) is defined by the set of coefficients of any point \( x \). With fuzzy c-means, depending on the level of belonging to the clusters the centroid of cluster is measured as the mean value of all points.

\[
G_x = \frac{\sum_{k=1}^{K} w_k(x) \cdot x}{\sum_{k=1}^{K} w_k(x)}
\]

The rank of fitting into \( w_k(x) \) is inversely correlated to the distance to the cluster center from \( x \) as previously defined. Which depends also on parameter \( m \) that controls the level of weight given to the closest centre. The minimization of following objective function on which it is based upon.

\[
J_m = \sum_{i=1}^{N} \sum_{j=1}^{C} u_{ij}^m \| x_i - c_j \|
\]

where \( m > 1 \) belongs to real number, \( u_{ij} \) is the degree of membership of \( x_i \) in the cluster \( j \), \( x_i \) is the measurement of data in ith dimensional, \( c_j \) defines the d-dimension center of cluster, and \( \| \cdot \| \) is any norm showing the likeness among the center and any calculated data. This function leads to Fuzzy partitioning after moving through an iterative optimization, with renewing of membership \( u_{ij} \) and the cluster centers \( c_j \) by:

\[
u_{ij} = \frac{1}{\sum_{k=1}^{K} u_{ik}^m \| x_i - c_k \|^{-1}} \left( \frac{\| x_i - c_j \|^{-1}}{\| x_i - c_k \|^{-1}} \right)^{m-1}
\]

\[
u_j = \frac{\sum_{i=1}^{N} u_{ij}^m \cdot x_i}{\sum_{i=1}^{N} u_{ij}^m}
\]

\[
\max \{ u_{ij}^{m+1} - u_{ij} \} < \varepsilon
\]

is the criteria to stop the iteration, Where \( \varepsilon \) is a termination criterion between 0 and 1, \( k \) is the iteration steps, this process meets to a local minimum or a saddle point of \( J_m \) [16].

Defuzzification is the process of alteration of fuzzy output. Before applying defuzification all the fuzzy outputs of the system are aggregated using a union operation [17], which is the max for the set of given membership functions and can be calculated using:

\[
\mu = U_1 (\mu(x))
\]

4.1. Algorithm applied on Hepatitis C patients’ data

Step 1: Applying fuzzy c-mean Cluster requires two clusters because there exist two cases of life and death.

\[
[\text{center}, \text{U}, \text{obj_fcn}] = \text{fc}m(\text{data}, \text{cluster_n})
\]

Step 2: Applying maximum defuzzification so we will put instances in different classes:

\[
\text{if } ( U(1,i) > U(2,i) ) \text{ Class } = 1 \text{ else Class } = 2
\]

Step 3: Finally finding the accuracy using the following formula:

\[
\text{Accuracy} = \frac{(\text{TruePositive} + \text{TrueNegative})}{\text{Total}} \times 100
\]

After repeating the iteration more than thirty times we obtained the average accuracy of 99.18%.

5. Results And Comparison. Before proceeding for model fitting, we have filled the missing values using mean value attribute technique. Then we reduce the dimension using principal component analysis as because the data have the problem of dimensionality’s curse. After data reduction, the seven independent variables are
Age, Bilirubin, Alk Phosphate, Sgot, Albumin and Protime. Table 4 shows the accuracies of various data mining techniques applied on HCV patients’ data. Table 5 shows the shows the accuracy percentage of classification and clustering technique applied on this paper.

**TABLE 4. Accuracies obtained by using hepatitis C diagnostic methods**

<table>
<thead>
<tr>
<th>Used method</th>
<th>Article author’s</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANN</td>
<td>Tahseen A. Jilani</td>
<td>89.6</td>
</tr>
<tr>
<td>RBF</td>
<td>Özyıldırım, Yıldırım, et al.</td>
<td>83.75</td>
</tr>
<tr>
<td>Naïve Bayes and semi NB</td>
<td>Stern and Dobnikar</td>
<td>86.3</td>
</tr>
<tr>
<td>15NN, stand. Euclidean</td>
<td>Grudzinski</td>
<td>89</td>
</tr>
<tr>
<td>FSM without rotations</td>
<td>Adamczak</td>
<td>88.5</td>
</tr>
<tr>
<td>IncNet</td>
<td>Norbert Jankowski</td>
<td>86</td>
</tr>
<tr>
<td>LVQ</td>
<td>Stern and Dobnikar</td>
<td>83.2</td>
</tr>
<tr>
<td>REGRESSION MODEL</td>
<td>Tahseen A. Jilani</td>
<td>89.6</td>
</tr>
<tr>
<td>CART (decision tree)</td>
<td>Stern and Dobnikar</td>
<td>82.7</td>
</tr>
<tr>
<td>RBF (Tooldiag)</td>
<td>Adamczak</td>
<td>79</td>
</tr>
<tr>
<td>Bayes.NaiveBayes</td>
<td>T.Karthikeyan, P.Thangaraju</td>
<td>84</td>
</tr>
<tr>
<td>Bayes.BayesNet</td>
<td>T.Karthikeyan, P.Thangaraju</td>
<td>81</td>
</tr>
<tr>
<td>MLP</td>
<td>Özy ildirim, Yıldırım, et al.</td>
<td>74.37</td>
</tr>
<tr>
<td>GRNN</td>
<td>Özy ildirim, Yıldırım, et al.</td>
<td>80</td>
</tr>
<tr>
<td>1NN</td>
<td>Stern and Dobnikar</td>
<td>85.3</td>
</tr>
</tbody>
</table>

**TABLE 5. Proposed methods**

<table>
<thead>
<tr>
<th>Algorithm</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAIVE BAYESIAN CLASSIFICATION</td>
<td>95.102</td>
</tr>
<tr>
<td>NAIVE BAYESIAN CLASSIFICATION (On Transformed Data)</td>
<td>96.7347</td>
</tr>
<tr>
<td>DECISION TREE</td>
<td>96</td>
</tr>
<tr>
<td>FUZZY C-MEAN CLUSTERING (FCM)</td>
<td>99.1837</td>
</tr>
</tbody>
</table>

In proposed methods table 5 we found that the FCM have more accurate answer than other but as there are only two classes in the data set and clustering technique always give better accuracy for less number of classes, beside this the classification technique applied on this paper have better results than the methods used on other mentioned papers of table 4, we applied decision tree after transforming the data where the Naïve Bayesian classification applied on non transformed and transformed data respectively. We have observed that the transformation improves the accuracy percentage of applied algorithm.

6. **Conclusion And Future Studies.** This paper provides the study on various data mining technique to investigate the factors of high prevalence of the risk of hepatitis C virus. In healthcare organizations providing the outstanding services involved diagnosing patients appropriately and managing the treatments in a valuable manner is becoming a core challenge. Impropar clinical decision can cause terrible results which are consequently unacceptable; therefore the focus is on using different algorithms for effective prediction of hepatitis C virus. This work can be more extended for the automation of Hepatitis C virus forecast. All the proposed techniques will be applied on real data from health care organizations and agencies and optimum accuracy will be compared. We also aim to implement K-mean, SVM and other data mining algorithm.

**Acknowledgments.** We want to give our special thanks to Badar Sami, Usman Amjad, Muhammad Najamuddin and Muhammad Hassan Ali for their support with the evaluation.
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ATTITUDE OF PAKISTAN’S INDIVIDUAL INVESTOR TOWARDS RISK DURING BULL AND BEAR MARKETS

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ABSTRACT:The study is based on analyzing Pakistan’s individual investor by contrasting their behavior in bull market (2007 & 2010) and bear market (2008-2009). The major objective of study is to examine whether the attitude, perception and preferences towards risk, book to market valuations are different between varying market conditions. Empirical investigation is done by using data of 100 companies of different sectors for four years. Price earnings ratio, Book to market value, systematic risk, volatility and abnormal returns are used as measure of risk in six different regression models along with intercept and interactive dummies. Individual level of ownership is used as attitude towards risk. Due to some behavioral biases, Overall Individual investor attitude towards risk is similar in both market condition except a significant behavioral difference is identified between bull and bear market and such behavior is associated with Book to Market Valuation only.

Key words: Overconfidence, Individual investor behavior, Bull and bear market

Introduction:Traditional finance ignores the biases that impact the investor behavior since it assumes the investors to act rationally. Behavioral finance is the application of psychology to financial behavior. People may not always be “rational” but they are “human”. Behavioral finance exposes irrationality of investors. Several psychological biases impact on investor behavior leading to non-optimal investment decisions. Among many explanations of irrational behavior one is that investors are influenced by overconfidence bias. Physiological studies have revealed that people are overconfident about their abilities and highly optimistic about their future. When it comes particularly to investing, overconfidence causes individuals to exaggerate their own abilities to forecast future outcomes and events.

Impact of psychological biases especially overconfidence on investor behavior has raised questions as how individual investor attitudes and preferences towards risk differ during varying market conditions. The purpose of the study is to examine if there are differences in investor preference in bull state as compared to other market conditions. Changing market conditions provide us with a basis upon which we investigate if varying market conditions relate to investor behavior, more specifically how investor attitude changes by the presence of bull and bear markets. To analyze the investor behavior under the presence of bull and bear periods, the definition of these states must be made clear. Rising prices indicate bullish market while falling prices indicate bearish market. In bull state average return is positive and greater than average return in bear state (Owain etal.) Depressed market is bear market characterized by a fall of more than 10% in
benchmark stock index (Anna & Mervi 2012) while an increase of greater than 15% in benchmark stock index is bull market (Peterson & Berglund 2007).

The objective of the study is to contribute empirical evidence on individual investor behavior. The study will specifically be focusing on Pakistan data to compare individual investor behavior during bull and bear markets. The reason to focus on Pakistan’s data is that Pakistan experienced bear market for two years period and by a bull market for two years period. It provides the basis to study investor behavior during varying market conditions and examine how physiological biases specifically overconfidence biasness is related to market conditions. Stock level data of Pakistan will be used to examine the behavior and performance of individual investors. In particular Investor attitude towards risk, book-to-market valuations will be measured during varying market conditions.

Functioning of financial markets was primarily based on key assumption, rationality of investors provided by traditional finance theory. The perspective on financial market functioning is leading to a new dimension behavioral finance. Behavioral finance provides new models to understand the functioning of financial markets provided that most of the investors while investing in financial markets will not be fully rational. Many studies has been conducted to study the behavior, attitude, perceptions and preferences of investors for making investment decisions (Selden, 1912; Festinger, Riecken and Schachter, 1956; Pratt, 1964; Tversky and Kahneman, 1974; Kahneman and Tversky, 1979). Traditional finance theory assumes that investor will behave rationally when making investments but behavioral finance states that investors will not be fully rational rather their decisions are influenced by several biases (Rabin, 1998). Investor Psychology is a significant dimension of behavioral finance (Shleifer and Summers, 1990). Investors can behave irrationally by taking more risk (Alpert and Raiffa, 1982), chasing past trends to gain abnormal returns (Andreassen and Kraus, 1988), underreact to new information (DeLong et al., 1990). This study tries to understand the behavior of individual investors during different market conditions within the framework provided by behavioral finance.

Few studies have examined Pakistani individual preferences while making investments in financial markets. The objective of the study is to analyze the behavior of individual investor of Pakistan during different market conditions. Investor behavior will be measured by the attitude and preferences that the investor holds while making investment in financial markets. Market conditions understudy are Bull and Bear markets. The study is based upon the representative stock market of Pakistan: Karachi Stock Exchange.

Bull and Bear Market States of Pakistan: The aim of study is to investigate investor behavior during varying market conditions. The study will be based on testing whether individual investor behavior will be different during varying market conditions. The study is specifically based upon Pakistani investors during bear market (2008-2009) and bull market (2007&2010). Criteria for the measurement of Market condition (Bull and bear markets) is change in representative index value and average annual return. Pakistan’s market experience crushing bear market for two year period (2008 & 2009) characterized by 24.05% decline in KSE-100 index value. The decline in KSE-100 index (Benchmark index) is greater than 10%, 2008 and 2009 is a bear period (Peterson & Berglund). Annual return in 2008 and 2009 was -40.52%. Negative return in this period makes it a bear market (Owain et al.). Bull period (2007&2010) is characterized by increase in KSE-100 index by 40.19% (2007) and 19% (2010). The increase in KSE-100 index (benchmark index) is greater than 15% which makes these years as bull period (Peterson & Berglund). Annual return was 33.53% (2007) and 24.75% (2010). Annual return in both years is positive and greater than returns of 2008 & 2009 which makes this period as bull period (Owain et al.). During bull and bear periods of KSE investor behavior will be tested in varying market conditions.
Objectives of Study: The main objectives of study include:
- To analyze the Pakistan’s individual investor behavior during varying market conditions.
- To test whether the attitudes and perceptions of Pakistan’s individual investors towards risk are different between market conditions
- To identify the impact of overconfidence biasness on different market conditions

Significance of Study: Empirical research on investor behavior in bull and bear markets specifically Pakistan is scant. Most of the research on investor behavior is been conducted on US investors as extensive datasets on US individual investors are available for study. Through the study, we contribute to the existing overconfidence literature by conducting tests to see whether individual investing behavior is related to market conditions or not. Taking the case of Pakistan as a base for study is due to the fact that it is a unique country that has several characteristics of common law legal system: separate sets of reporting requirement (Accounting and Tax purposes), no direct involvement of government in standard setting, Pakistan also exhibits characteristics of code law legal system: weak equity market, debt as major source of financing and low transparency in financial reporting (Baig, 1997).

Understanding the psychological biases impact on investor behavior is important as such biases and emotions affect investment decisions and investors can misplace their wealth. Understanding of such biases will allow taking suitable actions or corrective measures to reduce biases impact on investment decisions potentially leading to improved investment results.

Literature Review: Traditional finance theory suggest that Investment decision of investors is primarily based upon two factors: Expected risk and return. Taking these two factors into consideration investors design their investment strategy and try to optimize expected return and behave rationally. In recent years behavioral finance has been the core subject of interest for the researchers. Recent studies in behavioral finance reveals that financial decisions of investors depend upon numerous internal and external behavioral factors(Shefrin, 2000; Shlefier, 2000). Numerous research has been done on investor behavior and several factors have been identified that impact on making individual investment decisions especially in stocks. Key assumption of traditional finance theory is that individuals make rational decisions (Sultana, 2010). Investment decisions of individual is influenced by emotions and unconscious biases that lead people to non-optimal decisions.

Many studies have been conducted to why investors act irrationally and alternative explanations have been made through behavioral finance theories to justify the irrational behavior of investors. It is the human
nature that we relate the success to our own abilities (Wolosin, Sherman and Till (1973), Langer and Roth (1975), Miller and Ross (1975)). According to (Hastrof, Schneider and Polifka 1970) “We are prone to attribute success to our own dispositions and failure to external factors.” When people past investment decisions are wrong, they experience regret (Yahyazadehfar, Ghayekhloo and Sadeghi). According to (Sevil, Sen and Yalama 2007) people try to justify their wrong decisions by putting the responsibility on some other reference point. The bias in human nature about his abilities leads him to be overconfident.

Investor behavior has been the core subject of research during inflating stock prices i-e bull market. The focus of the study is to test whether similar behavioral factors are prevalent in declining stock prices i-e bear market? People are naturally overconfident. It has been proved by Physiologists that people exaggerate their own abilities and underestimate risk. According to Nofsinger (2001) overconfidence is exhibited greatly in making investment decisions. Barber and Odean suggest that investors are overconfident in their abilities. Over confidence being the behavioral trait leads to greater trading volume and trading mistakes especially in bull market.

**Individual Investor Behavior in Pakistan:**

**Reluctance to Invest in Stock Market:** It has been observed that people of Pakistan are reluctant to invest in stock markets. People of Pakistan are more interested to invest in real estate, starting new venture, depositing money to ensure capital protection or invest in foreign currency, gold etc. Stockholding portion of individuals is impacted by awareness, social interaction, financial literacy, informational and entry cost (Fouzia, Nabeela and Ali 2012). Surprisingly households of developed countries hold limited or no stocks. According to a research by Guiso, etal in 2003 revealed that US and Sweden has high rates of stockholdings even than their 50% of households do not invest in stocks. Most of the Pakistani investors have not embraced equity as an attractive investment.

According to Farrukh (2010) Investment in stocks is generally perceived to be extremely risky and the chances of losing money are high. That is due to the fact that stock market of Pakistan is believed to be controlled by the brokers (that are also the owners of stock exchange). Another reason is instability in Political and economic condition of Pakistan.

Recent boom in real estate and property sector of Pakistan has led to high return investment option to the people. Greater investment in real estate is due to the fact that prices of real estate are continuously increasing in Pakistan. Starting of housing schemes has attracted people investment towards real estate, rental income, as a stable source of income from an asset is also a reason for huge investments in real estate. It is a general perception of Pakistanis that land remains a good and long term investment. People of Pakistan are also perceived to be savers. They prefer capital protection and are generally risk averse. They invest their savings in Saving accounts, National saving schemes etc. (Farrukh, 2010)

Although investment in Equities is riskier, it also offers higher returns to compensate for the risk. Despite the above facts and statistics Pakistani households do invest in stocks. According to the economic survey 2011-2012 Per Capita Real Income in Pakistan is $1372. Total investment in Pakistan is 12.5% of GDP. Fixed Investment 11.5% of GDP, Private Investment 7.9% of GDP, Public Investment 3% of GDP and National Savings are 10.7% of GDP (Economic Survey of Pakistan 2011-2012). The portion of stockholding by general public of Pakistan in 50 listed companies on three major stock exchanges of Pakistan is 28.57% on an average. Pakistani individuals are involved in buying and selling of stocks as an investment.

**Overconfidence:** In behavioral finance overconfidence has widespread importance. Overconfidence can be defined in three ways:

- Overconfidence is measured through overestimation of one’s abilities (Soll, 2007)
- Another measure of risk is when people consider themselves better and superior relative to others (Larrick, Burson & Soll 2007).
- Excessive precision in prediction of prices (Barber & Odean 2000)
Overconfidence is one of the physiological characteristics of investors that are highly researched in behavioral finance.

There are two major implications of investor overconfidence. Failure to realize being at informational disadvantage and excessive trading volume. Shefrin (2000)

Overconfident investors can make following investment mistakes:

- Overconfident investor overvalues his own abilities and undervalues the available information. Available information might signal not to invest but overconfident investor will invest irrespective of expected negative gains.
- Overconfident investors trade excessively that might lead to poor performance overtime.
- Overconfident investors take more risk as they overestimate their abilities which has an impact on portfolio performance.
- Overconfident investors are not risk averse, giving preference to risk leads to an under diversified portfolio. (Behavioral Finance and wealth management by Michael Pompian)

**Overconfidence and Efficient Market Hypothesis:** Investor’s objective can be to beat the market by earning abnormal returns. Efficient market hypothesis suggest that information is accessible to everyone, every investor can earn only normal returns. Symmetrical information doesn’t allow the investors to make prediction about future returns. In efficient market, information available to investors is random that make the movement in prices random. Planned investment strategy will never be fruitful in Efficient Market. (Farhan et al, 2012).

Recent empirical studies have investigated the impact of overconfidence biasness on efficient market hypothesis. According to De Bondt and Thaler 1995 overconfident investors trade excessively that leads to high trading volume and thus disturbing the efficient market. Overconfident investors neglect risk factors, overestimate investment decisions, and ignore market realities that make the market less efficient. Asian investors exhibit significant overconfident trading behavior (Wen, Bong & Kai).

**Overconfidence and Market Conditions:** An investor with superior past performance will build higher future expectations, leading him to be overconfident and this results in complete failure. The tendency of past winners can lead to future loses (De Bondt & Thaler). According to Barber and Odean(2008) individual investors mostly buy attention grabbing stocks. Attention grabbing stocks are the stocks that are in news, with higher publicity, excessive return for a particular day or higher trading volume. Too many people overestimate what they are not and underestimate what they are (Malcolm s. Forbes). Numerous studies have shown that investors are overconfident in their investing abilities. Overconfidence can lead to several investment mistakes. It can also impact investor portfolio. Rational investor will seek and trade the information that will lead to profit maximization. Overconfident investor is highly optimistic about his abilities and believes that he has special knowledge that other lack that leads to excessive trading volume and thus reducing the anticipated utility. Overconfident investors can even trade when returns are expected to be negative (Barber and Odean). Over confident investors trade more (Bias et al, 2000). Overconfident investors respond more to private information and overlook widely accessible information (Daniel et al, 1998).

**Attribution Bias:** Attribution bias makes the investor overconfident by attributing success to his own abilities during bull market. Investors are not overconfident in bear market but they hold external factors responsible for their failure. Attribution bias relate to bull market. Investors in bear markets are less overconfident making improved investment decisions as compared to bull market. The results on individual trading performance during bull markets align with overconfidence theories. (Odean1998b). Overconfidence causes people to make poor decisions, so more trading mistakes are expected in bull market. In a bull market investor try to attribute their success and abnormal returns to his own abilities, therefore investor exhibit more overconfident behavior during bull market as compared to other market conditions like bear market (Zhen-Si & Na-Wang, 2012).

**Hypothesis:** To study individual investor behavior Pakistan’s data will be used to compare individual investor behavior during bull market to their behavior in bear market. Using this data, it can be examined
whether investor behavior relate to market conditions or not. Individual investor portfolio data was used in prior studies to examine the investor behavior. Investor behavior in Pakistan will be examined using the stock level data. Pakistan’s stocks with different levels of individual ownership will be used to examine the behavior of individual investor.

**Null Hypothesis:** Investors will behave similarly across both market conditions

**Alternative Hypothesis:** Investors will behave different among both market conditions

Existing overconfidence literature states that investors perform different among both market conditions. When investors are influenced by overconfidence biasness, they mostly hold riskier stocks, more excessive trading and trading mistakes are prevalent during bull market. We will examine whether it holds true in case of Pakistan.

**Econometric Model:** To examine the relationship between Individual level of ownership and independent variables we estimate the following equation:

\[
\text{Level} = a_1 + b_1 \text{ (Independent Variable)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{Independent Variable}
\]

**Variables:** Level is the dependent variable and it is the individual level of ownership in firm’s stock. Independent variables are Price to Earning ratio, B/M ratio, Beta, abnormal returns and volatility. Using different independent variables we derived 7 models using regression analysis for each model. Dbear is the dummy variable and it equals one when observation is during bear market (2007&2008). \(a_1\) and \(b_1\) are the coefficients and are interpreted through relationship between individual level of ownership and independent variable in bull market. \(a_2\) and \(b_2\) are the coefficients and are interpreted as the change in relationship between bull and bear market. They are used to test whether the individual investor behavior in bull market is significantly different from their behavior in bear market.

In model 1, independent variable is Volatility
\[
\text{Level} = a_1 + b_1 \text{ (Volatility)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{Volatility}
\]

In model 2, independent variable is Beta
\[
\text{Level} = a_1 + b_1 \text{ (Beta)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{Beta}
\]

In model 3, Independent variables are both measures of risk (Volatility and Beta)
\[
\text{Level} = a_1 + b_1 \text{ (Volatility and Beta)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times (\text{Volatility and Beta})
\]

In model 4, independent variable is Book to Market Ratio
\[
\text{Level} = a_1 + b_1 \text{ (B/M)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{B/M}
\]

In model 5, independent variable is Abnormal Returns
\[
\text{Level} = a_1 + b_1 \text{ (Abnormal returns)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{Abnormal returns}
\]

In model 6, independent variable is Price to Earning Ratio
\[
\text{Level} = a_1 + b_1 \text{ (P/E)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{P/E}
\]

In model 7, all independent variables Volatility, Beta, Book to Market Ratio, Abnormal Returns and Price to Earning ratio
\[
\text{Level} = a_1 + b_1 \text{ (independent variable)} + a_2 \text{D}_{\text{bear}} + b_2 \text{D}_{\text{bear}} \times \text{independent variable}
\]

**Data:** The study is based on bull and bear market of Pakistan but it is limited to four years 2007-2010. In 2007 Pakistan’s representative market KSE-100 Index experienced tremendous growth KSE-100 Index reached to 14075.83 and with an annual return of 33.53%. In 2008 and 2009 Pakistan’s stock market experienced a crash and overall trend was bearish. We have used years 2008-2009 as bearish period and Years 2007 and 2010 as bullish period in Pakistan. 21 companies are selected to examine the individual investor behavior in varying market conditions. All selected companies are listed on Karachi Stock
exchange. These companies are from leading sectors of Pakistan Oil and Gas, Textile, cement, chemicals, banking, insurance and food sector.

Currently three stock exchanges are working in Pakistan: Karachi Stock Exchange, Islamabad Stock Exchange and Lahore Stock Exchange. Karachi stock Exchange is the oldest, largest and representative stock market of Pakistan. Karachi stock exchange was established in 1947 and started trading with 50 share index.KSE -100 Index was introduced in 1991.Today more than 660 companies are listed on Karachi Stock Exchange.KSE-100 index is a capital weighted Index with a basket of 100 companies. Karachi stock exchange is the representative stock market of Pakistan and KSE- 100 Index is the benchmarked index for Pakistan’s stock market.

Individual level of stock ownership and financial data of selected companies is taken from company’s annual reports and KSE analysis reports of companies. According to a notification of SECP, a company has to report its pattern of shareholding to disclose the aggregate no of shares along with detailed categories of shareholders in their annual reports. Among the categories of shareholders, there are associated companies, mutual funds, financial institutions, non-banking finance companies, modarabas, pension funds government, public sector companies and corporations, directors and Individuals (Domestic & Foreigners). Individual investment can be by residents of Pakistan or by foreigners. We are interested to examine the Pakistan’s individual investor behavior we do not incorporate foreign investors in the study.

Individual level of ownership is the dependent variable in study. Individual level of ownership is the ratio of total shares owned by individual investors from the total outstanding shares of company. Price to Earning ratio, Book to Market ratio, Abnormal Returns, two measures of risk: Beta & volatility are independent variables. Earning per share is the ratio of earnings available to common stockholders and Total number of outstanding shares of company.EPS represents the number of Rs earned during the period on behalf of each outstanding share. Price to Earning ratio is the ratio of Market price of stock and Earning per share. P/E ratio measures the amount the investors are willing to pay for each Rupee of a firm’s Earnings. Book to market ratio is the ratio of Book value per share of company and Market price for each share of company. Volatility of each company is measured through sigma.

Individual level of ownership for each selected company was derived from company’s annual reports. Earnings per share, Price to Earning ratio, book to market ratio was collected from Analysis report of companies on KSE website for the year 2007-2010.This study uses daily closing value for Karachi stock Exchange (KSE- 100 Index) from Jan 1, 2007 to Dec 31 2010.

Data on closing value of KSE 100 index was collected from online database SKY Drive. Abnormal returns for each company are calculated by subtracting the KSE-100 index returns (Market Returns) from the company returns. Sigma is used to measure volatility of each company. Sigma for the individual companies is calculated from returns of company daily closing share prices for the period 2007-2010.

### Individual Investor Attitude towards Risk during Bull and Bear Markets of Pakistan Regression Analysis of Stock Characteristics and Ownership in Bull and Bear Markets

<table>
<thead>
<tr>
<th>Model</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.0926 (1.786)</td>
<td>0.1779 (8.747)</td>
<td>0.0939 (1.794)</td>
<td>0.0874 (3.438)</td>
<td>0.1781 (8.724)</td>
<td>0.1918 (8.545)</td>
<td>0.1210 (1.3041)</td>
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<tr>
<td>Volatility</td>
<td>2.7820 (1.768)</td>
<td>2.7565 (1.739)</td>
<td></td>
<td></td>
<td></td>
<td>-0.3194 (-0.124)</td>
<td></td>
</tr>
<tr>
<td>Beta</td>
<td>0.0290</td>
<td>0.0213</td>
<td></td>
<td></td>
<td></td>
<td>-0.1917</td>
<td></td>
</tr>
</tbody>
</table>

77
To examine the relationship between individual level of ownership and independent variables (Book to Market, Price to Earning ratio, Abnormal Returns, Beta and Standard Deviation) during bull and bear markets in Pakistan following equation is estimated:

\[ \text{Level} = a_1 + b_1 (\text{Independent Variable}) + a_2 D_{\text{Bear}} + b_2 D_{\text{Bear}} (\text{Independent Variable}) \]

Level of individual ownership of the firm's stock is Dependent Variable. Independent Variables are Book to Market Ratio, Price per Earning Ratio, Beta, Abnormal Returns and Sigma. D*bear equals one when observation is during bear market. Coefficients \( a_1 \) & \( b_1 \) shows the relationship between level and independent variable during bull market. Coefficients \( a_2 \& b_2 \) shows the change in relationship between bull and bear market. T-statistics is estimated using a pooled approach on the panel data of Pakistan’s bull and bear markets.

**Results:** T-Statistics is calculated using Pooled ordinary least square approach and is reported in table in parenthesis. In model 1, we have tested the relationship between ownership and volatility. The coefficient for the relationship between these two variables is insignificant (2.78).In model 2, beta is independent variable. Beta is another measure of risk. Individual level of ownership doesn’t align with beta in bull and bear market. As the results for both measures of risk appear to be similar using least square regression. It is possible that these two measures of risk are viewed to be same in eyes of the investor. In model 3, the

<table>
<thead>
<tr>
<th></th>
<th>(0.375)</th>
<th>(0.278)</th>
<th></th>
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<tbody>
<tr>
<td>BM</td>
<td></td>
<td></td>
<td>0.1135</td>
<td>(4.955)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.1046</td>
<td>(2.556)</td>
</tr>
<tr>
<td>Abnormal Returns</td>
<td></td>
<td></td>
<td>1.8016</td>
<td>(0.355)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.9621</td>
<td>(0.506)</td>
</tr>
<tr>
<td>P/E</td>
<td></td>
<td></td>
<td>-0.00091</td>
<td>(-1.438)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.000860</td>
<td>(-0.971)</td>
</tr>
</tbody>
</table>

**Estimates for Bear Market**

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
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<tbody>
<tr>
<td>Intercept D*Bear</td>
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<td>0.1469</td>
</tr>
<tr>
<td></td>
<td>(5.968)</td>
<td>(8.7744)</td>
<td>(5.968)</td>
<td>(6.659)</td>
</tr>
<tr>
<td></td>
<td>0.1774</td>
<td>0.1918</td>
<td>0.1774</td>
<td>0.1918</td>
</tr>
<tr>
<td></td>
<td>(8.689)</td>
<td>(8.545)</td>
<td>(8.689)</td>
<td>(8.545)</td>
</tr>
<tr>
<td></td>
<td>0.1619</td>
<td>0.1785</td>
<td>0.16264</td>
<td>0.1469</td>
</tr>
<tr>
<td></td>
<td>(5.968)</td>
<td>(8.7744)</td>
<td>(5.968)</td>
<td>(6.659)</td>
</tr>
<tr>
<td></td>
<td>0.1774</td>
<td>0.1918</td>
<td>0.1774</td>
<td>0.1918</td>
</tr>
<tr>
<td></td>
<td>(8.689)</td>
<td>(8.545)</td>
<td>(8.689)</td>
<td>(8.545)</td>
</tr>
<tr>
<td>Volatility D*Bear</td>
<td>1.2432</td>
<td>1.2947</td>
<td>1.2432</td>
<td>1.2947</td>
</tr>
<tr>
<td></td>
<td>(0.845)</td>
<td>(0.875)</td>
<td>(0.845)</td>
<td>(0.875)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2.0065</td>
<td>(0.408)</td>
</tr>
<tr>
<td>Beta D*Bear</td>
<td>0.0476</td>
<td>0.0514</td>
<td>0.0476</td>
<td>0.0514</td>
</tr>
<tr>
<td></td>
<td>(0.599)</td>
<td>(0.645)</td>
<td>(0.599)</td>
<td>(0.645)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.2402</td>
<td>(0.586)</td>
</tr>
<tr>
<td>BM D*Bear</td>
<td></td>
<td></td>
<td>0.0803</td>
<td>(2.853)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>0.0038</td>
<td>(0.065)</td>
</tr>
<tr>
<td>Abnormal Return D*Bear</td>
<td></td>
<td></td>
<td>1.1704</td>
<td>(0.0798)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1.5422</td>
<td>(0.091)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.000914</td>
<td>(-1.438)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>-0.00036</td>
<td>(0.293)</td>
</tr>
<tr>
<td>R-Square</td>
<td>0.0367</td>
<td>0.001711</td>
<td>0.03765</td>
<td>0.230387</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>0.024598</td>
<td>0.2602190</td>
</tr>
</tbody>
</table>
relationship between individual level of ownership and risk measures (beta and volatility) are used. The bull and bear market coefficients for risk and beta appear to be insignificant which indicates that investors perceive the two measures of risk as similar. In model 4, the relationship between individual level of ownership and book to market ratio is tested. The intercept dummy coefficient for book to market ratio is positive and significant which states that individual investor behavior related to book to market ratio in bull and bear market is different. While the slope dummy intercept in bear estimates is also significant this indicates that investors prefer value stocks during bear market. Value stocks are the stocks with higher Book to Market Ratio. Model 5, tests the relationship between individual level of ownership and Abnormal returns. Abnormal returns are an indicator of stock performance. Positive estimates of the relationship between the two variables indicate that investors over perform. Investors tend to hold the stock with positive abnormal return. There is no significant change observed in bear market for stock performance which states investors also hold the stocks with positive abnormal returns in bear market. Model 7, shows the relationship between Individual level of ownership and all independent variables. In model 7 measures of risk, volatility and beta appears to be negative during the bull market. These results are inconsistent with the results of Model 1,2 and 3. All other results for the independent variables are similar to previous regression results.

**Summary of Results:** Our regression findings suggest behavioral factors of individual investor of Pakistan. Individual investor of Pakistan prefers the stocks which have higher book to market ratios in bear market. There does not appear any significant change for the estimates of measures of risk (volatility and beta), Price per earning share and abnormal returns in bull and bear market. The individual investor behavior related to these independents variables appear to be similar in both market conditions in Pakistan stock market.

**Justifications for Similar behavior of Pakistan’s Individual Investor During bull and bear Market:** The regression results indicate positive significance impact of Book to Market ratio on individual level of ownership in Pakistan. Individual investors of Pakistan prefer the stocks that have higher book to market ratio during bull market. The preference of value stocks is also observed in bear market but in bear market the individual investor of Pakistan will prefer value stocks in lower magnitude as compared to their preference in bull market. We observed no significant change in investor behavior related to other variables including Earning per share, Price to Earning ratio, Abnormal returns and measures of risk during bull and bear market of Pakistan. Similar attitude towards risk by the individual investor of Pakistan is prevalent in Pakistan’s scenario. There are several reasons for the similar behavior and similar attitude towards risk of Individual investor of Pakistan during different market conditions.

Investors are categorized as Individual and institutional investors. Institutional investors include financial institutions, associated companies, Joint stock companies, government, modarabas, other companies etc while individual investors can be either residents of Pakistan or the foreigners that are making investments in Pakistan’s stock market. Our study focuses on the behavior of individual investor of Pakistan. Individual investor of Pakistan has limited stockholding. The reasons behind discouraged stockholdings by the Pakistan individuals are demographic characteristics like age, gender, occupation, education, income impact on stockholding by general public of Pakistan. In addition to these factors awareness, financial literacy, social interaction, informational cost, participation cost and entry cost are also found to have a significant impact on individual stockholding. A significant factor impacting stockholding proportion in Pakistan is lack of money and awareness and information about financial markets and alternative investments in Pakistan (Fouzia etal, 2012).

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Individual level of ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>19.80%</td>
</tr>
<tr>
<td>2008</td>
<td>16.80%</td>
</tr>
<tr>
<td>2009</td>
<td>19.12%</td>
</tr>
<tr>
<td>2010</td>
<td>16.80%</td>
</tr>
</tbody>
</table>
Average individual level of ownership in bull and bear markets for 20 listed companies

The behavior of individual investor in Pakistan appears to same in both market conditions. 2008 was a crashing bear period in Pakistan with a fall of 40.52% in KSE-100 index while 2010 was a significant bull period of Pakistan KSE-100 Index went up by 19%. In both these years individual level of ownership is similar which indicates similar behavior and similar attitude towards risk in different market conditions of Pakistan.

Due to limited stockholding of individual investors, institutional investors are a major participant in Pakistan stock market. Major participant in any financial market tends to move the prices in direction of their respective trading (Noah Stoffman). The changes in prices of Stocks or benchmark index of Pakistan move in direction of institutional trading and individual investors have a limited influence upon these changes.

Most investors of Pakistan have not embraced investment in equities as attractive asset class upon which to base their portfolio. Investment in gold, foreign currency, bank deposits and real estate is attractive for the individual investor of Pakistan. The investment in these asset classes is considered to be safe and capital protected. Pakistan individual investor is risk averse investor demanding greater capital protection. Perception of stocks as an extremely risky investment is a major reason for fewer proportion of stockholding. Pakistan’s stock market is been controlled by few powerful brokers and board of governors of stock market are allowed to trade equities in Pakistan. In such situation small investors especially individual investors consider themselves as lambs to slaughter. Being a manipulated market risk of losing money is high. It leads to a risk averse behavior of Individual investor of Pakistan (Farrukh, 2010).

Considering the stock market as being manipulated leads to lack of trust. Lack of trust means investor perceives to be cheated; it will significantly impact the stock market participation (Trusting the stock market, 2008).

Investor involvement significantly relates to market sentiments. Investor involvement relates to technical analysis while risk and overconfidence relates to fundamental analysis in Pakistan. Stock market can be weak efficient, semi strong or strongly efficient. Pakistan’s stock market is weak efficient stock market in which trading is done on the basis of technical analysis by chasing the previous price trends. Lack of fundamental analysis leads to lack of overconfidence in Pakistan’s stock market (Understanding investment behavior in Pakistan)

Institutional investor are informed investors (Mei Chen, 2010) and they have an informational advantage (Deinz, 2007). Institutional investors can design their strategies according to the changes in Market conditions while individual investor of Pakistan has lower informational advantage and financial literacy. Investment strategies of individual investor of Pakistan do not change overtime.

Pakistan is among the least financially literate countries. Preference of risk increase with education attainment. Risk behavior of an individual is dependent on individual risk preference and education. Individual investor of Pakistan is risk averse, prefers capital protection. There is a strong preference of dividends among individual investors of Pakistan which indicates individual investor capital protection behavior (Naeem). Investors in Pakistan have a risk averse behavior as they shy away from high risk equity funds (Farid Ahmad Khan, 2012).

Perception of Risk= f (Characteristics of stocks & characteristics of Investors)

Pakistan’s individual investor has a characteristic of being risk averse so his perception of risk is higher. Preference of risk is also dependent on education attainment. Individuals with more education about financial market have risk preference. Education about financial markets leads to confidence to take risk and ultimate outcome will be overconfidence in investors. Guiso & Spienza (2005) indicated the importance of financial literacy, as how much financially literate people understand stock market behavior.
Financial literacy of individual investor is a major factor in portfolio diversification in Pakistan. As investor knowledge about financial market trends products, conditions increase he will be keen to earn abnormal returns by beating the market and under reacting to public information. Being more financially literate will make the investor overconfident but Individual investor of Pakistan as lacking financial literacy overconfidence will not be prevalent in his behavior. The ultimate outcome of lacking overconfidence will lead to similar behavior and similar attitude towards risk in both market conditions.

Conclusion: We study Pakistan’s individual investor and contrast his behavior in bull market (2007&2010) to a bear market (2008-2009). The study focused on examining whether market conditions (Bull and bear market) relate to individual investor behavior in Pakistan. Significant impact of overconfidence on risk attitudes of investors was observed in previous studies but it was not related with market conditions. The impact Risk attitude of individual investor, book to market valuations and stock performance variables in varying market conditions was studied on individual level of ownership. Our study is based on representative stock market of Pakistan Karachi stock exchange. We randomly selected 100 listed companies on KSE to conduct our study. An important investing behavior was observed during bull and bear market of Pakistan. Individual investor of Pakistan prefers value stocks (High book to market stocks) in bear market as compared to bull market. Another important finding of our study is that individual investor of Pakistan do not seem to behave differently in varying market conditions. Investing behavior of Pakistan’s individual investor is not significantly related to market conditions. Our result is inconsistent with previous studies. Lack of financial literacy, overconfidence and trust among individual investors of Pakistan, institutional investors being the major participants in Pakistan’s stock market. Highly risk averse and capital protection behavior among individual investors were the key factors identified that accounted for the similar behavior of Pakistan’s individual investor during different market conditions. A major limitation of our study is that our study is based on smaller no of listed companies on Karachi Stock Exchange and bull and bear periods identified in Pakistan are fewer in number due to non availability of Individual level of ownership data in Pakistan. By overcoming these limitations better insights about individual investor behavior can be gained.

Limitations of Study:

1. The study is based on bull and bear period of only four years due to non-availability of individual level of ownership data in Pakistan
2. The study is based on limited no of companies listed on Karachi stock Exchange

Further Research: It would be interesting to analyze the bull and bear market of Pakistan by overcoming the limitations of our study to gain better insights for the Pakistan’s individual investor behavior and attitude towards risk. One could investigate the factors that account for similar behavior of individual investors during bull and bear market. Bull and bear market can also be analyzed in Mutual Fund, Money market or Bond Market for gaining insights about risk preferences. Among the physiological biases, overconfidence is significant yet another interesting line of research can be incorporating in study other biases attribution bias, familiarity bias, representative bias, availability bias, conservatism bias etc and relating such biases with market conditions.

REFERENCES:


**ELECTRONIC SOURCES**


THE RELATIONSHIP AND IMPACT OF MONEY GROWTH AND BUDGET DEFICIT ON INFLATION IN PAKISTAN

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ABSTRACT. This research study investigates the relationship and the effects of budget deficit and money growth on inflation in the case of Pakistan's economy. The data was gathered from different sectors in Pakistan. The data was collected from yahoo finance, ADB, KSE and State Bank of Pakistan. The period covered by this study is twenty six years starting from 1986-2011. The regression analysis test was used to examine/determine the results that were found/experienced during the research work. In regression analysis ANOVA, correlation of coefficients, and regression model test was used to analyze the results that were applied on the information gathered through secondary sources. The results show that there is a positive association of budget deficit and money growth on inflation. In general the key outcomes indicate that financing and government expenditures could have different effects. Therefore, it is very difficult to differentiate between current and capital expenditures. Budget deficit increase inflation in country and due to this there is decrease in money growth of a country.

Keywords: Inflation, Money Growth, Budget Deficit, Pakistan Economy

1. Introduction. The concerns about budget deficit and money growth on inflation have become global concern. Different studies have identified the causal relationships of different variables, either individually or collectively, which has its implications on the inflation in an economy. Although majority of the studies have indicated that budget deficit has been one of the major concerns regarding inflation, others have identified no empirical evidence to assure this fact. The coordinative relationship amongst money, budget deficit, and inflation has been at the core of monetary economics. It is argued that monetization of budget deficit has been the major initiator of inflation in developing countries. Considering the monetary phenomenon, it is argued that when growth rate of money tends to be more than growth of money than inflation takes place. In a given period, when the revenue tends to be lower than the total expenditures then budget deficit arises.
The popular view is that high interest rates are yielded by large deficits which have chronic effects on both the economic growth and productivity. Monetization of certain parts of the deficits is done by the monetary authorities in order to lower the money growth and inflation, which are caused by the high interest rate as a result of high deficits forces (Darrat & Suliman, 1991). In prior research, Sargent and Wallace (1984) have argued that higher inflation rates are negatively generated as a result of tight monetary policy due to large deficit. This has led the economists, practitioners and other government official to devise mechanisms through which they can control and lower the increasing budget deficit.

As identified by Haan and Zelhorst (1990) that the central bank in most developing countries in directly controlled by the central government, where the likelihood is that money creation finances the government deficits. This paper makes an attempt to empirically test the relationship of money growth and budget deficit on inflation within the context of Pakistan, along with determining the causal relationship amongst these variables. The Section 1 of this paper provides the introduction to this study. It is followed by the literature review in Section 2, and methodology in Section 3. Analysis and discussion of the empirical findings is provided in Section 5. The last section, Section 6 concludes the study under the heading Conclusion.

2. Literature Review. Numerous studies were conducted on money growth, budget deficit and inflation. Saleh (2003) deliberates the relationship of macroeconomic variables like growth, interest rate, trade deficit with budget deficit. It is most widely debated topics among Policy makers and economist in developed and developing countries have been widely debating about the topics related to these concerns. Different effects of financing and government expenditures as methods with key outcomes could have different impositions in general. Therefore, when evaluating the impact of financial policy on investment in private sector and growth in output, it is not easy to differentiate between capital expenditures and current expenditures. The relationship between current account deficit and the budget deficit both in developed and developing countries has been the concern of major studies. Current account deficit is caused due to induction in domestic absorption and expansion in imports which leads the budget deficit to increase.

Effects have been evidenced on exchange rate by the budget deficit which is dependent on the deficit funding due to taxation or money growth. Lanzo (2008) on one hand determined a composite relationship between money growth and inflation, and fiscal deficit and money growth on the other hand. The size of long term parameters looks acceptable when compared what it seen in other countries using different techniques. With the help of statistical tests Sergeant and Wallace (1984) hypothesis would be the most appropriate approach to understand the dynamics of these variables.

Mukhtar and Zakaria (2010) argue that a rise in inflation is seen due to high budget deficits with persistency, which cannot be prevented by the monetary policy alone. However such hypothesis is not supported by the empirical evidence. On the contrary empirical findings show that in the long-run budget deficit is not associated with inflation. Rather it is related to money growth, and budget deficit has no relationship as a cause and effect with supply of money. Pollin and Zhu (2005) used the data sample of countries from 1961—2000, and the results showed that moderate increase in GDP is associated with higher inflation. Data arrangement in the groupings by decade, presents us with the results indicating that inflation and growth are highly correlated to the degree that the focus is on demand management as a stimulus to growth in macroeconomic policy.

Concerning the macroeconomic conditions in Pakistan, the fiscal deficit continues to deteriorate, creating issues and risks for sustainability and growth in the long run. In Pakistan a powerful effect has been shown by the fiscal deficit on inflation and in order to eradicate the adverse effects of inflation there is need of coordination between monetary and fiscal policy (Ammama, Mughal, & Khan, 2011).

Fatima, Ahmed, and Rehman (2011) have identified the macroeconomic management in an effective manner to be critical for the generation of growth-induced employment and reduction in poverty. So are the private investments needed to play their role in the economy to improve the living standard of the country. Macroeconomic imbalances in Pakistan are a serious threat for its economic growth and development. Adverse impact of serious nature has been implicated by the fiscal profligacy on physical and social infrastructure in the country. Khalid (2005) says that in order to retain price stability and exchange rate stability in the country, economic growth needs to be maintained. The macroeconomic imbalances in Pakistan is extremely high with foreign (as well as domestic) debt, high budget
and current account deficits, extremely low international reserves, high inflation, high nominal interest rates and low economic growth. The average economic growth over 40 years is around 4 percent. Due to macroeconomic imbalances it is almost impossible to achieve a sustainable economic growth.

Agha and Khan (2006) argue that expansion in monetary terms is associated with inflation. As an Asian country, Pakistan has the same inflation experiences as other countries. As a matter of fact, when general price level arises then it can be mapped to growth in money supply. In Pakistan, it is generally argued that an important role is being played by fiscal imbalances in explaining the fluctuation in prices (Chaudhary & Ahmad, 1995). Inflation is burning issue in Pakistan. Public sector used mix of policies to control inflation. Inflation not affect the sectoral allocation, its create poverty. Budget deficit when backed by domestic financing is specifically from the banking sector in the long-run is inflationary. Government can control the inflation by cutting the size of budget deficit (Chimobi & Igwe, 2010). Through the results using the model of Vector Error Correction (VEC) points out that there is close relation between inflation and money supply.

Budget deficit is determined by the level of money supply as a macro factor of economy, and also estimates if there is or will be budget deficit. Anušic (1994) says that national budget deficit is the amount by which total government expenditures exceeds the total revenue. National economy can be observed by budget deficit. If economic activities in a country are high then budget revenue will grow without fiscal burden. Budget revenue decrease due to erosion of tax while expenditures increase due to population growth. It is common belief that budget deficit is harmful for economy (Sial, Hashmi, & Anwar, 2010).

In long run public and private investment showed a positive impact economic growth but growth is driven by private investment as compared to public investment. Government expenditures economic uncertainty is harmful for economic growth. In short period of time the private investment positively influence the growth and there positive relation between economic uncertainty and GDP (Fatima, Ahmed, & Ur Rehman, 2012). Budget is not important to achieve economic growth of a country but it is necessary. Regression analysis conducted to ascertain the impact of BD on the GDP, and explored a negative impact of budget deficit on the economic growth. Some policies are suggested for the government to avoid certain levels of the budget deficit to achieve desired level of growth.

Pekarski (2007) found that in the economies with extensive inflation there are persistent outbursts that can be analyzed by a particular hysteresis effect. But this analysis would be unjust if the regime shifts between moderate and high inflation economies happens with invisible corrosion in economic finance or sudden changes in monetary and financial policies. In the study of Harko and Fida (2009), the causality links of the deficit have been demonstrated through vector autoregressive model estimation that flows from budget deficits to interest rate to prices to exchange rate to capital flows and to trade deficits. There has been evidence concerning how the level of prices can be controlled with the help of reduction in the budget deficits.

Samimi and Jamshidbaygi (2011) state that in macroeconomics the important issue is the association between inflation and budget deficit. Using simultaneous equation model that includes on structural equation for monetary basis based on money growth, budget deficit and inflation. The result state that there is positive and significant impact on inflation by the budget deficit on monetary variables. Along with the finding of positive and significant impact o budget deficit by price index. Levin (1974) says that when few demanding goods are being chased by too much money then it is the basic cause of inflation. In order to increase or decrease the money circulation Federal Reserve as a tool are used. Money in the hands of general public increases with the rise in deficit.

Akcay, Alper and Ozmucur (1996) states that when there is difference in the rates at which money supply grows and the rate with which economy grows then inflation takes place if the rate is higher for the prior. Thus higher the deficit policies the higher are the inflation. If government borrowing requirements increase the net credit demands in the economy drive interest rate and private investment. The result is that the growth rate decrease and increase price level. The other channel through which deficits can lead to higher inflation when Central Banks do not monetize the debt is the private monetization of deficits. This occurs when the high interest rates induce the financial sector to develop new interest bearing assets that are almost as liquid as money and are risk free. Thus, the government debt not monetized by the Central Bank is monetized by the private sector and the inflationary effects of higher deficit policies prevail.
Saunders (1989) says that two closely related theoretical issues within the causality testing framework. First the direction of the causal flow in the deficit nominal interest rate relationship is analyzed. Second the effect of deficits on the two components of nominal interest rate such as the real rate of interest and the inflationary rate are investigated. Taking deficit as an indicator for the presence of disequilibrium and inefficiencies in a country, we could think of it as a factor that could be reducing the effectiveness of time devoted to education and training. Following a simple growth model and allowing for slight changes in the law of human capital accumulation, we reach a point where deficit might sharply reduce human capital accumulation. On the other hand, a deficit reduction carried on for a long time, taking that reduction as a more efficient management of the economy, may prove useful in inducing endogenous growth Prunera (2003).

3. **Methodology/Theoretical Framework.** This research aims to check the both the relationship and the impact of budget deficit and money growth which has influenced the inflation in Pakistan for a period of twenty six years from 1986-2011. This study undertakes the issues that influence the budget deficit and money growth, the statistical tools and techniques are applied to the distributed data used in the study to investigate the relationship between budget deficit, money growth and inflation.

3.1 **Data.** The data for the study have been obtained from yahoo finance, Asian Development Bank (ADB), Karachi Stock Exchange (KSE) and State Bank of Pakistan (SBP). The period covered by this study is twenty six years starting from 1986-2011.

3.2 **Variables.** This study makes an attempt to check the influence of money growth and budget deficit on inflation in Pakistan. The variables used in the study have been given below classified on the basis of dependent and independent variables.

3.2.1 **Inflation (Dependent variable).** When in a given period of time, the general prices of goods and services fluctuate in a steep or rising manner then it is termed as inflation. With this increase in level of general prices, few goods and services can be bought for each unit of currency. The effects of inflation are reflected in the deterioration of money's purchasing power which is classified as “a loss of real value in the internal medium of exchange and unit of account in the economy” (Saleem, et al., 2013). Inflation is normally measured using Consumer Price Index (CPI) in terms of inflation rate based on the annual percentage change in the index of general price.

3.2.2 **Budget Deficit (independent variable).** A government budget deficit is the amount by which some measure of government revenues falls short of some measure of government spending. If a government is running a positive budget deficit, it is also said to be running a negative budget surplus (and conversely, a positive budget surplus is a negative budget deficit). Debt differs from deficit in a way that debt is the annual deficit in accumulated form. Deficits in an economy take place when the revenue generated is less than the expenditures by the government. The deficit can be measured with or without including the interest payments on the debt as expenditures (Saleem, et al., 2013).

3.3.3 **Money Growth (independent variable).** The money growth is a policy variable that is controlled by fed. Money growth depends on economic situation of a country. If economic condition of a country will good then his economic growth will increase.
3.3 Theoretical Model

3.4 Hypothesis testing. Based on the objective of this study, we examine the relationship and the impact of budget deficit and money growth on inflation. The study makes a set of testable hypotheses [the Null Hypothesis $H_0$ versus the Alternate $H_1$].

$H_0$: There is no relationship and impact of budget deficit and money growth on inflation in Pakistan.

$H_1$: There is possible positive relationship and impact of budget deficit and money growth on inflation in Pakistan.

3.5 Model specifications. Panel data is used in this study with the regression being run on the combination of time-series and cross-sectional data. Constant coefficient model is used in the study, with the values of coefficient being constant. The data from both the time-series and cross-section is pooled together into one column based on the view that there is no significant cross-sectional data.

In order to check for the relationship and impact of the independent variables on the dependent, procedure of regression analysis are employed. The dependent variable is that whose values we are trying to expect or estimate. The independent variables explain the change in the dependent variable therefore they are not considered to be explained by the model itself.

Simple linear regression in the equation form is given below:

$$Y = a + bX$$

Where “$a$” is the intercept of the line and “$b$” is the slope of the line.

The straight line regression model with respect to CPI (inflation proxy), budget deficit and money growth $0 \beta 1$ can be given as

$$\text{CPI} = \beta_1 + \beta_2X_2 + \beta_3X_3$$

Where, CPI has been used as a proxy for inflation; $X_2$ refers to budget deficit and $X_3$ is the money growth. $\beta_1$ is the intercept coefficient referring to the coefficient of consumer price index representing the average value of the CPI when $X = 0$. $\beta_2$ is the slope of the regression line for Budget deficit indicating the averaged expected change in CPI due to change in budget deficit, whereas $\beta_3$ is the coefficient of money growth referring to the average expected change in CPI due to money growth.

4. Data Analysis and Discussion. Data analysis involves the use of statistical model to examine the relationship between the variables. The simple regression analysis fit best for our analysis which involves steps to confirm the accuracy of estimated relationship among the variables under study.
4.1 Regression Equation

CPI = β₁ + β₂X₂ + β₃X₃

The regression equation of the analysis is

\[ \text{CPI} = 5.180 + (0.756)X₂ + (0.06)X₃ \]

This result indicates that for each increase in X₁ and X₂ (budget deficit and money supply), y (CPI) is affected by -0.756 and -0.006, on the averaged, due to budget deficit and money growth. β₀ of 5.180 shows the coefficient’s average value of the dependent variables CPI, when budget deficit and money growth is zero. This shows that there is positive relations with increase in CPI of .7656, .06 because of each unit of budget deficit and money growth respectively.

This table shows that the fitted line has value of coefficient of constant CPI as 5.180 and coefficient of budget deficit and money growth as β₁ and β₂ to be 0.756 and 0.006, respectively. The standard error for c is 3.981, for B₁ is 0.553, and for B₂ it is 0.143 which is the dispersion of variables estimates around their means. The p-values from the above table suggest that at 1% level of significance we have β₂’s p-value as 0.0001 and of β₁’s p-value as 0.009. This suggests that the coefficients of the independent variables do have significant impact on the dependent variable in the model.

4.2 Measure of variation. While mounting a regression model to forecast the dependent variable with the help of independent variable, focus will be on a few measures of variations. Total Sum of Square (TSS) can be partitioned into two parts: Variation which can be attributed to the relationship between x and y is referred to as explained variation or regression sum of square (ESS). The second part which is unexplained can be attributed to factors other than the relationship between x and y, and is referred to as error or residual sum of squares (RSS).

Total sum of squares (TSS) = Regression sum o squares (ESS) + error sum of squares (RSS).

This table demonstrates the values of total sum of squares, regression sum of squares and error sum of squares according to the data. The TSS is the total deviations in the dependent variable consumer price index; the variation within the values of y is described by the ESS, and it shows the sum of the squared difference between y values and the mean value of y. The squares are taken to ’remove’ the sign (+ or -) from the residual values. The RSS describes the variation within the values of y, and is the sum of the squared difference between each value of y and the mean of y.
F-statistics is used in the analysis to determine the overall significance of regression model in regression. The value of f statistic here is 0.933 which is significant.

4.3 Coefficient of Determination. Coefficient of Determination, denoted by $R^2$, for regression models is used to explain how much of the variation in the dependent variable is due to the independent variables in the model. It is the ratio of regression sum of squares (ESS) to total sum of squares (TSS), it’s values ranges from 0 to 1.

Regression Statistics

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.274</td>
<td>.75</td>
<td>-.743</td>
<td>4.42253</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Money Supply, Budget Deficit

This table of regression statistic shows that for consumer price index, budget deficit and money growth. The R-square’s value of .075 indicates that 75 percent variation in consumer price index is because of budget deficit and money growth. The only difference between R square and adjusted R square is that it’s values based on degree of freedom. The degree of freedom associated with confidence interval and level of significance testing for Linear Regression is n – 1 which is 449.851

In general, the result of regression analysis shows that there is a positive relationship and impact of budget deficit and money growth on CPI in Pakistan.

Regression

Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Price Index</td>
<td>26</td>
<td>4.20</td>
<td>21.40</td>
<td>8.2089</td>
<td>5.23547</td>
</tr>
<tr>
<td>Budget Deficit</td>
<td>26</td>
<td>-8.70</td>
<td>-2.30</td>
<td>-5.8385</td>
<td>1.59977</td>
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<tr>
<td>Money Supply</td>
<td>26</td>
<td>4.30</td>
<td>35.20</td>
<td>16.1308</td>
<td>6.17815</td>
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<tr>
<td>Valid N (listwise)</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. Conclusions. The purpose of the study was to check the relationship and the impact of budget deficit and money growth on inflation in Pakistan. The results show that there is positive relationships and impact of budget deficit and money growth on inflation. When inflation rises in the country then money growth of a country decreases, showing an inverse relationship. The main concern of the paper is that if there is budget deficit and money growth in an economy then how does it affect the inflation in an economy, and the responsibility falls on the central bank and other financial institutions if they are not independent and do not make an attempt to curtail the budget deficits. The alternate hypothesis of the study is supported by the empirical findings of the study based on panel data.

REFERENCES


EMPIRICALLY EXPLORING THE IMPACT OF INTEREST RATE AND ANNUAL CPI DIFFERENCE ON EXCHANGE RATE

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ABSTRACT. This paper examines the relationship and the impact of interest rate and CPI difference from one year to another on the exchange rate of the home country. This particular study has been conducted in the context of Pakistan which serves to be the home country, and the empirical findings are made in relation to China, Japan, UK and USA. The study uses the panel data concerning the exchange rate, interest rate and CPI difference for all the five countries ranging from the first quarter of 1991 (Q1) to the last quarter of 2011 (Q4). The results of the study validate the conjecture of the literature that in the long-run, inflation affects the exchange rate in a positive way, while interest rate prevailing in a country has a negative impact on the exchange rate. The results of the panel data regression on the cumulative data of all the countries, with fixed-effect and random-effect shows that the relationship prevails but both the CPI difference and interest rate affects the exchange rate to a very insignificant level. Comparatively, the results of LSDV, which involved evaluating the coefficients on the country-specific level, shows that interest rate and CPI change has significant impact on the exchange rate.

Keywords: Exchange rate determination, interest rate and exchange rate, inflation and exchange rate

Introduction: In today’s era of globalization, exchange rate is termed to be of crucial importance for any economy due to the involvement of the international transactions among the countries. Countries, union of countries and continents have come closer as a result of the trend of globalization across the globe. To address the dynamics and determinants of exchange rate there is a vast pool of literature available concerning the exchange rate. Exchange rate has been studied as a macro variable in different empirical studies against a variety of determinants (interest rate, PPP, foreign reserves, monetary base, GDP, inflation etc.), both in the short-run and long-run (Meese and Rogoff, 1988; Evans and Lyons, 2002; Drazen and Hubrich, 2006; Ichiue and Koyama, 2011). In his study, Suthar (2008) has defined foreign exchange as:

“Foreign exchange rate is the price of a unit of foreign currency in terms of the domestic currency.”

The focus of the research in this study is on the exchange rate determination in between Pakistan and China, Pakistan and Japan, Pakistan and United Kingdom (UK), and Pakistan and United States (US). In all the cases, for exchange rate US Dollar (USD) is considered to be the base currency. The exchange rate of Pakistan with these four countries has been taken due to the fact that Pakistan since its inception has bilateral trade agreement with all these
countries especially US and UK. Pakistan heavily imports variety of consumer goods from all these countries, with some products and services being exported to them. Apart from trade these countries have been funding and supporting many projects in Pakistan, and have established a number of non-profit organizations. Pakistani Rupee (PKR) as compared to Chinese and Japanese currency is not internationally traded and is thus isolated. This isolation of Pak Rupee can give the chance of exploring the factors of exchange rate in an easy manner. Although in Pakistan, the political turmoil, terrorism, natural catastrophes, sectarianism, unemployment, safety and security play a vital role in determining the exchange rate, foreign reserves, international trade, imports and exports, trade-sanctions, and foreign direct investment (FDI); the study is limited to the two variables which are CPI and Interest rate prevailing in these countries.

In this paper, an effort has been made to find the empirical evidence concerning the trend of exchange rate in Pakistan in the long run with Chinese, Japanese, British and American currency. Results of this study would enable the policy makers and practitioners to be in better position to devise policies, make judgments and economic decisions based on the behavior of exchange rate and the associated risks in the long-run. Developing economies try to adopt the policy of obtaining high economic growth, price level stability and reduction in the volatility of exchange rate, which are termed to be the three separate points of a triangle that cannot be achieved simultaneously (Suthar, 2008).

The structure of the paper is arranged in five sections. Following the section of introduction, section 2 presents the literature review concerning the exchange rate, inflation with proxy of consumer price index (CPI) and the interest rate; section 3 is about the methodology of the research study; section 4 provides empirical results of the exchange rate behavior against two of the determinants studied in this paper in the long-run. Discussions about the results follow in section 5. The final section of the paper wraps up the study by providing the conclusions.

**Literature Review:** It is of utmost importance for any country to choose the most appropriate exchange rate system as per the crucial implications it would have on the economic policy both at the domestic and international level (Heller, 1978). As identified by Heller (1978), this choice of exchange rate in a country depends upon the economic characteristics of that country, and the factors that are relevant to it are: a country’s size, openness, financial integration degree, inflation and the foreign trade pattern. The presumption, which has been validated in Heller’s study was concerning those countries whose divergence of the inflation rate is higher as compared to the average of the rest of the world, have a tough time to maintain the fixed exchange rate over a longer period of time (Obstfeld and Rogoff, 1995; Goyal and Arora, 2012; Engle et al., 2007). Chiu (2008), in his study has determined the behavior of exchange rate in the long-run against “Purchasing Power Parity (PPP), productivity differential, foreign reserves and monetary base”. These factors turned out to be having strong driving for the exchange rate in the long-run. PPP has been referred to as the relative prices of items (goods and services) traded between the countries. Literature has two way studies concerning the proposition of PPP, one relating to the violation of this proposition (Balassa, 1964; Samuelson, 1964; Engle & Granger, 1987) and the other supporting it (MacDonald, 1994; MacDonald & Moore, 1996).

Looking at the relationship, for the effects of interest rate differential on the exchange rate, in the theory, Hacker et al. (2010, 2012) state that this relationship tends to be negative in the short-run and positive in the long-run. The relationship is negative in the short-run because ceteris paribus, the inflow of capital to the domestic country increases when there is a rise in the interest rate as compared to the off-home country which appreciates the domestic currency. On the other hand, the positive relationship holds true for the effect of interest rate on the exchange rate in the long-run is explained by the comprehension that when the interest rate in the domestic country increases, it raises the chances of an increase in the inflation of that country as compared to the foreign one, which depreciates the domestic currency. Depreciation of the domestic currency increases the trade balance of the domestic country and decreases the foreign trade balance, which brings on a rise in the domestic interest rate and a fall in the foreign interest rate (Hacker et al., 2012; Hacker et al., 2010). The hypothesis that the exchange rate is determined by the purchasing power parity (PPP) based on the relationship between exchange rates and prices, was disclosed in the study of Manzur (1990). This hypothesis in its absolute form mentions that exchange rate is the ratio of home prices to foreign prices, and in the relative form it is stated as the change in the exchange rate equal to the differential of the inflation (Manzur, 1990). Looking back at the history of PPP, Manzur (1990) has stated that the first principle regarding the PPP theory was presented in the 16th century and not during 1920s by the Cassel. In the tracks of PPP history, the other striking name is of Balassa (1964), who first identified the hypothesis of systematic bias for the measurement of equilibrium exchange rate in the absolute PPP.

Balsa (1964) argued that the relative prices of the non-traded goods rises as a result of the low productivity growth
in this sector as compared to the traded goods. As per the theory of Balsa this hypothesis is termed as the productivity bias hypothesis. Frenkel (1981) argued that the determination of exchange rate stems out of the ‘asset market theory’, and provides with the essential difference between exchange rate and state-defined price levels. In his study, Manzur (1990) found that the PPP hypothesis holds true in the long-run but the same prediction is not held true in the short-run. Pakistan being a developing Asian country is classified to be a small open economy that is heavily reliant on the import of consumer goods in order to meet the national demand for those products and services (Akbari and Rankaduwa, 2006). Due to the openness of the Pakistan’s economy to foreign trade, there is no immunity in it against the external price shocks, for instance when there is appreciation or depreciation of the exchange rate or price changes for the imported goods (Janjua, 2007). Since 1982, Pakistan Rupee (PKR) has been un-pegged from the Pound Sterling, and has been deregulated and shifted to managed floating exchange rate. The linkage of Pakistani rupee has been made with the currency basket that is trade-weighted (Ahmad, 1998).

Srikanth and Kishor (2012) in their study have concluded that the exchange rate between US Dollar and Indian Rupee is significantly determined by the variables such as the lagged value of the exchange rate for the last year between US Dollar and Indian Rupee, balance of the current account, relative supply of money, interest rate differential and index of industrial production. Multiple regressions were used in their study to assess the relative importance of the identified independent variables on the exchange rate as the dependent variable. Due to spurious regression, Augmented Dickey Fuller Test (ADF) was employed in order to check the stationarity of the variables by taking the first and in some cases the second differencing of the variables. Considering other factors, the interest rate within a country is considered to be an important element of its economic growth. The interest rate prevailing in Pakistan is termed to be the highest on global arena, which makes the banking and financial sector of Pakistan attractive. The high interest rate saved the banking sector in specific and the overall economy in general to the spread of financial crisis in 2007. In their study, Chen and Hsing (2005) have identified the factors that influence the exchange rate using the VAR model in Korea. From their study they have obtained the empirical evidences which are consistent with the theory of exchange rate. Among other factors, interest rate differential between the US and Korea have negative reactions to the exchange rate. The study of Frankel (1979), which is normally known as the model of real interest rate differential (RID), takes into account the relationship between monetary fundamentals and the exchange rate. Furthering with the discussion of interest rate by dividing them into short-term and long-term interest rate, it is stated that “...the short-term interest rates are designed to capture liquidity or real effects of monetary policy while the long-term interest rates are designed to capture expected inflation effects” (Yuan, 2011).

Research Methodology: In this study the behavior of exchange rate in Pakistan has been examined with the Chinese Yuan (CNY), Japanese Yen (JPY), British Pound Sterling (UKP), and US Dollar (USD) against two factors that are the inflation differential and interest rate differential. The exchange rate for all the currencies is determined in the national currency of Pakistan that is Pakistani Rupee. Inflation differential has been computed using the differential of Consumer Price Index (CPI) differential that has been used as a proxy for the Purchasing Price Parity. The study period that has been used in this study ranges from the first quarter (Q1) of 1991 to the last quarter (Q4) 2011. Quarterly data for the entire variables from all the five countries has been utilized in this study, due to the non-availability of monthly data concerning certain variables in specific countries. In this study, panel data regression has been used in order to express the influence in relative terms of the following independent variables on exchange rate of PKR/CNY, PKR/JPY, PKR/UKP and PKR/USD. Panel data regression has been used in this study because the data obtained is both of the time-series and cross-sectional format. As per the time-series arrangement the data ranges from 1991Q1 to 2011Q4, and for the cross-sectional arrangement the data is available country wise for exchange rate, interest rate and CPI. Panel data regression involving fixed-effect (fe), random-effect (re), and least square dummy variable model has been used. There were a total of 420 observations used in this study, out of which 84 observations pertain to each of the countries. Data has been sorted on the basis of each country.

Data for all the variables, countries and years was obtained from the International Monetary Fund’s (IMF) International Financial Statistics (IFS). Organizing of the data was done using Microsoft Excel, and for the purpose of regression and data analysis, Stata 11 was used. All the documentation has been attached in the annexure.

For panel data regression with fixed effect and random effect, we have:

\[
\text{ex}_{it} = \alpha + \beta_1 \text{IRD}_{it} + \beta_2 \text{IFD}_{it} + \omega_{it} \longrightarrow \text{eq.1}
\]

Where:
- \(a_i (i=1, \ldots, n)\) is the unknown intercept.
- \(\text{ex}_{it}\) is the dependent variable with \(i\) referring to entity and \(t\) referring to time.
IRD<sub>i</sub> and IFD<sub>i</sub> represent the two independent variables (Interest rate and CPI).

- β<sub>1</sub> and β<sub>2</sub> are the coefficients for independent variables,
- u<sub>it</sub> is the error term

For panel data regression with least square dummy variable model (LSDV), we have:

\[ \text{ex_rate}_{it} = \alpha_i + \beta_1 \text{IRD}_{it} + \beta_2 \text{IFD}_{it} + \gamma_3 D_2 + \ldots + \gamma_n D_n + \omega_{it} \rightarrow eq.2 \]

Where:
- \( \alpha_i \) (i = 1…n) is the unknown intercept.
- ex_rate<sub>it</sub> is the dependent variable with \( i \) referring to entity and \( t \) referring to time.
- IRD<sub>i</sub> and IFD<sub>i</sub> represents the two independent variables (Interest rate and CPI),
- \( \beta_1 \) and \( \beta_2 \) are the coefficients for independent variables,
- \( u_{it} \) is the error term
- \( D_n \) is the entity n. Since they are binary (dummies) thus n-1 entities included in the model.
- \( \gamma_n \) Is the coefficient for the binary repressors (entities)

The hypotheses that are developed and tested in this study are based on the critical review of the literature concerning the impact of interest rate and inflation on exchange rate. The two hypotheses in the alternate form are given below:

H<sub>1</sub>: There is significant negative impact of interest rate on exchange rate.
H<sub>2</sub>: There is significant positive impact of CPI difference on exchange rate.

**Empirical Results and Discussion:** The results presented here are for the variables identified and mentioned above using the multiple regression models. The results encompass data of 84 quarters for all the five countries, relating to all the variables used in the regression model. The results for each of the country along with their results and graphical presentation are presented below. The very first graph presents the trends of exchange rate, which is the dependent variable, in terms of Pak Rupees for all the countries.

![Figure 1: Exchange rate of China, Japan, UK and US in terms of Pak Rupees](image_url)

From the figure 1, it can be seen that there has been much volatility in between the exchange rate of Pak Rupee (PKR) and UK Pound Sterling (UKP) over the period of 20 years. Similarly there has been much volatility in between the exchange rate of Pak Rupee (PKR) and US Dollar (USD) over the same period. There has been less volatility in between PKR and Chinese Yuan (CNY), and almost negligible variation between the exchange rate of PKR and Japanese Yen (JPY). Thus, all the four countries show different volatility in terms of their currency to the Pak Rupee (PKR).
Amongst the panel data regression models, the fixed-effect is the first regression model which is run on the data. The fixed-effect panel data regression provides the following results.

<table>
<thead>
<tr>
<th>Fixed-effects (within) regression</th>
<th>Number of obs = 420</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group variable: nation</td>
</tr>
<tr>
<td></td>
<td>Number of groups = 5</td>
</tr>
<tr>
<td>R-sq: within = 0.2910</td>
<td>Obs per group: min = 84</td>
</tr>
<tr>
<td>between = 0.0066</td>
<td>avg = 84.0</td>
</tr>
<tr>
<td>overall = 0.0411</td>
<td>max = 84</td>
</tr>
<tr>
<td>corr(u_i, Xb) = -0.1840</td>
<td>F(2,413) = 84.74</td>
</tr>
<tr>
<td></td>
<td>Prob &gt; F = 0.0000</td>
</tr>
</tbody>
</table>

|                      | Coef.   | Std. Err. | t     | P>|t|  | [95% Conf. Interval] |
|----------------------|---------|-----------|-------|------|---------------------|
| ex_rate              |         |           |       |      |                     |
| cpi_change           | .9760769| .2101412  | 4.64  | 0.000| .5629972 - 1.389157 |
| discount_r-e         | -3.864832| .2990943  | -12.92| 0.000| -4.452769 - 3.276895|
| _cons                | 47.91341| 1.656124  | 28.93 | 0.000| 44.65793 - 51.1689 |
| sigma_u              | 39.832549|           |       |      |                     |
| sigma_e              | 14.126402|           |       |      |                     |
| rho                  | .88827866| (fraction of variance due to u_i) |

F test that all u_i=0: F(4,413) = 632.51  Prob > F = 0.0000

Table 1: Fixed-effects (within) regression

The panel data regression model with fixed-effect states that the model developed and used in this particular regression was acceptable. This is evident from the value of Prob > F, which is less than 0.05, and states that the model is acceptable and that the value of all the coefficients used in the model are different from zero. The value of corr(u_i, Xb), which is -0.184, states that the errors u_i are correlated with the regressors in the fixed effect model. The rho, which is the interclass correlation, portrays that 88.82% of the variation is due to the differences across the panels. T-values are highly significant for both the CPI and the interest rate, and shows high degree of relevance to the exchange rate. The two-tail p-values show that for both CPI and interest rate the values are less than 0.05, therefore the null-hypotheses would be rejected. Thus, the hypotheses in their alternative form are accepted that CPI difference has positive impact on the exchange rate, whereas interest rate has a negative impact on the exchange rate. The coefficient of CPI difference states that when there is one unit change in CPI, then on the average, there is a change of 0.976 in the exchange rate. While, for the interest rate, when there is a unit change in the interest rate, then there is -3.864 change in the exchange rate on the average. The coefficient of determination, R-squared for the overall data is 0.0411, which states that only 4% of the variation in the exchange rate is determined by interest rate and CPI change.

The result of panel data regression with random-effect which was used on the data after the fixed-effect provides the following results.
Table 2: Random-effects GLS regression

The results from the panel data regression model with random-effects present the following results. First of all, the acceptance of the model is checked. For that purpose the value of Prob>chi2 is a check, which is less than 0.05, on the basis of which we accept the results of this model. To check the correlation across the units, the value of corr(u_i, X) is checked, which in the case of random-effect states that the differences across the units are uncorrelated with the regressors. The two-tail p-values in the case of random-effect portrays that each coefficient is different from zero, and that these coefficients have significant effect on the dependent variable. Interpretation of the coefficient in the case of random-effect regression model is complex as it includes both the within-entity and between-entity effects. On the average, when there is one unit change in CPI difference across the time and the country, then it affects the exchange rate with 0.972 units. Whereas, one unit change in the interest rate across the time and the countries, on the average bring a change of -3.855 in the exchange rate. The coefficient of determination provided by the regression model with random-effect has the same value as the regression model with the fixed-effect. Thus, the value of R^2 for the overall data shows low variation of only 4% in the exchange rate, determined by the interest rate and exchange rate.

In order to check for the preference of either of the fixed-effects regression model or the random-effect regression model, the Hausman test is used. In Hausman test, the null hypothesis states that the preferred model is the random-effect, while the alternative hypothesis prefers the fixed-effect model (Green, 2008).

Table 3: Hausman Test Results
The Hausman test result states that the random-effect model is preferable as the null-hypothesis is accepted, based on the value of Prob>chi2, which is greater than 0.05. Following the panel data regression with both fixed-effect and random-effect, and Hausman test, the next regression model that is applied on the data is the least square dummy variable model (LSDV). LSDV model is another tool to check the impacts of the independent variables on the dependent variable by mediating the effect of independent variables over the countries. LSDV also provides a better understanding of the fixed effect, as the unobserved heterogeneity is controlled, and the pure effect of the independent variables is assessed.

<table>
<thead>
<tr>
<th>Source</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>Number of obs = 420</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
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<td>6</td>
<td>90110.74</td>
<td>F( 6, 413) = 451.56</td>
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<tr>
<td>Residual</td>
<td>82416.3131</td>
<td>413</td>
<td>199.555237</td>
<td>Prob &gt; F = 0.0000</td>
</tr>
<tr>
<td>Total</td>
<td>623080.753</td>
<td>419</td>
<td>1487.06624</td>
<td>R-squared = 0.8677</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Adj R-squared = 0.8658</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Root MSE = 14.126</td>
</tr>
</tbody>
</table>

**Table 4: Least Square Dummy Variable regression model**

The value of the coefficients for the CPI change and the interest rate are the same as provided by the panel data regression model with fixed-effect, with the similar t-values and the p-values. The model is acceptable as the value of Prob>F is less than 0.05. The interesting measure which is provided by the LSDV model is the value of coefficient of determination, which is the $R^2$ that shows the amount of variation in exchange rate which is explained by the CPI change and the interest rate. The value of adjusted $R^2$ is 0.865. Keeping in mind the data used for this particular study along with the time-frame, variables and countries involved, the adjusted $R^2$ shows that 86.58% of the variation in the exchange rate is determined by change of CPI and interest rate. Comparing the coefficient of determination of the LSDV model and the coefficient of determination of fixed-effect and random-effect model, it can be concluded that the LSDV model provides significant variation in the exchange rate as per interest rate and CPI change as compared to the value of $R^2$ of fixed-effect and random-effect.

**Conclusions:** This paper has examined and analyzed the relationship of exchange rate, as a dependent variable, with the interest rate and inflation, which are the independent variables. The study involved panel data from five countries namely Pakistan, China, Japan, UK and USA. The results are aligned with the previous findings of the literature (Srikanth & Kishore, 2012; Hacker et al., 2010; Chen & Hsing, 2005) regarding the relationship of exchange rate and interest rate that interest rate negatively affects the exchange rate in the case of all the countries selected in the study. Similarly, the empirical findings related to the impact of inflation on exchange rate validate the previous findings of the researchers identified in the literature (Chiu, 2008; MacDonald, 1994; MacDonald & Moore, 1996; Manzur, 1990) that inflation prevailing in a country affects the exchange rate in a positive manner. This validation has been true both in the case of exchange rate determination by inflation in case of all the countries used in the study. According to coefficient of determination ($R^2$) provided by both the regression model with fixed-effect and random-effect, although the value is the same but is insignificant and shows a very low level variation of 4.11% caused by interest rate and CPI in the exchange rate. This means that there are still other factors and variables which contribute to the determination of exchange rate. The co-efficient of determination $R^2$ is significant in the case of LSDV regression model used, where the coefficients are separately evaluated for each of the country using...
dummy variables. The LSDV regression model shows that as per the R² 86.77% of the variation in exchange rate is determined by interest rate and CPI change. Further research can be conducted on adding a number of other variables into the regression model and determining the exchange rate in case of different countries.

REFERENCES


COMPUTATIONAL PREDICTION OF MICRO-RNAs IN HEPATITIS B VIRUS GENOME

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ABSTRACT: MicroRNAs (miRNAs) are 19—25 nucleotides long, single-stranded, endogenous non-coding RNA molecules that play crucial roles in the post-transcriptional regulation of gene expression by targeting messenger RNAs for cleavage or translational repression. Genomes of various organisms ranging from higher animals and plants to viruses transcribe miRNAs. Recent studies show that both virus and host encode miRNAs that can give benefit either to virus or to host, depending upon the specific interactions. Hepatitis B Virus (HBV) is involved in acute and chronic diseases of liver and can bring about hepatitis, liver cirrhosis, and hepatocellular carcinoma (HCC). In this study, we analyzed HBV (genotype D) for miRNAs, computationally, since computational methods serve vigorous, better, and affordable tools for microRNAs identification. Initial searches through VMir software extracted 57 sequences with potential hairpin-like structures from HBV genome. MiPred program confirmed 10 candidates as real pre-miRNA like hairpin structures. Measurements of free energy and other parameters further excluded three candidates. Finally, MatureBayes web server v1.0 confirmed 12 mature miRNAs in 6 potential pre-miRNA candidates in HBV genome, including one which has been identified in earlier studies. These findings open new avenues for researchers to explore the role of these novel miRNAs in viral pathogenesis as well as in developing novel antiviral therapies.

Keywords: MicroRNAs; miRNAs; Hepatitis; Hepatitis B Virus; HBV

Introduction: MiRNAs are endogenous non-coding small RNA molecules that regulate gene expression post-transcriptionally. Genomes of a variety of organisms ranging from higher animals and plants to some viruses have been reported to encode miRNAs. Though the complete picture of miRNAs’ functions is yet to be explored, they have been reported to involve in regulating numerous cellular processes including differentiation, morphogenesis, organogenesis, and metabolism (Baltimore, Boldin, O’Connell, Rao, & Taganov, 2008; Gao, 2008; Griffiths-Jones, Saini, van Dongen, & Enright, 2008; Poy, Spranger, & Stoffel, 2007; Zhao & Srivastava, 2007). Initially, miRNAs are transcribed as long transcripts called primary miRNAs (pri-miRNAs) (Lee, Jeon, Lee, Kim, & Kim, 2002). Drosha, a nuclear RNase III enzyme, processes the nuclear pri-miRNA into one to several, 60-70 nt long, miRNA
precursors (pre-miRNAs) which acquire hairpin stem-loop structure while still in the nucleus (Lee et al., 2003). The export factor exportin-5 transports pre-miRNAs into the cytoplasm after cleavage (Lund, Gärttner, Calado, Dahlberg, & Kutay, 2004; Yi, Qin, Macara, & Cullen, 2003). Subsequently, another enzyme, called Dicer cleaves the pre-miRNA into an imperfect dsRNA duplex (Grishok et al., 2001; Hutvágner et al., 2001; Ketting et al., 2001; Lee et al., 2003). This duplex consists of two strands i.e. the mature miRNA strand and its complementary strand. The mature miRNA strand is then loaded into RNA-induced silencing complex (RISC), while the other strand of duplex is assumed to be degraded. The target mRNA is then either cleaved or repressed translationally by the RISC, depending upon the degree of complementarity between the target mRNA and the RISC bound miRNA (Hutvágner & Zamore, 2002; Okamura, Ishizuka, Sioni, & Sioni, 2004).

Recent studies on viruses suggest viral and host cell miRNAs as a new class of regulators of viral pathogenesis (Grundhoff & Sullivan). Virus-encoded miRNAs were reported to affect the expression of host genes and vice versa. For instance, the miRNAs embedded in the Herpes viruses genome control the expression of not only viral proteins but also the host cell proteins, thereby facilitating their pathogenic cycles (Lin & Flemington).

Hepatitis B virus (HBV) is a hepatotropic non-cytopathic DNA virus that belongs to a family of small, enveloped DNA viruses called *Hepadnaviridae*. It is major cause of acute and chronic infections of liver (Seeger & Mason, 2000). More than 350 million chronic carriers of HBV have been reported worldwide and chronic HBV infection has been strongly linked with high risk of cirrhosis, which in turn leads to hepatocellular carcinoma (HCC) (Lai & Yuen, 2008; Yang et al., 2008). An understanding of hepatitis B Biology and pathogenesis is indispensable for hepatitis B control. HBV is a noncytopathic virus that replicates favorably in the hepatocytes. Although the entrance mechanism of HBV into hepatocytes remains unknown, the viral large envelope protein’s N-terminus has been implicated in cell attachment and entry (Lepâtre-Douard, Trotard, Le Seyec, & Grignon, 2009). After fusion of viral and cellular membranes, the viral capsid is transported to the nuclear pore where the HBV relaxed circular genome (RC-DNA) is released into hepatocyte nucleus. Inside the nucleus, cellular enzymes convert the rcDNA to a covalently closed circular DNA (cccDNA) (Wei, Neveut, Tiollais, & Buendia; Weiser, Ganem, Seeger, & Varmus, 1983). The cccDNA works as template for transcription of all viral RNAs. HBV genome (3.2 kb) which contains four overlapping open reading frames, including gp1, gp2, gp3, and gp4, can express seven different hepatitis-B proteins, namely, the DNA polymerase, three S proteins, one X protein, and two C proteins.

During the last decade, experimental techniques such as cDNA cloning followed by confirmation through Northern blotting have been commonly employed to discover most of miRNAs in various organisms, including viruses (Cai et al., 2005; Pfeffer et al., 2005; Pfeffer et al., 2004; Samols, Hu, Skalsky, & Renne, 2005). However, these procedures are slow, laborious and expensive (Cui et al., 2006). In contrast, computer based strategies for the prediction of novel miRNAs represent vigorous, convenient and affordable techniques. In this study we carried out in silico analysis of the HBV genome and identified 10 mature miRNAs including one which was reported earlier.

**Materials And Methods:**

**Genome Sequence Retrieval** Fasta format of complete genome sequence of HBV, genotype D, (accession number AJ344117) was downloaded from the National Center for Biotechnology Information (http://www.ncbi.nlm.nih.gov/nuccore/AJ344117.1). HBV genome contains 3182 nucleotides. Figure1 shows a flowchart of the computational prediction process.

**Pre-miRNA Extraction** The ab initio prediction software VMir is used to identify pre-miRNA candidates on the basis of comparison to structural features of known pre-miRNA hairpins. In order to extract hairpin-structured miRNA precursors, the viral genome was scanned by VMir software (program version 2.3, scoring algorithm version 1.4) (Grundhoff, Sullivan, & Ganem, 2006; Sullivan & Grundhoff, 2007). Primarily, sequences with potential hairpin-like structures were extracted as candidate miRNA precursors (pre-miRNAs).

**Confirmation of Real Pre-miRNAs** In the next step, MiPred program with RNAfold algorithm (http://www.bioinf.seu.edu.cn/miRNA/) was used to distinguish real miRNAs from pseudo ones (Xue et al., 2005).

**Screening for Potential Unique Pre-miRNA Structures** The candidate pre-miRNAs sequences were analyzed for secondary structure prediction and minimum free energy (MFE) by RNAfold web server. Sequences with a hairpin-like secondary structures, and with lower minimum free energy (equivalent or below 25 kcal/mol) were selected as potential miRNA precursors. These sequences were further confirmed to be unique by conducting BLASTn searches.
Mature miRNA Prediction: Prediction of mature miRNAs in HBV, genotype D was performed on MatureBayes web server v1.0. This computer-based web tool uses a Naive Bayes classifier which is based on secondary structure and sequence features of the pre-miRNAs for the prediction of mature miRNAs in any given pre-miRNA (Gkirtzou, Tsamardinos, Tsakalides, & Poirazi). MatureBayes compute the most probable start position of the mature miRNA(s) by two alternatives.

Result And Discussion: VMir is a low stringency software especially designed for the identification of viral miRNAs (Sullivan & Grundhoff, 2007). By using RNAfold algorithm, VMir executes structure prediction by minimal folding free energy and detects individual hairpins above a certain size limit (by default 45 nt) (Grundhoff et al., 2006). VMir assigns score to these hairpins which is based on statistical comparison to a reference set of recognized pre-miRNA hairpins (Grundhoff et al., 2006). In this study, fasta format of the Hepatitis B virus (genotype D) genome was uploaded into VMir Analyzer. The program was allowed to operate with its adjusted parameters for window and step size of 500 and 10 nt, respectively. The viral genome was scanned in both the orientations for extraction of hairpin like sequences (pre-miRNAs). As a result, a total of 202 sequences as candidate miRNA precursors were initially detected by VMir Analyzer (Figure 2(a)). These 202 pre-miRNA candidates were passed through a filter in VMir Viewer. By adjusting the filter values for minimal scores and a low value for window counts, only 57 hairpins succeeded to pass through the window filter (Figure 2(b)). Figures 2(a) and 2(b) show the location and VMir scores for unfiltered and filtered hairpins, respectively.

These 57 pre-miRNA candidates were then analyzed by MiPred (online web server) to distinguish the real pre-miRNAs from pseudo ones (Xue et al., 2005). MiPred confirmed 10 candidates as real pre-miRNA like hairpin sequences from the pool of 57 filtered sequences. Measurement of lower minimum free energy (equivalent or below -25 kcal/mol) and BLASTn search further extracted 7 real pre-miRNA candidates. The secondary structure prediction of these sequences with potential hairpin-like structures was accomplished by RNAfold program (Figure 3). The mature miRNA sequences were identified by MatureBayes web server (Gkirtzou et al.). This computational tool predicted 12 mature miRNAs (Table 1) in 6 potential pre-miRNA hairpin structure candidates (Figure 4).

Although the exact functions of viral miRNAs (vmiRNAs) are yet to be unearthed, lines of evidences suggest that vmiRNAs have the potential to target both host and viral transcripts. Similar to other viral factors, vmiRNAs share their part in cellular reprogramming to (a) control the latent-lytic switch, (b) encouraging cell survival, proliferation, and/or differentiation to support viral replication and (c) modulate immune responses. Similarly, 1) for the completion of viral life cycle, vmiRNAs make a host cell environment conducive by down-regulating selected viral and cellular mRNAs. 2) Viruses can either mimic host cell miRNAs or influence the expression of cellular miRNA for controlling existing regulatory pathways and 3) Viral replication can be directly influenced by cellular miRNAs, and some miRNAs can directly target mammalian RNA virus genomes. For the completion of viral life cycle, a virus requires to retain a host cell alive for a long time. The time period is significantly prolonged for viruses that initiate latent infections. Thus, viral miRNAs may promote virus replication by at least two ways i.e. extending cell survival and evading immune recognition.

Experimental techniques like cDNA cloning and Northern blotting have been widely used for the discovery of majority of miRNAs in various organisms (Cai et al., 2005; Pfeffer et al., 2005; Pfeffer et al., 2004; Samols et al., 2005). Many miRNAs have also been identified computationally, as Computer based strategies represent robust, convenient and affordable techniques. These methods include programs which rely on features like hairpin stem loop structures of miRNAs identification and thermodynamics stability etc. (Cai et al., 2005; Pfeffer et al., 2005; Pfeffer et al., 2004; Samols et al., 2005).

Here we report the prediction of several miRNAs encoded by HBV genome by using computational tools which included softwares and publically available online web servers. VMir is a low stringency; updated ab initio computational algorithm especially designed for the prediction of putative pre-miRNA stem-loop structures in viral genomes and has been effectively applied to identify miRNAs in the genomes of several viruses of the herpesvirus and polyomavirus families. VMir investigation of HBV genome indicates that candidates are overall extensively distributed across the viral genome (Figure 2(a)). Several user-adjustable quality filters have been included in VMir program that can be used to decrease the intricacy of the prediction and make the prediction easier (Grundhoff et al., 2006). After filtering, the 57 high scoring filtered hairpins (with scores between 85 and 146) appeared between nucleotides 200 and 3132 (Figure 2(b)).

The characteristic feature of majority of pre-miRNAs to fold into typical stem-loop hairpin structures in many genomes makes it hard to distinguish real pre-miRNAs from pseudo ones (Xue et al., 2005). MiPred web tool,
a hybrid feature which consists of local contiguous structure-sequence composition, minimum of free energy (MFE) of the secondary structure and P-value of randomization test was used to differentiate real pre-miRNA like hairpins from other structures (Xue et al., 2005). MiPred outperform some of the existing web tools (Triplet-SVM-classifier, miRabela and ProMiR II) in terms of specificity (98.21%) and sensitivity (95.09%) for prediction of real premiRNA like hairpins (Xue et al., 2005). MiPred confirmed 10 sequences as real pre-miRNA like hairpins in HBV genome.

Further, for the identification of mature miRNAs in pre-miRNA candidates, MatureBayes tool was employed that uses a Naive Bayes classifier for the identification of mature miRNA in pre-miRNA candidates based on sequence and secondary structure statistics of their pre-miRNA. It is of great significance to predict the starting position of mature miRNA within pre-miRNA because the positions 2—8 of the miRNA (seed region) is important for discovering respective gene targets (Gkirtzou et al.). MatureBayes can predict the start position of the mature miRNA and/or the miRNA* duplex with high accuracy, significantly outperforming the two existing tools i.e. BayesMiRNAfind and ProMiR (Gkirtzou et al.). MatureBayes predicted 12 mature miRNAs in HBV genome (Table 1), including the one which have been already identified by Jin and co-workers (Jin, Wu, Kong, & Guo, 2007). The positions of these mature miRNAs in the respective 6 potential hairpins are shown in figure 4.

Medical strategies like antiviral nucleoside/nucleotide analogs and the use of interferon (IFN) was established for treating chronically infected patients. However, currently existing therapies for the termination of HBV infection are insufficient in the majority of patients. Improved knowledge regarding HBV-host interaction is mandatory for new antiviral therapeutic strategies. The association of viral-encoded miRNAs with the pathogenic characteristics of the virus highlights the biological importance of miRNAs in evolving therapeutic targets in a broad range of diseases and is expected to develop into a novel armada of more powerful and mechanism-oriented therapeutics. In silico prediction of miRNAs is only the first step of miRNA study and should be followed by other investigations like target and function analysis for a comprehensive understanding of its biological roles.

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REFERENCES


Figure 1: Flowchart of the computational prediction process
Figure 2. (a) VMir analysis of the HBV genome; showing that all hairpins are widely dispersed across the viral genome. (b) only those hairpins are shown which passed the filter and achieved a VMir score between 85 and 146 and located between nucleotides 200 and 3132. Hairpins are plotted according to genomic location and VMir score.
Figure 3: Secondary structures of selected pre-miRNA precursor using RNAfold program

1. MD 16

2. MD 42

3. MD 54

4. MD 65

5. MR 31

6. MR 64
Figure 4: Hairpin structures of HBV pre-miRNAs. The putative mature miRNAs sequences are shown in red.

1. MD 16

```
UUUC UUAUA A - UU- - UC UA
GCC AG UGG UGAU GGGUA GGGGGC CAAG UG C
CUG UC ACC AUUG CGCCAU UCCUCG GUUC AC -
UUU- UUUUA - U UUU A U- GA
```

2. MD 42

```
UCU CUGUUC - CU
UC UGUUCAUGUCCUA AAGCC UCCAAG G
AG ACAGGUACGGGGU UUCGG GGGUUC U
CU- ------ U CG
```

3. MD 54

```
AGAAACCGUU A- - UUC------- G
GAAG AUAG GUAUUUGUG UCU GGAGUGUG A
CUUC UAUC CGUAAACCAC AGA CCUCACGC U
ACAACUAUCC CC C UAUUCGACC U
```

4. MD 65

```
AUUC --- CC-- AC
GC GGGCU GGGUUUCACCCA GC G
CG CUGGG CCCGAGGGGGGU CG G
GGA- ACU UUUC GA
```

5. MR 31

```
- A A CGAC AAAC
CC GC GGAUUC GGC G GGGACGU A
GG UG CCUAGG CGCG CCCUCGCA -
U A A ---- GGAA
```

6. MR 64

```
GUAGG U G- GA
CAGCGGG CUGCU CCUGUCU GC U
GUCGUUU GGCGGA GGACGGA UG -
A---- - GG GU
```
### Table 1: Mature miRNA sequences predicted by MatureBayes web tool

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NUMERICAL SOLUTION FOR NONLINEAR MHD JEFFERY-HAMEL BLOOD FLOW PROBLEM THROUGH NEURAL NETWORKS OPTIMIZED TECHNIQUES

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ABSTRACT. The purpose of study is to develop a numerical techniques for nonlinear magnetohydrodynamics (MHD) Jeffery-Hamel blood flow problem to analyze the behavior of blood flow and its contribution in high blood pressure through artificial neural networks trained with Active Set and Interior Point Algorithm. First we transform three-dimensional flow problem into two-dimensional MHD Jeffery-Hamel flow problem, which is converted into an equivalent third order nonlinear ordinary differential equation. These neural network models using log-sigmoid activation function are developed for new transformed equation. Detailed statistical analysis is also included to ensure the reliability and accuracy of the proposed methods through large number of independent runs. Further, comparative studies of the proposed solutions with standard numerical results is presented.

Keywords: Blood flow; Jeffery-Hamel Problem; Neural Networks; Nonlinear ODEs; Boundary value problems;

1. Introduction. Jeffery-Hamel problems are consider as incompressible viscous fluid flows between non-parallel sheets. Study of Jeffery-Hamel flows have been commonly used in various fields of applied science and engineering like mechanical and bio-mechanical engineering, fluid mechanics, environmental science. Jeffery [1] and Hamel [2] have been proposed the mathematical formulation of the problem in detail. Jeffery-Hamel flows actually provide an exact similarity solution of the Navier-Stokes equations in the special case of a two-dimensional blood flow through a tube with inclined plane sheets converges at a source or sink at the single point. Further for historical background, its applications and importance in various fields reader can go through the references [3-8]. The classical view of Jeffery-Hamel problems with use of an external magnetic field on a conducting fluid were studied in [9] by taking the magnetic field as a control parameter. The MHD Jeffery-Hamel flow problems do not exist any exact solution due to their highly non-linearity in the literature. However, their analytical and numerical solutions have been frequently reported in the literature, like Homotopy Perturbation method (HPM) [10-13], Homotopy analysis methods (HAM) [14-15], the Adomian decomposition method (ADM) [16-17], the Differential transform method (DTM) [18-19], Variational iteration methods (VIM) [20-21], and so on.
Recently studied on the Jeffery-Hamel flow equations are presented in [22-27]. Therefore there is a need to find stochastic numerical methods based on computational intelligence techniques to solve these problems.

Today the most serious physiological problem was stenosis (narrowing) of the arteries because they develop and causes many harmful vascular diseases which have very close relationship with the nature of blood flow and deformation of vascular walls. The stenosis of artery causes by the decomposition of fibrous tissue and fats in artery lumen which restricts the normal movement of blood where reduces the transport of blood in a whole body. Furthermore, the transport of blood entirely depends on the heart pumping action in the circulatory system of human being and produces a pressure gradient. Due to the stenosis of artery pressure increases that causes the heart to work hard.

Stochastic algorithm based on artificial intelligence techniques using neural networks have been applied extensively by the many researcher to solve a variety of initial and boundary value problems of linear and non-linear differential equations [28-31]. Recently, uses of these algorithms are non-linear Van der Pol oscillators [32], Troesch’s problems arising in plasma physics [33], solution of thin plate bending problem [34], tracking problems of a spherical inverted pendulum [35-36], the first Painlevé transcendental [37], surrogate modeling for the solution of integral equations [38], Bratu’s problem in fuel ignition modeling [39], etc.

In our proposed model blood is consider as Newtonian fluid, due to which problem become simple and still valid for blood in large artery. The purpose of this study is to develop the relationship between the rate of the blood flow and cross-sectional area of artery. To understand the conditions that contribute in hypertension which increases the risk of heart diseases.

This mathematical model containing two partial differential equations, which are used to find the cross sectional area, blood flow rate and pressure. By using the transformation to convert cylindrical system into another system for sake of simplicity of problem. The non-linear system of equations are governed and converted into linear equations by linearization method. In section 2, we formulate the problem and next section proposed a mathematical model for this equation with the help of log-sigmoid function. In section 4 we presented numerical and graphical results. Finally, we put a comparative analysis through Active set Algorithm (AST) and Interior Point technique (INT) through MATLAB. We concluded the paper in the last section 5.

2. Mathematical Formulation of Problem: Consider cylindrical coordinates \((r, \theta, z)\) and a steady two-dimensional flow of an incompressible conducting viscous fluid from a source or sink. Where \(r\) is radial, \(z\) is axial component and \(\theta\) is angular coordinate. Consider a fluid in the problem is human blood and visco-elastic effect is neglected, therefore behave like water. We consider pipe like behavior of human artery in this problem and construct a cylindrical problem in three dimensional partial differential equations (PDES). The governing mathematical relations are given as.

\[
\frac{\rho}{r} \frac{\partial}{\partial r} [ru(r, \theta)] = 0
\]

\[
u \frac{\partial^2 u(r, \theta)}{\partial r^2} + \frac{1}{r} \frac{\partial}{\partial r} \left[ \frac{\partial^2 u(r, \theta)}{\partial r} + \frac{1}{r} \frac{\partial u(r, \theta)}{\partial r} + \frac{1}{r^2} \frac{\partial^2 u(r, \theta)}{\partial \theta^2} - \frac{u(r, \theta)}{r^2} \right] = 0
\]

\[
\frac{1}{\rho r} \frac{\partial P}{\partial \theta} - \frac{2 \nu}{r} \frac{\partial u(r, \theta)}{\partial \theta} = 0
\]

Where \(\rho\) is density, \(\nu\) is kinematic viscosity, \(u(r, \theta)\) is the component of velocity in radial direction and \(P\) denotes fluid pressure.

Integrating the Eq. (1) with respect to \(r\). We get the following equation.
\[ ru(r, \theta) = f(\theta) \]  
(4)

Now we introduce the new function \( f(\eta) \) as following,

\[ f(\eta) = \frac{f(\theta)}{A} \]  
(5)

Where by using dimensionless parameters,

\[ \eta = \frac{\theta}{\alpha}, \quad A = f_{\text{max}} \]

From Eq. (4) and Eq. (5), we conclude that

\[ f(\eta) = \frac{ru(r, \theta)}{A} \]  
(6)

\[ u(r, \theta) = \frac{Af(\eta)}{r} \]  
(7)

Differentiate Eq. (7) w.r.t "\( r \)" and "\( \theta \)".

First we take derivative w.r.t \( r \),

\[ \frac{\partial u(r, \theta)}{\partial r} = -\frac{Af(\eta)}{r^2} \]  
(8)

By taking second derivative of \( u(r, \theta) \) w.r.t \( r \),

\[ \frac{\partial^2 u(r, \theta)}{\partial r^2} = \frac{2Af(\eta)}{r^3} \]  
(9)

Again differentiating Eq. (7) w.r.t \( \theta \), we get

\[ \frac{\partial u(r, \theta)}{\partial \theta} = \frac{A}{r} \frac{\partial f}{\partial \eta} \frac{\partial \eta}{\partial \theta} = \frac{A}{r\alpha} f'(\eta) \]  
(10)

Second derivative of \( u(r, \theta) \) w.r.t "\( \theta \)."

\[ \frac{\partial^2 u(r, \theta)}{\partial \theta^2} = \frac{A}{r\alpha} \frac{\partial f'}{\partial \eta} \frac{\partial \eta}{\partial \theta} = \frac{A}{r\alpha^2} f''(\eta) \]  
(11)

Integrating Eq. (3) and, after simplification we get the following result;

\[ P = \frac{2v}{r} \rho u(r, \theta) \]  
(12)

Differentiate pressure "\( P \)" in Eq. (12) w.r.t \( r \), we obtain the result,

\[ \frac{1}{\rho} \frac{\partial P}{\partial r} = -\frac{2v}{r^2} u(r, \theta) + \frac{2v}{r} \frac{\partial u(r, \theta)}{\partial r} \]  
(13)

Now putting the values from above equations into Eq. (13) we get,
\[
\frac{1}{\rho} \frac{\partial P}{\partial r} = -\frac{4v}{r^3} Af(\eta)
\]  

Substituting the values of Eqs. (7 - 11) into Eq. (3), we obtain

\[
-Af^2(\eta) = \frac{4v}{r^3} Af(\eta) + v \left[ \frac{2Af(\eta)}{r} - \frac{1}{r} \frac{Af(\eta)}{r^2} + \frac{1}{r^3} \frac{Af''(\eta)}{\alpha^2} - \frac{Af(\eta)}{r^3} \right]
\]  

(15)

Now dividing both sides by \(\frac{2A}{r^3}\), we obtain

\[
-Af^2(\eta) = 4vf(\eta) + v \left[ 2f(\eta) - f(\eta) + \frac{f''(\eta)}{\alpha^2} - f(\eta) \right]
\]

After simplify the above equation takes the final form as,

\[
Af^2(\eta) + 4vf(\eta) + v \frac{f''(\eta)}{\alpha^2} = 0
\]  

(16)

differentiate the Eq. (16) w.r.t “\(\eta\)” we can get,

\[
2Af'(\eta) f(\eta) + 4vf'(\eta) + v \frac{f'''(\eta)}{\alpha^2} = 0
\]  

(17)

Multiplying \(\frac{\alpha^2}{v}\) with the Eq. (17) both sides, we get

\[
2\frac{\alpha^2}{v} Af'(\eta) f(\eta) + 4\alpha^2 f'(\eta) + f'''(\eta) = 0
\]  

(18)

Put \(Re = \frac{\alpha^2}{v} A\)  

(19)

Substitute the Eq. (19) into Eq. (18), we obtain boundary value problem of a third order ordinary differential equation for the normalized function profile \(f(\eta)\),

\[
f''(\eta) + 2\alpha \text{ Re} f'(\eta) f(\eta) + 4\alpha^2 f'(\eta) = 0
\]  

(20)

With boundary conditions

\[
f(0) = 1, \quad f'(0) = 0, \quad f(1) = 0,
\]

(21)

Here “\(\text{Re}\)” is the Reynolds numbers, which is defined as:

\[
\text{Re} = \frac{f_{\text{max}} \alpha}{v} = \frac{U_{\text{max}} r \alpha}{v} \begin{cases} 
\text{divergent - channel}, \alpha > 0, f_{\text{max}} > 0 \\
\text{convergent - channel}, \alpha < 0, f_{\text{max}} < 0
\end{cases}
\]  

(22)
3. Neural Networks Modeling. The solution of the Jeffery-Hamel problems $f(\eta)$ through neural networks which are well known approximators and its $n$th order derivatives $f^{(n)}(\eta)$ can be approximated by the following continuous mapping in this methodology. We construct the mathematical model based on active set (AST), Interior Point technique (INT) with fitness function. The following activation functions called log-sigmoid based on logarithmic functions was used in the mapping [40-44].

$$LS = \frac{1}{1+e^{-(C+B\eta)}}$$ (22)

The solution $f(\eta)$ of the differential equation (20) along with its third order derivative, $f^{(3)}(\eta)$ can be approximated and $\hat{f}(\eta)$ is defined as

$$\hat{f}(\eta) = \sum_{i=1}^{N} A_i \phi (B_i \eta + C_i)$$ (23)

where $A$, $B$, and $C$ are real-valued bounded adaptive parameters, can be combined in vector form as written as:

$$W = (A_1, A_2, \ldots, A_N, B_1, B_2, \ldots, B_N, C_1, C_2, \ldots, C_N),$$

where $N$ is the number of neurons. This proposed mathematical model is using $f_{LS}$, for the approximation of the solution of Eq. (23) along with first and $3^\text{rd}$ order derivative.

$$\hat{f}_{LS}(\eta) = \sum_{i=1}^{N} \frac{A_i}{1+e^{-(B_i \eta+C_i)}}$$ (24)

$$\hat{f}_{LS}'(\eta) = \sum_{i=1}^{N} A_i B_i \left[ \frac{e^{-B_i \eta-C_i}}{(1+e^{-B_i \eta-C_i})^2} \right]$$ (25)

$$\hat{f}_{LS}''(\eta) = \sum_{i=1}^{N} A_i B_i^3 \left[ \frac{6 e^{-(B_i \eta+C_i)}}{(1+e^{-B_i \eta-C_i})^3} - \frac{6 e^{-2(B_i \eta+C_i)}}{(1+e^{-B_i \eta-C_i})^3} + \frac{e^{-(B_i \eta+C_i)}}{(1+e^{-B_i \eta-C_i})^2} \right]$$ (26)

where (’) mean derivative with respect to $\eta$. The mathematical model for Eq. (20) can be formulated by a linear combination of networks, Eq. (24), (25) and (26), called a differential equation neural network (DENN).

The fitness function for proposed model “E” has been formulated for the Eqs. (20)-(22) using Mathematical model by defining the unsupervised error as the sum of mean squared errors:

$$E = E_1 + E_2.$$ 

The error term $E_1$ is connected with the physical problem (20) is given as:

$$E_1 = \text{AVERAGE} \left[ \hat{f}_i^- + 2\alpha \text{Re} \hat{f}_i \hat{f}_i^- + 4\alpha^2 \hat{f}_i^2 \right]$$ (27)

for $i = 1, 2, 3, \ldots, N$.

where $\hat{f}_i = \hat{f}(\eta_i)$, $\eta_i = Nh$ with increment ‘$h$’ i.e., value at N subintervals in [0,1], $[\eta_1, \eta_2], [\eta_2, \eta_3], \ldots, [\eta_{N-1}, \eta_N]$.
Also $E_2$ for initial values can be defined as

$$E_2 = \text{AVERAGE}
\left[
(f_0 - 1)^2 + (f_0')^2 + (f_N)^2
\right]$$

(28)

3.1. Optimization procedure for numerical result: Furthermore, we give in detail about the procedural steps for the optimization in MATLAB Optimtool, is given below.

- **Step 1: Initialization**: A vector is generated bounded real values of length equal to the number of weights in given Mathematical model randomly plays as the starting point for each solver:
  $$W = (A_1, A_2, ..., A_N, B_1, B_2, ..., B_N, C_1, C_2, ..., C_N),$$
  Here $N$ represents the number of neurons.

- **Step 2: Fitness Evaluation**: The MATLAB Optimtool for constrained optimization problems is invoked for each model.

- **Step 3: Termination Criteria**: Terminate the execution of the solver, if any of the following criteria is satisfied:
  - required level of predefined fitness obtained, i.e., $E \leq 10^{-12}$.
  - total number of iterations executed.

- **Step 4: Storage**: Save the final optimal weights (variables) along with fitness values and total computational time taken by the algorithm.

- **Step 5: Statistical Analysis**: Repeat the process from steps 1 to 4 for sufficiently large number of runs to perform an effective and reliable statistical analysis.

4. Numerical solutions. In this section we consider the case of Jeffery-Hamel flows with Reynolds number $Re = 110$ and channel angles $\alpha = 3^0$, we show that the solutions of Jeffery-Hamel flow problems with the uses of proposed method along with two optimizer like AST and INT techniques. Further, the exact solution for this equation is not available, therefore we calculate the values of $\hat{f}_{RF}$ used as a reference solution with technique of MATHEMATICA in this case and we now apply the neural network models with 10 neurons each to solve the problem. In each model there are a total of 30 unknown adjustable parameters or weights, its numerical solution $\hat{f}_{LS}$ with the help of proposed method. Moreover, we calculate the value of absolute error $|f_{RS} - \hat{f}_{LS}|$ with AST and INT. Through these solvers we showed that the present solution is highly accurate as compared to others methods present in literature.

![Figure 1. AST technique result for proposed MHD problem](image-url)
Figure 2. Comparison of numerical result of AST with Reference solution

Figure 3. Numerical result of INT for Proposed problem.

Figure 4. Comparison of numerical result of INT with Reference solution
Fig. 1 and Fig. 2 are shown the behavior of flow through AST and its comparison with reference solution and
similarly Fig. 3 and Fig. 4 are represented the behavior of Jeffery-Hamel flow through INT technique and
provide its comparison with reference solution. The numerical solutions obtained by the neural network
models consistently overlap the reference solution, as shown in both figures. In order to elaborate small
differences, values of absolute error (AE) are calculated, and results reported in Table I and Table II of AST
and INT techniques respectively and their graphical representation is shown in Fig. 5 and Fig. 6 in this case
.
Table I: Absolute Error (AE) for multi-runs of AST technique.
Result/



AE1
AE2
AE3
AE4
AE5
AE6
AE7
AE8
AE9
AE10
AE11
AE12
AE13
AE14
AE15

Result/
INT1
INT2
INT3
INT4
INT5
INT6
INT7
INT8
INT9
INT10
INT11
INT12
INT13
INT14
INT15



0
2.34E-05
4.72E-05
4.56E-05
4.85E-05
5.35E-05
9.94E-06
8.27E-05
4.70E-05
1.34E-05
3.43E-05
5.24E-05
2.66E-05
4.58E-05
8.27E-05
8.69E-05

0.1
2.20E-05
4.48E-05
4.34E-05
4.61E-05
5.04E-05
9.47E-06
7.80E-05
4.46E-05
1.32E-05
3.23E-05
4.95E-05
2.55E-05
4.38E-05
7.80E-05
8.12E-05

0.2
1.97E-05
4.03E-05
3.97E-05
4.11E-05
4.56E-05
8.68E-06
7.00E-05
4.01E-05
1.22E-05
2.93E-05
4.49E-05
2.30E-05
3.91E-05
7.00E-05
7.28E-05

0.3
1.68E-05
3.45E-05
3.48E-05
3.36E-05
3.97E-05
7.49E-06
5.96E-05
3.42E-05
1.03E-05
2.58E-05
3.91E-05
1.92E-05
3.21E-05
5.96E-05
6.29E-05

0.4
1.38E-05
2.82E-05
2.90E-05
2.44E-05
3.34E-05
5.76E-06
4.83E-05
2.74E-05
7.76E-06
2.23E-05
3.26E-05
1.51E-05
2.35E-05
4.83E-05
5.30E-05

0.5
1.11E-05
2.27E-05
2.41E-05
1.58E-05
2.83E-05
4.22E-06
3.87E-05
2.14E-05
5.19E-06
1.97E-05
2.72E-05
1.12E-05
1.55E-05
3.87E-05
4.51E-05

0.6
9.17E-06
1.87E-05
2.08E-05
8.78E-06
2.52E-05
3.23E-06
3.19E-05
1.69E-05
2.94E-06
1.84E-05
2.41E-05
7.87E-06
8.84E-06
3.19E-05
4.06E-05

0.7
8.20E-06
1.63E-05
1.92E-05
2.62E-06
2.44E-05
2.38E-06
2.80E-05
1.40E-05
8.46E-07
1.87E-05
2.29E-05
5.33E-06
3.11E-06
2.80E-05
4.01E-05

0.8
8.43E-06
1.62E-05
1.94E-05
2.19E-06
2.61E-05
1.64E-06
2.78E-05
1.32E-05
9.77E-07
2.07E-05
2.39E-05
3.97E-06
1.33E-06
2.78E-05
4.39E-05

0.9
9.96E-06
1.90E-05
2.25E-05
4.15E-06
3.12E-05
1.60E-06
3.29E-05
1.51E-05
2.09E-06
2.51E-05
2.83E-05
4.05E-06
3.23E-06
3.29E-05
5.34E-05

1
1.29E-05
2.46E-05
2.86E-05
3.63E-06
4.00E-05
2.23E-06
4.31E-05
1.98E-05
2.58E-06
3.18E-05
3.63E-05
5.47E-06
2.79E-06
4.31E-05
6.88E-05

0.9
2.00E-05
9.72E-06
3.65E-05
2.65E-05
3.22E-05
1.73E-05
1.68E-07
3.61E-06
6.90E-06
9.72E-06
3.34E-05
4.63E-05
3.87E-05
3.65E-05
2.65E-05

1
2.74E-05
1.25E-05
4.69E-05
3.40E-05
4.15E-05
2.22E-05
2.32E-07
4.72E-06
9.04E-06
1.25E-05
4.27E-05
5.95E-05
4.94E-05
4.69E-05
3.40E-05

Table I I: Absolute Error (AE) for multi-runs of INT technique.
0
9.25E-05
3.49E-05
7.77E-05
6.23E-05
7.89E-05
3.83E-05
9.80E-06
2.26E-05
2.50E-05
3.49E-05
6.44E-05
9.68E-05
6.92E-05
7.77E-05
6.23E-05

0.1
8.76E-05
3.37E-05
7.37E-05
5.95E-05
7.52E-05
3.64E-05
9.61E-06
2.19E-05
2.40E-05
3.37E-05
6.10E-05
9.17E-05
6.54E-05
7.37E-05
5.95E-05

0.2
7.82E-05
3.06E-05
6.64E-05
5.36E-05
6.79E-05
3.28E-05
8.74E-06
1.98E-05
2.15E-05
3.06E-05
5.50E-05
8.25E-05
5.90E-05
6.64E-05
5.36E-05

0.3
6.55E-05
2.63E-05
5.73E-05
4.61E-05
5.84E-05
2.82E-05
7.41E-06
1.69E-05
1.83E-05
2.63E-05
4.75E-05
7.10E-05
5.12E-05
5.73E-05
4.61E-05

0.4
5.12E-05
2.14E-05
4.76E-05
3.83E-05
4.81E-05
2.35E-05
5.81E-06
1.35E-05
1.48E-05
2.14E-05
3.98E-05
5.89E-05
4.32E-05
4.76E-05
3.83E-05

0.5
3.84E-05
1.65E-05
3.89E-05
3.09E-05
3.87E-05
1.91E-05
4.12E-06
1.00E-05
1.13E-05
1.65E-05
3.31E-05
4.83E-05
3.63E-05
3.89E-05
3.09E-05

0.6
2.84E-05
1.28E-05
3.30E-05
2.55E-05
3.19E-05
1.60E-05
2.64E-06
7.21E-06
8.57E-06
1.28E-05
2.85E-05
4.11E-05
3.18E-05
3.30E-05
2.55E-05

0.7
2.12E-05
1.03E-05
3.03E-05
2.28E-05
2.82E-05
1.45E-05
1.47E-06
5.13E-06
6.95E-06
1.03E-05
2.67E-05
3.79E-05
3.04E-05
3.03E-05
2.28E-05

0.8
1.78E-05
9.00E-06
3.10E-05
2.30E-05
2.79E-05
1.48E-05
5.97E-07
3.76E-06
6.28E-06
9.00E-06
2.82E-05
3.91E-05
3.25E-05
3.10E-05
2.30E-05

5. Conclusion.
 These solvers depend on neural network models using log-sigmoid function, optimized with active
set and an interior point method can provide reliable solutions for the nonlinear two time transformed
problem of the MHD Jeffery-Hamel flow equations.
 Comparative study of the results of the this proposed models shows that solutions in case of
log-sigmoid-INT and log-sigmoid-AST match upto 5 to 6 decimal places of accuracy. The results
reported here are better in accuracy.
 The proposed solvers have some advantages over other numerical techniques.
 The beauty of proposed method is its simplicity.
 In future, one may work other computational intelligence techniques based on neural network
models, optimized with global and local search algorithms.
 Moreover, one may explore to extend these methodologies to solve stiff, highly nonlinear differential
equations with singularities and requiring convergent solutions on larger scale for better application
of these problems.

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REFERENCES


EXPLORING BINDING MODES OF 5-SUBSTITUTED 1H-TETRAZOLES AS CYCLOOXYGENASE INHIBITORS: A MOLECULAR DOCKING STUDY

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ABSTRACT. Cyclooxygenases, which exists in two forms COX-1 and COX-2, are essential enzymes in the synthesis of Prostaglandin H, involves in the biosynthesis of Thromboxanes, and Prostacyclins. The inhibition of biological activity of these enzymes has very therapeutic importance in many pathological conditions. Many non-steroidal anti-inflammatory drugs (NSAIDs) have been used against these enzymes but mostly lead to side effects. Recently reported several synthetic compounds (5-substituted 1H-tetrazoles) which are experimentally shown to inhibit cyclooxygenase activity in the low micromolar range. We performed a computational study to help identify possible binding modes by docking these compounds onto the active site of cyclooxygenase-2 (COX-2) and to characterize the structures of binding complexes via MOE-Dock as docking software. Good correlations were found in docking scores and experimental values of these compounds against COX-2. The top-ranked conformation of each compound was interpreted for binding interactions with the residues of the binding cavity of the COX-2 enzyme. The predicted binding modes of these compounds prioritized structural features required for their biological activities. According to our study, the functional groups with nonpolar nature might be one of the reasons to enhance the biological activity of these inhibitors against cyclooxygenase, while the polar and bulky group might lead to less activity. The observed findings might be exploited to design more potential COX-2 inhibitors. The present computational analysis complements the corresponding experimental investigation and helps establish a good starting point for further refinement of COX-2 inhibitors.

Keywords: Cyclooxygenase Inhibitor; Molecular docking; Tetrazole; MOE

1. Introduction. Cyclooxygenases (COXs) 1 and 2, also identified as Prostaglandin endoperoxidase H synthases (PGHSs) 1 and 2 (Rouzer and Marnett 2009; Schneider et al., 2007; Smith 2008; Smith et al., 2002; Van der Donk and Kulmacz 2002; Ranjinder et al., 2010) are indispensable enzymes in the synthesis of Prostaglandin H, which is involved in the biosynthesis of series-2 prostaglandins, prostacyclins and thromboxanes (Hamberg and Samuelsson 1973).

Three isoforms of this enzyme have been identified (COX-1, COX-2, COX-3). COX-1 is constitutively expressed in most tissues and is believed to generate prostaglandin (PG) for physiological functions such as the regulation of vascular homeostasis, protection of the gastric mucosa and renal maintaining integrity. COX-2, by contrast, was almost undetectable at physiological conditions in most tissues. However, its expression is up-regulated by pro-inflammatory stimuli, growth factors and mitogens, and is implicated in
pathological conditions, including inflammation (Chandrasekharan et al., 2002). Recently, a third isoform COX-3 was cloned and shown to share the catalytic properties of the COX-1 and COX-2 (Vane et al., 1998). Both COXs (COX-1, COX-2) isoforms are homodimers made up of ~72 kDa subunits which are strongly bound to each other through an 2500 Å² interface spanning (Laskowski et al., 1997). Every COXs monomer consists of a membrane binding domain (MBD), an epidermal growth factor-like domain of strange function, and a vast catalytic core (Picot et al., 1994). The bifunctional catalytic subunit keeps both Cyclooxygenase and peroxidase enzymatic activities (Garavito and Mulichak 2003). The 3-dimensional structure of the COX-2 enzyme protein was retrieved from Protein Data Bank (PDB) with ID 1CX2. The 1CX2 is a complex of four homologous chains with an inhibitor SC-558 (http://www.rcsb.org/pdb/home/home.do. Accessed 10 March 2013).

Molecules that are inhibitors of this enzyme would be of therapeutic value (Qi et al., 2002). Both COXs isoforms are targets of non-selective (nsNSAIDs), for example ibuprofen and aspirin, whereas COX-2 can also be blocked selectively by diarylhetereocyclic COX-2 specific inhibitors called coxibs (Prusakiewicz et al., 2009).

The discovery of COX-2 enzyme near the beginning in the 1990s and further its characterization led to the inception of the assumption that selective inhibitors of this isoform would posses similar clinical efficacy, although reduced ulcerogenericity than usual (NSAIDs), which were having both non-selective COX-1 and COX-2 inhibitors following Rofecoxib and Celecoxib where the first Cyclooxygenase-2 selective inhibitors arrive at the market and then followed by Valdecoxib and Etoricoxib (Meade et al., 1993; Xie et al., 1991; Talley et al., 2000; Ormrod et al., 2002). The therapeutic applications of selective Cyclooxygenase-2 inhibitors have been widely extended ahead of the field of inflammation and analgesia (Friesen et al. 1998; Riendeau et al., 2001).

Conventional (NSAIDs) are employed at large scale in the treatment of osteoarthritis, rheumatoid Arthritis, and pain, etc. but, it as well has side-effects on the gastrointestinal tract (G.I.T), for example intestinal ulcers and gastric lesions, which happen frequently. The NSAIDs have the potential to inhibit the both COXs isoform, the key enzyme in prostaglandin biosynthesis (Qi et al., 2002). It is believed that the conventional NSAIDs inhibit both COX isoform activities and that Cyclooxygnse-1 inhibition causes the side-effects on the G.I.T, etc. Hence, COX-2 selective inhibitors were predictable to be the next generation NSAIDs with less side-effects on the G.I.T (Prusakiewicz et al., 2009).

It has been reported that various 1,5-diaryl substituted tetra-zoles containing a 4-(methylsulfonyl) phenyl substituent attached to position 1 of the tetrazole ring have good inhibitory activities against COX-2 enzyme (Al-Hourani et al., 2011). All these tetrazoles possess a tricyclic scaffold containing a central heterocyclic ring system with two vicinal aryl substituents as typically found in many selective and potent COX-2 inhibitors. One series (1-8) contains a sulfonamide (SO2NH2) group; the other series of tetrazoles (9–16) contains a methylsulfonyl (SO2Me) group.

There are different techniques used in in-silico drug design visualization, molecular dynamic, homology, energy minimization molecular docking and QSAR etc. (Wadood et al., 2013). Molecular docking is a computational method that can be used to explain the interactions of ligands with the receptor. There are a number of docking methods. Among them one is the MOE-Dock method (http://www.chemcomp.com). In MOE-Dock method, docking small molecules to macromolecular binding sites provide a database of conformations or conformations generated on the fly. Choose among several scoring functions, and optionally the force generated to satisfy a query positions pharmacophore search bias towards important interactions known. Refine the poses using a method based on force field to score MM / GBVI or a method based on the network quickly. FlexX is an interface for virtual screening provides high performance. The docking architecture is parallelized using technology MOE / smp (Labute P, 2008). We applied this method to explore the binding interactions of some 5-substituted 1H tetrazoles as COX-2 inhibitors.
2. **Materials and Methods.** In this study the molecular docking of some 5-substituted 1H tetrazoles into the binding pocket of COX2 (PDB: 1CX2) protein was performed using MOE-Dock as docking software implemented in MOE (Molecular Operating Environment) software package. LigPlot implemented in MOE was used to observe the interactions between COX-2 and ligands.

2.1. **Retrieval of modeling of ligands.** The structures and biological activities of known 5-substituted 1H tetrazoles as COX-2 inhibitors were collected from the published literature (Al-Hourani et al., 2012). The MOE-Build tool was used to construct the structures of all the inhibitors. The 2D structures and their biological activities of these compounds are given in **Table 1**. The three dimensional (3D) structure of all the ligands was modeled using MOE. All the 3D structures were then energy minimized with default parameters via MOE energy minimization algorithm [gradient: 0.05, Force Field: MMFF94X].

**Table 1.** Structures, biological activities and docking scores of the compounds against COX-2 enzyme.

<table>
<thead>
<tr>
<th>S.no</th>
<th>Structures</th>
<th>IC₅₀ (µM)</th>
<th>Docking Scores</th>
<th>p Docking Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><img src="image1.png" alt="Structure 1" /> 4-(5-phenyl-1H-tetrazole-1-yl)benzenesulfonamide</td>
<td>15</td>
<td>-13.4891</td>
<td>1.1299</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2.png" alt="Structure 2" /> 4-(5-(4-fluorophenyl)-1H-tetrazole-1-yl)benzenesulfonamide</td>
<td>56</td>
<td>-12.3298</td>
<td>1.0909</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3.png" alt="Structure 3" /> 4-(5-(4-chlorophenyl)-1H-tetrazole-1-yl)benzenesulfonamide</td>
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<td>-12.0785</td>
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<tr>
<td>4</td>
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<td>07</td>
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<td>1.1422</td>
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<tr>
<td></td>
<td>Chemical Structure</td>
<td>Experiment</td>
<td>Kd (M)</td>
<td>Error (M)</td>
</tr>
<tr>
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<td>1.1133</td>
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<tr>
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<tr>
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<tr>
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<tr>
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<td><img src="image10" alt="Chemical Structure" /></td>
<td>6</td>
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<td>1.1436</td>
</tr>
</tbody>
</table>

N,N-dimethyl-4-(1-(4-(methylsulfonyl)phenyl)-1H-tetrazole-5-yl)aniline
2.2. **Preparation of receptor protein**. The protein molecule of cyclooxygenase was retrieved from Protein Data Bank [PDB Code 1CX2]. The water molecules were removed and then 3D protonation of the protein molecule was carried out. The energy of the retrieved protein molecule was minimized using with most of the default parameters of MOE energy minimization algorithm [gradient: 0.05, Force Field: Amber99].

2.3. **Molecular docking**. The molecular docking of the ligands were carried out by the MOE-Dock program keeping with the default parameters. The ligands were kept flexible in order to find the correct conformations and obtained minimum energy structures. At the end of docking, the top-ranked conformation of each ligand was analyzed for their binding interaction.

3. **Results and Discussion**

3.1. **Validation of the docking procedure**. In order to assess the accuracy of the MOE-Dock program the co-crystallized ligand was removed from the active site and redocked into the binding cavity of COX-2. The root mean square deviation (RMSD) between the co-crystallized ligand and top-ranked docked conformation was observed to be 0.5892 Å ([Figure 1](#)), suggesting a high docking reliability of MOE-Dock in reproducing the experimentally observed binding mode for COX-2 inhibitors and the protocol set for the MOE-Dock is reasonable for to reproduce the X-ray structure (Wadood et al., 2013). The MOE-Dock and the set protocol could be extended to explore the COX-2 binding modes for other inhibitors accordingly.

**Figure 1.** Conformational comparison of the co-crystallized ligand extracted from the complex structure (red) COX-2 enzyme and the docked conformation (blue).

3.2. **Correlation between docking scores and IC50 values**. From the docking results a good correlation between docking scores and biological activities of COX-2 was observed ([Table 1](#) and [Figure 2](#)). The observed correlation coefficient ($r^2 = 0.931$) between p-docking score and IC50 values of the ligands suggest that the docking protocol is reliable.
3.3. Predicted binding modes in 5-substituted 1H-tetrazoles as COX-2 inhibitors. From the docking conformations of equipotent compounds 10 and 4 (Table 1) it was observed that both compounds established three hydrogen bonds with the active site residues of the COX-2 enzyme (Figure 3A and 3B). In case of compound 4 the oxygen atom of sulfur dioxide moiety of the compound formed hydrogen bonds with His90 and the amino group attached with sulphur dioxide moiety formed hydrogen bonds with Gln192 respectively, whereas the nitrogen atom of 1H-tetrazole established hydrogen bonds to Tyr355 (Figure 3A). The remaining oxygen of sulphur dioxide moiety expressed Van der Waals interactions with His90 and Gln192 and one nitrogen of the 1H-tetrazole expressed hydrogen bonding with Tyr355 residue while both of the benzene rings of the compound showed Van der Waals interactions with the Ser530 residue of the pocket. Although a similar binding mode for both compounds was observed, but a slight difference in activities might be due to the presence of methylsulfonyl moiety in compound 4 that become this compound more hydrophobic as compared to compound 8 that has sulfonamide moiety.

From the docking conformation of compound 1 it was examined that oxygen atom of a sulfonamide moiety of the compound established two hydrogen bonds with the active site residues Arg513 and Tyr355. The benzene ring of the compound expressed Van der Waals interaction with the Met522 (Figure 3C), whereas, with compound 7, the oxygen of the sulphur dioxide moiety formed one hydrogen bond with Try355 residue of the pocket. The benzene rings of the compound 7 showed Van der Waals interactions towards Met522 (Figure 3D). From the docking results it was observed that the presence of dimethylamine moiety in compound 4 and 10 might be one of the reasons for their more activities as compare to compound 1 and 7. Due to the presence of this moiety compounds 4 and 10 were able to form more hydrogen bonds with the active site residues as compare to compound 1 and 7 (Figure 3A, B, C & D).

About analogous binding modes were observed for compounds 5 and 8 (Figure 3E and 3F). In case of compound 5 the oxygen atom of sulfomethane moiety of the compound formed hydrogen to Ser530 and with Tyr358, Van der Waals interactions were observed whereas in case of compound 8 the nitrogen atom of 1H-tetrazole moiety of the compound formed hydrogen bond to Tyr355 in binding pocket of COX-2 enzyme, and the chloro group of the compound also showed the Van der Waals interactions with Val523, one of the nitrogen atom of 1H-tetrazole ring expressed Van der Waals interactions towards Val349 residue, furthermore, the two benzene ring expressed Van der Waals interactions towards Trp387. These two compounds have nearly same activities (IC50 30-32 µM) and both the compounds showed one interaction with the active site residues (Figure 3E & F). The relatively low inhibitory activity of compound 8 might be due to the presence of the electronegative chloride group in this compound. The lower activity of these two compounds as compared to the compound 10 might be due to the absence of dimethyl ammine group in these compounds.
The compounds 2, 3 and 9 are also almost equipotent in the series (Table 1). Almost similar binding modes were observed for these compounds in the active site of the COX-2 enzyme. From the docking conformation of compound 2 it was observed that the oxygen atom of methylsulfonamide moiety and nitrogen atom 1H-tetrazole ring of the compound established hydrogen bonds to Tyr385 and Tyr355 respectively. The residue Ser530 showed Van der Waals interactions with the one of the benzene ring of the compound (Figure 4A). In case of compound 3 only one hydrogen bond was observed between oxygen moiety of a methylsulfonamide moiety of the compound and the active site residue Tyr355. The chloro benzene ring showed Van der Waals interaction with Gly526 and the other benzene expressed the same type of interaction with Leu531 (Figure 4B).

Figure 3. Docked conformation of compound 16 (A) and 8 (B) in the active site of COX-2 enzyme. Docked conformation of compound 1 (C) and 12 (D) in the active site of COX-2 enzyme. Docked conformation of compound 9 (E) and 13 (F) in the active site of COX-2 enzyme.

The docking conformation of compound 9 showed that two hydrogen bonds were formed between the oxygen atom hydrosulfonylmethane moiety and nitrogen atoms of 1H-tetrazole ring of the compound to the active site residues His90 and Tyr355 in the active site of the COX-2 enzyme. In these three compounds the groups with electron withdrawing inductive effect (F, Cl, N+O2) were observed to play an important role regarding interactions, docking score and inhibitory activity. Compound 2, containing fluorine group, was observed with good interaction, docking score and activity as compared to compound 3 containing chlorine, while these compounds have the same structural features with sulfonamide group. Compound 9, having Nitro group, was found almost similar to compound 2 regarding interaction and docking score, although, it is...
slightly less potent by activity. The relatively good docking score and interaction as compared to the activity of this compound might be due to the presence of methylsulfonyl group. Moreover, the structural features that make these compounds less active as compared to the most active compounds 4 and 10 are the presence of these polar electron withdrawing groups.

The remaining compounds 6, 7 and 5 also showed docking scores and predicted binding modes according to their inhibitory activities.

3.4. Designing of new compounds. New compounds were designed in MOE software by replacing functional groups R of 5-diaryl substituted tetra-zoles containing a 4-(methylsulfonyl) phenyl substituent or sulfonamide group substituent attached to the 1 position of the tetra-zole ring. The functional groups [-NH(C2H5), -NH-CH3, -NH2, -OH, -SH] were attached at R position as shown in Table 2. As a result of that new inhibitors were obtained which were further docked with Cyclooxygenase (PDB code 1CX2) using MOE software.

The compound 1 and 2, which have similar functional group NH-CH3, has a good score of -24 and -22 respectively. Compound 1 formed four hydrogen bonds with active site residues (Tyr355, Arg513, Met522) and fit well in a pocket than the parent compound which have scores of -13 (compound 10 in Table 1), while compound D made three hydrogen bonds with active site residues (Tyr355, Tyr385, Ser530) and fit well in a pocket than the parent compound (compound 4 in Table 1). The parent compound of compound 1 and 2 also formed 3 hydrogen bonds with active site residues. The difference in hydrogen bonding network and docking score between compound 1 and 2 might be due to presence of SO2Me in compound 1, although both have the same functional group (Figure 5A and 5B).
The compound 3 and 4, which have the same functional group NH2, have a good docking score, -22 and -20 respectively. Compound 3 made four interaction with the important binding site residues (Tyr355, Tyr385, Met522) and compound 4 made three interactions with the pocket residues (Tyr355, Ser530, Arg120). Both were well fitted in the pocket of the target protein (Figure 5C and 5D).

The compound 5 formed three hydrogen bonds with active site residues (His90, Arg513) as shown in (Figure 5E). The compound 5 has docking score -15 and fit well in the pocket of target enzyme than parent compound that has docked score -13. Similarly the compound 6 formed three hydrogen bonds with active site residues (Tyr355, Arg120, Ser530) (Figure 5F) and well fit in the pocket of target enzyme with a Docking Score of -14. The parent compound has a docking score of -13.
<table>
<thead>
<tr>
<th>S.no</th>
<th>Structure</th>
<th>Docking Scores</th>
</tr>
</thead>
<tbody>
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<td>-24.9883</td>
</tr>
<tr>
<td>2</td>
<td><img src="image2.png" alt="Image" /></td>
<td>-22.6629</td>
</tr>
<tr>
<td>3</td>
<td><img src="image3.png" alt="Image" /></td>
<td>-22.8349</td>
</tr>
<tr>
<td>4</td>
<td><img src="image4.png" alt="Image" /></td>
<td>-20.7045</td>
</tr>
</tbody>
</table>
4. Conclusion: As a result of the docking study, we predicted the nature of some functional groups that may play an important role in the development of more potent inhibitors of cyclooxygenase. From our study, we suggest that the functional groups with nonpolar nature may enhance the activity of the cyclooxygenase inhibitors, while the polar and bulky group leads to less activity. For example, the methylsulphonyl group of the studied compounds, as a whole, showed a good docking score and interaction as compared to the sulfonamide group containing compounds. Similarly, the addition of some polar groups, (F, Cl, N+O2) and bulky groups (NO2, CF3, OMe) in the structures of these inhibitors was observed with low activity, docking score and poor interactions. Furthermore, new compounds were designed and docked into the receptor active site on the basis of our docking results. These new compounds showed good docking scores and interaction with the active site residues. The present computational analysis complements the corresponding experimental investigation and helps establish a good starting point for further refinement of COX-2 inhibitors.

REFERENCES


UNDERSTANDING PHYSICS BY PHYSICS
SUITE STRATEGIES IN SECONDARY SCHOOLS
IN PAKISTAN

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1
1Department of Education, University of Haripur

ABSTRACT: One of the teaching learning purposes of schooling is the social and psychological development of a child. Every field of today’s life is a slave of technology, which is in the state of flux. The role of physics is dominated of all other subjects in the school. Motivation of “doing” is important than simply acquiring knowledge. Physics suite is a set of strategies which enables the students ‘to learn to do’ in real life and enables them to be a socially active member of a society as well as psychologically sound personality. Main objective of the study was to examine the understanding of the learners taught by physics suite at secondary level in Pakistan. A null hypothesis “there is no significant difference between the mean scores of pupils taught with physics suite and those with traditional method”. Post-test only equivalent group design was used for the collection of data. A group of 40 students was observed, as experimental and control group comprising 20 students each. After six weeks data was collected through post test and analyzed using t test. Significant difference was found between the mean scores of experimental and control groups and the null hypothesis was rejected.

Introduction: All over the world learning and teaching physics in secondary schools is perceived one of the most difficult jobs (Colletti, 2010; Monk & Osborne, 2000). Cobern (1994) states that often well educated persons know little science. Till now teacher in secondary schools used very little resources and there is no link of physics topics to the real life (Ramma, Dindyal, Tan & Cyparsade, 2006). Even the inherent hurdles in its teaching, physics teachers have to do their best to make physics students understand the concepts in textbook (Lawrenz, Wood, Kirchhoff& Kim, 2009).

Over the whole year if the teacher comes in the classroom with same type of strategies, planning, resources, questions, and evaluation techniques then it becomes boring for the learners. In such conditions learners are not only unable to understand and apply science concepts, but they are also not able to understand the purpose of science in the school curriculum and are regrettably shying away. This also badly affects their social, emotional and psychological domains. To overcome these deficiencies, it is very important to try innovative strategies in the teaching and learning of physics. One of these is the intention of bringing variety to the classroom practices both for the benefit of the teacher and the learners (Cyparsade, Moheeput, & Caroopupnen, 2009).

Learners always need to be focused and engaged in different learning activities during teaching and learning process. It is also necessary to help learners internalize certain abstract concepts through the engagement of more than one sense at the same time (Sharma, 2006). Research studies found that learners worldwide are less at ease with physics concepts than other science subjects because more abstract concepts are to be found in physics than elsewhere. The subject of Physics is actually the master of scientific knowledge (Colletti, 2010). Thus the learning of physics concepts demands more concretisation.
Physics suite includes instructional methods that are based on, assessed by and validated through research on the teaching and learning of physics (Hake, 1998). These are interactive methods in which students are involved in their own learning more deeply and more intensely than does traditional method. Widely cited analysis of test data from thousands of students in dozens of courses have indicated that the superior effectiveness of active-learning instruction in physics (“interactive engagement”) in comparison to traditional, lecture-based methods. Cooperative learning approach is one of the active learning methods in physics suite which deals with “working in groups”. In cooperative learning students are organized in small groups and acquire knowledge through discussion which promotes team work in real life. Working in groups in the classroom also promotes students interaction, sense of belongingness reduces absenteeism, shyness and encourages social interaction. Research has shown that groups frequently devise more and better solution of the learning problem than more knowledgeable person and also learning together in groups provides students an opportunity to teach each other and learn from each other (Barkley et al, 2005).

The present study was aimed at investigating the understanding of physics at secondary level through pedagogical strategy of cooperative learning—“the jigsaw” based on social and psychological analyses by Aronson (1978, 2002). This structured cooperative strategy has the potential to avoid many of the problems of other forms of the learning in groups.

**Procedure of jigsaw strategy:** Aronson (2002) stated that in jigsaw method the lesson is divided into equal parts, which is also called as main theme and sub theme. The numbers are equal to number of students in the class. The students are organized in to heterogeneous groups called jigsaw or parent groups containing 4 students each (it depends on the size of the class). Every student is allotted number e.g. 1,2, 3 and 4. Then every student in each group having the same number assigned the same subtopic and is called the “expert”. Students then rearrange forming expert groups. Students in these expert groups discuss the main points of their segments and rehearse the presentations they will make to their jigsaw groups. After given time expert come back to their parent groups. Each member of the expert group should have sufficient command on the topic, so that he or she can easily convey the information to the home group and present their work with the entire class. It may be in the form of oral presentation, written graphics or a quiz. Each member of the group is responsible for the success of whole group. Group members are not fixed for a particular group but every day replacing is must. Teacher should move around the class to help the needy students to understand the material, and give some incentive on doing best work.

**Example:**

Topic: parts of plant

Segments: root, stem, branch, leaves.

Number of students=16

Number of groups=4

Number allotted=1,2,3,4

<table>
<thead>
<tr>
<th>Jigsaw groups/home group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group one</strong></td>
</tr>
<tr>
<td>Root(1)</td>
</tr>
<tr>
<td>Stem (2)</td>
</tr>
<tr>
<td>Branch (3)</td>
</tr>
<tr>
<td>Leaves (4)</td>
</tr>
</tbody>
</table>
Role of teacher in jigsaw class: Aronson (2000-2008) explains that teacher’s primary role in jigsaw classroom is to choose learning material, break up the material according to number of students, structure the groups, explain the responsibilities of group members, provide an environment conducive for this type of work, monitor group work, and assist students in summarizing, synthesizing, and integrating material. It is also important that the teacher model and explain effectively the jigsaw before involving students in this type of teaching strategy (Smith, 2001).

Objectives of the study:

1. To observe the social and psychological change in the students by applying jigsaw cooperative learning strategy.
2. To explore the academic achievements of control and experimental groups.

Results of many recent studies (Johnson & Johnson, 2005, 2006; Bertucci, Conte, Johnson, & Johnson, 2010) have shown that in cooperative learning situations, the students provide more social support both personally and academically. For this purpose null hypothesis “there is no significant difference between the mean scores of control and experiment groups of students learning physics”, was tested.

Background of the study: When entering in 9th class, students feel difficulties in understanding abstract concept of physics in Pakistani schools because most of the students come from villages. They are poor reader and slow thinker and have trouble creating for their group. They are socially weak and feel shy while talking to other. On the other hand, students belong to cities also unable to internalize the physics rules and concepts. In such circumstances it is important to use new ways of teaching and learning. Jigsaw was introduced and implemented on 9th class students.

Procedure of the study

Population and Sample: All the students learning physics constituted the population of the study. Forty students of 9th class learning physics from government high school Nowshera comprised the sample of the study.

Design: Post test only Equivalent Group Design was used to identify the effect of jigsaw strategy on the performance 9th class students learning physics in Govt. high school Nowshera (Pakistan). Forty students were randomly divided into two heterogeneous groups. For the purpose of investigating effectiveness of the strategy the groups were called experimental and control groups. Control group was taught traditionally while experimental group was exposed to the intervention.

Method and procedure for intervention: From the physics Text Book teacher planned the lesson selecting first two chapters in the light of jigsaw strategy for six weeks experimental period. A day before for the period of 45 minutes he assigned the segmented topic to the relevant student. Before the starting of experiment he also explained the aims and procedure of the strategy to the students. Twenty students were divided in to 5 groups each with 4 participants. Control group was taught by traditional method by another teacher the same chapters for the same time and duration. While students were working in groups teacher was moving round the class to help them and to note their behavioral changes according to teacher log. At the end of intervention period a hundred items true, false test was administered to both the groups.
The collected data from the test scores was analyzed by applying t-test for the comparison purpose, and teacher log was analyzed qualitatively.

**Result and discussion:** When analyzed by applying t-test the t value was found to be 3.07 which is greater than table value at 0.05 levels and the null hypothesis was rejected. Finding of this study is parallax with previous researches revealing that jigsaw cooperative learning has positive effects on students’ affective attributes and attitudes and raised academic achievement (Cai, 1997; Sarıtaş, 1998; Ernst and Byra, 1998; Dyson, 2001; Dyson, 2002). It was also found by (Koseoglu, 2010) that jigsaw technique raised the academic achievement of the students.

**Results from teacher log:** It was observed that positive attitude of the learners gradually increased towards physics learning. Students, who in the beginning looked lazy, became more active, cooperative, communicative, and social. Psychologically, it was observed that their self-confidence and self-esteem boosted up which was the main objective of the study. Students, who were not motivated when entered physics class and tried to sit on back benches, were ready to do the work in first attempt. These findings are in line with findings reported in the similar studies (Bourner et al., 2001; Mills, 2003; Ulmer & Cramer, 2005). This method lets students be more active, increases self confidence, provides interaction and cooperation. It also enhances learning. Jigsaw allows students to actively participate in learning (Sahin, 2010). Badawi (2008) attempted to investigate a significant effect for the students’ affective aspects such as self-concept, their value, and motivation of jigsaw II group. Working in small groups, Bayraktar (2011) argues, increases academic achievement, self-esteem and critical thinking skills. Students help each other improve their communication and problem solving ability.

**Some difficulties faced during the experiment:** Time management and formation of groups were the basic constrains faced by the teacher in the beginning. Students were also in trouble in understanding the process. However, at the end they were ready to use this activity in other subjects also. On the part of teacher, lesson plan was a difficult and an industrious activity. Same was pointed out by (Maftie, 2011) in jigsaw group activities, time budget of the class is affected by communicating the individual or group workload, formation of groups, distribution of teaching aids, and work sheets. Lesson preparation for the group activity demands more energy from teacher to prepare well devised strategy.

**Conclusion:** In the light of the findings of this study and other supported researches it was concluded that jigsaw cooperative strategy under the umbrella of physics suite is an effective practical and developmental strategies. From the students point of view it should be implemented for the other subjects as well.

**REFERENCES**


Existence of global solutions and for system of reaction-diffusion equations

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ABSTRACT. The subject proposed for this paper are concerned with the existence of classical solution of the reaction-diffusion systems with a triangular diffusion matrix.

The study concerns the generation of analytic semi group and compacts in real Banach spaces, the existence of local solutions and its positivity, the global solutions.

Keywords: Global solution, semigroups, local solution, reaction-diffusion systems.

1. Introduction. Recently, a class of systems of partials differentials equations of the parabolic type, called system of reaction-diffusion, it received a large amount number of interest by the researchers, who are motivated by both the enrichment structure of the solution as well as it governs several chemical, ecological, biological, metallurgical phenomena and even in marketing....

These systems spell in their simplest shape as follows:

\begin{equation*}
\frac{\partial w}{\partial t} - \Delta w = F(w), \quad \text{in } \mathbb{R}^+ \times \Omega
\end{equation*}

where \( \Omega \) is opened of \( \mathbb{R}^n \), \( w : [0,\infty[ \times \mathbb{R}^n \rightarrow \mathbb{R}^2 \), i.e. \( w(t,x) = (u(t,x), v(t,x)) \), \( \Delta \) denotes the Laplacian operator, and \( F : \mathbb{R}^2 \rightarrow \mathbb{R}^2 \)

\begin{equation*}
F(w(t,x)) = (\phi(u(t,x))v(t,x), \psi(u(t,x))w(t,x))
\end{equation*}

is the term of the reaction (generally nonlinear).

The terms of reaction are the result of any interaction between the constituents of the unknown \( w \).

The objective of this work is contributed to the study of the global existence in times of the solution of (SRD) with Newmann boundary condition:

\begin{equation*}
\frac{\partial w}{\partial \eta} = 0 \quad \text{in } [0,\infty[ \times \partial \Omega,
\end{equation*}

and the initial data

\begin{equation*}
w_0 = (u_0, v_0) \text{ in } \Omega.
\end{equation*}

Most studies which are made about the system of reaction diffusion are essentially based on some particular cases of (SRD), where the mathematical model:

\begin{equation*}
\begin{cases}
\frac{\partial u}{\partial t} - d_1 \Delta u = -\phi(u)\psi(v) & \text{sur } \mathbb{R}^+ \times \Omega, \\
\frac{\partial v}{\partial t} - d_2 \Delta u - d_3 \Delta v = \phi(u)\psi(v) & \text{sur } \mathbb{R}^+ \times \Omega, \\
\frac{\partial u}{\partial \eta} = \frac{\partial v}{\partial \eta} = 0 & \text{sur } \mathbb{R}^+ \times \partial \Omega, \\
u(.,0) = u_0(.,), v(.,0) = v_0(.,) & \text{sur } \Omega.
\end{cases}
\end{equation*}

where the constants of diffusion \( d_1, d_2, \) and \( d_3 \) are assumed to be nonnegative such that \( d_2^2 < 4d_1d_3, d_1 > d_3 \), is the most approached by the researchers.
The function $\phi$ is continuously differentiable in $\mathbb{R}$, and

$$
\begin{cases}
\phi(u) \geq 0 \text{ if } u > 0 \\
\phi(u) = 0
\end{cases}
$$

if $\phi(u)=u$, ce problem treated by M. Kirane [11].

Also the function $\psi(s)$ is continuously differentiable, nonnegative, and satisfies

$$
\lim_{s \to \infty} \frac{1}{s} \log(1 + \psi(s)) = 0.
$$

The main question we want to address is the existence of global solutions for system (P). In fact the subject of the global existence of reaction diffusion systems has received a lot of attention in the last decades and several outstanding results have been proved by some of the major experts in the field. See [2][3][13].

This question has been successively studied by Alikakos [1] who gave a positive answer when $1<\sigma<2$ and $\phi(u)=u$, $\psi(v)=v^\sigma$, with method is based on some Sobolev embedding theorems.

In [16] Masuda who showed that solutions exist globally for every $\sigma \geq 1$ by using some $L^p$ estimates.

A. Haraux and A. Youkana [6] have generalized the method of K. Masuda to handle nonlinearities $\psi(s)$ satisfying (5). In the case where $d_s \geq 0$, systems of the type (P) occur in many applications (cf. [4]) established a global existence result of system (P) for a large class of the function $f$ and $g$. More precisely they showed that for

$$
f(u,v)=g(u,v)=-u \Psi(v)
$$

the problem (P) admits a global solution provided that the following condition holds :

$$
\lim_{t \to +\infty} \frac{\log(1+\psi(v))}{v} = 0.
$$

The same result in [16] was obtained by Hollis et al [9] by exploiting the duality arguments in $L^p$ techniques, allowing to derive the uniform boundeness of the solution.

In the general case, that is to say for

(1) $f(u,v)=-g(u,v)$

the positivity of the function $g(u,v)$ together with the maximum principle of the heat operator give the following uniform estimate of the solution in $L^\infty(\Omega)$

$$
\|u(t)\|\leq\|u_0\|, \forall t \in [0,T_{\text{max}}],
$$

where $T_{\text{max}}$ is the maximal time of existence. See Pazy [18] for more details.

Based on the Lyapunov functional method and for $f$ and $g$ satisfying (1), Kouachi [12] proved that the solution of problem (P) exists globally in time if

$$
\lim_{t \to +\infty} \left[ \frac{\log(1+f(u,v))}{v} \right] \leq \frac{8\alpha \beta}{n(1-\beta)^2\|u_0\|_\infty}
$$

Recently, Moumeni and Salah Derradji [17] have established the existence of global solution using an approach that involves the Lyapunov's functional for the system (P)
where the functions \( f \) and \( g \) are assumed to satisfy the condition
\[
\sup(|f(r,s)|,|g(r,s)|) \leq C(r+s+1)^m, \quad \forall r,s \geq 0
\]
where \( C \) is a positive constant and \( m \geq 1 \).
In the present work we consider problem (P) by using a technique based on Lyapunov function we establish a global existence result of the solution.

- Introduction
- Notation and preliminary
- Local existence
- Positivity of solution
- Global existence

3. Conclusion.
The purpose of this paper is to prove the global existence in time of solutions for the coupled reaction-diffusion system:
\[
\begin{align*}
\frac{\partial u}{\partial t} - d_1 \Delta u &= f(u,v) \quad \text{in } \mathbb{R}^+ \times \Omega, \\
\frac{\partial v}{\partial t} - d_2 \Delta u - d_3 \Delta v &= g(u,v) \quad \text{in } \mathbb{R}^+ \times \Omega,
\end{align*}
\]
with triangular matrix of diffusion coefficients.
By combining the Lyapunov functional method with the regularizing effect, we show that global solutions exist. Our investigation applied for a wide class of the nonlinear terms \( \phi \) and \( \gamma \).

REFERENCES
HYBRID COMPUTING APPROACH FOR SOLVING DELAY DIFFERENTIAL EQUATIONS

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ABSTRACT. A number of nonlinear phenomena in many branches of the applied sciences and engineering are described in terms of delay differential equations, which arise when the evolution of a system depends both on its present and past time. In this paper, our aim is to present various optimization techniques for solving the delay differential equations with variable coefficients subject to initial conditions. We have used constrained nonlinear minimization in Active Set technique (AST) and Sequential Quadratic Programming (SQP) algorithms to solve delay differential equations. Also we have used Genetic Algorithm (GA) and a hybrid technique GA-SQP. Further, we presented the comparison of proposed numerical results with exact solution to confirm the reliability of our method for delay differential equations. We considered higher order delay differential equations and provided their numerical results on the bases of which we showed their complete graphical picture.

Keywords: Delay differential equation; Active Set; Sequential Quadratic Programming; Genetic Algorithm.

1. Introduction. Delay Differential Equations (DDEs) are widely used in the mathematical formulation of real life phenomena in many fields especially in engineering and science such as control problems, population dynamics, secure communication, infectious disease, economics and traffic control. In a DDE, the system not only depends on a certain time but also depends on the state of the system at an earlier time in contrast with Ordinary Differential Equations (ODEs) where the unknown function and its derivatives are evaluated at the same time [1].

A typical first order single-delay scalar DDE model may be expressed as:

\[ y'(t) = f_1(t, y(t), y(t - \tau)) \quad (1) \]

The term \( y(t - \tau) \) is called the delay term. In more general form the function \( y'(t) \) depends on \( y(t) \) and \( y'(t) \) itself at the past time \( y(t - \tau) \) as defined above, in this case, the above equation can be written as:

\[ y'(t) = f_2(t, y(t), y(t - \tau), y'(t - \tau)) \quad (2) \]

DDEs have attracted the attention of researchers in mathematical, biological and physical sciences. This is specially due to the fact that the theory of ODEs does not carry over to DDEs. Among the topics studied for the DDEs, oscillation of the solutions has been resolved the most and complied in the monographs [2].
The general theory of DDEs is developed by Hale [3], Bellman and Cooke [4], El'sgol'ts and Norkin [5], Driver [6] and Kolmanovskii and Myshkis [7], Hale and Verduyn Lunel [8], Kolmanovskii and Nosov [9], Diekmann et al. [10] and Kuang [11, 12], which also include many real-life examples of DDEs and more general retarded functional differential equation [13].

For solving the initial value problems of DDEs with a constant delay \( \tau > 0 \) a lot of numerical methods have been presented in recent times. The numerical theory, such as stability and convergence issues, have also been developed. For example, Linear Multistep Methods (LMMs), Runge-Kutta methods (RKMs) have been investigated and one-leg methods have been studied. These numerical methods for initial value problems of DDEs were obtained by using the corresponding methods to the initial problems of ODEs [14].

From many years, the numerical solution of models of dynamic systems has attracted the researchers. Many physical systems can be approximated by sets of ODEs, and the digital simulation of such models has caught the interest of engineers and applied mathematicians from the invention of the digital computer. There is also a huge number of systems from engineering and science that require the inclusion of delays in their models. The numerical simulation of models described by sets of DDEs has been developed by very few publications and the state of the art software is not highly developed for dealing with such models.

Good solvers were developed by Shampine and co-workers for simulating DDE models. These include a numerical DDE solver, called dde23, encoded in Matlab. They also include a numerical DDE solver, called dde solver, encoded in Fortran. Both solvers are classical solvers in the sense that they are based on the classical time-slicing algorithms used throughout the numerical ODE, DDE and DAE (Differential Algebraic equation) [15].

Most codes available in solving DDE do not cater for stiff DDEs. Most of them used explicit RKMs to solve DDEs. The only effort so far on stiff DDE is on the work of Roth [16]. He solved stiff DDEs using three methods, which are the backward differentiation (BDF) method, the Adams method and the Runge-Kutta Fehlberg method. The systems are considered as stiff right from the beginning and Lagrange interpolation is used to approximate the delay term [17].

In this paper, we are going to present various optimization techniques for solving the delay differential equations with variable coefficients subject to initial conditions. We have used constrained nonlinear minimization in Active Set technique (AST) and Sequential Quadratic Programming (SQP) algorithms to solve delay differential equations. Also we have used Genetic Algorithm (GA) and a hybrid technique GA-SQP. Mathematical modeling is defined in section 2. In section 3, solution technique is provided. Application of method is applied in section 4, where numerical results are provided. Section 5 provides discussion and conclusion.

2. Mathematical Modeling. A neural network model is provided in detail with satisfying initial conditions for DDE. For the following DDE of order \( n \),

\[
y^{(n)}(t) = f(t, y(t), y(t-\tau), y'(t), y'(t-\tau), \ldots) \tag{3}
\]

With these initial conditions

\[
y(0) = y_0, \quad y'(0) = y_1, \ldots, y^{(n-1)}(0) = y_{n-1} \tag{4}
\]

Mathematical model of above DDE in the form of following continuous mapping for the solution \( y(t) \), and its first derivative \( \frac{dy}{dt} \), second \( \frac{d^2y}{dt^2} \), and nth order derivative \( \frac{d^ny}{dt^n} \), respectively, written as:

\[
\hat{y}(t) = \sum_{i=1}^{n} a_i \phi(b_i(t) + c_i)
\]

\[
\frac{d\hat{y}(t)}{dt} = \sum_{i=1}^{n} a_i \frac{d}{dt} \phi(b_i(t) + c_i)
\]

\[
\frac{d^2\hat{y}(t)}{dt^2} = \sum_{i=1}^{n} a_i \frac{d^2}{dt^2} \phi(b_i(t) + c_i)
\]
The model shown in the above equations are normally using log-sigmoid based on logarithmic function $\Phi(t)$ and its respective derivatives, where

$$\Phi(t) = 1 - \frac{e^{-t}}{1 + e^{-t}}$$  \hspace{1cm} (5)$$

Furthermore, the above mathematical models can also be written as:

$${\hat{y}(t)} = \sum_{i=1}^{n} a_i \left( 1 - \frac{e^{-b_i(t) + c_i}}{1 + e^{-b_i(t) + c_i}} \right)$$

$${d\hat{y}(t) \over dt} = \sum_{i=1}^{n} a_i b_i \left( \frac{e^{-b_i(t) + c_i}}{(1 + e^{-b_i(t) + c_i})^2} \right)$$

$${d^2\hat{y}(t) \over dt^2} = \sum_{i=1}^{n} a_i b_i^2 \left( \frac{e^{-b_i(t) + c_i}}{(1 + e^{-b_i(t) + c_i})^3} - \frac{2 e^{2(b_i(t) + c_i)}}{(1 + e^{-b_i(t) + c_i})^5} \right)$$

$${d^n\hat{y}(t) \over dt^n} = \sum_{i=1}^{n} a_i b_i^n \left( \frac{e^{-n-1}(b_i(t) + c_i)}{(1 + e^{-b_i(t) + c_i})^n} + n \frac{e^{-n(b_i(t) + c_i)}}{(1 + e^{-b_i(t) + c_i})^{n+1}} \right)$$

### 2.1. Fitness Function

A fitness function or error function is given by sum of two errors as

$$e = e_1 + e_2$$  \hspace{1cm} (6)$$

Where $e_1$ is error function associated with differential equation and it is given as:

$$e_1 = \frac{1}{N} \sum_{m=0}^{N} \left[ \frac{d^n \hat{y}_m}{dt^n} - f(t_m, \tilde{y}_m, \tilde{y}_m, \tilde{y}_m, \tilde{y}_m, ...) \right]^2$$  \hspace{1cm} (7)$$

Where $\hat{y}_m = \hat{y}(t_m), \tilde{y}_m = t_m - \tau, \tilde{y}_m = \tilde{y}(t_m), N = \frac{1}{h} t_m - mh.$

Similarly, $e_2$ is the error function associated with initial conditions, which is defined as

$$e_2 = \frac{1}{n} \left[ (\hat{y}_0 - y_0)^2 + ... + (\hat{y}_{n-1} - y_{n-1})^2 \right]$$  \hspace{1cm} (8)$$

### 3. Solution Technique

To find the Solution of the problem, we have applied the Active Set Technique, Sequential Quadratic Programming, Genetic Algorithm and hybrid approach GA-SQP by using the Matlab built-in functions with the parameters setting given below for AST, SQP and GA, respectively.

### 3.1. Procedural Steps of Proposed Methods

The necessary procedure for AST, SQP and GA is given in following steps:

- **Steps 1: Initialization**: Initial values of parameters are set in this step with random assignment. These settings are provided in Table I and Table II for important parameters.
Step 2: Fitness Evaluation: Calculate the fitness for each individual using the fitness function defined earlier.

Step 3: Termination Criteria: When the criteria is achieved the algorithm is terminated, and the criteria is achieved for the following conditions:

- Maximum number of iterations is completed.
- Defined fitness function is achieved.
- Any defined value in optinset for maximum function evaluations, X tolerance or function tolerance is achieved as defined in above tables.

Step 4: Save Results: If the termination criteria is achieved then save the final optimal weights along with fitness values.

Step 5: Statistical Analysis: Perform all these steps mentioned above on a large number of runs to get an effective and reliable statistical analysis. It is shown in Fig.1.

Table I: Parameter settings for the functions “AST” and “SQP” in MATLAB simulations

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start Point generation</td>
<td>Randomly between (0,1)</td>
</tr>
<tr>
<td>Maximum Iteration</td>
<td>500</td>
</tr>
<tr>
<td>Start Point</td>
<td>Randomly between (1,30)</td>
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<td>Maximum Function Evaluations</td>
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<td>Hessian</td>
<td>FBGS</td>
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<td>X Tolerance</td>
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<tr>
<td>Finite Difference Type</td>
<td>Forward Difference</td>
</tr>
<tr>
<td>Start Point Size</td>
<td>30</td>
</tr>
<tr>
<td>Function Tolerance</td>
<td>$10^{-12}$</td>
</tr>
<tr>
<td>SQP Constraint Tolerance</td>
<td>Zero</td>
</tr>
<tr>
<td>Nonlinear Constraint Tolerance</td>
<td>Zero</td>
</tr>
<tr>
<td>Unboundedness Threshold</td>
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<td>Relative Line Search Bound</td>
<td>No Bound</td>
</tr>
<tr>
<td>Subproblem Algorithm</td>
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</tr>
<tr>
<td>Scaling</td>
<td>None</td>
</tr>
<tr>
<td>Others</td>
<td>Default</td>
</tr>
</tbody>
</table>

Table II: Parameter settings for the function “Genetic Algorithm” in MATLAB simulations

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Values</th>
</tr>
</thead>
<tbody>
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<td>Number of Variables</td>
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</tr>
<tr>
<td>Population Type</td>
<td>Double Vector</td>
</tr>
<tr>
<td>Population Size</td>
<td>[30 30 30 30 30 30 30 30 30 30]</td>
</tr>
<tr>
<td>Creation Function</td>
<td>Constraint Dependent</td>
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<tr>
<td>Scaling Function</td>
<td>Rank</td>
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<td>Selection Function</td>
<td>Uniform</td>
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<tr>
<td>Mutation Function</td>
<td>Constraint Dependent</td>
</tr>
<tr>
<td>Crossover Function</td>
<td>Heuristic</td>
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<tr>
<td>Direction</td>
<td>Forward</td>
</tr>
<tr>
<td>Hybrid Function</td>
<td>None</td>
</tr>
<tr>
<td>Generations</td>
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</tr>
<tr>
<td>Function Tolerance</td>
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</tr>
<tr>
<td>Level of Display</td>
<td>Off</td>
</tr>
<tr>
<td>Others</td>
<td>Default</td>
</tr>
</tbody>
</table>

3.2. Procedural Steps for Hybrid Method GA-SQP:
In this optimizer the step 1-3 are same as mentioned above. For step 4, if the termination criteria is achieved then SQP is used for further refinement of results by taking final weights of GA as initial weights in start point of SQP algorithm. SQP is applied then by following the parameter settings defined in table I then save the final weights of the algorithm. The above defined procedural steps are defined in the following flow chart.

4. Application of Proposed Techniques: Consider the following second order DDE,

\[ y''(t) = y(t) - y(t - 0.3) + \exp^{(-t+0.3)} \]  

(9)
The exact solution of the above equation is

\[ y(t) = e^{-t} \]  

\[ y(0) = 1, \quad y'(0) = -1 \]  

(10)

(11)

Figure 1: Flow Chart of procedural steps

For the above DDE with given initial conditions, mathematical model in the form of continuous mapping for the solution \( y(t) \), and its first derivative \( \frac{dy}{dt} \), second \( \frac{d^2y}{dt^2} \), and nth order derivative \( \frac{d^n y}{dt^n} \), respectively, written as:

\[ \hat{y}(t) = \sum_{i=1}^{n} a\phi(b_i(t) + c_i) \]

and log-sigmoid is using function:

\[ \phi(t) = 1 - \frac{e^{-t}}{1 + e^{-t}} \]

Error function is given by sum of two square errors as:

\[ e = e_1 + e_2 \]

We apply the neural network model with 10 neurons to solve this problem. There are total 30 unknown parameters or weights. The error function \( e \) for the input span from [0,1] with the step size 0.1 where \( e_1 \) is error function associated with differential equation and it is given as:

\[ e_1 = \frac{1}{11} \sum_{m=0}^{10} \left[ \frac{d^2\hat{y}_m}{dt^2} - \frac{d\hat{y}_m}{dt} + \frac{\hat{y}_m}{3} - e^{-0.3}e^{-t} \right]^2 \]

(12)

Where

\[ \hat{y}_m = \hat{y}(t_m), \quad \hat{y}_m = \hat{y}(t_m - 0.3) \]

Similarly, \( e_2 \) is the error function associated with initial conditions
\[ t = 0, y_0 = 1, y'_0 = -1, \]
\[ e_2 = \frac{1}{2} \left( (\hat{y}_0 - 1)^2 + (\hat{y}_0' + 1)^2 \right) \]  

(13)

Table III. Comparison of Exact Solution, AST, SQP, GA and GA-SQP for given problem

<table>
<thead>
<tr>
<th>t</th>
<th>Exact Solution</th>
<th>AST</th>
<th>SQP</th>
<th>GA</th>
<th>GA-SQP</th>
</tr>
</thead>
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<tr>
<td>0.0</td>
<td>1.000000</td>
<td>1.000000</td>
<td>1.000000</td>
<td>0.999546</td>
<td>0.999998</td>
</tr>
<tr>
<td>0.1</td>
<td>0.904837</td>
<td>0.904835</td>
<td>0.904835</td>
<td>0.904811</td>
<td>0.904832</td>
</tr>
<tr>
<td>0.2</td>
<td>0.818731</td>
<td>0.818727</td>
<td>0.818727</td>
<td>0.818850</td>
<td>0.818722</td>
</tr>
<tr>
<td>0.3</td>
<td>0.740818</td>
<td>0.740812</td>
<td>0.740813</td>
<td>0.741051</td>
<td>0.740807</td>
</tr>
<tr>
<td>0.4</td>
<td>0.670320</td>
<td>0.670312</td>
<td>0.670313</td>
<td>0.670733</td>
<td>0.670305</td>
</tr>
<tr>
<td>0.5</td>
<td>0.606531</td>
<td>0.606521</td>
<td>0.606521</td>
<td>0.607218</td>
<td>0.606512</td>
</tr>
<tr>
<td>0.6</td>
<td>0.548812</td>
<td>0.548799</td>
<td>0.548800</td>
<td>0.549857</td>
<td>0.548789</td>
</tr>
<tr>
<td>0.7</td>
<td>0.496585</td>
<td>0.496571</td>
<td>0.496572</td>
<td>0.498055</td>
<td>0.496560</td>
</tr>
<tr>
<td>0.8</td>
<td>0.449329</td>
<td>0.449312</td>
<td>0.449314</td>
<td>0.451272</td>
<td>0.449300</td>
</tr>
<tr>
<td>0.9</td>
<td>0.406570</td>
<td>0.406552</td>
<td>0.406552</td>
<td>0.409022</td>
<td>0.406537</td>
</tr>
<tr>
<td>1.0</td>
<td>0.367879</td>
<td>0.367858</td>
<td>0.367860</td>
<td>0.370865</td>
<td>0.367843</td>
</tr>
</tbody>
</table>

Figure 2: Comparisons of proposed solutions with exact solution for given problem
4.1. Numerical Experimentation and Results. The comparison of exact solution and solution obtained by proposed methods are given below in Table III; Furthermore, the Fig. 2 also illustrate the worth of proposed solution by comparing the exact solution and numerical solution obtained by proposed methodology. Set of optimal weights calculated by AST, SQP, GA and GA-SQP are given below in equations. These are also graphically shown in Fig. 3 and Fig. 4 in two and three dimensions respectively.

\[
\hat{Y}_{\text{AST}} = (-0.560375696662417) \left[ 1 + e^{(-0.775569822527061+t+1.269023038504775)} \right] + \\
(0.017225415158451) \left[ 1 + e^{(-0.7033182725252184+t+0.211832681359710)} \right] + \\
(0.823737050454974) \left[ 1 + e^{(-0.5535612633237892+t+0.023117514595446)} \right] + \\
(1.236421722938629) \left[ 1 + e^{(-0.142224726322291+t+1.82613348392143)} \right] + \\
(2.10583952632389) \left[ 1 + e^{(-2.656933318963404+t+3.282539425421912)} \right] + \\
(0.239366505543750) \left[ 1 + e^{(-0.881875216429771+t+0.394764621786012)} \right] + \\
(-0.456102093368282) \left[ 1 + e^{(-0.04794515795310+t+1.23834555241631)} \right] + \\
(-0.468750297682763) \left[ 1 + e^{(-0.754525208237513+t+0.247354145547301)} \right] + \\
(-0.542542862100195) \left[ 1 + e^{(-0.2014694091489885+t+0.010908638546419)} \right] + \\
(2.533491328484165) \left[ 1 + e^{(-1.4420044489311+t-1.26263971183955)} \right]
\]

(14)
Figure 4: Set of trained weights by AST, GA, SQP and GA-SQP for given problem

\[
\hat{y}_{SQP} = (0.662760246297838) \left[ 1 - \frac{e^{-0.181886155427568 + 0.541435695633353}}{1 + e^{-0.181886155427568 + 0.541435695633353}} \right] + \\
(0.353657817230244) \left[ 1 - \frac{e^{-0.396126942753631 + 0.442193185555769}}{1 + e^{-0.396126942753631 + 0.442193185555769}} \right] + \\
(2.440751375340688) \left[ 1 - \frac{e^{(-2.472628039115538 + (-2.940959702398721))}}{1 + e^{(-2.472628039115538 + (-2.940959702398721))}} \right] + \\
(0.087077350776645) \left[ 1 - \frac{e^{(-0.2930966444145935 + (-2.212308189304661))}}{1 + e^{(-0.2930966444145935 + (-2.212308189304661))}} \right] + \\
(0.510313883570241) \left[ 1 - \frac{e^{(-0.2930966444145935 + (-0.708801517458886))}}{1 + e^{(-0.2930966444145935 + (-0.708801517458886))}} \right] + \\
(0.836682517866336) \left[ 1 - \frac{e^{(-0.44332252066752 + 0.111490243252744)}}{1 + e^{(-0.44332252066752 + 0.111490243252744)}} \right] + \\
(-0.905631609343865) \left[ 1 - \frac{e^{(-2.3673047303038706 + 5.0001719214900819)}}{1 + e^{(-2.3673047303038706 + 5.0001719214900819)}} \right] + \\
(1.863465031255667) \left[ 1 - \frac{e^{(-1.4816770737484796 + (-0.883213966910466))}}{1 + e^{(-1.4816770737484796 + (-0.883213966910466))}} \right] + \\
(-0.349757700806720) \left[ 1 - \frac{e^{(-1.097653520399730 + (-0.613556464201361))}}{1 + e^{(-1.097653520399730 + (-0.613556464201361))}} \right] + \\
(0.760716282610728) \left[ 1 - \frac{e^{(0.150697624514636 + (-1.1845107035857781))}}{1 + e^{(0.150697624514636 + (-1.1845107035857781))}} \right] + \\
(15)\]
\[ \hat{y}_{GA} = (1.969196293207644) \left[ 1 - \frac{e^{-0.332126936555156 + 0.1007681983199347}}{1 + e^{0.332126936555156 + 0.1007681983199347}} \right] + 
\]

\[ (2.11724406046478) \left[ 1 - \frac{e^{-0.444172085431754 + (-0.297450893378288)}}{1 + e^{0.444172085431754 + (-0.297450893378288)}} \right] + 
\]

\[ (-1.00178799226400) \left[ 1 - \frac{e^{-3.332947377275055 + 1.447706027623595}}{1 + e^{3.332947377275055 + 1.447706027623595}} \right] + 
\]

\[ (-0.470792649996844) \left[ 1 - \frac{e^{-2.185712759283145 + (-0.301501202176470)}}{1 + e^{2.185712759283145 + (-0.301501202176470)}} \right] + 
\]

\[ (-0.697866455418294) \left[ 1 - \frac{e^{-0.873077540774102 + 2.178047952176411}}{1 + e^{0.873077540774102 + 2.178047952176411}} \right] + 
\]

\[ (-0.743154415343845) \left[ 1 - \frac{e^{-0.756907555473917 + 1.529726330379187}}{1 + e^{0.756907555473917 + 1.529726330379187}} \right] + 
\]

\[ (1.526309603483478) \left[ 1 - \frac{e^{-0.19213174531807 + 1.441594044637437}}{1 + e^{0.19213174531807 + 1.441594044637437}} \right] + 
\]

\[ (-1.105327764372499) \left[ 1 - \frac{e^{(-1.4200740943053999 + 1.358487481312616)}}{1 + e^{(-1.4200740943053999 + 1.358487481312616)}} \right] + 
\]

\[ (0.664396024451153) \left[ 1 - \frac{e^{(-1.24593090557029 + 0.673115873539305)}}{1 + e^{(-1.24593090557029 + 0.673115873539305)}} \right] + 
\]

\[ (0.770643222832880) \left[ 1 - \frac{e^{(-0.1297000119208150 + 0.3659357118400884)}}{1 + e^{(-0.1297000119208150 + 0.3659357118400884)}} \right] + 
\]

\[ \hat{y}_{GA - gap} = (-1.191431) \left[ 0.06533378 \left[ 1 - \frac{e^{(-0.270901197209193 + 0.3659357118400884)}}{1 + e^{(-0.270901197209193 + 0.3659357118400884)}} \right] + 
\]

\[ (0.5296140) \left[ 1951745 \right[ 1 - \frac{e^{(-0.9660186070315840 + 0.2258975691475890)}}{1 + e^{(-0.9660186070315840 + 0.2258975691475890)}} \right] + 
\]

\[ (-0.780839) \left[ 802931623 \right[ 1 - \frac{e^{(-1.91338111228290 + 2.99660545909730)}}{1 + e^{(-1.91338111228290 + 2.99660545909730)}} \right] + 
\]

\[ (2.0725642) \left[ 54239857 \right[ 1 - \frac{e^{(-1.457060359244276 + 0.81848604335303)}}{1 + e^{(-1.457060359244276 + 0.81848604335303)}} \right] + 
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\[ (-0.068925) \left[ 349662073 \right[ 1 - \frac{e^{(-1.298764047167720 + 1.4913665927295779)}}{1 + e^{(-1.298764047167720 + 1.4913665927295779)}} \right] + 
\]

\[ (-1.231270) \left[ 368367227 \right[ 1 - \frac{e^{(-1.5429064065090590 + 1.4809604927295779)}}{1 + e^{(-1.5429064065090590 + 1.4809604927295779)}} \right] + 
\]

\[ (2.2133681) \left[ 27024384 \right[ 1 - \frac{e^{(-0.08101441517122 + 2.20085521645160)}}{1 + e^{(-0.08101441517122 + 2.20085521645160)}} \right] + 
\]

\[ (-0.138283) \left[ 640684099 \right[ 1 - \frac{e^{(-0.0198518178059672 + 1.30822562930000)}}{1 + e^{(-0.0198518178059672 + 1.30822562930000)}} \right] + 
\]

\[ (0.5418045) \left[ 57406408 \right[ 1 - \frac{e^{(-0.4290679895875820 + 1.35657520000000)}}{1 + e^{(-0.4290679895875820 + 1.35657520000000)}} \right] + 
\]

\[ (0.6512934) \left[ 61630325 \right[ 1 - \frac{e^{(-1.249016280616880 + 2.175594354091777)}}{1 + e^{(-1.249016280616880 + 2.175594354091777)}} \right] + 
\]
5. Conclusion.

- A new approach is developed to solve Delay Differential Equations using Active Set, Genetic Algorithm, Sequential quadratic Programming and their hybrid approach GA-SQP.
- Comparison of exact solution with the reported solution obtained by the above mentioned techniques is provided for given problem.
- It is concluded that AST and SQP are more efficient than GA.
- And GA-SQP provides more quick and better results for optimization and time factor is minimize in this technique.
- Thus a new artificial intelligence based technique is developed for solving higher order delay differential equations.

In future some one can try these techniques for future delay in differential equations with tan-sigmoid and some application of bessel’s function. One can improve the accuracy and convergence of results by changing the optimization algorithm.

REFERENCES

MAWLANA SHAH AHMAD NOORANI: HIS ROLE IN THE RESTORATION OF PARLIAMENTARY DEMOCRACY IN PAKISTAN, 1977-2003

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ABSTRACT: Mawlana Shah Ahmad Noorani entered into Pakistani parliament through general elections held in 1970. He always struggled for the democratization and Islamization of Pakistani society through constitutional means. On the demand of Mawlana Noorani, leaders of the United Democratic Front (UDF), Jam’iyyat ‘Ulama-i-Pakistan (JUP) and Tahrik-i-Istiqlal (TI) on January 10, 1977 formed Pakistan National Alliance (PNA) against the illegal and undemocratic practices of the government. He stood against the martial law regime of General Ziaul Haq. During the Movement for Restoration of Democracy (MRD), Mawlana Noorani only voiced for the rehabilitation of the political parties, restoration of the judicial powers and finishing the military courts, elimination of the Martial law; and announcement of the election schedule. Through Mawlana’s efforts a new political alliance known as “Pakistan Awami Ittihad” (PAI) came into existence on October 5, 1988 consisting of JUP, PML and TI. In May 1999, another electoral alliance was made with the name of Islami Jamhuri Mahaz, where too, Mawlana played a constructive role. For the purpose of sectarian harmony Milli Yakjehti Council was formed in 1995, which was headed by Mawlana Noorani. At the advice of Mawlana Noorani, a new alliance of six religious political parties, named as Muttahida Majlis-i-Amal (MMA), came into being in 2001. Mawlana Noorani was unanimously chosen as its President. He remained the President of the MMA till his death. The MMA struggled collectively for the establishment of a true Islamic democratic system in Pakistan.

Keywords: Democratic, anti-martial law, anti-sectarianism, unifying figure, seasoned legislator.

1. Introduction: Pakistan got independence from British Rule in 1947. Soon after its independence efforts from different sections of Pakistani society started to make Pakistan a truly democratic and Islamic state. In this struggle for democratization of Pakistan a number of religious scholars, politicians and political parties have contributed and scores of them are still striving to achieve this goal. These forces of democratization are struggling in a variety of ways. Some of them are directly participating in political system. While a number of these forces are indirectly involved in influencing the efforts for democratization. In this regard the role of religious scholars turned politicians is of considerable importance. From the very beginning of the creation of
Pakistan they either directly or indirectly strived for it. A respectable number of religious scholars and politicians not only contributed in their individual capacities but also even organized political parties to achieve this goal of democratization.

One such group of religious scholars organized themselves in shape of Jam’iyyat ‘Ulama-i-Pakistan in 1948. Leaders and workers of this religious party started contributing to the process of democratization in a number of ways. It had the services of some such leaders who remained active on the political scene of Pakistan for a number of years like Mawlana Shah Ahmad Noorani and Mawlana Abdus Sattar Khan Niazi (1915-2002). Both these personalities as leaders of their own factions remained active political figures for a number of years, where the politics were mainly dominated by the agenda of democratization and Islamization of Pakistani society.

2. Early Life of Mawlana Noorani: Mawlana Shah Ahmad Noorani was born on April 1, 1926 in Meerut (India). He was the son of a famous religious scholar Mawlana Shah Abdul Aleem Siddiqi (1892-1955). He memorized the Holy Quran by heart at the age of eight. He passed his Matriculation Examination from Meerut and he graduated from the National Arabic College, Meerut. He got his Dars-i-Nizami (Fazil) from the Darul-‘Ulam-i-Arabiyyah, Meerut. He also got his Fazil Degree in Arabic from the Allahabad University.

Mawlana Shah Ahmad Noorani started his parliamentary career with the Jam’iyyat ‘Ulama-i-Pakistan (JUP) which won 7 seats in the National Assembly of Pakistan during the 1970 elections. He was one of the seven successful candidates from Sindh. He has also been in the Senate of Pakistan twice. He played a vital role in framing the 1973 constitution of Pakistan. Mawlana Noorani proposed round about 200 amendments to the 1973 Constitution during his parliamentary career.

Before the elections of 1970 JUP of Mawlana Noorani tried to unite the opposition parties against the Pakistan Peoples Party (PPP). The PPP was at its peak due to the towering personality of Zulfikar Ali Bhutto. While on the other hand, the ideological base of the country was endangered due to the socialist economic order. The United Democratic Front (UDF) already existed but nominally. The UDF had been inactive due to its internal conflicts. However, Mawlana Noorani ruled out any possibility of rejoining the UDF or joining any alliance with Jama’at-i-Islami Pakistan (JIP). However, he was optimistic about a grand alliance of the opposition parties believing in the ideology of Pakistan. He observed that fair and impartial elections could be held only under the supervision of an interim National Government. He also announced his party’s decision to take part in the forth-coming elections in collaboration with the Tahrik-i-Istiqlal (TI). At the end of 1976, when the general elections were in the offing, the JUP boycotted the by-election from Jhang for the vacant seat of Mawlana Muhammad Zakir, who died in November 1976, because of the sectarian tension in the constituency. On January 7, 1977, Prime Minister Bhutto announced that fresh general elections for the National and Provincial Assemblies would be held on March 7 and 10, 1977 respectively.

3. The 1977 Elections and Mawlana Noorani: Soon after the announcement of the Election date, Mawlana Noorani, in his press statement, welcomed declaration of the assemblies and holding of general election in March 1977. In order to ensure fair, independent and impartial elections, he demanded the release of all political prisoners, withdrawal of section 144 and suspension of the decisions taken under Defense of Pakistan Rules (DPRs). Mawlana stated that the opposition was ready for the elections, and during the election campaign, they would raise the issues of staggering price hike, increase in the administrative expenditures and the failure of foreign policy, and in case of victory, he promised to bring the price of commodities down to the level of 1970. Under the banner of Nizam-i-Mustafa, he declared, they would establish a true democratic and Islamic social welfare order in Pakistan.

The PPP government started its election campaign in such a direction as to counter the efforts of different political parties, including JUP, by initiating a move to encourage rival groups of these parties. The Sahibzada group of JUP was asked to support the PPP. On January 17, 1977, at a combined session of the central working committee and general council of this group, which was held at Lahore, it was decided that “on the occasion of the forth-coming general elections the JUP, while fully preserving its distinct identity, resolve to support the Prime Minister of Pakistan and the PPP.” The meeting also formulated a program for holding an all Pakistan Sunni Convention, in support of Prime Minister Zulfikar Ali Bhutto, to establish liaison with shrines of saints, Darul Uloom and the Mashaikh, and to support the election campaign of the PPP, in all constituencies.
The leaders of the group demanded funds to carry out their programs and to counter the JUP led by Mawlana Noorani. In March 1977, another group of the JUP came into being, under the name of Jam‘iyyat-i-Ulama-i-Pakistan (Haqqiqi) headed by Mawlana Abu’l Fateh Ghulam Rasul Chishti of Karachi.\textsuperscript{vii}

4. Formation of Pakistan National Alliance and Mawlana Noorani: Although the 1973 Constitution laid down a five-year term for the National Assembly, commencing from the day its members took oath. The second general election was due sometime in spring of 1978. However, towards the end of 1976, there were indications of an election before the spring of 1978. So, the activities of the political parties were mainly diverted to formulate an election strategy.\textsuperscript{viii}

The UDF, the main opposition alliance, had lost its image and attraction, as Jam‘iyyat ‘Ulama-i-Pakistan (JUP), Tahrîk-i-Istiqlal (TI) and National Democratic Party (NDP) (formed in 1975, after the NAP was banned) were standing outside the UDF. However, public opinion and politicians were all in favor of forging a grand alliance against the PPP. Mawlana Noorani, in his press statement, said that his party had decided to take part in the forthcoming elections in collaboration with Tahrîk-i-Istiqlal, in order to give the country a viable leadership.\textsuperscript{ix}

Another attempt to forge unity among the Jam‘iyyat ‘Ulama-i-Pakistan, Tahrîk-i-Istiqlal and Pakistan Muslim League was made in August 1976, and the leaders of these parties completed their talks. The leader of the National Democratic Party, Sardar Sher Baz Mazari, invited a meeting of the opposition parties at Lahore on October 30, 1976. Mawlana Noorani, Mawlana Mufti Mehmood, Nawabzada Nasrullah Khan (1916-2003), Pir Pagara, Mian Tufail Muhammad (1914-2009) and Professor Ghafoor Ahmad attended this meeting.\textsuperscript{x}

The first meeting was not so effective due to the absence of Air Marshal (Retired) Muhammad Asghar Khan (b. 1921), the leader of the Tahrîk-i-Istiqlal. To ensure the participation of Asghar Khan in the second conference, a delegation was organized. This delegation consisted of Mawlana Noorani, Sardar Sher Baz Mazari and Professor Ghafoor Ahmad. Asghar Khan was of the view that there was no need of ineffective alliance. However Mawlana Noorani persuaded him to put their joint candidates.\textsuperscript{xi}

In order to pressurize the opposition, the Senate approved an amendment bill on December 31, 1976. This was to disqualify the members of the Parliament and provincial assemblies. The Law Minister, Malik Muhammad Akhtar said that the corrupt people would be disqualified. The law would be applicable to disqualify the Federal and Provincial ministers, MNAs and MPAs, Attorney General and Advocate General. The law would not be misused.\textsuperscript{xii}

Mawlana Noorani strongly opposed the bill in the Senate. He said that the bill was not different from the pervious Elected Bodies Disqualification Ordinance (EBDO) and Public and Representative Office Disqualification Act (PRODA). He pointed out many flaws in the bill. He criticized the empowerment of the Prim Minister to initiate the investigations. In such a way the Prime Minister would become dictator. He will misuse the bill against his opponents in the Parliament and the provincial assemblies.\textsuperscript{xiii}

Another move was initiated by Rafique Bajwa, the Vice President of the JUP in Lahore, where opposition leaders of the UDF, JUP and TI met at his residence on January 10, 1977. They decided to form a National Alliance and on the demand of Mawlana Noorani, the new alliance was named as Pakistan National Alliance (PNA).\textsuperscript{xiv}

The nine component parties of the Pakistan National Alliance were: All Jammu and Kashmir Muslim Conference (AJKMC), Jama‘at- i-Islami Pakistan (JIP), Jam‘iyyat-i-Ulama-i-Islam (JUI), Jam‘iyyat ‘Ulama-i-Pakistan (JUP), Khaksar Tahrîk (KT), National Democratic Party (NDP), Pakistan Democratic Party (PDP), Pakistan Muslim League (PML) and Tahrîk-i-Istiqlal (TI).\textsuperscript{xv} After the formation of the PNA, Jam‘iyyat ‘Ulama-i-Pakistan and Tahrîk-i-Istiqlal raised the question of fair distribution of tickets. These two parties demanded 50 per cent seats for the National Assembly as well as provincial Assemblies. However, the other constituent parties of the PNA were not willing to give them more then 30 percent. The deadlock was solved due to the efforts of Mawlana Abdus Sattar Niazi, who, after his meetings with Mufti Mehmood and Pir Pagara detained 36 percent quota of seats for the Jam‘iyyat ‘Ulama-i-Pakistan and Tahrîk-i-Istiqlal, which was to be divided equally between the two parties. But, as the Chief of the Tahrîk-i-Istiqlal was not willing to reduce his demand of 40 percent, Mawlana Niazi reduced the quota of the JUP, and finally it was decided to give 19 percent seats to the Tahrîk-i-Istiqlal and 17 percent to the JUP. Thus due to the efforts of Mawlana Niazi and sacrifice of the JUP, the infant PNA alliance survived.
The PNA started its election campaign by holding a public meeting at Nishtar Park, Karachi, on January 23, 1977. The leaders of the PNA addressed public meetings in Punjab, NWFP and Sindh (urban). While addressing a public meeting in Korangi, on January 30, 1977, Mawlana Noorani announced that PNA would enforce “Shari’at-i-Muhammad” in Pakistan and solve problems of hunger, unemployment, inflation and black-marketing. While addressing a public meeting in Karachi on February 7, 1977, Mawlana Noorani alleged that the country had become bankrupt due to the policies of the PPP government. While addressing a press conference in Hyderabad, Mawlana Noorani stated that the PNA would scrap Pakistan Penal Code (PPC) and replace it by a Muslim Criminal Law as enunciated in the Quran.

The leaders of the PNA promised to enforce a true democratic set up in the country. The religious parties of the PNA, i.e., the JUP, JUI and JIP, had sensed the development of democratic and Islamic sentiments in the country. But Jam’iyyat ‘Ulama-i-Pakistan claiming to represent the Swad-i-Azam, mobilized these sentiments under the name of Nizam-i-Mustafa, a term coined by Jam’iyyat ‘Ulama-i-Pakistan. Mawlana Noorani and Refique Ahmad Bajwa, who represented the JUP in the public meetings of the central PNA, used this term in their speeches. The PNA leadership was optimistic about its victory in the elections. But the elections had been rigged blatantly. The PNA won only 36 out of the 192 seats in the National Assembly.

Mawlana Noorani decided not to take part in the elections of the Provincial Assemblies, as the National Assembly election was rigged. The PNA did not accept the election results and demanded resignation of Bhutto and fresh elections under the supervision of the army. Mawlana said that the regime was unconstitutional and started a movement against the government. Mawlana Noorani and Mawlana Niazi were put behind the bars due to their movement against rigging in the election. During the movement, the government allegedly planned to kill a few top leaders. Mawlana Noorani was among them. For his services for the true democratic order in Pakistan, Mawlana Noorani was given the title of Salar-i-Qafilah-i-Tahrik-i-Nizam-i-Mustafa in September 1977. Mawlana Noorani warned the government that if it were not ready to cooperate, the people would not spare the government and would carry on the movement more vigorously.

However Bhutto accepted demand of holding fresh elections in October 1977. He also proposed to form a special team to supervise the elections.

Bhutto agreed to hold elections in October and form an Implementation Committee with equal PNA and PPP government representation. Mawlana Noorani said that the government must accept the final draft of the PNA and the Implementation Committee or the Supervisory Council must have Constitutional position. These drafts of the PNA, for the creation of the Council, created a political deadlock. The military take over was the result of the deadlock and Chief of the Army Staff, General Muhammad Ziaul Haq (1924-88) declared Martial Law in the country. The Prime Minister and a number of political leaders were taken into protective custody.

5. Martial Law Regimes and Mawlana Noorani: Mawlana Noorani said that the paralyzed democratic institutions, the oppressed opposition, destroyed economy and the distorted law and order situation were the causes of the downfall of Bhutto. In the last months of his regime the country was on the verge of civil war, but he delayed the negotiations and decision. Mawlana Noorani said that the Bhutto era was the darkest period of our political history.

At first, the military take over was welcomed by the JUP and the PNA. Mawlana Noorani said, “in the light of General Zia’s recent steps, we believe that he is a true Muslim and he is sincere to hold elections in October.” On August 1, 1977, it was announced that the elections would be held on October 18, 1977. The Parliamentary Board of the PNA met at Lahore to distribute tickets. The JUP was allocated twenty-one seats for National Assembly and fifty-two for the assemblies of Punjab, Sindh and Baluchistan. Mawlana Noorani said that he was fully satisfied with the decision of the PNA high command about the allocation of seats.

The PNA started its campaign in the last week of September and successfully organized historic public meetings at Peshawar, Rawalpindi, Lahore, Karachi, Hyderabad and Quetta. While addressing the public meeting at Lahore, Mawlana Noorani said that if the PNA come to power, it would replace the entire economic infrastructure, by a system based on the Nizam-i-Mustafa, with in a period of six to twelve months. He was confident that with the dawn of October 18, 1977, the Nizam-i-Mustafa would be the rule of the day. While addressing the public meeting at Karachi, Mawlana Noorani said that the Nizam-i-Mustafa was universal program. He appreciated the services and sacrifices of the citizens of Karachi during the Tahrik-i-Nizam-i-Mustafa.
his press conference, Mawlana Noorani asked Martial law authorities to determine whether the causes of the East Pakistan debacle were military or political. He said that the Hamoodur Rehman Commission Report was not comprehensive and asked for a judicial commission.

On October 1, 1977 General Zia declared that the bad law and order situation did not allow elections to be held so postponed it indefinitely. The JUP central working committee, meeting under the chairmanship of Mawlana Noorani, opposed the postponement decision and called for early elections. The committee observed that the solution of all national problems lay only in free and fair election. Mawlana Noorani offered his support to General Zia provided he enforced the Nizam-i-Mustafa.

In the meeting of the JUP at Lahore, a resolution was adopted in which it was demanded that the government should allow political activity. Mawlana Noorani said that the PNA should be strengthened in order to enforce Nizam-i-Mustafa. He said that clashes in the PNA would not benefit any party. He made it clear that the JUP would remain in the PNA. When TI left the PNA on November 11, 1977, Mawlana Noorani declared this step of the TI as a severe setback to the PNA. Mawlana Noorani demanded that the election must be held before March 17, 1978.

6. Movement for Restoration of Democracy (MRD) and Noorani: During 1981, the Martial law regime relaxed the situation and the political parties desired for the restoration of democracy. PPP was on the top of those parties. Other parties were TI, PDP, JUI and the JUP. The newly formed political alliance was named as the Movement for Restoration of Democracy (MRD).

Mawlana Noorani was of the opinion that only those parties could be favored, which were free of socialist tendency. On March 29, 1981, the JUP and PML (Pagara Group) issued a joint communiqué, through which the alliance was named as “Tahrik-i-Tahaffuz-i-Pakistan”. These two parties were out of the MRD. But their aim was to struggle for the enforcement of the Nizam-i-Mustafa in its true sense. The Tahrik-i-Tahaffuz-i-Pakistan also aimed at the restoration of the democracy in the country. Mawlana Noorani struggled to bring the country on the democratic tracks. Although, his efforts could not get the required results, but towered against the Martial law regime.

Basically, Mawlana Noorani kept himself aloof from the MRD. He was of the opinion that the anti-democratic behavior of the PPP had paved the way for the recent Martial law. But on August 14, 1983, the MRD declared that an organized movement would be launched for the restoration of democracy. For this purpose, the NDP President, Sardar Sher Baz Mazari and Secretary General, Ghulam Ahmad Bilour met Mawlana Noorani and persuaded him to join the MRD. In the meantime, General Zia announced the new political setup in the country. Mawlana Noorani called for a high level meeting of the JUP to discuss the situation in the country. During this meeting Mawlana Noorani supported the MRD. He declared that his party had always been in the forefront for the restoration of democracy and also favored the parties, which were struggling for the rule of law and democracy.

The Government invited Mawlana Noorani for talks. He accepted the offer on the condition to have talks on the following agenda:

i. Rehabilitation of the political parties;
ii. Restoration of the judicial powers and finishing the military courts;
iii. Elimination of the Martial law; and
iv. Announcement of the election schedule.

The government accepted these conditions of Mawlana Noorani. He also demanded to release all the political prisoners and hold the elections on party-basis. He warned the government vehemently to avoid the amendments to the Constitution.

General Zia blamed Mawlana Noorani for disclosing secrets of the talks held on October 10, 1983. However Mawlana refuted those blames and said that General Zia had not fulfilled his words by not restoring the original Constitution of 1973. He said that if the rulers were serious and sincere about the political crisis in the country, they should hold the elections in the country on party basis. He further said that the imposition of the
Nizam-i-Mustafa was stopped by the imposition of the Martial Law. Mawlana Noorani was banned in Punjab by the government due to strong stand against the Martial Law regime. He was sent to Karachi.

General Zia-ul-Haqq declared that the general elections would be held in 1984. Mawlana Noorani warned that if the elections were not held on the party basis, JUP would launch a movement, along with other parties. In the meantime, General Zia announced to hold referendum over the question of imposing the ‘Islamic System’ in the country. The 71-97 percent Muslims of the country favored the questions in yes, for the imposition of the ‘Islamic System’ in Pakistan. In this way General Zia legalized his President-ship for further five years. Thus he secured his position for the next election.

President Ziaul Haqq declared that the elections would take place on February 25, 1985, on non-party basis. In response to the government declaration, the MRD announced it would not participate in the elections. The MRD leadership further said that the government should hold the elections according to the 1973 Constitution and should create an atmosphere of fair and impartial elections. The prominent leader of the MRD, Malik Muhammad Qasim, warned those who contested the elections on non-party basis would be expelled automatically from their parties (parties including in MRD).

The election to the National Assembly was held on the non-party basis on February 25, 1985. The Provincial Assemblies’ elections were held on February 28, 1985. Mawlana Noorani was imprisoned prior to the elections. Mawlana Noorani criticized the government by saying that the Constitution was so amended, that the Prime Minister was made helpless. He said that it would be observed, how the Members of the Parliament and the Prime Minister Muhammad Khan Junejo work? He said that the whole Parliament was at the mercy of ‘one man’.

Mawlana Noorani said that the original Constitution was deteriorated through regular amendments. He considered the Interim Constitution of 1985 as a new one, and said that it was amendment in the Constitution of 1973.xxxvii

When General Zia’s various steps were termed as the “Democratization”, Mawlana Noorani said,

Whichever steps were taken by Zia for the Islamic system were based on bad intentions. If he had done all in a fair sense, he would be appreciated in every field of life. The people, at the initial stages appreciated him as he used and exploited the name of Islam and presented himself as a true Muslim (Momin). The people were discouraged and dishearten by the General…. General Zia could do any thing he wanted but he did noting for Islam. Allah had granted him a grand opportunity… General Zia harmed Islam instead of serving it. No socialist, communist or non Muslim had ever harmed Islam as Zia had done.xxxviii

The National Assembly of Pakistan passed the Eighth Amendment Bill. According to this bill, Martial Law was protected. The President could dissolve the National Assembly whenever he desired so. The Martial Law was lifted from the country on December 30, 1985, but the country was still far from democracy. We saw the exhibition of this power on May 29, 1988 when Junejo government was dissolved.xxxix Untill Zia’s death in plan crash he was all in all.

7. Pakistan Awami Ittihad (PAI) and Mawlana Noorani: The restoration of democracy got a chance after the death of General Zia-ul- Haqq. Ghulam Ishaq Khan, Chairman of the Senate, sworn in as the Acting President of Pakistan the same day. He declared that the elections would be held according to the scheduled program on November 16, 1988.

Pakistan Peoples Party was at its peak during 1988 at the political front. A new political party came on October 5, 1988 by the name of Islami Jamhori Ittihad (IJI). Ghulam Mustafa Jatoi was made its head. As this alliance was the product of the ruling elites, therefore, Mawlana Noorani kept himself away from it. But he remained in close contact with the Muslim League and Tahirik-i-Istiqlal. As a result of his efforts a new political alliance came into existence on October 5, 1988 consisting of JUP, PML and TI. This alliance was known as “Pakistan Awami Ittihad” (PAI).xl The general elections were scheduled on November 16, 1988 for the National Assembly and November 19, 1988 for the Provincial Assemblies.

On August 26, 1988, Nawaz Sharif was elected as the Secretary General of the Muslim League while
Junejo had some compulsions to join the Pakistan Awami Ittihad: Firstly, he was disheartened by the decision of the Supreme Court to declare the dissolution of the Assemblies on September 30, 1988 as unconstitutional but decided that the Assemblies could not be restored. Secondly, the Muslim League had completed its party elections on August 26, 1988. So there was no other way for Junejo except joining the Pakistan Awami Ittihad.

The parties of the PPA i.e., JUP and TI were not so influential to get majority votes. Mawlana Noorani expressed his views over these failures and said,

We had no resources. We did not compete the conspiracies... As far as the votes were concerned, PPP had the highest votes. But after that the JUP was more important. As Nawaz Sharif had confessed that we lost about 25 seats due to JUP. If we had got the same seats then the PPP would not be the ruling party. Apart from Karachi and Hyderabad, we also faced failure in some places at Punjab. This was also due to our minor resources. Whenever I went on a campaign, I used taxi or raksha. The people would laugh at me. On the other hand the offices of the other parties were full of vehicles.

The PPP was the single party, which got success in the 1988 elections. The MQM was successful in Sindh. The traditional politician, Wali Khan lost and his Awami National Party was defeated in the NWFP. Aftab Ahmad Khan Sherpao made PPP successful in the NWFP. PPP got 57 seats out of 115 in the Punjab. Baluchistan, where the party politics was different from its tribal politics, the PPP was a little bit successful. The PPP got 92 seats in the National Assembly while the IJI got 68 seats. Later on the independent Members from the FATA also joined hands with the PPP. MQM became ally of the PPP in Sindh. The PPP formed the government in Sindh and NWFP, while Nawaz Sharif made the government in Punjab. Nawab Akbar Bugti was elected the Chief Minister of Baluchistan.

After having governed for twenty months, the then President Ghulam Ishaq Khan issued a charge sheet against the government and dissolved National Assembly and Provincial assemblies on August 6, 1990. He appointed Ghulam Mustafa Jatoi as the interim Prime Minister. It was mainly on the plea that PPP government was corrupt.

Although the democratic period (1988-1990) saw many ups and downs politically, but the regular conflicts among the politicians increased the Public anxiety. Mawlana Noorani had predicted that the dictatorship of General Zia-ul-Haq would manage to provide a bureaucrat to the country as a President. His prediction proved true. As a result of the democratic setup, two political parties came to the national stream. Those were the PML and PPP. 

8. Islami Jamhuri Mahaz (IJM) and Mawlana Noorani: When Ghulam Ishaq Khan, the President of Pakistan, dismissed the PPP government on August 6, 1990, the opposition leader Ghulam Mustafa Jatoi was appointed as the caretaker Prime Minister of the country. The caretaker Prime Minister announced that the elections would take place on October 24, 1990.

The elections for the National Assembly took place on October 24, 1990, while for the Provincial Assemblies on October 27, 1990. As a result the Islami Jamhori Ittihad (III) got majority seats in the National Assembly. Mian Muhammad Nawaz Sharif was elected as the Prime Minister of Pakistan. The religious parties could not get the required results. They were lacking harmony and unity amongst themselves.

Mawlana Noorani blamed the winning team of the elections for rigging. He said that elections were rigged at high level in various places of the country. An election cell was responsible for the rigging. He gave an example of the constituency of Professor Shah Faridul Haq in Karachi, where the result of his constituency came at 11 p.m. although the counting of the votes was not yet complete. As a result the Professor lost the elections.
On another occasion Mawlana Noorani said that the aggressive politics of the MQM at Sindh destroyed the position of JUP and TI. When the JUP workers would visit the booths during the counting process, the hooligans of the MQM would make them run away. If there were no use of weapons, the JUP would achieve the same success as during the 1970 and 1977 elections.

Realizing the lack of unity, Mawlana Noorani of JUP and Mawlana Fazl-ur-Rehman of JUI formed a new political alliance with the name of “Islami Jamhuri Mahaz” (IJM) in May 1992. Mawlana Noorani was made its President, while Mawlana Fazl-ur-Rehman was nominated as its General Secretary. The IJM convened a meeting of all the opposition parties in October 1992 at the office of the JUP. This meeting was attended by Nawabzada Nasrullah Khan, Ghulam Mustafa Khan, Mawlana Fazl-Ur-Rehman, Qazi Hussain Ahmad, Sheikh Rafique, Malik Qasim, S.M. Zafar, Shah Farid-ul-Haq, Abdul Qadeer Khamosh, General K.M Azhar etc. but the meeting was not successful in its objectives. So the JUP altered its program to unite all the opposition parties at the same platform, and desired for a more grand alliance, which also failed. xlvi

Benazir Bhutto started a movement against Nawaz Government on October 24, 1992. She declared to have a long march against his government on November 10, 1992. Nawaz Government faced a tough opposition from the opposition side. The government started arrests of the workers of the opposition parties’ all over the country. xlvii Benazir Bhutto started train march and road march respectively against the government. xlviii

In the meantime, the Babri Mosque incident took place, which turned the eyes of the public from the internal affairs of the country towards the Pak-India relations for sometime. The opposition parties had to postpone the protest against the government. The IJM took serious notice of the Babri-Mosque incident. As a result Secretary General of IJM, Mawlana Fazl-Ur-Rehman called for all parties’ conference in order to analyze the situation after the Babri Mosque martyrdom. Mawlana Noorani, Nawabzada Nasrullah Khan, Ahmad Ali Qasuri, Hamid Sarfaraz, Ghulam Rabbani Khan, S.M Zafar and others attended this conference. xlix

There arose some differences between the Prime Minister and the President over the Eighth Amendment Act. Therefore the President Ghulam Ishaq Khan dissolved the National Assembly on April 18, 1993 and made Mir Bakh Sher Mazari as the caretaker Prime Minister on April 20, 1993. The elections were to be held in July 1993 according to the Constitution. Nawaz Sharif challenged the dissolution of the National Assembly on April 25, 1993 in the Supreme Court of Pakistan. The Supreme Court declared the dissolution of the National Assembly as unconstitutional. So as a result, Mian Nawaz Sharif got the vote of confidence from the National Assembly. On June 15, 1993, Mian Nawaz Sharif decided to have negotiations with the opposition. Benazir Bhutto forwarded some conditions for the rapprochement with Nawaz Sharif. The conditions were to form a National Government, prepare a package for the constitutional reforms and declare a date for the new elections.

The situation became more complex and Nawaz Sharif along with the Gulam Ishaq Khan presented their resignations to the Chief of Army Staff on July 17, 1993. On July 18, 1993 Moeen Qureshi was nominated as the caretaker Prime Minister. The political parties started their campaigns for the coming general elections. On July 21, 1993, Mawlana Noorani declared that IJM would make an alliance with other religious parties. On August 15, 1993, addressing the “Jeeway Pakistan convention”, Mawlana Noorani said that the public had rejected Nawaz Sharif and Benazir. Both of them were the agents of America. Nawaz Sharif created dissensions and hatred in Karachi and Hyderabad.xlix

The President of IJM, Mawlana Noorani said to a gathering in Hyderabad that the fate of Pakistan was related to the Nizami-i-Mustafa. The election to the National Assembly took place on October 6, 1993. According to the results PPP got 89 seats in the National Assembly while PML (Nawaz group) got 73. IJM was defeated vehemently. Total 52 candidates contested the election from IJM side, only four were successful. Mawlana Noorani accepted the results wholeheartedly and said that his party would participate in the next election too. 1 Mawlana Noorani had contested the election from the constituency NA-125. He was defeated. He, as result of his defeat, said that success and defeat were the part of elections. He expressed his happiness over the peaceful transfer of power under the democratic traditions. This should be a model for future. li

No party could get the clear majority. The MNAs were involved in Horse-trading. li On October 19, 1993, Benazir Bhutto was elected as the Prime Minister. lii

The IJM got success at the time when the secretary General IJM, Mawlana Fazl-ur-Rehman, was elected as the Chairman of standing committee on Foreign Affairs in the National Assembly. liii

When all the elections completed in all respects there was no need for any electoral alliance. Therefore Mawlana Noorani announced to abolish the IJM. On April 19, 1994, at the residence of Sardar Muhammad Khan
Laghari in Dera Ghazi Khan, Mawlana Noorani officially declared the end of the IJM. He said that the IJM was needed only up to the 1993 elections. Then the destinations of JUI (F) and JUP were different.


9. Milli Yakjihti Council (MYC) and Mawlana Noorani: On March 24, 1995, the Ulama of different schools of thought met in Islamabad. They decided in that meeting to form a council in order to develop the sense of sectarian harmony. The council was named as “Milli Yakjihti Council”. The council consisted of eleven members. Its head was Mawlana Noorani. Mawlana Noorani while mentioning the main objectives of the Council said that it would try to eradicate the sectarian clashes and terrorism. “Foreign hands were involved in terrorist activities, because some foreign elements wanted to weaken the country on the basis of sectarianism, provincialism and linguistic issues”.

Mawlana Noorani blamed the opposition leader, Nawaz Sharif and Altaf Hussain for racism. He said that PML (N), MQM and ANP wanted to make ‘Panjabistan’, ‘Muhajiristan’ and ‘Pakhtunistan’ respectively. Due to diverse political conditions of the country, the Milli Yakjihti Council (MYC) also started to participate in the political activities.

During that period, the Benazir’s government moved 13th Amendment Bill in the National Assembly, which increased rivalries between the President and the Prime Minister. Due to all these reasons, President Farooq Laghari, invoked Article 58 (2)-B and dissolved the National Assembly on November 5, 1996. In this way the Benazir government was dismissed. Malik Mairaj Khalid was made caretaker Prime Minister. He along with the new cabinet took the oath from the President on November 6, 1996.

The new set up had to hold elections within 90 days. JUP and the MYC under the leadership of Mawlana Noorani, decided to boycott the 1997 elections. The JI also decided to boycott the same elections. The elections were held and Mian Nawaz Sharif got a heavy mandate. The PML (N) got 134 seats out of 202 in the National Assembly. The PPP got 18 seats. Nawaz Sharif was elected as the Prime Minister of Pakistan. The government of Nawaz soon involved in clashes with the Judiciary and military. The three pillars of the government i.e., legislature, executive and Judiciary got frustrated and finally the military got the upper hand. As a result, General Pervez Musharraf took over government on October 12, 1999 in a military coup d’état.

The MYC had lost its importance during Nawaz Sharif’s government (1997-1999) and afterwards in the first three years of the military regime.

10. The Muttahida Majlis-i-Amal (MMA) and Mawlana Noorani: Both the political parties of PPP and PML (N) had disappointed the people. There was a need for change. Only the religious parties could be the other option. The people had developed expectation from religious political parties. Therefore, at the advice of Mawlana Noorani, Qazi Hussain Ahmad called a meeting of six religious parties at his house on June 26, 2001. Qazi Hussain Ahmad (JI), Mawlana Noorani (JUP), Mawlana Fazl-Ur-Rehman (JUI-F), Allama Sajid Ali Naqvi (TI), Allama Sajid Mir (JAH) and Mawlana Sami-ul-Haq (JUI-S) attended this meeting. The heads of these religious parties signed a joint communiqué. These parties approved the establishment of a new alliance named as Muttahida Majlis-i-Amal (MMA). Mawlana Noorani was unanimously chosen as its President. He remained the President of the MMA till his death.

Mawlana Noorani said, “The meeting hereby resolved to struggle collectively for the Islamic identity, true democracy, freedom, integrity and solidarity of Pakistan. The six religious parties have decided to have joint efforts from the platform of the MMA. Our target is the establishment of a true Islamic democratic system. Today’s meeting declares that the base of Pakistan is Islam and the 1973 Constitution has given protection to the Parliamentary democracy and rule of law.”

The MMA decided to adopt a common policy for the elections of 2002. The three main religious parties of the country i.e., JI, JUI and JUP decided to contest the elections from the platform of MMA. Mawlana Noorani was of the opinion that the 9/11 incident had brought the people nearer to the religious parties and they would not elect any other party.

The MMA was converted into a full-fledged alliance on March 19, 2002. The MMA leadership
criticized the Presidential referendum of General Pervez Musharaf and declared that a countrywide movement would be launched against it. Mawlana Noorani said that there was no room for the referendum in the 1973 Constitution. The MMA leadership declared that it would impose the *Nizam-i-Mustafa* in the country if it came into power.

On the other hand other parties were also trying to unite themselves under one platform. Alliance for the Restoration of Democracy (ARD) was on the top, headed by Nawabzada Nasrullah Khan. On May 19, 2002, an All Parties Conference (APC) was held under the auspices of (ARD). Thirty-five political parties including the MMA participated in the APC. The APC was presided over by Nawabzada Nasrullah Khan. The agenda of the conference was conflict at the borders; price hike, unemployment and terrorism. The APC decided to warn General Pervez Musharaf to protect the borders of the country and get back to the barracks. The political process should be left to the politicians.

The government was busy in fulfilling the American agenda of registering the religious institutions. Mawlana Noorani warned the government against the registration of the religious institutions. Mawlana Noorani said that the MMA was a permanent alliance. He also criticized the government on the constitutional amendments. The leadership of the MMA met the President for the purpose but the meeting was not successful.

The international scenario had suddenly changed after the 9/11 incidents. The ‘Taliban’ in Afghanistan were held responsible for the incidents. USA demanded Usama Bin Laden from the ‘Taliban’ who was held responsible for the attacks. But they refused to hand him over to the US. When America along with its allied forces attacked Afghanistan, Pakistan had no option but to side with the international forces. Their wrath fell upon the religious institutions, which in their opinion were the sanctuaries of the ‘Taliban’ and ‘Al-Qaeda’. Therefore, Pakistani government decided to action against the religious institutions.

Mawlana Noorani stood on both the MMA and JUP fronts. He was sure that the general elections would be fateful for the secular forces. The elections were held both for the National Assembly and the Provincial Assemblies on October 10, 2002. The MMA emerged as the second largest party after PML (Q), which had secured the majority seats.

MMA announced to take oath under the Constitution instead of the Provisional Constitutional Order (PCO) of General Pervez Musharaf. However in order to protect the Parliamentary system of the country, the MMA nominated Mawlana Fazl-ur-Rehman for the Premiership, while Liaqat Baloch for the seat of Speaker. Mir Zafarullah Khan Jamali was elected as the Prime Minister on November 21, 2002. He got 172 votes, while his opponent, Mawlana Fazl-Ur-Rehman of MMA got 86 votes, getting the second position.

Mawlana Noorani concentrated over the Provincial affairs and restoration of the original Constitution. He also declared that military president was not acceptable. If General Musharaf left military command, MMA would help to make him constitutional head of the state. Meeting of the Supreme Council of the MMA was called on December 17, 2002 at Peshawar in which the following issues were discussed:

i. Presidency of General Pervez Musharaf in military uniform;

ii. Presidency through constitutional means;

iii. Legal Framework Order (LFO).

iv. National Security Council; and

v. Article 58(2)-B

The MMA and PML (Q) had decided to continue talks but were not successful. Due to failure of the talks Mawlana Noorani declared that the MMA would not join the government and had to sit in the opposition. The MMA rejected president in uniform, 58(2)-B and the National Security Council. They also demanded restoration of the Constitution and also vowed not to permit the American operations in the NWFP and Federally Administered Tribal Areas (FATA).

MMA nominated Mawlana Noorani for Senate seat. He was not willing but Qazi Hussain Ahmad convinced him that he was needed in the Senate. Mawlana Noorani was elected as a Senator on February 24, 2003. The MMA got 18 seats in the Senate. Total seats in the Senate, under the Legal Framework Order were
Mawlana argued on the issue of LFO on the floor of Senate: “The 1973 Constitution was framed after great efforts. Unfortunately, some people fashioned it according to their own interests. Constitution is the base of the people’s economic, social, moral and spiritual prosperities. It is used to be sign of unity. To attack this sign of unity is a great injustice to the nation. A proper way is there to amend the Constitution. But the President did not follow this method and LFO was inserted in the constitution. He argued that it was not legal framework but was an “Illegal Framework” and also an “illegal order” and has no moral, legal and constitutional status.

The American forces attacked Iraq on March 20, 2003. Demonstrations were held in the nook and corner of the country as a protest. The people came out of their houses with the slogans of “Jihad” When a resolution regarding the American war on Iraq was moved in the Senate on March 28, 2003, Mawlana Noorani spoke boldly on it. He said, “There is no Muslim who had no spiritual, moral and religious attachments with Iraq. We are attached with them in the bond of Islam. Not only the Muslims but the secular people of Europe also condemned the war against Iraq.He said that Bush had started crusade.

He further said that Bush was fighting for the ‘Greater Israel’. The Israeli kids were being taught at primary and secondary level to make Greater Israel. Madinah, Hijaz and Farat were to be parts of Greater Israel, according to them. Those maps of the Greater Israel were present at bazaars. The Israelis considered that Hazrat Ibrahim was born on the land of Babul and therefore that land was also a part of the Greater Israel. Mawlana said that they were fighting for that purpose.

Mawlana said that former American President, Bill Clinton, invited some prominent Muslims to White House. Hilary Clinton also spoke at this occasion. She admitted that Islam was the fastest growing religion in that region. Now they wanted to stop our religion from spreading by various tactics. They were trying to relate our Islam with the terrorism. Many Muslims could go there easily to preach Islam but they wanted to stop their preaching. As they could not stop the Muslims legally from preaching so they were being labeled as terrorists. This way they would stop spreading of Islam in Europe and America.

Mawlana Noorani explained the logic of Islam very beautifully. He said, “Islam is a religion of peace and tranquility. Islam is the greatest guardian of the humanity. Islam is totally against terrorism. The Quran says that if any body killed an innocent person, he killed the whole humanity.” He demands of the USA to stop war in Iraq as they were killing the Muslims without any claim and reason.

The meeting of the MMA was held on April 9, 2003 during this sensitive situation. The stand of the government over LFO and foreign policy was rejected. Mawlana Noorani said on the occasion, “No change has occurred in our stand over the LFO. If the President Musharaf did not remove the uniform, accidents like the East Pakistan could appear. America is the war criminal and the UNO did not play its role to stop the war. Kofi Annan should resign. The Pakistanis should boycott the American and British products. America has killed three lac Afghani. So there is need of new policy for the recent world crisis”. As far as the LFO was concerned, the stand of General Musharaf was unconstitutional, undemocratic and immoral. The MMA has never accepted the LFO. This is a dictatorial law; amendments to the Constitution could be done only through constitutional means.”

The whole year the dialogues between the MMA and the government over the LFO and uniform issue continued but President Musharaf and the government did not show sincerity. Mawlana Noorani always stood for the supremacy of the Constitution and Parliament while the government was not ready to show any flexibility. The MMA had been asking General Musharaf to quit the charge of Army and become a civilian president; abolish LFO and restore constitution to its original status. Mawlana very well articulated these demands. He was determined to restore the lost prestige of Parliament and thus provide stable footing to the democratic norms. December 17, 2003 was that date for which Mawlana had been preparing a fiery speech against the regime of General Musharaf. Unfortunately, fate did not allow him. He passed away on December 11, 2003. After his demise the MMA weakened.

Conclusion: Mawlana Shah Ahmad Noorani entry into parliamentary politics after the 1970 election brought in a change in the parliamentary as well as religious politics of the country. He rejected the traditional politics and boldly fought against the undemocratic and unparliamentary spirit of the military regimes unlike some of his party leaders who were little bit accommodative towards the dictators. He never joined hands with dictators. He epitomized the spirit of dissent in and outside the Parliament; always advocating democracy and all that was
normally decent in politics and bitterly opposing all kinds of dictatorships. Mawlana Noorani had never permitted his party to encourage sectarianism or to patronize violence. He remained committed to a democratic Pakistan and wanted it to be a welfare state. He was seen as a unifying figure amongst various Islamic religious parties of Pakistan into a single alternative political force. Uniting the six different religious parties into a single force of the Muttahida Majlis-i-Amal was a glaring example of it. Recognizing his services for the elimination of sectarianism in the country, he was appointed as the Chairman of the MMA.

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COOPETITION DOCTRINE FOR CORPORATE SOCIAL RESPONSIBILITY

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ABSTRACT: The term Corporate Social Responsibility has evolved ever since it was coined in second half of 20th century. Broadly, CSR is a way a business achieves a balance or integration of economic, political, social and ethical dimensions; while at the same time addressing shareholder and stakeholder expectations. CSR is a concept whereby corporate organizations take social responsibility and create products or services for greater good of the society and consistent with the interests of customers, suppliers, employees, shareholders, communities and other stakeholders, as well as the environment. Most of the time, these activities and actions are considered to be on voluntarily basis to improve society. The way businesses engage/involve the shareholders, employees, customers, suppliers, governments, non-governmental organizations, international organizations, and other stakeholders is usually a key feature of the concept. However, considering various entities or stakeholders stated above, it is not surprising to note that conflict of interest exists among various stakeholders in respect of activities performed by a particular organization. Thus, a need arises to rethink the normative approaches to CSR and evaluate other avenues for a better solution. Considering that CSR is interdisciplinary and affects many facets of society simultaneously, it is considered that coopetition may hold the key to solve complex relationship of various stakeholders and their conflict of interests. Coopetition is a promising and challenging perspective to understand cooperation between competing individuals and/or organizations. In the literature, coopetition phenomenon has been connected with strategic alliances, territorial development work, and resource-based view. This Paper aims to relate the coopetition phenomenon with CSR to create a sustainable partnership between various stakeholders.

Key words: Corporate Social Responsibility; CSR; Coopetition; Cooperation; Competition

Introduction: The organizations have become increasingly aware to portray their image as friendly and socially responsible organizations. This awareness is sometimes referred as Corporate Social Responsibility (CSR) of the organizations. The CSR has gained tremendous importance as business strategy and served as tool to achieve business growth. Use of health care products, cause-related marketing, public-awareness campaigns, establishment of public facilities and charities by organizations are some of the examples of CSR in action. However, it is believed that there exists a gap between business and social needs. This paper attempts to examine the situation and proposes a competitive-cooperative strategy to execute CSR of organizations.
Corporate Social Responsibility: Corporate Social Responsibility was phrased by Bowen in his seminal work ‘Social Responsibility of a Businessman’ in 1953 (Bowen, 1953). Since its inception, the term Corporate Social Responsibility (CSR) has undergone many revisits by the scholars and multiple dimensions of the issue have been explored. The multi-faceted approaches to defining CSR can be weighed from the fact that around 30 years ago, Votaw wrote: “corporate social responsibility means something, but not always the same thing to everybody. To some it conveys the idea of legal responsibility or liability; to others, it means socially responsible behavior in the ethical sense; to still others, the meaning transmitted is that of 'responsible for' in a causal mode; many simply equate it with a charitable contribution; some take it to mean socially conscious; many of those who embrace it most fervently see it as a mere synonym for legitimacy in the context of belonging or being proper or valid; a few see a sort of fiduciary duty imposing higher standards of behavior on business men than on citizens at large” (Votaw, 1972). Years later, another notable scholar on the CSR explains CSR as "an eclectic field with loose boundaries, multiple memberships, and differing training/perspectives; broadly rather than focused, multidisciplinary; wide breadth; brings in a wider range of literature; and interdisciplinary" (Carroll, 1994).

The perplexing nature of the CSR can be gauged from the fact that many theories and frameworks exist to define the CSR due its multi facet nature. All such theories are well reasoned and define one or more dimensions of the CSR and, at times, counteract each other. Hence, it becomes increasingly difficult to apply all such definitions simultaneously. In a remarkable work by (Elisabet & Domène, 2004) regarding CSR theories, CSR theories have been divided into following major categories:

**Instrumental Theories:** The CSR is considered as Strategic Tool for corporate organizations, as these organizations are formed as an instrument for wealth creation. Thus, wealth creation is the sole Social Responsibility and CSR is just another strategy to achieve profits. Therefore, an activity which does not yield an economic benefit is not undertaken.

**Political Theories:** The theories in this group focus on the corporate presence or corporate citizenship. The corporate are considered to be socially active and use their influence/power towards their environment. The theorists believe that corporation must behave as citizens and be socially responsible.

**Integrative Theories:** The theorists in this group argue that the firms / corporations are dependent upon societies for growth and mere existence. Therefore, the firms /corporations must be integrated in society and value / fulfill social demands. These theories are thus called integrative as they emphasize business to work for society and become integrated into it.

**Ethical Theories:** Such theories propose that the business and society relationship is based on ethical values. Thus, CSR gets ethical perspective and corporations have ethical obligation to accept social responsibilities. As stated earlier, the CSR has broader scope and multiple approaches. Thus, we resort to more generalized definition. CSR has been considered as key factor for sustainable development (Dahlsrud, 2008). It may be considered that three key corporate responsibilities identified are: economic, social and environmental and CSR has been defined as “the continuing commitment by business to behave ethically and contribute to economic development while improving the quality of life of the workforce and their families as well as of the local community and society at large” (Dahlsrud, 2008), (Falkenberg & Brunse, 2012).

The key areas for the CSR includes: human rights, employee rights, environmental protection, supplier relations, community involvement, stakeholder rights and CSR performance monitoring and assessment (Elisabet & Domène, 2004).

Having defined the CSR, it is worthwhile to discuss some of the key benefits of the CSR, which include: stronger financial performance (e.g. through eco-efficiency), improved accountability, improved employee commitment, stronger relationships with communities leading to lesser vulnerability and improved reputation and branding (Falkenberg & Brunse, 2012). Further, the impact on society is visible in form of better/improved products, discontinuation of toxic/damaging materials and improved infrastructure/processes (Rasche, Bakker, & Moon, 2013).
Coopetition: Coopetition is being cooperative and competitive simultaneously (Khanna, Gulat, & N., 1998). The cooperative aspect refers to the collective use of shared knowledge and the competitive aspect refers to the use of shared knowledge to make private gains in an attempt to outperform the partners (Khanna, Gulat, & N., 1998).

Traditionally businesses have been seen as competitive in nature. For long, businesses have maintained the competitive edge by jealously guarding the businesses secrets through patents, trademarks and confidentiality agreements with their employees (Barney, 1991).

The question arises if the businesses are truly benefited through competition? The answer lies in studies of various business activities, which boast cooperation rather than competition. Mergers, MoUs for continuous supply of materials, vertical integration are some examples to secure business interest (Hill, 1992). However, safeguarding own business interest cannot be neglected. So it can be deduced that businesses are benefited both from the competition and cooperation (Walley, 2007). A pictogram below describe the areas where cooperation and competition between firms can exist (Walley, 2007)

![Figure 1 Cooperation to Competition](image)

Coopetition strategy is not a simple one. It requires a considerable insight into a business. The interaction with a rival company with conflicting interest cannot remain simple. Being aware of pitfalls, the coopetition strategy proposes to interact with rivals on commonalities rather than the difference (Bengtsson & Kock, 2000). Various examples in the corporate world can be seen as living examples of coopetition (Zineldin, 2004). Although multiple examples have been cited in literature from auto manufacturers to restaurants and convenient stores (Martinelli & Sparks., 2003); it is considered that development of USB Standard by world leading technology companies is most apt example of coopetition, whereby world computer and mobile phone technology companies collaborated to create the now well-known USB standard for connecting multiple devices with computers and mobile computing devices of many origins. Each company cooperated to create the USB standard and now they are using in their devices to compete rivals firms.

It has been identified that in order to have coopetitive relationship; both (or more) parties agree to establish relationship and needs and demands of other party are honored. The relationship should be mutually rewarding, which can be achieved by striking balance between the advantages and disadvantages of the relationship. It is utmost important that well negotiated terms and conditions are framed, which are flexible and can be changed. There should
be ample communication between parties as communication is considered as key to any relationship. Above all, both parties must share, value and practice core ethics (Zineldin, 2004).

**Problem Statement:** The question arises can coopepetition produce the promised results? Is coopepetition relevant to businesses? If yes, what are likely areas of application and if no, can coopepetition concept can be further refined?

**Application of Coopepetition for CSR:** Coopepetition: combination of cooperative and competitive strategies to be more effective (Khanna, Gulat, & N., 1998). Whereas, Corporate Social Responsibility (CSR): continuing commitment by business to behave ethically and contribute to economic development (Dahlsrud, 2008) are two concepts aimed in one direction: to be more effective (have sustainable development).

As discussed above, coopeptive relationship can be established if (Zineldin, 2004):

1. Both (or more) parties agree to establish relationship.
2. Needs and demands of other party are honored.
3. Relationship should be mutually rewarding.
4. Flexible terms and conditions are framed.
5. Ample communication exists between parties.

It can be argued that the conditions explained above for the coopepetition relationship are valid for every contract forged between parties. However, in the context of CSR, which is ethical obligation as well as perpetual economic concern of an organization, realizing of coopepetition in the absence of formal contracts remains questionable (Walley, 2007). So how would coopepetition work? How coopepetition can deliver the results for an organization to be more effective and achieving CSR? Coopepetition is phenomenal in two ways; it does not loses the cutting edge of competition & growth and at the same time it allows for the cooperation to be made between entities (Walley, 2007). Likely areas where most organizations cooperate include research & development, common production facilities, raw materials sourcing and knowledge sharing. Whereas, areas such as sales and distribution networks, new product development and services are highly competitive in nature. It can be seen that the areas where firms are cooperating appear benign in nature, yet have powerful impact on the overall effectiveness of a firm. By applying coopepetition at inter-organization level in some of the key areas, the overall gain is economy of resources, sharing of knowledge and improved products & services, as is the case with development of USB standard. The firms can form a cluster as Special Interest Groups, Discussion Forums or even formal contracts for resource sharing to investigate complex areas/develop newer and better technologies or services. This way the organizations can become more focused and huge burden of R&D expenditure can be shared by participating organizations. Improved knowledge sharing leads to sustainable development of the organizations and fulfills the CSR for the firms in terms of better products and services (Bengtsson & Kock, 2000) (Dagnino & Padula, 2002).

It is pertinent to highlight coopepetition is sometime attributed as ‘market rigging’ (Kessler, 1998) (Walley, 2007), however, this notion can be dispelled by arguing that; although, economic concern may lead to such ‘market rigging’, but the same cannot continue perpetually as new market entrants may not comply with existing ‘market rigging’ (Kessler, 1998).

**Conclusion:** It can be seen readily that both coopepetition and CSR complement each other. The coopepetition has potential to improve the overall businesses by combining resources and sharing of knowledge, whereas, CSR is ethical business practices with sustainable development in perspective. However, the concern remains regarding the level of cooperation and competition between firms. It was also observed that the both CSR and coopepetition are dependent on the individuals practicing it (Bagshaw & Bagshaw., 2001). This area is considered as further focus for the research as to how individuals can be made to cooperate in the face of fierce competition to take true advantage of coopepetition. The same was not considered here, mainly due to the fact that team-building, and interactions between humans form a separate topic for research.

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ABSTRACT: In 1947, on the eve of Partition of India, a large scale killing, lootings of innocent citizens across the border took place which claimed lives of millions of people. According to an estimate almost more than two million people were killed, and almost another fifteen million, in addition, were forced to migrate from their homes. Much has been written about the communal violence in India, but in most of the literature, the British is blamed for igniting and encouraging disturbance for their imperial designs. In fact, despite British stern actions to address the law and order in India in the dying days of the Raj, the British Government failed to prevent the massacres, especially brutal and widespread in the Punjab, and in the rest of the country in general. The British was blamed for mishandling the communal matters which to some extent were true, but after the lapse of 67 years of partition of India, one can make an objective study of the Punjab disturbances that broke out in 1947. It is important, therefore, to analyze the dynamics of the communal violence in the Punjab and the factors that led to the tragic happening of communal violence. This paper attempts to understand how and why the disturbances in the Punjab took place and what efforts were made by the parties concerned to deal with it. The author intends to challenge this theory that these were the British who applied the Divide and Rule theory which resulted in the communal violence. This paper is significant to uncover the story on the basis of primary sources which will help fill an important gap in our existing historical literature.

Keywords: Muslims, Hindus, Sikhs, British, riots,

1. Introduction. Partition of India was such an appalling episode of sub-continental history which is both hard to ignore and difficult to forget easily. That tragic act resulted in the displacement of 12.5 million people in the former British India and an estimated loss of life of close to one million. The violent nature of the partition created an air of mutual antagonism between the newly emerged states of India and Pakistan. The nature and severity of violence in united Punjab was different from other areas because of the magnitude of bloody riots and extensive bloodshed. The greatest forced human migration in history with its gory tales of massacres, looting, arson, rape, abduction of women and children and other acts of savagery was essentially that facet of a Punjabi tragedy which has left deep and seemingly inerasable imprints on the future course of South Asian history. Historians have been trying their best to investigate various aspects of this history. But much more research needs to be done to shed a clearer light on the dynamics of that cataclysmic event. Therefore, it aims to examine the pre-partition time-period that preceded the later genocide, violence and riots.

The violence and the turmoil which occurred during the transfer of power of British India in August 1947 was the result of many factors. Though in some cases the violence against the other community was spontaneous, more often it was executed by well-trained and well-prepared militant organizations with clear objectives. The three main communities--Muslims, Hindus, and the Sikhs--all applied fear and violence as instruments of
terror to win the war of succession in the Punjab. The main area of communal contention was Northern India in which certain parts of Punjab, some Princely States and Jammu were the main areas of attacks on the other community which was forced to flee to the other side of the newly-created border. Punjab especially, became a bloody battleground which left a permanent legacy of hatred between the successor states, India and Pakistan. There were clear indications that on the eve of the final transfer of power there could be widespread civil disturbances, but very few in India or in the United Kingdom had appraised its true dimensions. Thus, immediately after the June 3 announcement, which announced the termination of the British paramountcy in India, it began to turn ugly and very soon it became so wild and violent that some critics have called it ‘genocide’, while others have labeled it ‘ethnic cleansing’. No wonder Mountbatten’s period as the Viceroy of India came under criticism regarding his failure to ‘nip the evil in the bud’. And it was alleged by critics that he failed to arrest the main leadership of the Sikhs who were not only instigating people for violence but also Shatching conspiracies against the Muslim leadership. Another belief is that the delay in the announcement of the Radcliffe Award caused uncertainty and thereby intensified the fighting. Each of these points may have a certain truth to it, but still they merit a deeper examination. Therefore, this paper will try to answer to all these questions so Mountbatten’s true role in all those happenings can be properly analyzed. This study will, hopefully, help fill not only an important gap in our existing historical literature, but will also help revise the general perception about Mountbatten’s role in the communal riots in the Punjab.

In recent years, many writers like Ian Talbot, Gyanendra Pandey, Paul Brass, Horowitz, Yasmin Khan and others have written about the violence and the human aspect of the partition. Their observations about the violence, on whether it was spontaneous or planned or was it ‘genocide’ and ‘ethnic cleansing’, have contributed greatly to the understanding of the history of violence before and after the partition of India. Other historians like Pippa Virdee and Ian Copland, have shed light on the communal history of the Princely States of the Punjab. This paper argues that no single party can be assigned sole responsibility for the outbreak of violence in the Punjab. In fact, individuals and groups bent on violence only moved into full gear after August 15, 1947, precisely because the final British restraints on their activities had been removed, but its true origins lay in the politico-communal estrangement which pre-existed among the Muslims, Sikhs and the Hindus.

2. Causes of the Riots. Since March 1947 the whole country had been in a politically unsettled state, including the Hindu-majority province of U.P., which was being run by a Congress Ministry. The previous August had seen a cycle of communal killings, which spread to East Bengal and North India following the Great Calcutta Killings. Initially, the Punjab had been unaffected, but in the wake of Khizar Tiwana’s resignation on March 2 following a sustained Muslim League campaign against him, violence had broken out in the province as well. Giving an appraisal about the political condition of the Punjab, Jenkins (Governor of Punjab) told Mountbatten that the Province was heading towards a civil war owing to the military preparations of the various communities, particularly the Sikhs. Nehru, also doing the same analysis, said that the situation was very dangerous and disturbing. He believed that it was principally due to a struggle between two fairly equally balanced parties to assume power over the whole province by June 1948. He ruled out any chance of a coalition government, since the parties mistrusted each other so profoundly. Therefore, he suggested an immediate partition of the Punjab with or without the partition of India. Not surprisingly, Hindu and Sikh members of the Central Assembly routed a memorandum through Nehru to the Viceroy requesting the partition of the Punjab the very next day. Similarly, the members of the Punjab Assembly’s Panthic Party also demanded the ‘Division of the Punjab’.

Shiromani Akal Dal, agreeing with the resolutions submitted by the Nationalist Hindus and Sikhs of the Punjab regarding the partition of that province, stated that in fact ‘recent barbarities of the Pakistani Muslims on the Hindus and Sikhs of the Punjab have left no other solution of the communal tangle except the partition of the Punjab.’ Akali Dal demanded that before the transfer of power to the Indian hands in June 1948, the Punjab should be divided into two provinces and a boundary commission should be set up for finalization of the new provincial boundaries. In a combined statement issued by the Hindu and Sikh leaders of the Punjab it was made clear that “In no circumstances are we willing to give the slightest assurance or support to the Muslim League in the formation of Ministry, as we are opposed to Pakistan in any shape or form.”
Master Tara Singh, commenting on the Congress Working Committee’s resolution regarding the partition of the Punjab, said, “The Sikhs will be glad if the Muslim League accept the principle and concede the Sikh demand of forming districts into a separate province in which the Sikhs and Hindus are given as much land as they possess at present. We cannot tolerate a division in which predominantly Sikh districts were partitioned.” And he warned that “If the Muslims think they can break the spirit of the Sikhs and achieve Pakistan by indulging in such wanton communal violence as they have in the past few days done, then they are mistaken.” Resultantly, it brought about communal riots, which, while starting from Lahore and Amritsar, soon engulfed the whole province.

According to Ian Talbot, ‘The announcement that the British would quit India by June 1948 had a disastrous effect on the situation in the Punjab.’ No doubt, the artificial cobweb woven to ensure a semblance of communal harmony by Evan Jenkins could not resist the public pressure and as a result Khizar Hayat Khan Tiwana resigned on March 2, 1947, thereby creating an opportunity for the Muslim League to form a Ministry, not possible otherwise.

The Congress and the Sikh leaders opposed the formation of the ministry and threatened to resist it by force. In fact, the historians mostly agree, that Khizar’s resignation paved the way for widespread disturbances because following this Master Tara Singh started issuing irresponsible statements, and also because once the equilibrium between Muslims and the non-Muslims was broken, a return to a political status quo ante was going to be difficult. No wonder in a few days, communal riots started in Lahore and soon spread to the whole province. Once the wave of communal riots was unleashed, it turned into a vicious cycle of attacks of revenge and counter-revenge between Muslims and non-Muslims. Jenkins thought the only solution to the communal problem in the Punjab was the imposition of section 93, instead of allowing the Muslim League to form a ministry. He ruled out either the formation of the Muslim League ministry or holding fresh elections mainly because he thought that either would lead to a civil war. In fact, the British had indicated that they would quit India by June 1948 but to whom and how their power would be transferred was still unclear. This created a situation of uncertainty in India, particularly in the Punjab. The imposition of the section 93 had caused a stalemate. This political deadlock in the Punjab was not merely a religious conflict. Nor was it a question of minority versus majority. Essentially, it had become a struggle for power in the province of the Punjab because Muslims and non-Muslims were evenly balanced following the creation of the NWFP Province in 1901. Additionally, it had been a demand of the Congress and the Sikhs to divide Punjab into Muslim and non-Muslim areas since 1944.

The three leading communities of Punjab, Muslims, Sikhs and the Hindus, each had militant organizations called the Muslim League National Guards, the Jathas, and the RSS, respectively, backed by political parties and these militant organizations devised and executed ‘dramatic production of riot systems’ especially in the month of August 1947, but were active throughout the period from March onward.

In fact, the genesis of violence lay in the partition of the Indian which caused the partition of the Punjab, a big task even for the British government to manage in those disturbs times. For them, “Every argument for dividing India is an argument for dividing the Punjab, and every argument for keeping the Punjab united is an argument for retaining the unity of India.”

In the June 3 Plan, Lord Mountbatten had given the power to East Punjab to join either the legislature of Pakistan or India as per the demand of the Sikh community. The Sikhs began to prepare themselves to take their homeland by force.” Although the Sikhs’ had started aggressively in March/April 1947, and with the signatures of 18 important Sikh leaders a war fund of Rs. 50 lakhs was announced. Giani Kartar Singh, Master Tara Singh and Baldev Singh were fully involved in these preparations, particularly with the support of the Maharaja of Patiala. Sikhs were not ready to accept the sole dominance of any other group in the Punjab. In view of these aggressive preparations the Governor of the Punjab asked Sardar Soran Singh, the former Minister of Punjab to eliminate this aggressive propaganda. Primarily Sikhs were only preparing for the violence in the province. Initially they had no intentions to make attacks on Muslims. There preparations were only to face the Muslims after the elimination of the British rule.

The Punjab Governor believed that the Sikhs would not prefer to launch any aggressive activity before July 1948. But “… The Governor of Punjab gave clear and persistent warnings to Mountbatten that the Sikhs meant to make trouble if the Governments of Pakistan and India were set up before the lines of demarcation were laid
down by the Award of the Boundary Commission and if that Award were not to their liking…”. So Lord Mountbatten asked Baldev Singh, the Defense Minister of India, that if Sikhs showed any brutality, he would crush them using the army and air force.

As per the Radcliffe Boundary Award (August 17, 1947), West Punjab was awarded about 62,000 square miles with an estimated Muslim population of 15,800,000, while East Punjab comprised of 37000 square miles with a population of 12,600,000, the number of Muslims in East Punjab it was about 4,375,000. The Award deprived Pakistan of many those areas as per which the agreed upon formula of Punjab’s partition should have been awarded to her.

The inclusion of the Sheikhupura district with its Sikh holy shrines, along with the transfer of Multan, Montgomery and Lyallpur districts, where many Sikhs were either large landowner and/or resided in large numbers, part of West Punjab which incited them and they opted to resist by force. Gradually the law and order situation were becoming worse in the Punjab. “It is well known that in Punjab the Sikhs, assisted by the Hindus, are preparing for a communal war. The Maharaja of Patiala is supplying arms, ammunition and explosives and has also sent some of his troops in mufti to Amritsar. The Maharaja of Faridkot has also joined in. Liaqat Ali Khan suggested to the Viceroy to permit the Muslims to be able to own and carry weapons with them for security purposes like the Sikhs, who were given such permission in 1924 but the Viceroy felt that such a permit could cause more violence.

2.1 Outbreak of violence: Punjab had caught up with epidemic of religious violence which had rippled out from Calcutta (August 1946—The Great Killings) to Noakhali (E. Bengal) and Bihar. These episodes polarized opinion in the Punjab. During this period, the Hindu-Sikh unity against the common enemy, the Muslims, was the hallmark of the communal violence. As Paul Brass and Ian Talbot have already observed that the 1947 Punjab violence was ‘politically motivated’, unlike the ‘traditional’ communal religious violence. It had a purpose to carve out control over territory and to displace the concerned minority population whose identity was reduced to that of an ‘essentialised’ religious labeling. Some violence was of course ‘spontaneous’ and motivated by the desire for loot or revenge. But alongside this was the highly organized and politicized violence which had some of the very same characteristics which Brass attributed to post-independence communal conflict in North India.

According to Jenkins the communal violence in the Punjab passed through three stages. The first phase lasted from March 4 to 20. This phase started mainly from Lahore and spread to Amritsar, Rawalpindi, Gurgaon, Multan and Jullundur; it was a phase of normal intensity of communal disturbances except in Multan where 130 non-Muslims were killed in three hours. The second phase lasted from March 21 till May 9, and comprised of minor incidents in many cities, as the communities were preparing for the final battle. The third and final phase, during Mountbatten’s viceroyalty, lasted from May 9 to August 15. In this phase, communities caused maximum scale of damage to one another and to property while ‘exposing a minimum’ expanse of surface to police and army.’

Though the Muslim League’s Civil Disobedience Movement against the Khizar Hayat Khana Tiwana’s government had dented the communal relations, but organized rioting only occurred after the resignation of Khizar Tiwana. British Intelligence reports focus on the activities of the RSS and the Muslim League’s National Guards, but there were numerous other organizations as well. However, Master Tara Singh’s open pronouncements to resort to a religious war against the Muslims, and indulging in strong war preparations not only heightened the already very tense and suspicious nature of communal relations in the Punjab but also produced a mushrooming of private armies.

These organizations were receiving arms and ammunitions from the rulers of the Princely States and from the Frontier (presently ‘KPK’). Moreover, funds were raised by the political parties to support these organizations. These organizations were fully backed by the political parties and when the RSS and the National Guards were banned by the Punjab government on January 24, 1947, agitation started against the Government and it was forced to lift its ban under great pressure. Thereafter, it appears that the British avoided direct confrontation with the political parties and their affiliated organizations. Therefore, they avoided detaining the top leadership of these organizations as well.
Although the whole of Punjab was ablaze with religious frenzy, the main trouble-spots were the cities of Lahore and Amritsar, along with the Gurgaon District in the UP, which remained the most disturbed areas till August 15. The police and army continued to curtail the activities of the rioters.

The rioters had developed the methodology of carrying out “cloak and dagger” attacks, which made the work of the police and the army difficult. However, the imposition of the martial law in Lahore, as suggested by Nehru, was deemed counterproductive. Trouble flared up again in Lahore and Amritsar, and in the Gurgaon district. Arson and stabbing were widespread in the two former areas. The British defended their position by saying that since it was carried out by “cloak and dagger” methods, it was, therefore, very difficult to put down. There is a long list of occurrences of the communal violence in the Punjab from March 29 to August 15, 1947, but it suffices to suggest that studies have already been carried out on these events by Ian Talbot et al. It further suffices to state that these communal outbreaks all over Punjab was leading up to independence, both were set the pattern and paved the way for the greater bloodbath which followed independence.

The violence had complex motivations, including frenzy and lust for revenge, looting and political motives for asserting a community’s domination. With respect to the latter case, the outbreaks were not just spontaneous, but were in fact well-organized occurrences in which the RSS, Muslim League National Guards and the Sikh Jathas played a big role. These organizations were trained and well-prepared to take part in what Jenkins termed ‘the war of succession in the Punjab.’ They had accumulated arms, given training to the people and instigated their communities to get ready for the coming showdown.

Not only the British officials believed that these attacks were planned, but Nehru also had the same opinion. Nehru expressed his horror and disgust at the riots in the Punjab, Bengal and elsewhere, and said that these were riots were not isolated acts, but was planned attacks instead and held the administration responsible for not stopping them.

As a matter of fact the province of the Punjab was passing through a critical situation and thereby posed a challenge for the administration which was diametrically different from the 1942 Congress uprising. At that time the authorities were faced with concentrated attacks on Government employees and government property, but in 1947 the challenge was to deal with the widespread fighting between the three main religious communities. What then was the British response, Lord Mountbatten’s in particular, to the deteriorating situation in the Punjab?

3. Conclusion. The Punjab was going headlong towards civil war, owing to the lofty demands and the mindset of the communities to achieve their respective, narrow goals. There were para-military organizations, jathas, and groups which were making preparations and at times committing violence. The Governor and his administration, civil administration and police were alerted to nip violence in the bud, but some of the foreign employees of the Punjab government were losing heart and had already decided to leave India as early as possible because of the growing turmoil. In fact, the communal violence had already started in the Punjab and continued to grow as the date for the partition came closer. He could only check terrorist activities of the organized groups with the help of the police and the army. But not only the politicians had been divided on the communal lines, but signs of division were visible in the Punjab police as well, and the army also displayed signs of division on communal lines during the last days of the British rule in India. Mountbatten was, however, successful in checking the organized activities of paramilitary organizations, but could not succeed in disbanding them in advance of the British departure. In its wake, with local government structures in disarray and partisan in character, they were able to step up their efforts in pursuit of political goals. This forms the background to the intense violence and the mass migrations, it gave rise to, of the immediate post-partition period.

The leaders and political parties remained complacent at the beginning about the growing communal bloodshed which resulted in the religious frenzy among the communities. Therefore, arresting the Sikh leadership or announcement of the Radcliffe Award before August 15, would not have served the purpose as the stage for the war of succession and the communal disturbances had already been set by the irresponsible statements, fantastic demands, complacent attitude of the Indian leaders, coupled with the extremely divisive and hostile communal mood of the people, police and even the army. Contrary to the view of his critics, despite limited resources, Mountbatten was able to curtail communal bloodshed in the Punjab to manageable proportions in the March to 15 August 1947 period, and therefore, was happy with Jenkins and his faithful band of officials. Following the
transfer of power a new set of circumstances prevailed, which enabled the plans of, for example, the Sikh rulers and the Akalis to ‘ethnically cleanse’ Muslims from East Punjab to come to fruition. Similarly, the Muslim League National Guards and criminal groups were given free rein to loot, pillage and drive out Hindus and Sikhs from West Punjab, although some of these activities were mitigated by the Punjab Boundary Force which Mountbatten had established. In a nutshell, though the British government may have been complacent to curb the riots in the beginning, but the disturbances in the Punjab turned into ‘ethnic cleansing’, ‘holocaust’ or genocide, because of the inherent undercurrents of aggressive communal feelings and thus it was almost impossible for the State machinery to curb them altogether.

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RELATING INDIVIDUAL DEMOGRAPHICS, WORK-FAMILY CONFLICT AND DECISION MAKING STYLES OF FACULTY MEMBERS IN HIGHER EDUCATION SECTOR OF PAKISTAN

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ABSTRACT. This study examines the work-family conflict and decision making styles of faculty members in higher education sector of Pakistan. This describes the impact of work-family conflict on decision making styles of faculty members. Study also highlighted the role of individual demographics in predicting the work-family conflict and decision making styles. Three hypotheses are generated for the present research work including; (i), work-family conflict has significant impact on the decision making styles of faculty members; (ii), there is significant difference of work-family conflict of faculty members based on gender, marital status and university sector; and, (iii) there are significant differences of preferred decision making styles of faculty members based on gender, marital status and university sector. Questionnaire method is utilized to collect data from the targeted sample. A total of 489 questionnaires were distributed from which 352 received back with a response rate of 72%. Simple linear regression analysis is utilized to test hypotheses H₁ while t-test analysis, Mann Whitney U test, ANOVA and Kruskal-Wallis test are used to study hypotheses H₂ and H₃. Results of the regression analysis for hypothesis H₁ suggest that work-family conflict negatively predicts rational and intuitive decision making styles and positively predicts avoidant and spontaneous decision making styles while no association found with dependent decision making style. Comparative analysis based on individual demographics for hypotheses H₂ and H₃ describes that gender; marital status and sector of employment of faculty members influence their work-family conflict and decision making styles. All of the hypotheses were partially supported based on the current research findings. This research work describes both academic and professional issues and its findings can be comprehensively utilized for the betterment of higher education sector of Pakistan.

Keywords: Demographics, Work-Family Conflict, Decision Making Styles, Higher Education

1. Introduction. Education has got its importance for individual development in this present age. The core function of the higher education institutions around the world, is to develop the people mentally and spiritually so, they become useful resource for the country in terms of country development and prosperity. In case of Pakistan, there are about 150’s higher education institutions (www.hec.gov.pk) which are departing quality education to their customers for the
sole purpose of country development. However, the rapid change in economic development during last few years has led the organizations towards several challenges. Every organization is tried to meet these challenges for sustainable development. To meet upcoming challenges and changing world scenario, organizations lead towards the change in organizational structures and culture. Due to which, work setups also changes such as downsizing, acquisitions, mergers and technological changes.

In the similar pattern, changing in work setup lead the employees towards complex jobs to perform as they are more involved in their jobs compared to last decades. The demanding jobs, long working hours, struggling job tasks, work pressure and use of rapidly changing technology make it difficult for working individual to maintain a balance between work and family life. Creating a balance with family and job responsibilities is a dilemma for the employees and almost impossible due to tempestuous work environment, and rapid economic development across the world which resulted in high demanding jobs and long working hours. This state of affairs leads towards a greatest challenge i.e., work-family conflict for human resource management. Work-family conflict can be defined as incompatibility between work and family life or as push and pull between family and work responsibilities.

In the span of life, a working individual perform dual type of role which include role from family as being father / mother, sibling, friend, spouse etc., and role from work such as being employer, worker etc. In performing these roles, individuals have to take many routine decisions as well as strategic decisions which have long lasting impact on their role performances. However, a quality decision making by an individual leads him / her towards satisfied life while poor decision making in performing work or non-work roles may result in certain incompatibilities such as work-family conflict.

2. Literature Review

2.1. Work-Family Conflict (WFC). Conflict occurs in all life activities and becoming devastating part of them. Conflict then is an inconsistency that could occur between people or entities like groups and organizations or may exist between man and man, man and woman, man and his own self, and man and social groups, nature etc. Amongst this work-family conflict results from an imbalance between work and family life. More than 75 years ago, many employees in the US were only conscious about their working hours, however since World War II, largely because of labor unions, employees became more conscious of working fewer hours and better pays (Schor, 1991). While during the last few years employees are demanding even fewer work hours because they want to get balance their work and family life (Akintayo, 2010). Working overtime incurs cost on family life (Cole, 2004) or if the work is demanding, it may result in negative family outcomes and vice versa (Adebola, 2005). Both Americans (Frone, Russel & Cooper, 1992) and European (Kinnunen & Maunao, 1998) employed parent’s experience 40% to even 78% work-family conflict in certain aspects.

In the literature, work-family conflict is defined in different ways and one can categorizes them in two group of definitions i.e., (i) Work-family conflict can be defined as a source of stress that shows a lack of overall fit between work and family life (Frone, Russell, & Barnes, 1996; Frone et al., 1992; Frone, Yardley, & Markel, 1997); and, (ii) work-family conflict is a form of inter-role conflict in which role pressures from the work and family spheres are jointly inconsistent in some ways (Flippo, 2005; Kahn, Wolfe, Quinn, Snoek & Rosenthal, 1964; Greenhaus & Beutell, 1985).

In the last few years, a great deal of attention has been given to learn more about work-family conflict and its influence on various outcomes (Carlson & Perrewe, 1999). Netermeyer et al. (1996) define work-family conflict by identifying the three forms of it as a form of inter-role conflict in which time devoted to job, general demands of job and strain produced by the job hinder with family related responsibilities. Most common typologies classify work-family conflict in three forms which includes (a) time; (b) behavior; and, (c) strain based work-family conflict (Greenhaus & Beutell, 1985; Stephens & Sommer, 1996; Carlson, 1999).
As described earlier, during last few years a great pact of attention according to Carlson and Perrewe (1999) has been given to study work-family conflict and its sway on various outcomes. Work-family conflict is reflected as a potential source of stress that has negative impact on behavior and well-being (Geurts, Kompier, Roxburgh & Houtman, 2003). A cross sectional study by Kinnunen and Mauno (1998) identified that work-family conflict associated with various negative work and stress related outcomes. Researchers such as Amstad, Meier, Fasel, Elfering, and Semmer (2011); Bellavia and Frone (2004) categorize the consequences of work-family conflict in three ways i.e., (a) family related; (b) work related; and, (c) domain unspecific outcomes. Both directions i.e., WIF and FIW of work-family conflict are linked with family related outcomes such as family satisfaction (Cardenas, Major, & Bernas, 2004), family related stress (Swanson & Power, 1999), decrease in family well-being (Burke, 1988), marital satisfaction (Voydanoff, 2005). Work related outcomes such as job satisfaction (Burke, 1988; Frone et al., 1992; Perrew, Hochwarter, & Kiewitz, 1999), organization commitment (Aryee, Srinivas, & Tan, 2005), absenteeism (Kirkmeyer & Cohen, 1999), intention to quit (Shaffer, Harrison, Gilley, & Luk, 2001), turnover (Burke, 1988, Frone et al., 1992) work-related strain (Netemeyer, Alejandro, & Boles, 2004), occupational burnout (Peeters, Montgomery, Bakker, & Schaufeli, 2005, Frone et al., 1992) and organizational citizenship behavior (Netemeyer, Maxham & Pullig, 2005). Lastly, domain unspecific outcomes of work-family conflict also found to be related with both direction of work-family conflict such as psychological strain (Kelloway, Gottlieb & Barham, 1999), life satisfaction (Frone et al., 1992; Greenhaus, Collins, & Shaw, 2003), depression (Vinokur, Pierce & Buck, 1999), somatic complaints and abuse (Peeters, Jonge, Janssen & Linden, 2004; Grzywacz & Bass, 2003). However, little attention has been given to study work-family conflict in relation to individual or group decision making behavior for comprehensive understanding that is; how work-family conflicts can affect individual / group decision making behaviors.

In addition to this, researchers claim that other demographical characteristics of an individual such as gender (Parasurman & Simmers, 2001; Loerch, Russell, & Rush, 1989; Gutek, Searle, & Klepa, 1991; Wallace, 1999; Behson, 2002; Nielson, Carlson, & Lankau, 2001) and marital status (Akintayo, 2010; Rehman & Waheed, 2012) also have an effect on work-family conflict. Though, catholic work-family conflict reduces the quality of employees’ lives and their relationships with other family members (MacDermid, 2005).

2.2. Work-Family Conflict and Decision Making. Individuals and couples often develop habits for how they will respond to work-family conflict that arises in everyday life (Medved, 2004). However, not every decision to settle work-family conflict is covered by these routine decisions. When an individual establish an ongoing and complex nature of work-family conflict related decision making and the influence of these decisions (Medved, 2004; Shumate & Fulk, 2004), researchers may provide value to explore these decisions made by individual on that particular incidents of work-family conflict. Past researches such as Greenhaus and Powell (2003); Netemeyer, Boles, and McMurrian (1996) have focused on the phenomenon of ongoing work-family conflict and the decision processes through which people manage work-family conflict incidents (Greenhaus & Powell, 2006) while slight attention has been given to after work-family conflict impact on individual decision making processes. Although, many researchers for example, Carlson and Perrewe (1999); Greenhaus and Parasuraman (1994); Thompson, Beauvais and Lyness (1999) argue that ongoing support from role sender diminishes the level of work-family conflict but little is known about how the work-family conflict afterwards affects individual decision making.

Basically, term decision making is repeatedly utilized in career development and behavioral studies than decision making literature (Scott & Bruce, 1995). Keegan (1984) applied this term in to management as a psychological contribution towards decision making. Decision making have been defined in terms of individual phenomena of selection to achieve desired state of affairs (Shull, Delbeq & Cummings, 1970) or a process of choosing among alternatives (Miller & byrners, 2001; Gupta & Khanna, 2004). In management perspective, Decision making have been studied at three levels i.e., (a) individual for example, Tversky and Kahneman (1974) used individual level approach by determining the effect of personal cognitive biases and heuristics on one’s choices; (b) group for example, Schweiger, Sandberg and Ragan (1986) take group approaches towards decision making; and, (c) organizational level for example, Miles and Snow (1978) typology of defenders, prospectors, analyzers and reactors recommend that it is
appropriate for organizational level decision making. However, it is generally discussed that individual decision making is most important to study because its individuals behaviors which leads towards effective group level decision making and ultimately, towards successful organizational level decision making. Harren (1979) and Driver (1979) argue that individual model of defining, interpreting and reacting to decisional tasks denotes his/her decision making styles (DMS).

In relation to decision making literature, several studies acknowledged the factors that influence decision making behavior of an individual. Rowe and Boulgarides (1992) identified that individual personal needs such as security, support, recognition and awards have an impact on decision making process of an individual. Furthermore, researchers for instance, Ali (1989); Ali and Al-Shakis (1985); England, Dhirga and Agarwal (1974); Flowes, Hughes, Myers and Myers (1975) and Goodale (1973) summarize that national origin, type of industry, organization type and size, education, socioeconomic status and management level influence decision making style of an individual. Schwella and Ballard (1996) classify decision making on the basis of organizational sector and claims that decision making in public sector is highly complex and unpredictable in nature as compared to private sector organizations while Schmidt and Posner (1982) argue that public sector workers are more inclined towards feelings and impression rather than reasoning and enquiry. Nature of task also influence decision making style as Spice and Sadler (2005) determine that choice of decision making depends upon the type of decision; people used intuitive decision making in familiar task while rational decision making in unfamiliar tasks. Many researchers found that personal factors such as cultural background (Brew, Hesketh & Taylor, 2001; Yi & Park’s, 2003; Mau, 2000; Weber & Hsee, 2000), Gender difference (Brenner & Bromer, 1981; Loden, 1985; Habermitoglu & Yildirim, 2008), Aging (Kim, Hasher & Zacks, 2007; Chen & Sun’s, 2003), experience (Bergstrand, 2001; Callan & Proctor, 2000; Muchinsky, 2007) and emotional status (Spice and Sadler, 2005) influence decision making of a faculty members. However, much remains to be done to get comprehensive understanding of the relationship between individual’s decision making behavior and role of emotions in this regard.

3. Methodology

3.1 Hypotheses: Based on the review of literature above, this study has following hypotheses:

H₁: Work-family conflict has significant impact on the decision making styles of faculty members.

H₂: There is significant difference of work-family conflict of faculty members based on gender, marital status and university sector.

H₃: There are significant differences of preferred decision making styles of faculty members based on gender, marital status and university sector.

3.2 Sample: Information regarding participants (Table 1) denotes that seventy-two (72.2%) percent of the respondents are male while rest i.e., 27.8 percent are the female faculty members. Since the country like Pakistan, there is little strength of females which are working in higher education sector. Similarly, they consist of 47.4 percent of single status, 50.9 percent married and 1.7 percent of others status including divorced, widows and separated faculty members.

Respondent’s data further identify that there are 47.2 percent lectures, 30.7 percent assistant professor, 13.9 percent of associate professors and 8.2 percent are serving as full professors including 76.7 percent from public sector universities and remaining 23.3 percent are associated with private sector universities. Comparatively, a smaller amount of participants from the private sector universities are due to less number of private sector universities chartered by federal government in Pakistan.
Table 1: Demographical Characteristics of the Respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>254</td>
<td>72.2</td>
</tr>
<tr>
<td>Female</td>
<td>98</td>
<td>27.8</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>167</td>
<td>47.4</td>
</tr>
<tr>
<td>Married</td>
<td>179</td>
<td>50.9</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>1.7</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
</tr>
<tr>
<td>Job Position</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer</td>
<td>166</td>
<td>47.2</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>108</td>
<td>30.7</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>49</td>
<td>13.9</td>
</tr>
<tr>
<td>Professor</td>
<td>29</td>
<td>8.2</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
</tr>
<tr>
<td>University Sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>270</td>
<td>76.7</td>
</tr>
<tr>
<td>Private</td>
<td>82</td>
<td>23.3</td>
</tr>
<tr>
<td>Total</td>
<td>352</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Sample Size = 352

3.3 Measurements

3.3.1 Work-Family Conflict Scale. This is an 18 items scale developed by Carlson (2000) which measures work-family conflict construct. Results of the reliability tests show that work-family conflict scale has alpha reliability of 0.770. Each item is measured on 5 point Likert rating scale with 1 representing strongly disagree to 5 representing strongly agree.

3.3.2 Decision Making Styles Scale. This is a 25 items adapted scale originally developed by Scott and Bruce (1995) which measures the individual decision making styles. Decision making styles scale have alpha reliability of 0.595 for rational; 0.619 for intuitive decision making style; 0.574 for dependent decision making styles; 0.611 for avoidant decision making style and 0.610 for spontaneous decision making style. Five items are utilized to measure each decision style that is rational, intuitive, dependent, avoidant and spontaneous decision making style. All the responses are measured using 5 point Likert scale with 1 representing strongly disagree to 5 denoting strongly agree with the given item.

3.3.3 Individual Demographics Scale. In order to collect respondent’s personal characteristics and to make necessary comparisons, this study also measures the respondent’s gender, marital status, job position and sector of employment based on the standard discrete scales.

3.4 Procedures. All respondents were approached through university administration and appointments were taken from the faculty members. After concisely explaining the nature of the study, researcher solicited individual’s voluntary consent prior to handing them the packet of scales to complete. Most of the faculty members respond within couple of hours after the questionnaires distributed to them while others were collected back within three to four days from the day they were distributed. Respondents who declined not became part of the sample. All the questionnaires were self-administered and completed at respondent’s leisure. Issues pertaining to scales items were addressed and necessary clarification were given to the respondents.
4. Results

4.1 WFC and Decision Making Styles. To study the impact of work-family conflict on decision making styles (H1) of the faculty members, simple linear regression model is utilized. The results of the regression analyses are depicted in Table 2.

4.1.1 WFC and rational decision making style. Regression equation is calculated by taking work-family conflict as predictor variable and rational decision making style as criterion variable. Results of the regression analysis suggest that 4.2% variance in rational decision making style is explained by work-family conflict as $R^2 = .042$, $F (1, 351) = 16.048$. It is determined that work-family conflict has negative impact on rational decision making style of an individual. The regression equation 1 for this relationship suggest that the rational decision making style will decrease by 0.082 with per unit increment in WFC.

\[
\text{Rational DMS} = 19.353 - 0.082 \text{ WFC} \quad (1)
\]

4.1.2 WFC and intuitive decision making style. In the same, results of the regression analysis calculated by taking work-family conflict as predictor and intuitive decision making style as criterion variable suggest that work-family conflict negatively predicts intuitive decision making style as $\beta = -.049$, $t (351), p = .005$. Results of the analysis further reflects that WFC caused significant variance of 1.9% in dependent decision making style as $R^2 = .019$, $F (1, 351) = 9.148$, $p = .005$ and regression equation for intuitive decision making style are depicted in equation 2.

\[
\text{Intuitive DMS} = 14.018 - 0.049 \text{ WFC} \quad (2)
\]

4.1.3 WFC and dependent decision making style. Regression analysis is calculated by considering work-family conflict as independent and dependent decision making style as dependent variable. Results of the analysis indicates that work-family conflict has no influence on dependent decision making style as $\beta = -.006$, $t (351), p = .624$ as depicted in Table 2.

4.1.4 WFC and avoidant decision making style. Taking the same predictor and criterion variables for the regression analysis, equation is calculated for avoidant decision making style as shown in equation 3.

\[
\text{Avoidant DMS} = 8.775 + 0.142 \text{ WFC} \quad (3)
\]

Regression equation suggest that work-family conflict significantly and positively predicts avoidant decision making style such as one unit increase in WFC caused 14.2% increase in avoidant decision making style as $\beta = .142$, $t (351)$, $p = .000$. Statistical data for the regression analysis further reflects that a total of 14.4% variance in avoidant decision making style is explained by WFC as $R^2 = .152$, $F (1, 351) = 64.101$, $p = .000$.

4.1.5 WFC and spontaneous decision making style. Further to WFC as predictor variable for decision making styles, it is determined that work-family conflict also positively predicts spontaneous decision making style. Regression equation for this decision making style is given in equation 4.

\[
\text{Spontaneous DMS} = 11.825 + 0.121 \text{ WFC} \quad (4)
\]

From the equation, it is concluded that work-family conflict caused 12.1% increase in spontaneous decision making style with per unit change in WFC as $\beta = .121$, $t (351)$, $p = .000$. A total of 10.3% variance in spontaneous decision making styles is explained by WFC as $R^2 = .103$, $F (1, 351) = 41.153$, $p = .000$. 

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Table 2: Regression Analysis of Work-Family Conflict and Decision Making Styles

<table>
<thead>
<tr>
<th>Model</th>
<th>B</th>
<th>SE</th>
<th>B</th>
<th>T</th>
<th>F</th>
<th>R²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>19.353</td>
<td>1.214</td>
<td></td>
<td>15.937</td>
<td>16.408</td>
<td>.042</td>
<td>.000</td>
</tr>
<tr>
<td>Rational</td>
<td>-.082</td>
<td>.020</td>
<td>-.212</td>
<td>4.051</td>
<td>.019</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>Intuitive</td>
<td>14.018</td>
<td>1.040</td>
<td>13.475</td>
<td>7.948</td>
<td>.019</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>Dependent</td>
<td>8.886</td>
<td>.754</td>
<td>11.791</td>
<td>.241</td>
<td>-.002</td>
<td>.624</td>
<td></td>
</tr>
<tr>
<td>Avoidant</td>
<td>.142</td>
<td>.018</td>
<td>.393</td>
<td>6.415</td>
<td>.152</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Spontaneous</td>
<td>11.825</td>
<td>1.317</td>
<td>10.404</td>
<td>41.153</td>
<td>.103</td>
<td>.000</td>
<td></td>
</tr>
</tbody>
</table>

Significance level is at 0.05, Sample Size = 352

4.2 WFC and Demographical Characteristics. The hypothesis H2 entails that there is significant differences of work-family conflict of faculty members exist based on gender, marital status and university sector. It is clear from Tables 3, that gender of an individual has no impact on the level of work-family conflict of faculty members in higher education sector of Pakistan as p > 0.05.

Table 3: T-test Analysis of Work-Family Conflict based on Gender Differences

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-Family</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conflict</td>
<td>Male</td>
<td>254</td>
<td>59.5039</td>
<td>.092</td>
<td>.927</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>98</td>
<td>59.4082</td>
<td>9.45400</td>
<td></td>
</tr>
</tbody>
</table>

Significance level is at 0.05, Sample Size = 352

Table 4: Mann-Whitney Test of Decision Making Styles based on Gender Differences

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS</td>
<td>Male</td>
<td>254</td>
<td>171.93</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>98</td>
<td>188.35</td>
</tr>
<tr>
<td>Intuitive</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS</td>
<td>Male</td>
<td>254</td>
<td>169.57</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>98</td>
<td>194.46</td>
</tr>
<tr>
<td>Dependent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS</td>
<td>Male</td>
<td>254</td>
<td>176.61</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>98</td>
<td>176.22</td>
</tr>
<tr>
<td>Avoidant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS</td>
<td>Male</td>
<td>254</td>
<td>176.30</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>98</td>
<td>174.43</td>
</tr>
<tr>
<td>Spontaneous</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DMS</td>
<td>Male</td>
<td>254</td>
<td>181.26</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>98</td>
<td>164.15</td>
</tr>
</tbody>
</table>

DMS = Decision making style, Significance level is at 0.05, Sample Size = 352

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It is further clear from Tables 5, that there is no significant differences exist among single male (M = 58.48, SD = 8.65), married male (M = 60.25, SD = 8.66) and other male (M = 63.83, SD = 10.26) status faculty members based on the level of work-family conflict as F = 2.567, p = .078.

**Table 5: One-way ANOVA Analysis of Work-Family Conflict based on Marital Status**

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-Family Conflict</td>
<td>Single</td>
<td>167</td>
<td>58.4850</td>
<td>8.6538</td>
<td>2.567</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>179</td>
<td>60.2570</td>
<td>8.6609</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>63.8333</td>
<td>10.2648</td>
<td></td>
</tr>
</tbody>
</table>

*Significance level is at 0.05, Sample Size = 352*

**Table 6: Kruskal-Wallis Test of Decision Making Styles based on Marital Status**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Marital Status</th>
<th>N</th>
<th>Mean</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational DMS</td>
<td>Single</td>
<td>167</td>
<td>187.29</td>
<td>.034</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>179</td>
<td>164.34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>238.92</td>
<td></td>
</tr>
<tr>
<td>Intuitive DMS</td>
<td>Single</td>
<td>167</td>
<td>184.54</td>
<td>.195</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>179</td>
<td>167.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>214.67</td>
<td></td>
</tr>
<tr>
<td>Dependent DMS</td>
<td>Single</td>
<td>167</td>
<td>178.46</td>
<td>.449</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>179</td>
<td>173.08</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>223.92</td>
<td></td>
</tr>
<tr>
<td>Avoidant DMS</td>
<td>Single</td>
<td>167</td>
<td>164.62</td>
<td>.107</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>179</td>
<td>186.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>198.92</td>
<td></td>
</tr>
<tr>
<td>Spontaneous DMS</td>
<td>Single</td>
<td>167</td>
<td>162.13</td>
<td>.034</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>179</td>
<td>188.63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>214.67</td>
<td></td>
</tr>
</tbody>
</table>

*DMS = Decision making style, Significance level is at 0.05, Sample Size = 352*

Result of the analysis shows that there is statistically significant difference prevails between male and female faculty members as shown in Tables 7. Public sector employees (M = 60.46, SD = 8.51) faces high level of work-family conflict as compared to private sector faculty members (M = 56.23, SD = 8.64) as t = 3.926, p = .000. The hypothesis H2 is partially supported by the findings of the tests of differences.

**Table 7: T-test Analysis of Work-Family Conflict based on University Sector**

<table>
<thead>
<tr>
<th>University Sector</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work-Family Conflict</td>
<td>Public</td>
<td>270</td>
<td>60.4630</td>
<td>8.5183</td>
<td>3.926</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>82</td>
<td>56.2317</td>
<td>8.6442</td>
<td></td>
</tr>
</tbody>
</table>

*Significance level is at 0.05, Sample Size = 352*
Table 8: Mann-Whitney Test of Decision Making Styles based on University Sector

<table>
<thead>
<tr>
<th>Variables</th>
<th>University Sector</th>
<th>N</th>
<th>Mean</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rational DMS</td>
<td>Public</td>
<td>270</td>
<td>166.50</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>82</td>
<td>209.41</td>
<td></td>
</tr>
<tr>
<td>Intuitive DMS</td>
<td>Public</td>
<td>270</td>
<td>167.10</td>
<td>.002</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>82</td>
<td>207.44</td>
<td></td>
</tr>
<tr>
<td>Dependent DMS</td>
<td>Public</td>
<td>270</td>
<td>167.83</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>82</td>
<td>205.04</td>
<td></td>
</tr>
<tr>
<td>Avoidant DMS</td>
<td>Public</td>
<td>270</td>
<td>189.06</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>82</td>
<td>135.16</td>
<td></td>
</tr>
<tr>
<td>Spontaneous DMS</td>
<td>Public</td>
<td>270</td>
<td>190.40</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Private</td>
<td>82</td>
<td>130.73</td>
<td></td>
</tr>
</tbody>
</table>

DMS = Decision making style, Significance level is at 0.05, Sample Size = 352

4.3 DMS and Demographical Characteristics. The hypothesis H3 entails that there is significant differences exist among decision making styles of faculty members based on gender, marital status and university sector Mann-Whitney test is utilized to study the degree of differences of faculty decision making styles based on gender and university sector while Kruskal-Wallis test is employed to study the differences based on marital status. It is clear from Table 4, that no significant differences based on gender differences exist among rational, dependent, avoidant and spontaneous decision making styles of members of faculty. Analysis further shows that female faculty members utilize more intuitive decision making style as compared to male faculty members as significance level is less than 0.05 for this test.

With regards to marital status, It is determined that there is significant difference exist among single, married and other status faculty members based on rational (p = 0.34) and spontaneous (p = .034) decision making styles while no differences exist based on intuitive (p = .195), dependent (p = .449) and avoidant (p = .107) decision making styles. It is concluded from Table 6, that other status faculty members employ more rational and spontaneous decision making style other than married and single status faculty members.

From Table 8, it is analyzed that faculty members working in private sector universities are more frequently use rational, intuitive and dependent decision making styles as compared to public sector employees. Results shows that avoidant and spontaneous decision making styles are more frequently used styles in public sector faculty members as compared to private sector faculty members. The findings of the differences tests suggest that hypothesis H3 is partially supported.

5. Discussion: This research work is proposed to study the impact of work-family conflict on individual’s decision asking styles in higher education sector of Pakistan. In addition, individual’s demographical information is utilizes to study the potential differences based on the study variables including work-family conflict, decision making styles. At first, no gender differences are examined based on work-family conflict in general as t (351) = .092, p = .927. Findings of the current study are not supported by the previous researcher such as Parasurman & Simmers (2000); Loerch, Russell, and Rush (1989); Wallace (1999); Behson (2002) and Nielsen, Carlson, and Lankau (2001) who argues that work-family conflict has significant differences based on gender. In Pakistan, there is system of joint families and people love to share their work within their family members therefore, there is less chances for either of the gender to experience highly intense work-family conflict as other members of the family provide support to each other. With regards to decision making styles, this study investigate that female (M = 194.46) faculty members used high level of intuitive decision making style as compared to males (M = 169.57) though none of the difference are found between male and female members of faculty based on rational (p =.173), dependent (p =.974), avoidant (p =.811), and; spontaneous decision making style (p = .155). It is clear from the given literature that very low amount
of research have been done in the past to study the demographical differences based on decision making styles. Although, this study signifies that intuitive decision making style is the more prevailing decision style in females as compared to male individuals though further research studies are needed to validate the findings of the current research work.

To study the potential difference based on marital status, ANOVA analysis and Kruskal-Wallis test is employed according to the appropriateness of the data. It is analyzed that no potential differences among single, married and others status individuals are found based on work-family conflict as $F(1, 351) = 2.567$, $p = .078$. This study partially supported the findings made by (Akintayo, 2010; Rehman & Waheed, 2012) that work-family conflict is influenced by marital status of an individual. Considering decision making styles to diagnose the degree of differences among single, married and others status faculty members, It is concluded that others status faculty members are highly employed rational decision making styles than their counter parts, and afterward single status are on second that utilize high rational decision making styles as compared to married faculty members. It is further found that others status individuals also make use of spontaneous decision making style than single and married individuals while the married individuals employed spontaneous decision making style in greater frequency as compared to single status individuals. However, this study reveals no significant differences of marital status based on intuitive, dependent and avoidant decision making styles.

In order to highlight the potential differences based on sector of employment, t-test and Mann Whitney U test is utilized. It is determined that public sector faculty members experiences high level of work-family conflict ($M = 60.46$, $SD = 8.51$) as compared to private sector faculty members. Findings of the present research contradicts with the findings made by Rehman and Waheed (2012) who argued that no difference is exist between public and private sector faculty members. Though the findings made by these researchers was based on smaller sample size which may be in result of no significant difference based on sector of employment. With regards to decision making styles, faculty members employed in private sector universities are utilize high level of rational ($M = 209.41$), intuitive ($M = 207.44$) and dependent ($M = 205.04$) decision making styles than the rational ($M = 166.50$), intuitive ($M = 167.10$)and dependent ($M = 167.83$) decision making style employed by public sector employees. In private sector universities of Pakistan, there is high level implementation of rules and regulations as compared to public sector and members of faculty in private sector have to follow them with minimal chances of errors. Therefore, faculty members employed in private sector universities have to utilized positive styles of decision making including rational, intuitive and dependent decision making style to get minimal errors in decision making. In addition, it is further identified that public sector individuals employed high level of avoidant ($M = 189.06$) and spontaneous ($M = 190.45$) decision making style than their counterparts.

6. Conclusions and Recommendations: It can be concluded from the present research work that work-family conflict is an important determinant of faculty decision making behaviors working in higher education sector of Pakistan. This highlights that work-family conflict is a negative predictor of individual decision making behavior as it inversely predict rational and intuitive decision making styles. The study findings also clarifies that work-family conflict results in the high usage of avoidant and spontaneous decision making styles by an individual which ultimately declines the quality of decision making. This signifies the importance of faculty training needs regarding the effective management of individual’s conflicts.. In addition, this study also highlights the importance of individual’s demographics including gender, marital status and sector of employment in predicting work-family conflict and decision making behavior therefore, the university administration should consider the findings of the present study during the phase of policy making for different groups of faculty members. This is identified that individual conflicts more specifically the work-family conflict effects faculty decision making processes which ultimately effects their teaching quality. Based on this, the findings of this study can be useful to improve the teaching quality of faculty members by assessing and providing necessary trainings programs which ultimately increases the overall quality of higher education institutions in Pakistan.
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A NOVEL STEMMING APPROACH FOR URDU LANGUAGE

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ABSTRACT. Stemming is one of the most important pre-processing steps in the process of Text Mining which boosts the performance of information retrieval (IR) system. It is also equally important for many other interesting research areas like natural language processing (NLP), text categorization etc. The main objective of stemming is to bring many grammatical word forms, for example parts of speech, gender, tense etc. to their stem or root form. Due to the rich morphological structure of Urdu language, it is a challenging task to develop an Urdu stemmer for information retrieval system. In this paper, we have proposed an effective rule-based stemming method for Urdu language to cope with the challenges of Urdu morphological structure. Our proposed Urdu stemmer generate the stem of Urdu words as well as borrowed words (words from other languages such as Arabic, Persian, Turkish, etc). The proposed methodology is compared with the existing Urdu stemming technique such as Light Weight Stemmer for Urdu Language to demonstrate the dominance of proposed Urdu stemmer as compared to the competitor.

Keywords: Urdu, Stemmer, Prefix, Postfix.

1. Introduction. Urdu is a national language of Pakistan and is also the state language of India. It is an Indo-Aryan language. Urdu language is made up of with the combination of different foreign languages such that Arabic, Persian, Turkish, etc. These borrowed languages themselves are complex morphological languages. Resultantly, Urdu is a morphologically rich language with complexity inherited from the parent languages. Urdu is robust in both inflectional and derivational morphology [1]. Morphology deals with inner structure of words [2]. The major units of morphology are morphemes. Term morpheme is a smallest word unit that has a semantic interpretation and cannot be decomposed further [3]. Morphemes can be free morphemes or bound morphemes [4]. Morphemes that exist freely are called free morphemes such as flower is free morpheme. On the other hand, morphemes that are made as a result of combining different morphemes are called bound morphemes i.e. in flowers, ‘s’ is a bound morpheme. To boost the performance of IR system, morphological analysis of Urdu language is very important. This important is based on the fact that IR system works on the root/stem form of a word rather than its inflected and derived form. The improvement in the performance of IR system is possible with the use of stemmer. Stemmer is an algorithm that produced the root form of the word. For example, an English stemmer should reduce the English words like, liking, liked, and likes to their stem “Like”. Likewise Urdu stemmer should restrict the Urdu words خبر (news), خبر (news), to Urdu stem word خبر (news).

In this paper, we introduce a novel stemming approach for Urdu text. Generic Urdu stemming rules are proposed, which have the ability to generate stem of any Urdu word. The rest of the paper is organized as
follows: section 2 describes a brief overview of the related work. In section 3 proposed Urdu stemming method is described. Experiments are given in section 4, to demonstrate the effectiveness of proposed approach. Finally the section 5 gives the conclusion of the paper.

2. Background and Related Work. There are three approaches [5] that are commonly used for stemming such as affix stripping, table lookup, and statistical methods. Affix stripping approach [6] is used to obtain the stem of the word by removing the attached prefix and postfix from the word. In table lookup approach [6], each word and its associated stem is stored in structured table. This approach requires a lot of storage space for its implementation and its table needs to be updated manually for each new word. On the other side, in statistical approach [7] statistical analysis are performed based on corpus size.

J.B. Lovin’s [8] proposed first English stemmer that is based on rule-based strategy. In this stemmer, Lovin’s defined 260 rules for stemming English word. This stemmer produces the stem of English words in two phases. In the first phase, it removes the maximum matching suffix defined in suffix table and recodes the word to produce valid stem. Spelling exclusions are handled in second stage. In 1980, Porter [9, 10] introduced another stemming method that is also based on rule-based strategy. This stemming technique removes the suffixes form words with the help of suffix list and some conditions are enforced to determine suffix to be separated. Porter stemmer has five steps and within each step, rules are applied until one of them passes the conditions. If a rule is recognized, the suffix is removed consequently, and the next step is executed . At the fifth step, recoding is performed and resultant stem is returned. Porter reduced the Lovin’s rules upto 60.

Variety of effective stemming methods for Arabic language has been proposed. Khoja et al [11] proposed a rule based stemmer for Arabic language which is known as superior root-based stemmer. This stemmer truncates prefix, suffix and infix and then uses pattern for matching to generate root. It makes use of several linguistic data files such as punctuation characters, definite articles, list of all diacritic characters and 168 stop words in order to improve stemming accuracy results of proposed Arabic stemming technique. To stem Arabic text, Thabet, [12] introduced a light stemming approach. It is applied on classical Arabic in Quran to generate stem of Arabic words. This method reads each surah from text files as an input and after replacing all the uppercase letters with the lowercase letters, it generates a list of words for each Surah. This stemmer produced 96.6% accuracy for prefix and 97% for postfix stemming.

Regarding to Persian stemming, M. Tashakori [13] proposed first Persian stemmer called Bon, based on rule-based strategy. It is an iterative longest matching algorithm. Bon truncates longest possible morpheme from the word and this process is repeated until no more character left to truncate. After removing the matched prefix and suffix from Persian words, the achieved stem may be incorrect. Bon uses a re-coding technique to produce the correct stem of the processed Persian word. By using this Persian stemming method, the recall is improved by 40%. Another Persian stemmer [14] is developed by Mokhtaripour which is also based on rule-based approach. This stemmer works without the help of dictionary. In order to handle the borrowed words such as Arabic, English etc., this stemming method proposed certain rules. By enforcing these rules, stemming performance of this work is considerably improved. This stemmer is used in a query system and 46% accuracy of the query system was improved by using this proposed Persian stemming technique.

As far as Urdu language is concerned only two methods [1, 15] for Urdu stemming have been proposed i.e. Assas-band and Light weight Urdu stemmer. These stemmers can only handle prefix and postfix present in Urdu words. To remove these prefix and postfix from Urdu words, these techniques [1, 15] use very large lists of rules and exception lists. These are also highly dependent on these large lists. The large size of rules list and exception lists considerably affect the efficiency of existing Urdu stemming methods. As Urdu language is a union of other foreign languages i.e. Arabic, Persian, Hindi, Turkish, etc. proposed Urdu stemmers are not competent to produce the stem of loan words i.e. Arabic, Persian, Hindi, Turkish, etc.

3. Proposed Urdu Stemmer. In this section, we describe our proposed Urdu stemming approach to stem Urdu text. This stemming method is based on rule based strategy and used affix stripping technique to generate stem of word. The overview of proposed Urdu stemmer is presented in figure 1.
To support the proposed Urdu stemming technique, we have developed various rules and exception lists which are as follow:

3.1. **Prefix Rules List.** Prefix is a smallest language unit that is attached to the start of the word. The prefix may be single or two characters long and sometimes it is a morpheme. In order to produce prefix rule, various grammar books and Urdu literature are consulted to get a list of 60 prefixes rules. The size of this list is much smaller as compared to that generated in earlier work [15]. Examples of prefix rules are ﺑ، ﺑ، ﺑ، ﺑ.

3.2. **Postfix Rules List.** Postfix is a smallest language unit that is attached to the end of the word. The postfix is normally one to two characters long and sometimes it is a morpheme. After consulting various grammar books and Urdu literature, we presented a list of 140 suffixes rules. The size of this list is significantly smaller than the size of list as presented by [15]. Samples of these suffixes are ﺯ، ﺯ، ﺯ.

3.3. **Prefix Global Exception List (PrGEL).** The correct identification of prefixes is very important because a wrong interpretation of prefix leads to poor stemming resulting in a loss of significant information. In Urdu morphology, there exist some words having prefixes as they matched with one of the rules. But in reality, they are an integral part of some word. Removing such prefix will result in destruction of such words. For instance, when we remove prefix “ﺎ” from the word “ﺎ” (arm), then it returns stem “ز”, which is incorrect. As these rules handle vast majority of valid prefixes, it is not logical to remove such rules to avoid destruction of some words. Such words are therefore handled as an exceptional case by putting them in exception lists. In
our proposed work, we have developed a prefix global exception list of about 5000 words. This exception list of prefixes is significantly smaller in size as compared to that generated by [15].

3.4. **Postfix Global Exception List (PoGEL).** Exception list of postfix stemming is critical to avoid destruction of certain words due to application of postfix rules. There are many words in Urdu morphology that appears to have a postfix. If we truncate this postfix from the word, its incorrect form will be produced. For example, in the word “کر یس” (chair) when suffix “یس” is stripped then it generates stem کر، which is invalid. Therefore to make sure the originality of these words, they must be treated as an exceptional case. A postfix global exception list of about 6000 words has been created to support this stemming work. The size of this list is considerably smaller than the size of list used by [15].

3.5. **Add Character Lists (ACLs).** Sometime, the truncation of postfix from Urdu words results in incomplete stem. For example, after applying the suffix rules the word will become which is incorrect. Therefore, a character Hey (ا) will be added at the end of word to make it a meaningful word place (ہ ے جگ). For our proposed stemmer, we have developed 8 separate lists w.r.t. characters (ا، ت، ر، س، ن، و، ی) to attach at the end of such incomplete stems.

3.6. **Non Informative Word / Stop Word List.** Non informative words are those that occur frequently and do not provide valuable information to understand the sentence and its type. In order to clean the dataset form non informative words, a static list of 200 words is generated by consulting Urdu language experts, grammar books and Urdu literature. Some example words are نہیں، کیا، ہیں.

3.7. **Stem Word Dictionary.** Stem dictionary contains a list of words followed by their actual stem. This dictionary is essential to validate the accuracy of stemming algorithm. After studying various grammar books and Urdu literature, we developed a stem word dictionary of about 10000 words to verify the accuracy of proposed stemming method. Some examples of stem words are حکم، حسر، نظر.

3.8. **Proposed Urdu Stemmer Algorithm.** The proposed algorithm is based on longest-match theory which states that when more than one stemming rule is matched for a given word, then apply that rule which removes maximum number of characters from the word to reduce it to its potential stem. To achieve this, we need to find all possible rule matches rather than applying the rule immediately matched. Our proposed algorithm compiles all possible affixes once and arranged them based on their length. Affix with maximum length is removed from the word. The algorithm is comprised of following steps:

1) **Input a word to get its stem.**
2) **Search the word in stop word list.**
   a) Filter out the word if it is a stop word such as if its match is found from the non-informative word list. Ignore that word and select the next one from the word sequence.
   b) If word does not exist in non-informative word list, then go to step 3.
3) **Search the word in Prefix Global Exception (PrGEL) List.**
   a) If word exists in PrGEL then go to step 4.
   b) If word is not found in PrGEL, then apply prefix removing rules and remove the maximum matched prefix from the word and go to step 4.
4) **Search the word in Postfix Global Exception (PoGEL) List.**
   a) If word found in PoGEL, mark the processed word as stem and go to step 5.
   b) If word does not exist in PoGEL, then apply the postfix removing rules.
   c) If any one of the postfix removing rule is matched, then remove the maximum matched suffix from the word and search the processed word in Add Character Lists (ACLs).
   d) If processed word found in any ACLs, then attach the respective character to the end of processed word. Mark the processed word as stem and go to step 5.
e) If processed word does not found in any ACLs, mark the processed word as stem and go to step 5.

f) If none of the postfix rule is applied then mark the word as stem and go to step 5.

5) Repeat steps 1-4 for all words.

4. Experimental Studies. To evaluate the performance of our proposed Urdu stemming methodology, four self generated Urdu headline news corpora have been used. Brief overview of these Urdu headline news corpora is given in TABLE I.

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Corpora</th>
<th>Dataset Description</th>
<th>Total Words</th>
<th>Unique Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Corpus 1</td>
<td>An Urdu headline news corpus. It contains the news of two different categories i.e. politics and weather</td>
<td>12500</td>
<td>5070</td>
</tr>
<tr>
<td>2</td>
<td>Corpus 2</td>
<td>It is also an Urdu headline news corpus. It comprises of two different news classes i.e. sports and terrorist.</td>
<td>7250</td>
<td>3080</td>
</tr>
<tr>
<td>3</td>
<td>Corpus 3</td>
<td>It consists of unique Urdu word. It has developed by using various grammar books and Urdu dictionaries.</td>
<td>24238</td>
<td>24238</td>
</tr>
<tr>
<td>4</td>
<td>Corpus 4</td>
<td>A comprehensive headline news corpus obtained by combining corpus 1, corpus 2 and corpus 3.</td>
<td>43988</td>
<td>32388</td>
</tr>
</tbody>
</table>

4.1. Experiment 1: Evaluation of Proposed Urdu Stemmer. The purpose of this experiment is to evaluate the stemming accuracy of proposed Urdu stemmer on variety of Urdu datasets. We evaluated the proposed Urdu stemmer on the unique words of Urdu headline news corpora. After removing the less informative words in a pre-processing step 32000 unique words are extracted. Proposed prefix and postfix rules as discussed in section 3.1 and section 3.2 are applied on 32000 unique words. The performance of the proposed prefix and postfix rules is measured using the number of words that matched prefix and postfix rules. We also report the number of True Positives (correctly stemmed words) and False Positives (incorrectly stemmed words) achieved using application of these rules on different corpora. Accuracy of our proposed stemming rules is then computed as the ratio of the True Positives and the number of words that matched stemming rules. The prefix stemming accuracy of proposed Urdu stemmer is presented in TABLE II. It is observed that the proposed prefixes rules are showing good accuracy results i.e. 85.64%, 87.91%, 83.59%, 85.28% respectively using all the corpora.

The postfix stemming accuracy results are achieved by using proposed postfix rules are given in TABLE III. As obvious from the stemming results given in Table III that; proposed postfix rules give the best stemming results with the significant accuracies i.e. 91.05%, 90.54%, 88.22%, and 88.67% respectively.

<table>
<thead>
<tr>
<th>Corpus</th>
<th>Total Words Tested</th>
<th>Number of Words that Matched Prefix Rules</th>
<th>True Positive</th>
<th>False Positive</th>
<th>Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus 1</td>
<td>4819</td>
<td>195</td>
<td>167</td>
<td>28</td>
<td>85.64%</td>
</tr>
<tr>
<td>Corpus 2</td>
<td>2943</td>
<td>182</td>
<td>160</td>
<td>22</td>
<td>87.91%</td>
</tr>
<tr>
<td>Corpus 3</td>
<td>24238</td>
<td>323</td>
<td>270</td>
<td>53</td>
<td>83.59%</td>
</tr>
</tbody>
</table>
### TABLE III: STEMMING ACCURACY RESULTS OF PROPOSED POSTFIX RULES

<table>
<thead>
<tr>
<th>Corpora</th>
<th>Total Words Tested</th>
<th>Number of Words that Matched Postfix Rules</th>
<th>True Positive</th>
<th>False Positive</th>
<th>Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus 1</td>
<td>4819</td>
<td>2280</td>
<td>2076</td>
<td>204</td>
<td>91.05%</td>
</tr>
<tr>
<td>Corpus 2</td>
<td>2943</td>
<td>1460</td>
<td>1322</td>
<td>138</td>
<td>90.54%</td>
</tr>
<tr>
<td>Corpus 3</td>
<td>24238</td>
<td>18023</td>
<td>15900</td>
<td>2123</td>
<td>88.22%</td>
</tr>
<tr>
<td>Corpus 4</td>
<td>32000</td>
<td>21763</td>
<td>19298</td>
<td>2465</td>
<td>88.67%</td>
</tr>
</tbody>
</table>

4.2. **Experiment 2: Comparison of Proposed Urdu stemmer with Competitor.** The aim to conduct this experiment is to compare the stemming accuracy of proposed Urdu stemmer with existing Light Weight Urdu Stemmer. The experiment is performed on our internally generated Urdu headline news datasets as described in TABLE I. It also aims to demonstrate that our proposed Urdu stemming approach is generic for any kind of Urdu corpora. The competitor rules are applied on 32000 unique Urdu words. The accuracy results of competitor approach for prefix stemming and postfix stemming are presented in TABLE IV and TABLE V. It is observed that competitor performance is significantly affected by the incorrect identification of prefixes and postfixes. The word generated by competitive stemmer is not a valid word because their rules break down a lot of compound words. They have also generated erroneous prefix and postfix rules that are the part of words.

In Urdu vocabulary, there are large numbers of compound words e.g. [ٴبپتل] (Flower pots), [ٴیاشابی] (Irrigation) etc. Compound words do not have any stem because these are formed with the combination of other words. These words have their own significant meanings. The breaking down of these compound words will definitely causes the wrong stemming and the loss of useful information. For example word [ٴیاشابی] (Irrigation) has a unique significant meaning if prefix [ٴی] is removed then the meaning of this word will totally destroy. There are lots of compound words i.e. دلفروش (blindly follower), etc that have been destroyed by competitor rules. Competitor approach is also not able to handle borrowed words effectively. The comparison of proposed stemming approach with the competitor is given in TABLE VI and TABLE VII. The comparison of stemming accuracies of proposed stemming approach with the competitor demonstrates that proposed stemming approach gives best results as compared to competitor.

### TABLE IV: STEMMING ACCURACY RESULTS OF COMPETITOR PREFIX RULES

<table>
<thead>
<tr>
<th>Corpora</th>
<th>Total Words Tested</th>
<th>Number of Words that Matched Prefix Rules</th>
<th>True Positive</th>
<th>False Positive</th>
<th>Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus 1</td>
<td>4819</td>
<td>920</td>
<td>154</td>
<td>766</td>
<td>16.73%</td>
</tr>
<tr>
<td>Corpus 2</td>
<td>2943</td>
<td>413</td>
<td>57</td>
<td>356</td>
<td>13.80%</td>
</tr>
<tr>
<td>Corpus 3</td>
<td>24238</td>
<td>2238</td>
<td>288</td>
<td>1950</td>
<td>12.86%</td>
</tr>
<tr>
<td>Corpus 4</td>
<td>32000</td>
<td>3571</td>
<td>499</td>
<td>3072</td>
<td>13.97%</td>
</tr>
</tbody>
</table>
TABLE V: STEMMING ACCURACY RESULTS OF COMPETITOR POSTFIX RULES

<table>
<thead>
<tr>
<th>Corpora</th>
<th>Total Words Tested</th>
<th>Number of Words that Matched Postfix Rules</th>
<th>True Positive</th>
<th>False Positive</th>
<th>Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus 1</td>
<td>4819</td>
<td>2760</td>
<td>1520</td>
<td>1240</td>
<td>55.07%</td>
</tr>
<tr>
<td>Corpus 2</td>
<td>2943</td>
<td>1835</td>
<td>840</td>
<td>995</td>
<td>45.77%</td>
</tr>
<tr>
<td>Corpus 3</td>
<td>24238</td>
<td>20023</td>
<td>7990</td>
<td>12033</td>
<td>39.90%</td>
</tr>
<tr>
<td>Corpus 4</td>
<td>32000</td>
<td>24618</td>
<td>10350</td>
<td>14268</td>
<td>42.04%</td>
</tr>
</tbody>
</table>

5. **Conclusion.** This paper presents a novel stemming approach for Urdu text. In proposed Urdu stemmer, we have developed generic prefix and postfix rules that can be applied on any kind of Urdu datasets. These rules are significantly smaller in size as compared to competitor. For experimental analysis, it is observed that our proposed stemming approach gives superior accuracy results as compared to competitor i.e. A Light Weight Urdu Stemmer. Our approach is also capable to handle compound words and loan words (words borrowed from other languages i.e. Arabic, Turkish, Persian, Hindi, etc).

TABLE VI: COMPARATIVE ACCURACY RESULTS OF COMPETITOR AND PROPOSED PREFIX RULES

<table>
<thead>
<tr>
<th>Corpora</th>
<th>Total Words Tested</th>
<th>Competitor Prefix Rules Accuracy %</th>
<th>Proposed Prefix Rules Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus 1</td>
<td>4819</td>
<td>16.73%</td>
<td>85.64%</td>
</tr>
<tr>
<td>Corpus 2</td>
<td>2943</td>
<td>13.80%</td>
<td>87.91%</td>
</tr>
<tr>
<td>Corpus 3</td>
<td>24238</td>
<td>12.86%</td>
<td>83.59%</td>
</tr>
<tr>
<td>Corpus 4</td>
<td>32000</td>
<td>13.97%</td>
<td>85.28%</td>
</tr>
</tbody>
</table>

TABLE VII: COMPARATIVE ACCURACY RESULTS OF COMPETITOR AND PROPOSED POSTFIX RULES

<table>
<thead>
<tr>
<th>Corpora</th>
<th>Total Words Tested</th>
<th>Competitor Postfix Rules Accuracy %</th>
<th>Proposed Postfix Rules Accuracy %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corpus 1</td>
<td>4819</td>
<td>55.07%</td>
<td>91.05%</td>
</tr>
<tr>
<td>Corpus 2</td>
<td>2943</td>
<td>45.77%</td>
<td>90.54%</td>
</tr>
<tr>
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RESPECT, RIGHTS & RANK: A DREAM OF EVE'S DAUGHTER (FROM PAST TO PRESENT, IN THE LIGHT OF RENOWNED RELIGIONS)

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ABSTRACT. In the days of ignorance (i.e. before entering of Islam), women had not specific rights of equality to men. They were in the worst condition, and treated like animals. The gender bias was at its extreme, and, it prevailed to such an extent that this creature (woman) was not even accepted as a human being. It was hypothesised and believed that a woman has basically been created only for serving and appeasing a man. This inequity had actually plagued the Arab societies for a long time. Such an obscure system was first questioned, after Islam dawned. The rights and privileges of woman were first introduced, she was exemplified in the remaining world, consequently. The Holy Quran justifies her honour and status of egalitarianism, clearly. It becomes testified that the man and the woman are equal before Allah, and her margins of rights became recognised. It is Islam, in fact, which substantiated the integrity of woman's rights in different values such as mother, sister, daughter and a wife. But, within the Muslim world, specifically Pakistan, the situation is worse if one considers the respect and rank of woman, unfortunately. This article is an approach to comprehend the status of women in the renowned religions with a special study of Islam, and also an existing situation in the Muslim society.

Keywords: Days of Ignorance, Islam, Rights, Woman.

1. Introduction: We observe the conflict of the status of women in the world. This dilemma appears in their rank, status and rights. Different societies and religions treat to level the ground off and to balance these issues, in distinct ways. We recognise this quandary in the earlier periods, by reviewing history. This is an unresolved question, for various societies as yet. We put efforts to draw a comparative profile here, for few religions and a couple of societies such as the Arabian society in the days of ignorance, in few renowned religions, in Islam and the Muslim society.

1.1. The status of woman in the days of ignorance: The Arabian society had been involved in a sombre calamity of hurting women, in the days of ignorance. She was treated like a slave or a property, and her existence was considered, humiliating. She was unbearable because of the fear of dishonour. There was no concept of getting women's personal assent for anything, including wedding, in those days. Her status was no
more than an entity which is discarded after use. The society had a great dearth of the rules to protect her rights such as independence, owning property and inheritance, for example, and also such a nasty behaviour extends to consider her a part of pillage, in the times of war, literature explores. We can simply sum up with the words that her plight was at extreme.

We summarise ‘the status of women during the age of ignorance’ as follows, by reviewing the literature.

The killing of the infant girls was a common practice amongst the Arabs [1]. Such loathsome practice of killing was considered a symbol of honour on the occasion of the birth of a baby child. Such offensive deeds represent the despicable mentality of those people about women. She was a creature, no more than an animal, for them. She was supposed to be a senseless and a needless entity, just a mean of bearing children, serving man, and to bring comfort, consequently, compelling her to prostitution and beating to get satisfied their lust, was in usual practice. In that way, this weak and delicate creature was forced not only to satisfy the lust of the husband, but also to earn for him through nefarious trafficking. The birth of a baby child was deemed disgraceful, and the born of a daughter would have made the Arabs sad, therefore [2]. She was killed by burying alive without any feeling of affection, kindness and love of a father, soon after she got delivered. Allah describes this wicked practice in the Holy Quran: “When news is brought to one of them, of the birth of a female (child) his face becomes dark, and he is full of wrath. He hides himself from the folk because of the evil of that which is announced to him. (Asking himself) will he keeping it in disgrace, or bury it (alive) beneath the dust? Now surely evil is their judgment” [3]. The Arabs were dreaded for a couple of reasons, which were affixed behind this evil act. One belongs to fright of burden economically, if she gets populated. However, another was the fear of disgrace that could cause by the imprisonment of the female instead of males by the hostile tribe(s). There had been many examples, one of which is, “Quis Bin Asim”. He was leading the tribe of “Tamim”. He had buried his eight daughters, alive. One other example is stated below in the own words of a man who had told himself, about his evil action towards his daughter at the age of ignorance, to the Prophet Muhammad (SAW). “I had a little daughter who loved me very much. Whenever I called her, she came running happily towards me. One day I called her, as usual she came running and then followed me. I took her to a nearby well and pushed her in. At that moment she cried, “Father, father”. The Prophet of Islam (SAW) was shocked to hear it, and his eyes were filled with tears [4]. In the Holy Quran, Allah says: “When the female (infant), buried alive, is questioned for what sin she was slain” [5]. Allah will ask this question from that girl on the Day of Judgement, that, for what reason or crime, she was banished to slay via burying her living. What sin made her to that mistreatment? This illustrates the moral degradation and ethical debasement of the Arabs, in the age of ignorance. The pagan Arab was accustomed to bury their daughters alive, for one another fear, of her marriage to someone if becomes son-in-law. Although slaying daughters was a common practice, but this malevolent action didn’t plague all the tribes. It was dependent upon the culture and the laws of those tribes, where females were living. The situation was different, therefore. This gender was underestimated in the lower classes, however. She was treated as a slave, a commodity and a prostitute. She had been exploited physically, socially and even economically by men without pity, and remained unable to enjoy any right. There was no limitation for marriages, no margin in the number of wives for a man consequently, more than ten wives at a time, for example. Meanwhile a woman had no option of choosing a man as her husband. This decision was believed to be made by either of her father or brother. However, she was sometimes sold by her relatives (father or brother) for wealth or an advantage [6]. It is stated in Abu Dawood that if the Arabs kept their daughters alive, they deprived them of all their rights. They married as many women as they liked. When Wahal Asadi (RAA) embraced Islam, he had ten wives [7]. An example is Gheelan Saqfee who had ten wives at the time of his embracing to Islam [8]. Afsar Bano states in her words as follows: Moreover, there were no limitations on divorce, man was free to divorce his wives any time and any number of times and reunite at will [9]. Now, if we think out the status of a married woman and her life in the age of ignorance, we find that wife was actually a servant to her husband, and had to serve him all through her life. The inheritors of her husband had complete right over her, after her husband’s death. They had authority either to get marry with her, step-mother, for example, or got her married to someone else, they choose. They were also free to stop the widow marrying someone, specifically if she owned some wealth or property [10]. There was another degrading act commonly practiced with a widow. She was induced to spend a year of her life in a dark and an unventilated small hut out of her house, soon after her husband’s death. There was no permission to leave the hut or take a bath and, or, change the clothes during that period. It was like a prison. She had to face an inhuman act by the folk, after her confinement. She had to move in another
agonising stage, after the completion of the first excruciating phase. She was ordered to rub her body against the body of an animal, after people threw camel dung into her lap, and compelled to walk round the entire village in the same condition and in such a way that to throw camel dung on her left and her right. Now, she was thinking and considered to have completed her Iddat (waiting period) [11].

If we look into the situation of an Arab woman in the days of ignorance, at home within the circle of blood relations, it reflects that she was inferior. There was no consideration of valuing her in the inheritance. She had no right to get inherited, a mother from her son, a daughter from her father, and also a wife from her husband, for example. The Arabs were used to leave their inheritance only to those who defended the tribe by carrying sword [12]. Contrary to that history declares the honour of women in some tribes, and shows that she was deferential to such a level that she could break the wars either internal or external. We recognise that women were treated well, in the tribe of Quraish. The gratis woman was asked for marriage, no without her prior consent, and her decision was considered to be respectable. She was able to do own trade. “Khadija Bint Khuwailid” is an example, the first wife of the prophet “Muhammad (SAW)”. She was not only rich, but, also, had a reverential status among her tribe. We find another example of “Hind Bint Otba”, Sufyan’s wife. She had high regard and nobility in her tribe, before conversion to Islam [13].

Consiely, we can conclude that although few tribes were well-mannered in their treatment with women, but an overall situation in the Arab was miserable, in the age of ignorance. She was debased and the moral degradation of the society was on peak.

1.2. The status of woman in the other religions: We report on the status and rank, other renowned religions, present to women, and strive to draw an outline considering narrations and citations.

A famous non-Muslim scholar, Gastauli Ben, illustrates her place in the Greek society as an inferior creature. He describes her status unhonourable. The concept of respect, regard and affection has been missed among Greeks, and she has been treated as an inhuman source to bear warriors only. She was slayed in chastisement if her delivery could not be fruitful, to yield a normal child who was supposed to be a warrior. The debasement of the society was very high upto the stage of such an immoral act that man’s interest retained in case she deliver a normal and likely warrior child, and was lent to produce a child of another person with his seed (race), subsequently. The Greeks were not respectful to their women and didn’t value them, regardless of their most civilised age excluding the time of circumambulation. According to the following quote of the chapter “Sermon” of the Old Testament: “He who loves God must shun woman. I found one out of one thousand men whom God loves, but there is none among the women of the world whom God loves in Rome. The husband’s attitude towards his wife was cruel. She enjoyed no share in the social activities. He had every right to claim even her life. The same was the position was the Greeks”.

If we have a look at the Torah, we find verses 5-10 of chapter 25 describing that, “If two brothers live together and one of them dies childless, the wife of the deceased should not be married to a stranger, but her husband’s brother should have sexual intercourse with her in privacy, treating her to be his wife and fulfill the right of being her husband’s brother at the child which will be born to her would be called the child of his deceased brother. Thus his name will not be effaced from Israel. If he refuses to act as her husband, his brother’s wife should draw out shoe from her feet and spit on his face before the judges saying: “who does not care for his brother’s home, deserves such treatment. “His name would become notorious among Israel as being the house of one where a shoe has been drawn out”. The above mentioned verses are self-explanatory and we find them enough to conclude the status of women with respect to rank and honour, in this religion. It becomes recognised that her specific rights for a relation has been demolished.

We find some strange and degrading statements about position of women, which are difficult to accept if one considers ethical standards for a human. We observe via exploring further the other religions, such as the Bible mentions, “Woman is bitterer than death”, and the Hindu Law states, “lack, storm, death, hell, poison, poisonous snakes, none is more harmful than woman”, Tartaulian elucidates the Christian view in the following words: “She is a gate through which Satan enters. She allured man to the forbidden tree. She is a breaker of Divine law. She spoiled man, the image of God”, A well-known Christian leader articulates her as: “An inevitable evil, an hallucination, a pleasant hardship, a domestic trouble, a destructed charm, a decorated
scourge”[14]. Following quote is taken from the Bible: “Now the snake was the most cunning animal that the Lord God had made. The snake asked the woman, “Did God really tell you not to eat the fruit from any tree in the garden?” “we may eat the fruit of any tree in the garden” the woman answered, “except the tree in the middle of it if we do, we will die”. The snake replied, “That’s not true, you will not die when you eat it you will be like God and know what is good and what is bad. So she took some of the fruit and ate it. Then she gave some to her husband and he also ate it. God asked, “Did you eat the fruit that I told you not to eat?” The man answered, “The woman you put here with me gave me the fruit and I ate it”. And He said to the woman, “I will increase your trouble in pregnancy and your pain in giving birth. In spite of this, You will still have desire of your husband, yet you will be subject to him” [15].

All of above mentioned elucidation reflects the oppressed status of women in all around the world without any definition of rights to rank her as a human being. It remains a common thought, she has to live a life, the man chooses for her, without considering her separate entity as a human. She has been portrayed as an evil creature for depriving a man from goodness and has been disliked, and the man still needs her for breeding, conversely. She has been introduced no more than a machine to yield the product according to the choice of man, healthy infant (boy), for example. She has been chastised or would have to chastise either to slay or via some other means, otherwise. A painful ground from birth to death appears for her [16]. A sensible human being can never appreciate such unjust circumstances for another soul, specifically when the individual is naturally delicate. This is the only religion, Islam that introduces her as a being and places her on the equality of man. She enjoys respect and rights, and becomes known as an honourable creature [17].

1.3. The status of woman in Islam: Islam is such a religion which introduces the rights of women, in an integrated and a comprehensive way. It measures all her needs, makes a grade of ease and peace for her and protects her, all through her life, in all ages. She enjoys every aspect of life within the confined boundaries and ties of relationships with a vast offer of rights. Her entity becomes esteemed, and her value gets prominence. She becomes equal to the man either in rights and or, responsibilities. She gets inheritance, finds opportunities of education as a basic right, own property with an entitlement of construction and vending, gets social rights, rights of equality and freedom irrespective of race, caste, residence and empowered to consent in contracts specifically marriage. The statement of Muhammad (SAW) fourteen centuries earlier, evinces an obligation of obtaining knowledge for all Muslims, and also its implementation, history proclaims. Hazarat Khadija (RA) and Hazarat Ayesha (RA), the wives of Muhammad (SAW), were the women with great wealth and great knowledge, respectively, for example. We recognise from the review of the history, that the Muslim women accompanied Muslim armies in battles, looked after the wounded people, prepared supplies and served the combatant, which reflects upon the equal rights of women to men to aid humanity. We see four different categories of women in salutation of her respect i.e., mother, daughter, sister and wife.

1.3.1. Status and rights as a mother: A true, unadulterated and sincere relation among the human beings is the relationship of the parents with their child. This is a genuine relationship that is clean of any contamination. Parents are the greatest gift of the Almighty Allah for all the beings, and are the blessings of Allah upon the humankind. The example of affection and the sentiments they pay, the care and kindness they present, and the troubles and difficulties they bear, to grow up, their child, is unique in the world and can be seen in this genuine relationship only to the optimum. The Holy Prophet Muhammad (pbut) has stated: “Allah (Glory and Greatness be to Him) will not speak to three kinds of people on the day of judgement. Neither will He have mercy upon them, nor will He purify their sins. There is for them a horrible chastisement. The three types of people are the believers in destiny, the drunkards and those who disobeyed their parents” [18]. Allah (Glory and Greatness be to Him) says in Hadith al-Qudsi: “I swear by My Glory and power that if a (child who is) disobedient to his parents comes to me with all the good deeds of all the prophets, I will not accept them from him” [19]. This is what Islam teaches! Islam instructs to treat father and mother politely with special care and love, and introduces the way of obedience and reverence. A behaviour of love, kindness, honour and obedience to them, is highly appreciated in Islam. Allah says in Surah Al-Isra: “Thy Lord hath decreed that ye worship none but Him. And that ye be kind to parents. When one or both of them attain old age in thy life, say not to them a word of contempt, nor repel them, but address them in terms of honour” [20]. And then says: “Be good to your parents” [21]. If we further head in deep we find that the mother has been valued in right over father. We find a verse in Surah Al-Nisa: “Respect the Womb that bore you” [22].
recognise the grade and esteem of the mother, Ahmed and Ibn-e-Majah narrated, “Paradise lies at the feet of the mother” [23]. One can now visualise the status of mother in Islam. She has highly been ranked and her obedience is of utter significance to get the Paradise. Abu Huraira narrated, “The Prophet was once asked who amongst all the people was the most worthy of his respect and compassion. The Prophet (pbuh) replied “your mother”; the man wanted to know who should be next, the Prophet (pbuh) said “your mother”. The man enquired, who next?, the Prophet (pbuh) replied for the third time “your mother”, again the man asked who next? The Prophet (pbuh) replied “your father” [24]. In the same way we find that the Prophet (SAW) said: “I enjoin man about his mother, I enjoin man about his mother, I enjoin man about his mother”[25]. We further get awareness from the narration by Hazrat Aisha while she enquired: “O Messenger of God, who has the greatest right on woman?” The Prophet Muhammad (pbuh) replied, “Her husband (has the greatest right on her)”. She then asked, “Who has the greatest right on man?” The Prophet (pbuh) replied, “His mother (has the greatest right on him)”. There is an unusual thinking within a scarce number of people that owing to the strong status of the father, the mother as she is delicate in nature, the Prophet Muhammad (SAW) instructed to obey and honour her greatest over him. It may or may not be right, but one can identify this distinction in honour for a number of reasons. This is actually the ‘mother’ who endures all the onuses, troubles and pains of pregnancy for nine long months. She is the only one who puts her life in danger and deliver the child, after severe pain. She feeds an infant from her blood, provides a caring ambiance in long nights and leads towards growth. Although, father also plays his role in developing the child and making comforts of life, but he can never put his life in danger to bear the child with all the efforts of nine months. Mother deserves more favour and concern than father, therefore, “Hazrat Aisha states that Hazrat Harsa bin Noman behaved with his mother in the most respectable, pleasant and polite manner. Once Muhammad (SAW) said: “I saw heaven in my dream where I heard somebody reciting the Quran. I asked whose voice was that. I was told that it was the voice of Hazrat Harsa bin Noman. Then the Prophet (SAW) said that is the reward of fair treatment to mother” [26].

We can conclude from the above account that Islam places mother in a highly respectable and honourable position.

1.3.2. Status and rights as a daughter and a sister:The sweetness and lovability of the respectful relationship of a man with a woman as a daughter and a sister, had soon been recognised, after Islam dawned. A careful behaviour in these relationships can place one in the paradise, it became illuminated, a daughter and a sister is not disgusting but worth. They have rights over everything a man has, and the margins of the rights have been defined in Islam. This is the Almighty Allah Who has created man and woman, and this is all He will either to bestow someone a daughter or a son. No one is allowed to slay his child specifically female of thinking them burden or humiliating. It’s been stated in the Holy Quran, “To God belongs the dominion of the heavens and the earth. He creates what He wills (and plans). He bestows (children) male or female according to His will (and plan) or He bestows both males and females and He leaves barren whom He will for He is full of knowledge and power” [27].

Islam advises for an appropriate sustenance and nourishment of daughter(s). The daughter(s) and sister(s) have been ranked to such a great honour that, her proper growth can protect from the fire of the Hell and lead to the Heaven, conveyed as follows: “Hazrat Aisha relates that Prophet Muhammad (peace be upon him) said: Whoever is in charge of (put to test by) three daughters and treats them generously, then they will act as shield for him from the (Hell) fire”. “Hazrat Itha bin Aamir relates that Prophet Muhammad (saw) said: Whoever has three daughters, and bears with the miseries in their connection, feeds and clothes them with the earnings of his labour, they will become a curtain on the fire of hell, for him”. “Hazrat Abu Sayeed relates one more Aihadit that Prophet Muhammad (SAW) said: Whoever has three daughters or three sisters or two daughters or two sisters and he adopts a good company with them and fears Allah about them, He has (place for him in) heaven”. “Hazrat Anas relates that Prophet Muhammad (SAW) said: If anyone cares for two girls till they grow up, he and I will come on the day of resurrection thus, and he joined his fingers”. “Hazrat Abu Hurairah relates that Prophet Muhammad (pbuh) said: Whoever has three daughters and he bears with the difficulties and financial problems, in connection with them, Allah will make him enter Heaven, for courtesy towards them”. Abu Hurairah reports that a man inquired if he has two daughters (and bears with the difficulties in connection with them). The Prophet (SAW) replied, “Even if he has two daughters (Allah will bless him with Heaven)”. A man asked, if he has one? The Prophet (SAW) said (He will) even if he has one” [28]. “Hazrat Abdullah bin Abbas relates a similar Hadiths that prophet Muhammad (SAW) said: If anyone takes care of
three girls or the like number of sisters, training them and showing kindness to them till God enriches them, God will guarantee him paradise” [29].

A door opens to identify and realise that, a generous conduct with daughters and sisters, is their prime right, and shows them respectful and valuable to the man and or, parents. A daughter should be nourished similarly to a son with an identical behaviour of kindness and affection towards them either in education or marriage, and inheritance considering the teachings of Islam [30]. “Hazrat Abu Sayeed Khudri relates that Prophet Muhammad (SAW) said: Whoever nourishes three daughters, educates and trains them, gets them married (and afterwards) offers a gentle behaviour to them, for him there is heaven” [31]. Such a compassionate attitude towards daughters and sisters of one’s own family, guides him to venerate other’s women, which helps eliminate the degradation of the society.

1.3.3. Status and rights as a wife: Islam gives honour, independence and identity to women. She enjoys her value as a self-determining entity. Marriage or Nikkah neither resolves her personality to her husband’s personality nor renovate her position to become a servant. Marriage if ties her to some newer responsibilities, she gets the owner of few fresh rights, meanwhile. She can neither refuse her responsibilities nor she can be deprived of her rights. Allah inserted love in the relationship of husband and wife, and it depends solely on adoring, understanding and respecting each other. A natural love and attraction rest in this contract [32]. Allah says in the Holy Quran: “And among His signs is this, that He created for you mates from among yourselves, that you may dwell in tranquility with them, and He has put love and mercy between your hearts, verily in that are signs for those who reflect” [33]. It can now be realised that the marriage retains happiness and peace, it neither holds man at the position to become a master, nor allow him to deal her woman as a slave. Islam settled boundaries, established separate rights of husband and wife, and also taught to head with respect, love and sincerity towards each other. An abhorrence towards the life partner has strongly been disliked. Hazrat Muawiya Qushairi once inquired to the Prophet (peace be upon him), about the rights of the wife. The Prophet answered: “That you should give her food when you eat, clothe her when you clothe yourself, not strike her on the face and not revile her or turn her out of the house (if separation becomes necessary) but live separately within the house itself (temporarily)”. In other words we learn, “Feed her what you feed yourself with, her clothing should be of the same standard as yours, do not beat or abuse and rebuke her” [34].

It becomes highlighted that a husband has been obliged to maintain similar living standards for his woman, as for him. He has been instructed to treat her caringly, politely and honourably, and has been forbidden to beat or abuse her. A husband has been advised to live separately within the house, instead of eradicating her from the house, if a wife ill-treats her husband, and if the problem doesn’t make to be resolved then divorce is allowed but disliked. It becomes emphasised from the teachings of Islam, that woman is equal in rights to the man. There is no concept of ‘master and slave’. A good moral treatment has been appreciated, and leaving via divorce is permitted in case the charm doesn’t retain, and resolution of the problems becomes impossible, without harming each other [35]. “Hazrat Aisha relates that Prophet Muhammad (SAW) said: The best of you is he who is the best to his family, and I am the best among you to my family” [36]. A society is based upon the role of man and woman, equally. If a man manages economies of home, a woman administers the home. A number of responsibilities have been assigned to each of them, and they have distinct rights, consequently. There is no introduction of inferiority to a human on the basis of gender in Islam, the individual becomes good or bad depending upon the obedience and piousness. Islam preaches and advocates equality for all and leave no room for any prejudice on the basis of either of caste, creed or gender [37].

2. The existing rank of woman in the Muslim society: We highly appreciate the rules outlined by Islam to introduce the rank and value of women to the world, if we ponder the details summarised above, and draw a comparison with other religions. We identify, she became honoured and ranked highly to the status of equality. Her position upsurged to such a grade that she enjoys every right a man enjoys either in education, in social activities such as business or job etc., and in inheritance. We admire her distinct esteem as a mother, a sister, a daughter and a wife, and realise her benefits, which has been granted to her, in Islam, to sustain a secure, peaceful and happy life. We observe and find a constancy among the existing rank and rights of women to those instructed by Islam, but it is also true that some controversy and contradiction appear in such statues designed by Islam, and those currently being followed in existing Muslim societies. Although several Islamic
countries still strictly follow the marked boundaries suggested in the rank and rights of women in Islam, but some of the old traditions couldn't fully be exchanged. We find a vast number of such cases, when a woman is compelled to obey the man at home. Her option of consent and agreement has been withdrawn for her wedding, inheritance or inherited property, and even sometimes she is not allowed to move freely out of the home in the society for her needs. If we turn our focus to Pakistan we see an unsatisfactory condition in the application of the Islamic instructions properly. We observe an ill-treatment with her in the name of cultural diplomacy. She has been deprived of the most fundamental rights such as education, consent for marriage, divorce, inheritance and social development, for several years, which are still being observed in many parts of the country. She lives in a male dominated society and is considered a subservient to man where the concept of equality becomes vague. Her position becomes ignominious in tribal areas where the paucity of education and the misinterpretation of Islam induced her to live an oppressed life without fundamental rights. The society still follows such traditions, which put it back again in the days of ignorance, and urge to get a new start according to Islam as the country had been made in the name of Islam, such as sale of women, Karo Kari (honour killing), death by burning, forced marriages and the curse of a dowry.

3. Conclusion: Before Islam, the woman had no credible status in the society. She had been treated as a property, regardless of her thoughts, mindset and or, natural feelings. She had not rights and there wasn’t any concept of giving her option to decide or choose a way to follow concerning social affairs. There was no rule of inheritance for her. We don’t see any rank of respect, an honour of rights, and a position of equality for women in few discussed renowned religions or authorised systems except Islam. Islam has no favouritism for man or woman in any field, be it social affairs, family matters, educational disciplines or matrimonial interact. The legal rights and the honourable positions of woman have been modelled and protected in the family system of Islam. The woman in rights has equally been placed to the man, and both are equal before Allah, it becomes explicit according to the teachings of Islam, but the preferentialism appears in good deeds, piousness and Taqwa. Allah says in Surah Al-i’Imran: “Then their Lord heard their prayer that I certainly waste not the labour of any worker from amongst you, be a male or female, you are one among yourselves. Hence those who emigrated and were driven out from their homes, and were tortured in My way and fought and were killed. I shall surely wipe out all their sins and shall surely cause them to enter into the gardens beneath which flow rivers, a reward from Allah. And with Allah only there is good reward” [38]. This is Islam, which grants rights for woman integrally in the position of a mother, a sister, a daughter, or a wife. Islam, as a faith and philosophy, and way of life, was the first religion in the world to grant a respectable status to women. It bestowed equal property rights to women, at first. It issued clear instructions for women obtaining education, and created a niche for them in society [39]. It is beneficial for the Muslim societies follow the rules of Islam properly, and give their women honour and rights to establish a stable and balanced society.

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[38] Al-Quran, Surah Al Imran, verse195.
PERFORMANCE OF VOIP OVER DIFFERENT INTERIOR GATEWAY PROTOCOLS

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ABSTRACT. In order to supply device interoperability by means of standards based protocols, Voice over Internet Protocol (VoIP) technology incorporate data networks with voice networks. For efficient run time data delivery in VoIP, routing is an essential function. Interior Gateway Protocol (IGP) is used between hosts for finding the route for routing packets. For a network there is have to give benefits by over-provisioning the connections and switches so unwanted levels of inertness, jitter and parcel misfortune should not happen because of system clogging. This paper thinks about how diverse directing practices which incorporate Routing Information Protocol, Enhanced Interior Gateway Routing Protocol and Open Shortest Path First can influence VoIP execution. Displaying and reenactment have been completed with OPNET Modeler to assess and think about exhibitions.

Keywords: VoIP, RIPv1, OSPF, EIGRP, Interior gateway protocols

1. Introduction: Voip development offer economy respond in due order regarding fused data and voice structure, that will rapidly get off as a useful non-compulsory to customary voice structures and open traded telephone frameworks (PSTN) [1]. Voip is versatile in running young organizations through contraption interoperability using gages based gatherings. Voip as a progressing demand bring latest tests for organization suppliers and wanders. Frameworks need to be more vigilant, secure, and have a bigger measure of execution. Exactly when arranging a framework to help Voip and continuous-demands, such thoughts as procurement essentials, open arrangement, nature of organization necessities, and downtime outcomes, must be acknowledged. Best effort framework plan is a general strategy that helps VoIP organization.

Routing is crucial data frameworks organization work that gives a capable consistent data movement Voip require. Paramount effort frameworks power Interior Gateway Protocol (IGP) developments to center courses
for guiding packages among hosts. IGP gatherings are utilized inside a free composition (AS) [2], which is
delineated as different switches/sort out beneath only managerial control and offer a common controlling
framework. It is the greatest component inside the web dynamic framework. Not all directing assemblies see
AS, yet the ones that do can control courses lock stock and done with various choice toward oneself structures,
and set up framework breaking points catapulting off different meetings or entire frameworks. IGP gatherings
create controlling tables which are referenced at each switch bounce crossed by the bundles. Engineers for
finest attempt frameworks give profits by over provision the associations and switches so that framework
blockage did not show needless level of inactivity, jitter, and package hardship. Course re-consolidating may
be badly arranged to Voip customers in the company of a talk, like it impact on lethargy and jitter.

The operation of directing conventions depends on two sets of data steering table and conveyance of
learning [3]. At the same time both are imperative to a switch's process, diverse conventions will utilize
distinctive set of information and have dissimilar data in the steering tables. However mainly they are the
similar. Directing tables are the instrument that a switch utilization to spot different systems. These can have
data, for example, the following switch that a bundle must be sent to, or having more mind boggling
information, for example, data on every switch in the neighborhood system and the velocities of the related
interfaces. The extra perplexing a directing table turns into the greater amount of the switches recourses, for
example, RAM and CPU force get used. This should be capable of definitely ease off switches influencing the
velocity of the system. Dispersion of information is the route in which switches get mindful of every other.
The information sent, and the measure of the information extraordinarily shifts between conventions; some
send general redowns at occasional interims, and some launch data just after an alteration in the system
happen.

This paper explains how VoIP execution could be influenced through distinctive steering practices which
incorporate the most generally utilized conventions, for example, RIP and OSPF. Cisco's restrictive EIGRP is
likewise talked about in favor of examination reason. System displaying and recreation have been completed
through OPNET Modeler in order to assess & analyze exhibitions. Area two blueprints the outline
contemplation for VoIP endeavor systems. Segment 3 basically outlines the distinctive inner part portal
steering conventions. Segment 4 demonstrates the system shows that are utilized for the examinations,
dissects the recreation results, and also assesses the system exhibitions. Area 5 closes the paper.

2. VoIP in Enterprise Networks: A PBX (private branch trade) which gives VoIP administration to client
destinations could be either facilitated or reason-based. Facilitated result for the most part uses telephones and
a few switches as on location supplies. The exchanging and sagacity be distant. This sort of system is shoddy
to run and simple to keep up, however the negative aspect is that new administrations are subject to the
supplier, and the framework is not adaptable and can't be modified [4]. The other result is cause base which be
locked through nearby exchanging & knowledge through utilization of servers. It offer superior adaptability
contrasting with facilitated result, yet the start-up expense might be high and additional intricacy is acquainted
with the server support and overhauls [5].

The primary tests confronting the sending of Voip in expansive endeavor systems are the interoperability,
security, and transmission capacity administration problem. These three issues, examined underneath, are real
hindrances that keep Voip engineering from being executed quickly into substantial companies; in anticipation
of these issues are settled, typical PBXs linger simply for vocal sound interchanges.

2.1. Interoperability. To overcome from multi seller interoperability is the greatest test for system directors.
Fundamentally there are a couple of essential Voip convention stacks which are characterized by dissimilar
standard bodies and sellers, to be specific H.323, MGCP (Media Gateway Control Protocol) & SIP (Session
Initiation Protocol) [6]. Though ITU-T's suggestion H.323 is picking up wide-ranging distinguishing,
numerous merchants contain totally conform to all the rules and different suggestions. Because of such
purpose, innovations & gears for executing whole VoIP systems are yet not ready at an achievable level.
2.2. Security: It is significant trouble in VoIP systems. Despite the fact that H.323 characterizes encryption and verification of client right of entry, H.323-mindful programmers can in any case tap into any discussion on the framework, that implies a representative or any untouchable with web access can screen the voice discussions while never needing to leave the work area [7]. An alternating protection problem emerges but partnership utilizes VoIP engineering used for an isolated way in region, which be one of essential utilization in support of incomplete VoIP execution nowadays & frequently includes problem with firewalls. H.323 obliges immediate access toward organization system & will release whole system up to all TCP & UDP movement [8]. Result is to hold all H.323 movement inside one area and afterward utilize a voice trunk to interface activity between the segregated district & whatever remains of system. The further practicable result is to utilize a H.323 mindful firewall [9].

2.3. Bandwidth Management: Which will rapidly take off an exchange basic test is the unlucky deficiency of information transmission organization of current frameworks used inside most immense associations. Voip produces two sorts of framework development the digitally encoded voice exchanges and control communication. Control communication be utilized to system & supervise companionships among IP PBX & an IP phones. The included assemblies usually utilize alongside no transmission limit & a holdup of quite limited seconds in setting call is typically satisfactory [10]. Genuine test is to fulfill information exchange limit appeals of digitized voice streams among customers. Every exchange eats up a just about unaltering measure of information exchange limit for compass of the call. Exchange pace obligatory for every one call depends essentially on vocal sound encrypting strategy and moreover a couple of diverse variables [11]. 2 vocal sound encrypting principles are extensively maintained by Voip things – G.711 and G.729. Again here is conflictingly issue through codec from various dealers. Exchange speed necessities for significant associations or universities are much greater than for little associations & work places. Since the codec is the obliged parts for changing over straightforward waves into groups of modernized signs, the packaging exchanges of far reaching associations are more depleted [12]. Slower & all the additional troubled functioning skeletons ask for more breathtaking exchange speed for codec. The reliance of generous level execution of Voip advancement is an immense test used for incomprehensible ventures at current moment as a valuable elective.

3. Reviews of Interior Gateway Protocols: Element directing conventions are divided into three classifications: Link State (LS), Distance Vector (DV) and half and half conventions. The information data imparted by diverse system fragments is characterized by the steering convention chose, which are put away in directing tables. To keep up a forward-directing table the switch must focus the best data to be put away. Every convention decides this focused around certain basis with the utilization of calculations, which incorporate qualities known as measurements. Measurements are produced from as meager as one qualities of the system or all the more frequently a few attributes. The most widely recognized estimations typically incorporate jump checks, delay, transmission capacity, load, unwavering quality (i.e. failures on the connection), cost, and so forth.

Between 3 kinds of routing protocols, the most straightforward design is separation vector convention which utilizes the separation and course to discover the greatest way to the end by utilizing a calculation called the Bellman-Ford calculation [13]. System disclosure is accomplished by social affair data from specifically associated adjacent switches which thus may have picked up their data from adjacent switches. To impart this data separation vector conventions utilize a technique known as a nearby telecast. This conveys information to any gadget that is joined with an interface of the switch. Separation vector does not give a second thought that gets and methodologies these telecasts and that they are occasional in their methodology. These conventions will be conveyed redesigns at standard interim paying little heed to whether there is a topology change. As these parcels consistently navigate the system a lot of unwelcome system activity, might be produced. Cases of separation vector conventions are Ripv1, IGRP, and so on.

LSP (Link State Protocols) are somewhat added intricate than separation vector conventions. These
conventions utilize a calculation called the Dijkstra calculation [14] or briefest way initial. This calculation considers measurements when deciding the best information conveyance way. A commonplace sample of connection state convention is OSPF. A real distinction among separation vector & connection state conventions is that whilst the separation vector convention takes in the steering table & far off switches from specifically joined neighbors, connection state conventions take in the whole topology of a system [15]. Connection state convention permits system gadgets to have a greatly improved comprehension and perspective of a system. Contrasted with separation vector conventions, connection state conventions scatter data in a manner which is considerably less transfer speed concentrated. Connection state conventions utilize a strategy known as multicasting [16], which connection position conventions utilization to send overhauls at the point when there is change in the system & toward particular hosts, though separate vector conventions occasionally convey steering upgrades paying little mind to changes in a system. Half breed conventions join the instruments of both separation vector and connection state conventions. Most widely recognized samples are Border Gateway Protocol (BGP), EIGRP, and Ripv2 and. A common combination is a method that begins off with a separation vector convention, and afterward including more intricate capabilities of connection position convention. Three conventions will be reviews in the going with area: EIGRP, Ripv1& OSPF.

3.1. RIP Version 1. RIP version1 is a DV convention which is not difficult for fathom & convey inside an AS. In spite of the fact that superseded by more unpredictable directing calculations, RIP is still generally in littler Ass on account of its straightforwardness. Tear makes no formal qualification between systems and hosts. Switches regularly give a portal to datagram to leave one system or AS and to be sent ahead to an alternate system. Switches thus, need to settle on choices if here is a decision of sending way on recommendation. The metric framework RIP systems utilization is jump check, which have most extreme worth of 15 [17]. Each moment a switch passes steering table to different switches a worth of 1 is added to the metric inside the directing overhaul. The greatest number of jump check is to tackle the directing circles issue. Directing circles are fundamentally perplexities in system topology to happen when upgrade/age not in clocks could be wasteful. Through the bounce number situate toward 15 the parcel could be passed through a greatest of 15 switches earlier than being tossed, without whom the bundles might be passed uncertainly awaiting moreover system crashes or the switches are exchanged off. Tear backings up to a most extreme of six equivalent cost way to an objective, this implies that is an end of the line is reachable over diverse courses which has identical measure of jumps, the switch will hold every courses in memory up toward a greatest of six (four is the default) [18]. The ways are the entire put into the switches table and might be utilized to load equalization when dispatching information. The principle characteristics of RIP can additionally prompt its drawbacks, for example, data flooding, incapability of measurements framework, and classful routing algos, descriptions of which take after.

Initially, steering data is gone to different switches in a RIP organize by utilizing a nearby telecast. This show is as a matter of course at regular intervals and is held for most extreme of 180 seconds [19]. The telecast upgrade holds switches whole steering table; this is approved like clockwork around switches. These exercises cause a honestly extensive measure of system activity to be intermittently sent all around the system. This kind of data flooding squanders system assets and reason system wastefulness and potential blockage issue.

Besides, the metric framework that RIP utilization is to discover the briefest ways through a system for the information conveyance. The errand is done only focused around the jump number estimations in any case alternate parts of the systems, for example, transfer speed, and so on. This conduct can't ensure the disclosure of the ideal course for the information bundles. Figure 1 shows a case. Given the system particulars, RIP might pick the course with the minimum number of jumps as opposed to the ideal course which is likewise the speediest course. Should system clogging happen, RIP can adjust the movement stack on distinctive courses, be that as it may it can just occur on equivalent-cost ways.
Thirdly, RIP goes beneath caption of classful steering convention; significance one and only subnet cover designed for several group of subnet might be utilize for switches, that basically could exist inefficient of locations of IP. Case in point, but 192.168.1.0 is appointed for oblige six subnets, subnet veil 255.255.255.224 ought to be utilized, which keeps the utilization of the default cover of 255.255.255.0, overall, the switch will return failures in setup document, example. Double IP Address, Non-careful subnet cover convention is able to result in misfortune of switch arrangement data that incites shaky system execution.

3.2. OSPF. OSPF is centered on unwrap principles & have incredible comparability on a more far reaching scope of supplies, which is a transcendent regulating assembly in greater undertaking frameworks. It is a LS regulating meeting that avail extra capricious metric structure to grant beneficial pathway exposure responds in due order regarding remote frameworks. The cost to calculate the metric is worked out through captivating regressively of transmission limit of associations. Basically, speedier association is lesser into charge. The slightest expense approaches to distant frameworks are mainly supported courses, & held in the regulating table. OSPF can load modify over most great of 6 proportional charge route interfaces, regardless of the way that performing this be capable of bring about difficulties. The serial interface of the switch is planned with a clock rate and a transmission limit. The clock rate is the speed data may be sent over an association and the exchange pace is used by the administering assembly as a piece of the metric tallies. As is normally done the speed of a serial interface is arranged to 1544 Kbps [20]. There is a possible peril of this skeleton. Exactly when unique clock rates are arranged on a substitute association, the information exchange limit must be moreover planned; general OSPF will see both co operations as the same rate, which will bring about issue with trouble conforming [21]. Right when switches need to run OSPF intermittently, heaps of advantages are given to the strategy; this possible issue be capable of essentially dial down system administration speed.

There are a number of real contrasts between RIP & OSPF. Firstly, contrasting with OSPF & RIP is an uncouth convention which permits use of distinctive subnet veils, which basically gives system overseers more adaptability with IP addresses and smaller amount consumption. Also, one engaging playing point that OSPF offers over RIP is versatility. OSPF has the information of Ass & ranges, & can comprehend the various leveled steering structure. Thirdly, as a LS convention, OSPF just conveys redesign data when there is alter in the system, instead of sending occasional overhauls at customary interims as in DV conventions. This quality spares the data transmission use all around the whole system correspondences. Fourthly, while RIP utilization telecast to pass going on directing data all around systems which can result in potential system blockage issues, OSPF utilizes multicast strategy to lessen system activity which uses addresses that are bound for specific equipment.

OSPF fabricates tables recognized as proximity & LSD (LS databases). The nearness database is database that holds a rundown of switches that switch has bi directional associations with. The LS database records every one of different switches into system topology. Each switch in a particular zone will have the same LSD that implies each switch has same data about state of connections and different switches neighbors. On the off
chance that every switch in a system needs adjacencies from each other, there might be a mass of data coursing through the system, in addition to the database of every switch could be amazingly expansive. The answer for this issue is the decision of a switch known as the Designated Router (DR) and Backup Designated Router (BDR) as indicated in Figure 2, which are not vital switches themselves however traits of switch interfaces [22]. DR is the main issue of every zone which structures adjacencies with all different switches inside region. The DR however could be a solitary purpose of disappointment that is viewed as a shortcoming in OSPF. This issue could be remunerated by the term of BDR which is reserve replacement for DR if there should be an occurrence of disappointment.

Figure 2. BDR & DR in OSPF

3.3. EIGRP. EIGRP is one of the mixture conventions that are focused around IGRP (Interior Gateway Routing Protocol). EIGRP can scale to an undertaking system size, not exactly as huge as an OSPF system can scale yet a ton bigger then a system running RIP can deal with. EIGRP figures separate by utilizing a cooperation of distinctive data. The attributes chose are accessible data transfer capacity, deferral, load, MTU and the connection unwavering quality. By utilizing these components the chose ways might be finely tuned, so data could be passed around a system by the quicker most dependable courses. As a matter of course just transfer speed and deferral are utilized. EIGRP is additionally a raunchy convention and will help burden adjusting over six unequal ways [23]. This however is not such a straightforward summon to utilize, and obliges manual design. On the off chance that inaccurately arranged, it can result in system shakiness and steering circles, henceforth it is a typical practice to overlook this capability.

There are 5 parts for the interworking of EIGRP convention: neighbor tables, topology tables, course states, course labeling, and steering tables [24]. Neighbor tables are basically a rundown of neighboring switches. There is a hold time that is situated for every passage. In the event that a switch has not gotten notification from a neighboring switch inside the specified hold time, then the switch is recognized non-operational, in this manner a disappointment recuperation calculation will be set in movement. Topology table holds all the ends of the line that are promoted by neighboring switches and the measurements connecting them. Course states characterize the status of the courses that are held in the topology. Course labeling is an action that distinguishes outside courses around diverse Ass. Inner courses are then alluded as the ways inside Ass.
Directing table holds data on all the courses that will be utilized to achieve remote systems, for example, promoted separation, and achievable separation, and so on.

EIGRP utilizes the Diffusing Update Algorithm (DUAL) to focus the courses. Double empowers EIGRP switches to figure out if a way publicized by a neighbor is circled or without circle Low meeting postponement might be attained by keeping up a table of without circle ways to each goal, notwithstanding the slightest-cost way. Double's joining times are a request of extent easier than those of customary DV calculations [25]. The pseudo code for limited state machine of DUAL is:

```plaintext
// Track all routes advertised by neighbors;
Select loop-free path using a successor and remember any feasible successors;
If successor is lost
{
    Use feasible successor;
    If no feasible successor
    {
        Query neighbors and re-compute new successor;
    }
}
```

The possible successor course needs to have the same metric as the successor course. In the illustration demonstrated in Figure 3, if the connection between switch 1 and switch 2 falls flat, switch 1 will utilize the practical successor course to focalize the system association; consequently organize data transfer capacity is spared by the end of course re-reckoning. Then again, if the connection between switch 3 and switch 4 breaks down, since switch 3 has no achievable successors, it will inquiry switch 1 to get another course.

![Figure 3. DUAL algorithm network example](image)

EIGRP is extra adaptable than OSPF. It has jam-packed backing of convey rundown [26]. Handbook outline is possible in any interface at any switch inside EIGRP systems. EIGRP offer quick system merging & simple design. Notwithstanding, EIGRP is Cisco Proprietary convention, that be able to influence the prevalence of the convention. Because of cost of Cisco gears not everyone systems will hold singularly Cisco switches, & setting up a few switches to utilize EIGRP and some to utilize interchange conventions be able to result in bunches of disarray & misuse of switches assets.
3.4 Summary of Comparisons: Depend on previous discussions, comparisons of 3 routing procedures are concise in Table 1.

<table>
<thead>
<tr>
<th>NATURE</th>
<th>RIP</th>
<th>OSPF</th>
<th>EIGRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCALE</td>
<td>INetworks</td>
<td>Enterprise networks</td>
<td>Hybrid</td>
</tr>
<tr>
<td>ROUTING</td>
<td>Classful</td>
<td>Classful</td>
<td>Classful</td>
</tr>
<tr>
<td>NETRICS</td>
<td>Number of hops</td>
<td>Number of hops</td>
<td>Number of hops</td>
</tr>
<tr>
<td>DISCOVERY AND UPDATES</td>
<td>Percolation probability (broadcast)</td>
<td>DLR missiles</td>
<td>DLR missiles</td>
</tr>
<tr>
<td>LOAD BALANCING</td>
<td>Only supported on equal-cost paths</td>
<td>Supports 5 equal-cost paths, but difficult to implement</td>
<td>Supports 5 equal-cost paths, but difficult to implement</td>
</tr>
</tbody>
</table>

Table 1: Comparison of RIP, OSPF, and EIGRP.

4. Performance Evaluation: The Voip execution measurements incorporate postponement, jitter, parcel misfortune and MOS (Mean Opinion Score). Postponement is instancing to slips by among as an articulation is told & what time it is played once more at the collector. Jitter is adjustable in deferral which is processed not surprisingly entry time less genuine landing time. De-jitter cushion help settle the issue, yet adds to general postponement. As indicated by ITU-T G.114 that suggests worthy voice holdup edges [27], postponement of Voip system should be kept short of what 150ms for ongoing-discussions & voice jittering should short of what 30ms. Bundle misfortune measures the rate of dropped bundles which ought to be short of what 1% [28]. ITU-T P.800.1 standard characterizes MOS as subjective metric that evaluates client fulfillment by method for score that differs as of poor (1.0) to best (5.0). The base MOS ought to kept up at level 3 to accomplish an adequate execution [29]. Some prerequisites will be utilized to do the accompanying execution assessments.

Table 2 shows a rundown of Voip execution limits.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Acceptable Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delay</td>
<td>( \leq 150 \text{ ms} )</td>
</tr>
<tr>
<td>Jitter</td>
<td>( \leq 30 \text{ ms} )</td>
</tr>
<tr>
<td>Packet Loss</td>
<td>( \leq 1% )</td>
</tr>
<tr>
<td>MOS</td>
<td>( \geq 3 )</td>
</tr>
</tbody>
</table>

Table 2: Threshold of acceptable VoIP performance

This research utilizes OPNET Modeler as recreation instrument [30]. It’s business system recreation programming bundle which gives a stage to displaying and reenacting system provisions. Venture-scale systems have assembled by OPNET as indicated in Fig 4. A couple of switches (R1…R5) are uniting 2 workplace extension arranges that have 100baset details. Different transfer speeds have been designed for the connections interconnecting the switches keeping in mind the end goal to make diverse directing
measurements prerequisites. 2 bottleneck stations have been created: 56k information rate among R1 and R2, and 33k information rate among R2 & R5. 3 system situations have been intended to empower the three steering conventions separately. Voice movement is going through the system, which has the indistinguishable requisition designs and client profiles for the three situations. The reproductions are booked to run for 60 minutes. Keeping in mind the end goal to assess the system execution in response to system disappointments, the connection between R1 & R3 are deliberately fizzled following 10 mints, & after an additional 10 mints. It is situated naturally recuperated by OPNET

5. RIP versus OSPF/EIGRP:  Fig 5 shows aggregate voice activity gained by end clients. Fig 6 shows the amount of jumps for every course. Fig 7 demonstrates the values of MOS. Fig 8 exhibits the voice jittering circumstance. Not surprisingly, RIP picks course to have minimum amount of bounces (Fig 6), regardless of the presence of a bottleneck transmission. The wasteful information conveyance prompts poor throughput (Fig 5) and poor MOS quality (Fig 7). At the point when the system is introducing, directing activity involves system data transfer capacity that causes clogging issue in the bottleneck joins, that effects genuine jittering in the begin of the voice discussion (Fig 8). Interestingly, before disappointment point rises, OSPF & EIGRP has comparable exhibitions, that is, high throughput (Fig 5), satisfactory MOS qualities (Fig 7), & only some occurrences of jittering (Fig 8). The explanation behind that is they together consider join data transmission when picking the ideal courses; consequently speedier courses will be decided to suit prominent activity.  Fig 6 shows that it is possible that EIGRP & OSPF has picked similar Voip requisition course earlier than disappointment point.

![Model of network simulation](image)

Through presentation of disappointment point of network, OSPF & EIGRP begin give up diverse exhibitions. Right now, it is worth specifying that RIP is not irritated by the fizzled connection in the reproduced system as demonstrated in the factual outcomes, on the grounds that the fizzled connection is not some piece of its picked course. Taking into account the expectation of moderate union behavior of RIP, the target of this some piece of the reenactment is to look at the system disappointment recuperation conduct of OSPF & EIGRP.

6. OSPF versus EIGRP: The connection disappointment has influenced the execution of mutually OSPF & EIGRP. Throughout the intentional connection disappointment & auto-recuperation process, OSPF perform reliably all around the technique, whereas EIGRP is vigorously upset throughout the disappointment yet reinstates first state afterward disappointment recuperation.

Fig 6 demonstrates the disappointment point, OSPF picked an elective course to proceed with the date conveyance process, & stick up to this course after much disappointment recovered. As clarified in the past areas, OSPF just redesigns the directing table at whatever point progressions are made. Reproduction comes
about infer that it won't adjust the course for any current movement stream as long as there are no clogging or different issues in its picked course. In the system model demonstrated in Figure 4, all the conceivable substitute courses (i.e. interfaced by R4 & R3) have somewhat high transmission speeds. So despite the fact that the quantity is decreased later the system re-merging (Figure 5), the MOS and the jittering are all kept up in the adequate level (see Fig 7 & Fig 8), which demonstrates adaptability and proficiency of OSPF for the Voip administration system.

EIGRP then again, appears to be broken throughout the connection disappointment state, as non details are gathered in Figures 7 and 8. Fig 6 intimates that information conveyance procedure continues for one bounce and stops at R1. The guess is no possible predecessor can be establish by DUAL calculation; consequently system is experiencing moderate merging period to re-arrange the course that includes inquiries of neighbor's directing tables, and re-processing of data transfer capacity. While the re-meeting advancement is even now progressing, the fizzled connection is reinstated by OPNET, so EIGRP is then re-captivated with first directing procedure. The effects demonstrate wasteful system re-merging conduct of EIGRP when there is disappointment point and no prompt plausible predecessors are established.

![Fig 5. VTR (Voice traffic received) (bytes/sec)](image-url)

![Fig 6. Hops per route](image-url)
7. Conclusions: In spite of the fact that Voip offers extraordinary profits for administration suppliers and endeavors, tests to actualize Voip requisition over big business system still remain. Directing is a vital information systems administration work that gives an effective constant-information conveyance needed by Voip. Best-exertion systems influence IGP advances to focus ways for directing parcels among hosts. 3 IGP conventions are examined OSPF, EIGRP & RIP of which the characteristics and additionally the points of interest and impediments have dissected in the paper. Undertaking-scale systems have been assembled with OPNET Modeler. A different part of system has been particular in the reproduction show so as to assess the execution of the 3 routing protocols.

Of course, RIP does low-proficient directing in the network with a restricted access broadcast interface as it doesn't think seriously about data transfer capacity. Interestingly, RIP and EIGRP carry out with brilliance as they are dedicated to processing the quickest conceivable course. Effects demonstrate that with the similar system details it is likely that EIGRP and OSPF have selected the similar course for Voip provision. The connection disappointment has influenced the execution of both EIGRP & OSPF. Throughout the intentional connection disappointment and auto-recuperation procedure, OSPF acts reliably all around the system, whereas EIGRP is genuinely upset throughout the disappointment yet restores to the first state later than the disappointment recuperation. OSPF redesigns steering table upon system disappointment to re-ascertaining another course, and does not adjust the course for any current activity stream as lengthy as there are no blockages or other new issues in its picked course. System focused around OSPF keeps up worthy execution all around the procedure, which shows its adaptability and productivity for the Voip administration system. Then again, the DUAL calculation is not as proficient as OSPF when no practical predecessor is established. The factual investigation has prompted the finish of flexibility and proficiency of utilizing OSPF within big
REFERENCES


simulation. Dec.


BENAZIR BHUTTO: A LESSON FOR DEMOCRACY

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ABSTRACT. Though Peoples of Pakistan spend much of their time in Martial Law Regimes either it was of 1958, 1969, 1977 or of 1999, the peoples of Pakistan believe that Pakistan is democratic country, among all Pakistani’s one school of thought is of the opinion that it is the fault of the civilian government’s which create a gap to induct the Army into the democratic affairs of the country, but, on other hand the second school of thought believe that there are some power seeker Generals who are always in search of the gap to grab the power and interrupt the civilian government to end their thrust to rule the country as compare to do their own duty. On other hand this school of thought also believe that democracy should be continued either in any form in Pakistan they are always struggling to encourage to work for democratic Pakistan, the prominent figure among all in Pakistan who raised the voice against the Martial Law regimes to raise their voice is Benazir Bhutto, without whom the democratic history of Pakistan is incomplete. Who set new trends to establish the rules in the democratic movement in Pakistan? The aim of the research paper is to look into the politics, policies and struggles to restore the democracy in Pakistan by Benazir Bhutto. It was her role, especially her role in MRD through which she fought against Zia regime and mobilized Pakistani nation to get rid of his dictatorship and restored the Democracy. The main purpose/object of this study is to analyze the politics of Benazir Bhutto that to what extent her politics remain favorable for Democracy as well as for the poor peoples of Pakistan

Keywords: Democracy, Dictatorship, Martial Law, Movement, Restoration.

1. Introduction (Life & Politics of Benazir Bhutto): Benazir Bhutto was born in Karachi Pakistan on 21st of June 1953. She received her early education from Pakistan, got her graduation from Harvard University US and Post Graduate Diploma in Foreign Affairs from Oxford University UK. During her education abroad unfortunately Pakistan was facing crises like situations. One problem among others was raised in Pakistan that during general elections of 1970 which were held in Pakistan’s both wings (eastern and western) in eastern wing of Pakistan Awami League of Shaikh Mujeeb-ur-Rahman won the majority of the seats and in western wing of Pakistan, Pakistan People’s Party of Zulifqar Ali Bhutto got the majority of the seats and overall majority of the seats were taken by Awami League of Shaikh Mujeeb-ur-Rahman, but political powers refused to hand over the power to Shaikh Mujeeb-ur-Rahman of Awami League, in the result “On March 26, 1971, leaders of East Pakistan declared the province independent as Bangladesh (land of the Bengali’s) and its independence was assured on December 16th, 1971”. (Baxter 2008) Due to which Pakistan was divided and “Yahya Khan resigned and Zulifqar Ali Bhutto sworn in as the President of
remaining portion of Pakistan and the first civilian Chief Martial Law Administrator of Pakistan on December 20th, 1971". (Heitzman 2008)

After completion of her education her plan was to join foreign services or to open her own newspaper in Pakistan, but her father compelled her to join her hands in politics in this way she entered into politics. On other hand, “Pakistan National Alliance (PNA) did not accept the election results and accused the ruling party for rigging. They boycotted the elections of the provincial assemblies”, (Dawn 1977) due to which country wide agitation was launched by PNA against Zulifqar Ali Bhutto’s government. In this connection, Zulifqar Ali Bhutto contacted to the leaders of the PNA for the solutions of the crises. “Zulifqar Ali Bhutto’s Pakistan People’s Party and PNA agreed to negotiations and many meetings were held between the leaders of both parties. Finally the dialogue between Bhutto and the PNA leaders nearly reached to conclusion. Bhutto also declared it in the press conference that the agreement would be signed next day. But the military never wanted to slip the opportunity of taking over the government, hence declared Martial Law before the next sunrise on 5th July 1977”. (Mushtaq, Mahmood, Dr. Farhat, Ahmed. and Saleem. 2013) by his own promoted Army General named as Zia-ul-Haq through military que later on he was hanged on 4th of April 1979. ‘Bhutto was hanged in a rigged trial organized by General Zia-ul-Haq, who took Islam more seriously. With the American patrons looking the other way, and with China and Saudi Arabia providing active support, Zia sought a third transformation, pursuing Islamization and nuclear weaponization’, (Cohen, 2011) which shows the International conspiracy against him. His death was the great shock for the whole country in general and Bhutto family particular; just after that Benazir Bhutto along with her family was put under house arrest at her home in Karachi.

2. Movement for Restoration for Democracy (MRD): After some time when Benazir Bhutto was released from jail for a short period, she started planning to stand against dictatorship of Zia-ul-Haq, she planned to make an alliance to get rid of dictatorship for which she started organizing different political parties for the MRD in Pakistan against the dictatorship of the Zia-ul-Haq, though it was really very difficult task for Benazir Bhutto and workers of PPP to shake hand with those parties which played an active role to topple the Zulifqar Ali Bhutto government and supported Zia-ul-Haq, but she was of the opinion that in the interest of Pakistan and in the interests of Democracy, we must be united to make an alliance, in which all the majority parties who were against Zulifqar Ali Bhutto during his own time were included, except Jamaat-e-Islami. “The first official meeting of the leaders for the formation of Alliance was held at 70 Clifton Karachi on 6th February 1981. The leaders were agreed and the alliance was formed and named MRD.

In this meeting following political parties attended and formed the alliance.

1. Pakistan People’s Party
2. Pakistan Muslim League (Khawaja Khair-ud-din Group)
3. Pakistan Democratic Party
4. Pakistan Mazdoor Kisan Party
5. Pakistan National Party
6. National Awami Party
7. Quomi Mahaz-e-Azadi
8. Jamaat-i-Ulema-i-Islam (JUI)
9. Tahrik-i-Istiqlal (TI)
10. National Democratic Party

This alliance was unanimously gathered on the following four point program:

A. End of Martial Law;
B. Restoration of the 1973 Constitution;
C. Parliamentary elections; and
D. Transfer of power to the public representatives” (Chandio, Naseem and Ahmed 2011)

“Just after the announcement of the movement against the Martial Law by Movement for Restoration of Democracy, Martial Law authority issued Provisional Constitutional Orders (PCO) and reduced the power of the Judiciary on 23rd March 1981, according to which the judiciary could no longer quash (cancel) detention orders of the Military courts, and stay flogging and execution on the basis of lack adequate evidence”.(Waseem,
On other hand “Government propagated that it was the conspiracy of the PPP leadership against the army and Pakistan”. (Mushtaq, Mahmood, Dr. Farhat, Ahmed. and Saleem. 2013)

Though all the parties were united against Zulifqar Ali Bhutto’s government but this time except Jamaat-e-Islami all other parties were united on one platform. In this way this alliance was formed under the umbrella of Benazir Bhutto to restore the democracy in Pakistan

3. Role of Benazir Bhutto in MRD: As Zulifqar Ali Bhutto being the Chairman of PPP was arrested due to his absence Begum Nussrat Bhutto was made Chairperson of PPP, Begum Nussrat Bhutto was made acting Chairperson of the Party but after short spell of time due to her illness and un-bearng shock of her husband her daughter Benazir Bhutto was made the Co-Chairperson to assist her in the matters of the party because Benazir Bhutto was young and energetic at that time and she started the struggle against the dictatorship, during her struggle subsequently, she spent five years in detention, including ten months in solitary confinement; During this period she tried to bear the shock of her father’s death, she remained in jail till 1981.

Some peoples were of the view that, due to the prolonged military rule (1977–1988), obliterated democratic norms, stifled democratic values, yet aspiration for democracy continues to persist. Soon after starting the struggle she mobilized the masses to boost up Movement of Restoration for Democracy, Benazir Bhutto once again arrested and sent to jail, but, during this struggle consequently, including 10 months in detention, she remained about 5 years in the jail and which was not easy time for her because during this she also faced her father’s death (Khuhro and Choudhry 2009) suddenly under international pressure she was released in the year 1984 and she left Pakistan UK to work for MRD. She lived there for hardly two years, when her younger brother Shah Nawaz Bhutto was assassinated in France, she returned to Pakistan for burial of her brother and again she had to leave the country.

During this time Zia-ul-Haq promised to hold election within ninety days, but with one or another reason he tried to postpone the general elections while giving different reasons, actually he wanted to make accountable Zulifqar Ali Bhutto and his party to whom he executed him in the year 1979. This event changed the whole political scenario; those situations compelled the PPP and some other parties to make their political alliance to end the rule of martial law and for the restoration of democracy in the country. This time Benazir Bhutto decided to fulfill duties and to continue the mission of her father, for this purpose she planned to come back to Pakistan, to pressurize military ruler for Restoration of Democracy in the country, due to this she came back to Pakistan on April 11th, 1986, “The carefree girl who first left home in 1969 to study at Harvard had now turned into a woman with an iron will, to fight the battle left incomplete by her father” (Rafique 1994). It was her will to fulfill all the dreams of her father because of that she left all her own dream behind actually her ambition was to join Pakistan’s foreign services, not to become a politician, she was of the opinion that, “her tendency was not towards politics, it was her father to whom she wanted to please by joining oxford union”, (Bhutto 1988) where she was warmly welcome by millions of her country men, this time Zia-ul-Haq had fear from Benazir Bhutto so he sought a third transformation, pursuing Islamization and Nuclear weaponization and also played a card of Islamization and announced for referendum in Pakistan, Benazir Bhutto hoped for change for democracy in Pakistan but Zia-ul-Haq also made his clear intention that power would be transferred to only those persons which are religious minded, Zia-ul-Haq’s so called democracy shunned down when on 14 August 1986 Benazir Bhutto was arrested at her home in Karachi, when she was just preparing to attend peaceful rallies on Pakistan’s Independence day. She was given thirty days detention order and once again she was send to jail. On other hand, except Jamaat-i-Islami, all the other political parties had already joined the MRD; they once again arose against the brutal killing of innocent peoples in lump sum and arrest of thousands of peoples by their own military. During movement General Zia was worried because he was thinking, if she came in power then what will be his position? So he always avoided to conduct the elections in Pakistan, once he replied, “It is Miss Bhutto’s unnecessary impractical ambition and her attitude towards acquiring power which is objectionable.” (New York Times 1986)

Unwillingly under International pressure and the pressure of MRD, Zia-ul-Haq had released Benazir Bhutto on 10th September 1986, but many peoples remained in jail. This struggle was intensified against Zia-ul-Haq by Pakistan People’s Party along with other political parties under Benazir’s guidance. “While PPP
On other hand as a chairperson of PPP Begum Nusrat Bhutto appealed the citizen of Pakistan to join their hands against the martial law regime, which encouraged the moral of nation which was later on translated and then published in local languages like Sindhi and urdu, in response of the appeal thousands of Pakistan People’s Party workers and others directly came to the roads and anti-government slogans were raised in which army interrupted and so many peoples were killed, tortured and thousands were put behind the bars by the Marshal Law Regime, official sources quotes that, “a summary of the casualty list, as available in official documents, was fifty killed and a hundred and fifty wounded. The actual figures may have been much higher.” (Khan 1999) Apart from that official statement, “number of the killed people was 61, while 200 hundred were injured. The arrested people were more than 4691.” (The Muslim 1983) On other hand Sindhi nationalists estimate that, “800 were killed, 2000 injured and thousands of people arrested”. (The Muslim,1984), Even though the movement was also supported by different unions, and it was first time when Sindhi Waderas (Landlords) opposed the military dictatorship, one of from main reasons was imposition of usher on the rich persons throughout the country, though on other hand some people believed it was not a strong reason, but, “these “Waderas has been pushed into the movement due to pressure from below i.e. the rural masses and the feeling of deprivation extends also to the affluent section of Sindhi society, particularly access to political power”. (Hussain 1991) “The movement in Sindh had a spontaneous character as distinct from the rest of the country: It was more rural than urban. It involved more unplanned, leaderless and mob action than was the case in other provinces. There followed cases of shooting, arson and armed attacks on trains, police stations, railway treasury, banks and various other government institutions.” (Waseem, 1994) Ms.: Benazir Bhutto compared those blood shad situations of Sindh with the situation which were earlier created in East Pakistan in 1971. “The nationwide rebellion was not crushed by the guns and tanks of the army until the second week in October, leaving particular bitterness in the hearts of the Sindhi’s. 800 people were reportedly killed. Whole villages were erased and crops burned. Women reportedly were molested by the army, bringing back dark memories of the army’s rampage in Bangladesh twelve years before. In the ashes of fury, Sindhi nationalism was born. The move towards secession escalated in the other minority province as well. The fragile federation of Pakistan was strained to breaking point under the ruthlessness of Zia and six years of Martial Law.” (Bhutto 1994)

It was also believed that leaders of the different Political Parties were on single plate form to lead the movement against military dictatorship, which shows the commitment of people and leadership towards the democracy in Pakistan. “The movement became popular in Sindh and succeeded to gain the mass support. It turned into a violent movement because of the crushing policy of the military. Army used Tear gas, Lathi charge, and gun firing against the demonstrators and the most important reason for the rise of the movement has been near total exclusion of Sindhi’s from the state elite”. (Amin 1993) It was the result of the huge mass support in Sindh to the movement due to which, “American Defense Secretary, Casper Weinberger visited Pakistan in September 1983, while arguing after visit to Pakistan he was of the opinion that in this situation, we have to look at alternative.” (Hussain, 1991)

After a long struggle of democratic forces in Pakistan General Zia announced the elections, through which he made Mr. Muhammad Khan Junejo as his Prime Minister, that step once again gone into the darkness when Zia-ul-Haq abolished the assemblies under article 58-2(b) on May 29th 1988, after that he announced that the new election will be held on November 16th 1988. (Khuhro and Choudhry 2009) This news was the hope of democracy for the Benazir and other political parties but Zia-ul-Haq announced on 21st July, 1988 that the elections would be held purely on nonparty basis; the reason was that the PPP has popular support, there was a reason behind the elections on non-party basis, though Benazir herself was interested in taking part in the elections through independent looking proxies. She was of the view that no field should be left open for the dictators manipulate, but, at that time she was out of the country and had to depend much on the party leadership which were handling the matters inside Pakistan and they decided to boycott the polls because of the conducting on the non-party bases. She had to agree to the unanimous decision of her colleagues. (Shaikh,2000) If we look into deep “General Muhammad Zia-ul- Haq preferred the non- party elections because he was well-aware of the fact that nonpolitical and non-committed people are easy to control as compare to political and affiliated peoples. So he wanted that elected member of assemblies had
no political association as well as membership of any political party or loyalty to any political leader.” (Chandio 2011) Now Benazir went to the courts and she challenged the General Zia’s nonparty based election, because she was of the opinion that, “in this way the military rule of General Zia will come to an end and the democracy will be restored, she wrote, “Just as a flower cannot bloom in a desert, so political parties cannot flourish in a dictatorship.” (Bhutto 1988) In July 1987 marriage, her marriage did not become problem in Benazir Bhutto’s political life, “while Pakistan People’s Party increased its strength as a political institution. Zia-ul-Haq consistently claimed the party was out of revenge, Benazir Bhutto retaliated against this by saying that her party was speaking not out of vengeance, but for nation building” (Rafique 1994).

In the beginning the movement in the Sindh was as peaceful as it was in the other provinces of Pakistan, “It assumed violence when the army used state force to suppress it, the attitude of the military authority towards the people of Sindh was very harsh as compare to the other provinces, it was deliberately done by the authority to achieve their goal i.e. ‘divided and rule’ and regime was successful in its planning”. (Waseem, 1994)

But slowly the Movement became stronger and “A large number of leaders and workers of PPP and MRD were arrested. But policy towards the public was different in Sindh and Punjab. This was the reason that the roads and streets of Punjab were not closed during the MRD movement. But in Sindh people were fighting with the army. They even did not allow Zia to land in Dadu.” (Ahsan, 2013)

After wards, a new strategy was planned by the leaders of MRD to start giving the voluntarily arrest by the political workers, which was going to start from August 14th 1983, “in shape of giving voluntarily arrests by the workers as a strategy and pursuit of its demands due to which Movement very soon gained very good momentum in the larger context of public activities. Professional organizations, Trade unions, Bar-councils, and the student unions all that supported Movement against the dictator rule in Pakistan, in which, “about a hundred labor leaders endorsed the Movement’s call in their meeting in Karachi”. (Waseem, 1994).

It was the Benazir Bhutto, for about thirty months she continued to mobilize world opinion for the restoration of democracy and violation of human rights by General Muhammad Zia-ul Haq. “Zia wanted to keep the Benazir away from contesting the election; the election date was suggested by keeping in the view the pregnancy of Benazir Bhutto, so that she may not be able for election campaign”. (Bhola 1989) “However, the rule of Zia-ul-Haq ended abruptly on 17th August 1988, when his C-130 Aircraft exploded shortly after taking off from the Bahawalpur Airport. This disaster also claimed the lives of five Generals, five Brigadiers, one Squadron Leader, an American Ambassador and fourteen members of crew.” (Saqib 2009-10) The report conformed the Zia’s death in air crash came on T.V and Radio in the same evening, “C-130 exploded 10 minutes after it took off from Bahawalpur, 60 miles west of the Indian border, at about 4:30 P.M” (Sciolino 1988) “In 1988 Zia was killed in an airplane crash possibly caused by sabotage”, (Muhammad 2008) whole Pakistan went into a state of shock, even those who disliked General Zia-ul-Haq immensely and had waited for such news, they did not know how to react.

Benazir only expressed, “life and death is in the hands of God”. (The New York Times 1988) Though, for the purpose of keeping her away from power, a group of political parties formed Islami Jamhoori Ittehad (I.J.I) which included fundamentalists and Zia-ul-Haq’s loyal, on the same night Chairman Senate Ghulam Ishaque Khan took reins of the country. He also announced November 16, 1988 the same date which was already planned for elections but he didn’t clear that elections would be held on party basis or on non-party basis. Though the case filled by Benazir was in court against non-party based elections, and after the death of Zia the court passed the verdict that the elections will be held on party basis, in this way the “general elections to the National Assembly and Provincial Assemblies were held on 16th November 1988 and 19th November 1988, respectively on Party Basis,” (Saqib 2009-10) in which PPP got majority seats and being the Party’s chairperson she was made Prime Minister of Pakistan.

Bhutto family is the only family in Pakistan, which sacrificed the whole family for the stable democratic system in Pakistan, “Goher Jamal argued that, “no ideology could succeed without sacrifices and Bhutto family had given historic sacrifices for democracy and they all would be long remembered”. (Times 2008) Benazir Bhutto spent her whole life in fighting for the rights of common people, democracy, stable political
system, foreign Policy and on 27th December 2007 she was assassinated, while returning from Rawalpindi’s Liaquat Bagh, where she addressed the public gathering.

4. Conclusion: No doubt, in democracy the rights are given to the people, one of them is the right to vote, which make the rulers accountable towards people and this right gives the common people to participate in government but unfortunately in the history of Pakistan, the military dictators always used to imposed their will on the citizens of their country due to which the fundamental rights suffer. Pakistan is a democratic government, but unfortunately Pakistan has spent long time under martial law regimes and in the history of democracy the name of Benazir Bhutto would be remembered, the reason was Benazir Bhutto being a lady mobilized world opinion and fought for the peoples of Pakistan through the Democratic Movement against General Zia, during this period she started the movement.

After the Zia’s death general election were held in Pakistan, through which PPP emerged as the largest party in National Assembly and she became Prime Minister on 2nd December 1988, she became the Prime Minister of Pakistan twice in 1988-90 and 1993-96. She struggled the whole life for the democracy because she knew that it is the only democratic government which provide people’s participation in government, people participate in government through their elected representative, which they elect through their right to vote and this right to vote makes the representatives answerable towards common people and on other hand martial law is the opposite of democracy, in which political rights are suspended, generally without democracy the concept of good governance is meaningless, because democracy is the assurance of people’s participation which is the key element of good governance. The central battle for the Democratic Movement became Sindh particularly but it was also supported by other provinces of the country, the rulers tried their best to stop the movement but unfortunately they failed to stop the peoples the situation became tense like civil war in the country

It can be argued that this was the second time in the history of South Asia which Sindhi peoples faced so many hindrances and came out from those hindrances successfully. This Democratic Movement became the strong challenge for the dictatorship in Pakistan. Though Movement initially was not successful to pressurized rulers of Pakistan but immediately one thing happened that Zia-ul-Haq made an announcement for holding of referendum for his face-saving, in which very small number of peoples cast their votes who wanted Zia-ul-Haq like Jamaat-e-Islami who were against Zulifqar Ali Bhutto. It was the due to the movement he agreed upon to hold fresh elections in the year 1985 to make stable system in Pakistan.

It also can be argued that due to the movement peoples demands were accomplished and therefore it is also believed that MRD was the reaction of action taken by dictatorship in the country and through this movement peoples fought for their rights against Military Rulers. MRD became the power of tool for the nation because they have not been as active as they were seen earlier. It is also argued that this movement proved that Pakistani unarmed nation can do anything if their leader is strong.

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DEMographers DIFFERENCES ON PARENTAL ACCEPTANCE-REJECTION AND PERSONALITY AMONG CHILDREN WITH INTELLECTUAL DISABILITIES

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ABSTRACT. The study examined the demographic differences on parental acceptance-rejection and personality in children with intellectual disabilities. For this purpose a sample of 100 children was taken from Special Education Institutions of Gujranwala and Lahore, Pakistan. Both male and female children were included in the study. The data were analyzed by using Independent Sample t-test and One-way ANOVA in SPSS software (Version-20). Results show that the children belong to urban background were higher on parental warmth however children belong to rural background were higher on parental hostility and indifference. Gender differences revealed that female children were higher on parental warmth whereas male children were higher on the indifference. Children with uneducated mothers were higher on hostility whereas children with educated mothers were higher on parental warmth. Children belonged to the joint family system were higher on the father warmth and mother’s warmth as compared to the nuclear family system. Moreover results show that middle class children were higher on the father’s warmth as compared to lower class children. Elder children were higher on the parental hostility, indifference and father’s warmth as compared to younger children who were higher on the mother’s warmth. First born children were higher on father’s warmth as compared with the second born children. The current findings provide valuable insight for parents and teachers to make friendly policies for the welfare of children with intellectual disabilities.

Keywords: Parental Acceptance Rejection, Personality, Demographic Differences, Pakistan

1. Introduction. The research program reported in this article was initiated almost five decades ago in response to claims by Western social scientists that parental love is essential to the healthy social and emotional development. Children everywhere need a specific form of positive response/acceptances from the parents and other caregivers. When this need is not met satisfactory tend to report them to be hostile and
aggressive, dependent or defensively independent, emotionally unstable and negative worldview. In fact much of parental acceptance and rejection is symbolic (Kagan, 1978). Thus to understand why rejection has a consistent effect on children one must understand its symbolic nature. Parents everywhere express some degree of acceptances (warmth, affection, care and concern) and rejection (coldness, lack of affection, hostility and aggression) towards their children.

1.1. Parental Acceptance-Rejection Theory. Parental Acceptance is basically defined by parental positive encouraging and motivating behavior toward the child to interact openly within the environment of parental appreciation and supporting contrasting. Parental rejection is viewed as parental such behaviors which are very restricted, limited toward the child and the child can't interact freely and explore physical and interpersonal aspects of their environment (Barbee, 1997). The study of child's personality is very important topic. However what features is an effect on personality functioning needs careful explanation (Rotter, 1981). Rotter research reveals that parental acceptance play very important role in the personality. PAR Theory attempts to answer five classes of questions regarding parental acceptance and rejection. These questions are categories into three sub theories: personality sub theory, coping sub theory, and socio-cultural systems sub theory.

First, it draws extensively from the major ethnic groups in the United States as well as from worldwide, cross-cultural evidence (Rohner, 2002). Second, it draws from literary and historical materials going as far back as 2,000 years. Third, it draws from nearly 2000 empirical studies on parental acceptance and rejection since the 1930s to form a conceptual structure for explaining the Universalist perspectives incorporated into PAR Theory’s three sub theories (Rohner, 2005). These sub theories are described more fully below.

1.2. The Warmth Dimensions of Parenting. Human being everywhere experience more or less love or affection at the hands of parents must important to them as they grow. Theoretical model of child rearing most compromises two extents which can be described as the acceptance warmth as rejection and psychological self-sufficiency vs. control/ overprotection. Parental acceptance-rejection taken together from the warmth dimension of parenting on which all human beings can be placed. One end of this continuum marked by parental acceptance, which refers to the warmth, affection, care, concern, nurturance, support or simply love that parents feel and express toward children. The other end of the warmth is marked by parental rejection refer to the absence of significant withdrawal of these feelings and behavior and by the presence of a variety of physically and psychologically hurtful behaviors and effects. Parental rejection is usually expressed by any one or the combination of four different forms of behavior pattern (1) cold and unaffectionate, (2) hostile and aggressive (3) indifferent and neglecting, (4) undifferentiated rejection. When parents act on the feelings of love, they are likely to be affectionate. Expression of parental affection involves approval of children's behavior. All kinds of fostering; encouraging and loving behaviors are an expression of parental acceptance. Some children never experience parental affection. Rather they feel only the cold, affectionate expression of parent resentment and aggressions, indifferent and neglect on undifferentiated rejection.

Figure 1. Parental Acceptance and Rejection Theory
1.3. Parental Acceptance-Rejection and Personality. Parental acceptance-rejection and are uniquely linked with personality and mental health of children’s. Because the security and other emotional and psychological state of offspring’s have depended on the quality of relationship with their parents. This acceptance and rejection is an intimate pattern is also postulated to have a major influence on the child mental health and personality. The concept personality is defined as’ an individual more or less stable set of predisposition to response i.e. affective cognitive and motivational dispositions and actual mode of responding i.e. observable behavior in various life situations. This recognized that personality is formed with twin’s factors (environmental and biological.). Most of the researchers explain that the parental acceptance plays very important role in the child’s personality and mental health. However what these effects are on personality functioning needs careful explanation (Bowlby, 1969; Rotter, 1981). Rohner (2001) research program investigated the claims by Western social scientists that parental love is necessary to the healthy social and emotional development of children. After conducting about two thousand researches, many researchers stimulated directly by parental
acceptance-rejection theory (PAR Theory) and on the bases of this theory the researchers reached at one conclusion: Children all over the place need a specific form of positive acceptance from their parents and other primary caregivers. When positive acceptance from their parents is not met adequately, children in spite of variations in culture, gender, age, ethnicity, or other such defining circumstances be inclined to report themselves to be hostile and aggressive, dependent or defensively independent, low in self-esteem and self-sufficiency, emotionally unfeeling, emotionally unstable, and to have a negative world view. Moreover, children and adults who experience them to be rejected appear to be willing toward behavior problems and conduct disorders, to be depressed or have depressed affect, and they also willing to involve in drug and alcohol abuse, surrounded by other problems.

According to the Babree (1997) child development has focused on the impact of different child education styles. Many studies, using a variety of methodologies, have been conducted (Cheung & Lau, 2010). Orthogonal domains frequently emerge as primarily dimensions’ of child background styles. The first dimension in conceptualizes in terms of concept such as attachment, acceptance, hostility and rejection. The second dimension in conceptualizing in such terms such as monitoring, supervision, control and discipline. These are both individually and together significantly affiliated with a number of distinct personality characteristics and with many aspects of individual and socially organized behavior. Maccoby and Martin (1983) have also documented that degree of parental warmth and parental control is two primary dimensions’ of child rearing styles. Schaefer (1999) conceptualized that the warmth factors deal with the emotional relationships of the parents with the child and the control factor deals with restriction made upon child behavior and personality.

1.4. Parental Acceptance-Rejection and Personality of Children with Learning Disabilities. In the perspective of children’s psychological problems some researchers have conducted the researches to investigate the relationship between perceptions of parental acceptance-rejection and children’s psychological and biological problems. The results of these studies revealed that children who perceive their parents as more rejecting tend to experience from more psychological problems i.e. lack of confidence and below average adaptive and cognitive functioning as compared to those children who feel acceptance from their parents (Abdel-Rahman, 2003; Khalifa, 2003). However both biological and environmental factors correlated cause of mental retardation. Some most important biological factors are trauma/head injury, parents and genetic factors and metabolic diseases. Similarly psychological factors are parental neglecting and lack of social stimulus.

Due to the bad socioeconomic situations, lack of awareness, lack of facilities and other circumstances of Pakistan mental retarded children faced a number of personality and behavioral crises including communication difficulties, communicating their needs and wishes, lack of confidence, poor academic outcomes and low self-esteem that leads to frustration, stress, depression, insomnia, isolation and other bad psychological conditions. Mentally retarded children often face a higher degree of teasing and taunting due to their mental and adapting differences in Pakistani society. Without proper care or education, mental retarded children are at greater risk of becoming impoverished or homeless. People are not aware of the problems of mental retarded children; they do not take it a serious problem, that’s why mentally retarded children have bad psychological and social development. This was gap in research and my research fulfills the gap.

2. Method
2.1. Objective
• To investigate demographic differences in parental acceptance-rejection and personality of children with intellectual disabilities.

2.2. Hypothesis
• The demographic factors (i.e. gender, age, education, class, rural urban background, family system and birth order) will impact on parental acceptance-rejection and personality among children with intellectual disability.

2.3. Sample. The sample of the present study consisted of children with intellectual disabilities (N=100). Male children (n = 40) and female children (n = 60) were included in the sample. Purposive sampling technique was used. Age range of the sample was 10 to 13 years. Grade was contained to 6th, 7th and 8th classes.

3. Instruments
3.1. Parental Acceptance-Rejection Questionnaire. Acceptance Rejection Questionnaire (Father and mother Form) developed by Rohner (1980) and Urdu version by Haque (1981) was based on a list of parental acceptance-rejection among mentally retarded children. It contains 60 items and reliabilities are .72-.92. This subscales items are parental warmth, parental aggression and undifferentiated parental rejection 10 items and parental negelect 15 items.

3.2. Personality Assessment: Questionnaire. Personality assessment questionnaire for children developed by Rohner (2005) and translated by Haque (1981) was based on a list of personality and adaptive functioning and its reliabilities. It contains 42 items and it is four point Likert scale. PAQ range indicating serious healthy physiological adjustment to high 168 indicating maladjustment and reliability co-efficient is .76. These 42 items are further divided into seven subscales of hostility, aggression, dependency, negative self, adequacy, emotional instability, emotional responsiveness and negative view of world view.

4. Procedure. Children were selected from different Special Education Schools of Lahore and Gujranwala. The school children were approached in their respective institutions to collect the information. Children were informed about the purpose, significance and implications of the study in the future. They ensured to be confident, as the information obtained will be kept highly confidential on behalf of the researcher that their personal identities will not be revealed. Moreover, the information and data obtained from them will be specially be used for research purpose. Then informed consent was obtained from the participants before administering the questionnaires. Questionnaires were administered and collected data were analyzed by using SPSS.

5. Results. The present study aimed to investigate parental acceptance-rejection and personality among children with learning disabilities. The sample consisted of 100 Children. Sample took in the age range of 10 to 13 years male and female children. Statistical package for social sciences (SPSS) was used to analyze the data. ANOVA and t-statistics were applied to evaluate the hypotheses of the study.

5.1. Table 1. Comparison of Male and Female differences, Rural and Urban background on Parental Acceptance-Rejection and Personality among Children with Intellectual Disabilities

<table>
<thead>
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<th>Female (n = 60)</th>
<th>t(98)</th>
<th>Urban (n = 43)</th>
<th>Rural (n = 57)</th>
<th>t(98)</th>
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<td>26.2</td>
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<td>1.08</td>
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</tbody>
</table>

*p < .05, **p < .01

Results show that female children were higher on parental warmth whereas male children were higher on the
indifference. On personality female children were higher on hostility, negative self-adequacy whereas male children were higher on instability. Children belong to urban background were higher on parental warmth including mother and father warmth however children belong to rural background were higher on parental hostility and indifference; mother and father hostility as well as indifference. On personality urban area children were higher on dependency and negative self-esteem.

5.2. Table 2. Comparison of Educated and Uneducated Mother, and Family system on Parental Acceptance – Rejection and Personality among Children with Intellectual Disabilities

<table>
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<th>variables</th>
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<th>Nuclear (n=45)</th>
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<td>25.0</td>
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<td>94.7</td>
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<td>4.05*</td>
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</tbody>
</table>

*p < .05, **p < .01

Children with uneducated mothers were higher on parental hostility including mother and father hostility whereas children with educated mothers were higher on parental warmth both mother and father warmth. On personality children with uneducated mothers were higher on instability, and negative world view. Children belonged to the joint family system were higher on the father warmth and mother’s warmth as compared to the nuclear family system. On personality children with nuclear family system were higher on were higher on instability, negative world view, unresponsiveness and negative self-adequacy.
### Table 3. Comparison of Children Age and Class in Parental acceptance-Rejection and Personality among Children with Intellectual Disabilities

<table>
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<td>SD</td>
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</table>

*p < .01

Results show that middle class children were higher on the father’s warmth as compared to lower class children. On personality lower class children were higher on negative self-esteem and negative self-adequacy. Elder children were higher on the parental hostility, indifference and father’s warmth as compared to younger children who were higher on the mother's warmth. On personality elder children were higher on negative world view and child total.
5.4. Table 4. Comparisons of Children Birth Order on Parental Acceptance-Rejection and Personality among Children with Intellectual Disabilities

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<td>6.83</td>
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</table>

*p < .05, **p < .01

First born children were higher on father's warmth as compared with the other born children. On personality first born children were higher on negative self-esteem, negative self-adequacy and unresponsiveness.

6. Discussion: The study was conducted on a sample of 100 school going mental retarded children. Parental acceptance rejection questionnaire and a personality assessment questionnaire were used. Analysis of this study indicted co-efficient of alpha reliability ranges .92 to .76. This high alpha reliability shows the fact that scale is internal consistence. Findings show that female children were higher on parental warmth whereas male children were higher on the indifference. Children belong to urban background were higher on parental warmth however children belong to rural background were higher on parental hostility and indifference.

Children with uneducated mothers were higher on hostility whereas children with educated mothers were higher on parental warmth. Children belonged to the joint family system were higher on the father warmth and mother’s warmth as compared to the nuclear family system. Moreover results show that middle class children were higher on the father’s warmth as compared to lower class children. Elder children were higher on the parental hostility, indifference and father’s warmth as compared to younger children who were higher on the mother’s warmth. First born children were higher on father’s warmth as compared with the second born children. The current findings provide valuable insight for parents and teachers to make friendly policies for the welfare of children with intellectual disabilities.

Findings of this study reveal that children of higher socioeconomic status families, children of non-working mothers, those living in small families, and rural areas children are inclined to perceive their parents to be more accepting. They also perceived their parents as less neglecting, less aggressive and less rejecting when compared to other children. This supported the hypothesis children belonging to rural area will be higher as compared to the urban area (Abou-el-Kheir, 1999; Helewa, 1997; Salama, 1990; Taher, 2005). Ahmed and Gijelen (2008) studied that perception of parental acceptance-rejection and personality dispositions in Kuwait. The results reveal that parental rejection effects negatively on children’s personality and creates maladjustment, creates more aggressiveness and feelings of neglect in the children. Moreover results showed that males as compared to females tended to perceive their parents, and especially, fathers as less accepting, more rejecting, more aggressive and more neglecting.
Ruan and Rohner (2004) conducted a research to investigate the relationship between parental acceptance in childhood and psychological adjustment among Asian immigrants to the USA. The results revealed that perceived paternal (but not maternal acceptance) acceptance in childhood contributed uniquely and significantly to the children’s psychological adjustment. This also supported the hypothesis male will be high on parental acceptances rejection as compared the female. Khalique and Rohner (2011) suggest that parental acceptance and rejection may have a substantial effect on children's personality. Researchers also found direct and positive relation between parental acceptance and lack of maladjustment and negative relation between parental rejection and maladjustment among normal and disabled children (Greene & Moore 2000). These proofs provide a large portion of children's and adults' adjustment that are explained by a variety of factors such as other interpersonal relationships, sociocultural factors, and behavioral inherited factors. However, these proofs reported by researchers confirm that perceived parental acceptance-rejection by itself is generally a powerful predictor of psychological and personality development (Rohner, 2004).

7. Conclusion: The main objective of the present study was to find out demographic differences in parental acceptance rejection and personality among children with intellectual disabilities. The researcher was trying to investigate the effect of different demographic variables like age, gender, socioeconomic status and gender differences with study variables. In the light of the current findings and discussion gender difference were found. Female were high on parental acceptance rejection as compared to male. Birth order socioeconomic status and rural urban background also impacted on the child's personality. For further research following suggestion is recommended. The researchers take large sample so that finding can be generalized. Other factors should be included which can affect a child's personality such as socioeconomic status and parental support.

REFERENCES


EFFECT OF BANKING SECTOR PERFORMANCE IN ECONOMIC GROWTH, CASE STUDY OF PAKISTAN

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ABSTRACT: This study aims to explore the impact of banking sector’s performance on economic growth of Pakistan. Using a sample of ten commercial banks for the period from 2008 to 2012, we found a positive and significant association between measures of bank performance and economic growth. Results of linear regression show that measures of bank performance namely deposits, advances, profitability, interest earnings and investment have positive relationship with economic growth as measured by GDP. It is suggested to improve policy reforms in banking sector for economic development of Pakistan

Keywords: Banking Sector, Economic growth, Investment.

1. Introduction: Banking is one of the most essential business all over the world. Banks play very vital role in the economy of a country. The banking sector is a backbone of the country’s economy. Banking sector provides financial assistance to government and private sectors. In finance terms performance of the bank means profitability and stability in economic activities. If profitability of the bank is increasing constantly it mean that bank performance is increasing. The solvency position of the bank means ability to pay its debts, if the bank is in the strong solvency position it refers the bank performance is good. In the recent past the government interventions have been able to avoid a fall down in the banking sector. The banks are needed to take some measures to manage the risk and regular failure of the banking industry Jhon et al.(1994). The main objective of this paper is to provide evidence on factors that impact on profitability. What are the determinants of bank’s profitability and how financial statements and macroeconomic variables influence the profitability? As per the author's understanding no study has studied for the specific time and a number of banks. The study uses the data of the 21st century when the world economy has opened to different challenges Pasiouras & kosmidou (2007). The study also focuses the individual economy which has explored both internal and external challenges.

In Pakistan banks has well developed system, we conduct research on the impact of banking sector in the growth of Pakistan economy. In today’s World Banks plays a major role in each economy and acts as a financial institution which receive deposits from the general public at lower rate of interest and lend to another at higher rates. The difference between these rates is called the profit which is also called the bank spread. In Pakistan banks are a leading institution and banking sector is growing rapidly from the last two decades.

The main objective of this research is to examine the determinant of the banking sector. For measuring the growth rate as we know that competition in banking sector take place. Every bank wants to become a leading bank in society and try to provide the maximum services to their customers and get deposit from their customers.
and the bank lends these deposits to others in form of loan and earn profit which increases the banking performance in the economy due to their profitability. Many governments have been actively working on the eradication of failure problems of the banks. In the same way Pakistani government has also been working on how to eradicate this problem.

As we know that the banking sector is growing rapidly which has a positive impact on our economy and growth rate increases which is good for our economy. The banking sector is providing up to date services and products which are helpful for customers and everyone attract towards banks and open their accounts and maintain deposits with bank by which bank lend these deposits at a higher rate to others and earn profit which increases the bank profitability. For the last few years banking sector flourished and now banks give the facility of online banking through you transfer your amount to anywhere where you want. Most banks give this facility free of cost which attracts the customers and now a day’s public show more confidence towards banks. People maintain their deposits also gold in their lockers which banks provide the facility to their account holder and charge nominal fee against the locker facility. The banking sector is growing day by day. Banks maintain its position in the economy for the development. Banking sector plays a vital role in betterment of the economy due to this our growth rate increases which make our economy more stable and move towards development.

The banking sector has played a vital role in the economy. The economy flourished with the increase in the performance of the banking sector. In the present era there is a lot of competition takes place in the banking sector. Every bank is trying to compete another bank and want to take a higher place in the economy this is all due to competition and every bank is trying to compete other by offering latest product and services and trying to provide maximum facilities to their customers so that customer not divert to another bank and maintain deposit only with that bank which increase the bank profitability and bank have surplus money to lend.

2. Problem Statement. The banking sector is playing a vital role in the economy of the country but according to the current scenario the banking sector is facing the worst crisis. Dollar rate is increasing day by day. In our central bank we don’t have enough reserve for issue currency notes so that our currency devalued in the foreign market. In Pakistan the policies are very strict so that Pakistan facing the problem of the trade deficit, unemployment and inflation in our country is increasing day by day. Due to political instability and economic crisis in our country, the banking sector is passing from great disaster due to which financial performance of our banking sector is greatly affected. Merger & acquisition activities become now common & economic condition of our country are very poor that becomes a hurdle in growth of banking. Banking sector decline due to worst energy crisis. Energy crises in Pakistan is at peak point. Our whole economic collapse due to insufficient supply of energy. Most of the industries transferred their operations in another country. Huge amount of capital is withdrawn from the bank. FDI investor is not interested in Pakistan. Banks earning decline due to withdrawn of capital

Objective of the Study. The main objective of this study was to study the impact of banking sector on the economic growth of Pakistan.

• To analyze the performance of the banking sector.
• Importance of banking sector to overall economic development.
• Socio economic contribution of banking sector
• Policy reforms in banking sector are linked to overall economic growth.

3. Literature Review:
3.1. Economic growth: The gross domestic product is one of the most important economic indicators used by economic decision makers and government in planning and formulate the policies. Gross domestic product (GDP) is the most important economic indicator that tells us overall health of the economy. We are identifying its impact.

François Lequiller (2001) “If by growth you mean the expansion of output of goods and services, then GDP or preferably real GDP – which measures growth without the effects of inflation – is perfectly satisfactory. It has been built for this purpose. The letter P stands for “Product”, the result of production. Gross Domestic Product is defined as the sum of all goods and services produced in a country over time, without double counting
products used in other output. It is a comprehensive measure, covering the production of consumer goods and services, even government services, and investment goods”.

3.2. GDP and Profitability: Profitability is calculated by return on total assets. It stands for the ratio which measures corporation earnings before interest and tax expenses against its total assets. This ratio indicates the firm’s efficiency of using its assets to produce earnings. Investor look this ratio and decide whether or not to invest in the company. Greater income shows efficient use of company assets.

This ratio tells us how profitable a company is relative to its total assets. The return on assets (ROA) ratio explains how management is using the company’s total assets making a profit. The higher the return, the better organized management is in utilizing its asset base” (Francis et al., 2005).

H1: There is association between profitability and economic growth.

3.3. GDP, deposits and lending: Deposits are the money which people lend to banks and receive interest as profit. Banks use public deposits, without having deposits banks cannot able to invest and lend anywhere. There are different types of deposits like call deposits, saving deposits, Current deposits, and fixed deposits. After getting deposits banks give loan to needy people and receive interest.

H2: Deposits has some impact on economic growth.

H3: There is linkage between advances and economic growth.

3.4. GDP and investment: According to economist’s investments is the formation of newly created physical units like machinery, houses, factories, and goods inventories. According to finance, investment is the purchase of an asset or item with the hope that it will give healthy income or gain in the future and be sold at the higher price.

H4: There is association between investments and economic growth.

3.5. GDP and interest earning: An amount which company earn through its banks fixed deposits accounts and other investments.

Barth, Nolle and Rice (1997) studied that, significant difference in banking structure although many efforts are being made to create stability among variables. They use return on equity and return on asset as Dv to measure the performance of single bank. They stated proofs in favor of some banks specific variables. Bitzenis (2008) studied the banking changes in Serbia by using survey data results. Qualitative method has been use of results however this article find out the positive results.

Samolyk (1994) studied the relationship between the banking performance and economic growth at state level. Their study show the impact of banking performance on economice growth.

Contrary to this, Javeed et al, (2011) investigating on the factors affecting the profitability of banks in Pakistan. He takes the data of top fifteen commercial banks of a period 2005-2009. Purpose of this research is to find the relationship between bank profitability and the characteristics of banks. He adopts the methodology of (POLS) pooled ordinary least square to check the impact of loan, assets, deposits, economic growth in the major profitability of banks. Both internal and external factors have a strong impact on the profitability. In this the value of r square is 0.54 which shows that the 54% variation in the dependent variables. The result shows that size has positive relations with ROA. It indicates that larger banks have higher ROA.

Saleem (2008) invested on the technical efficiency of the banking sector in Pakistan. It takes the sample of almost 30 banks which includes foreign, local and private banks. It takes the data from banks between1995-2000 and measures the efficiency of banks in Pakistan. Pakistan is a developing country and it is in the process to maintain the market economy where the state bank play its role in establishing and make the banking sector efficient. The model which he used to investigate is the Data envelopment analysis (DEA) which is linear model technique and used for measuring the organization performance. The result shows that the there
is a potential in a bank to increase their efficiency. In paper efficiency score 100 shows that the bank is technically efficient.

Rehman (2011) conducts research on the banking. He wants to check the impact on growth of Pakistan through the banking sector. As you all know that today’s banks are involved in advances the credit to public and private at some interest rate through which bank can earn the profit which increases the profitability of banks and increases the performance of the bank. In his paper he takes the data of thirty years and through regression equation he checks the impact and the result which is found is that there is a positive impact of financial reforms on the economic growth of Pakistan. It is suggested to the Government to overcome the problem of inflation which makes more growth of the economy of Pakistan.

The theory shows the positive impact of risk taking behavior on its profitability. Rime (2001) also studied the relationship of risk taking behavior and profitability, he concluded that under the strict regulation policy and pressure bank can increases their capital. Koetter et al. (2007) also shown his research on the German banking sector, they stated that banks try to increase their capital ratio and attempt low and vice versa. Most significant studies conducted by Laeven and Levine (2009). They explored the relationship of ownership structure and banks profitability. They explained that all power is in hand of majority shareholder more voting right, owner force to take more risk.

H5: There is relation between interest earning and economic growth.

Conceptual Frame Work

2.1. Methodology: collect samples of 10 banks in Pakistan to check the banking sector performance in growth. In this research we have taken the secondary data, all types of data is collected from financial statements of banks. We take samples of 10 commercial banks and data which we collected is from 2008-2012. We have taken six variables, growth, deposits, investment, advances, profitability, interest earning. The dependent variable is growth and the independent variables are deposits, investment, advances, profitability, interest earning.

Data is collected from the financial statements of banks. The deposit is on the liability side of the balance sheet and these are deposits of customers maintained by banks in customer accounts. Advances are on the assets side of the balance sheet. Advances are the assets of the bank through which bank earns profit by lending it to borrow at some interest rate. Investments is also on the assets side of the balance sheet. The investment is basically which we have taken is invested in stock, securities etc. profitability (profit after tax)
is in the income statement. We have taken from income statement which shows the profits of banks. Interest earning is taken from the income statement. This is the earning which bank earns from advances, the rate of interest which bank charge on advances is interest earning. We take the percentages of all the data we divide each variable value on the total asset value and take the percentage of the data.

In this research we check the performance of bank on the growth and performance of being measured by deposits, investment, advances, profitability, interest earning. We check that these variables have a positive impact on growth or negative. We conduct research on this topic. After selecting the above mentioned variables, we check the impact of banking performance of Pakistan on growth in a following way

\[ \text{GDP} = f (\text{DEP, INV, ADV, PRF, INE}) \]

Where GDP represent the growth, \( f \) is the function and DEP, INV, ADV, PRF, INE, represent respectively, deposits, investments, advances, profitability and interest earning.

We can write in following way:

\[ \text{GDP} = \alpha + \beta_1 \text{DEP} + \beta_2 \text{INV} + \beta_3 \text{ADV} + \beta_4 \text{PRF} + \beta_4 \text{INE} \]

Table 1: Regression Analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>B</th>
<th>( R^2 )</th>
<th>( \Delta R^2 )</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>7.19</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deposit</td>
<td>-.036**</td>
<td>.501</td>
<td>.707</td>
<td>8.81***</td>
</tr>
<tr>
<td>Advances</td>
<td>.012*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment</td>
<td>-.034***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profitability</td>
<td>.037*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Interest</td>
<td>.036*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Conclusion. In this study we have researched the role of banking sector in the economic growth of Pakistan. We gathered data from time period 2008 to 2012 of 10 banks. We used linear regression model for analyzing the data. The table above shows the result of linear regression in SPSS. We can see in table Model Summary that \( \Delta R^2 \) value is 0.707, which represent the change explained by model. In the results deposit (-.36, \( P < .01 \)) and investment (.01, \( P < .05 \)) significantly negatively predicted GDP whereas advances (.34, \( P < .001 \)), profitability (.37, \( P < .05 \)), and interest (.036, \( P < .05 \)), were significantly positively predicted GDP:

\[ \text{GDP} = 7.194 - 0.036 \text{DEP} - 0.034 \text{INV} + 0.012 \text{ADV} + 0.037 \text{PRF} + 0.036 \text{INE} \]

It is to be suggested that in Pakistan banking sector is contributing a major role in economic development, so the policy makers have to adopt efficient policies that increase the performance of banking sector in Pakistan and which is much helpful for the economic growth.
REFERENCES

NEURO-LINGUISTIC PROGRAMMING AS AN INSTRUCTIONAL STRATEGY TO ENHANCE COMMUNICATIVE COMPETENCE OF LANGUAGE TEACHERS

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ABSTRACT: The research paper explores Neuro-linguistic Programming as an instructional strategy in language teaching to enhance communication competence of language teachers. The research paper, furthermore addresses Neuro-Linguistic Programming and its potential in academia with the prime aim of examining its role in i) enhancing communicative competence of language teachers and ii) investigating its effect on mode of language teaching in educational settings. To achieve this end, 20 ELT teachers and 20 students were selected purposively. The teachers were taught to become aware of their students representational styles and use them while communicating with them. Students were asked to rate their teachers on communicative competence scale before and after usage of NLP strategy. The results of the co-relational analysis and t-tests exhibited a positive association between communication competence and usage of NLP by teachers, resulting in more goal oriented and student centered language learning. The teachers who employed NLP as an instructional strategy were rated high on communicative competence scale proving the effectiveness of NLP as strategic tool for enhancing learners’ output.

Keywords: Communication Competence, Educational Setting, Representational Styles, Neuro-Linguistic Programming.

1. Introduction: Teaching and Learning languages with the help of new methodologies has been an age old phenomenon. Today the academic domain has become increasingly competitive with the advent of new perspectives and technological interventions. As a result professional competence and ability of educationists to deliver the knowledge and ensuring involvement of students has become altogether more demanding. To address these core issues teachers are expected to develop their own teaching procedures informed by a particular requirement of the discipline, students’ needs and a particular theory of learning. Keeping in view the demanding educational requirements, academicians worldwide are engaged in revising and modifying spectacles of teaching/learning based on the performance of the learners and their response to various instructional strategies. Specifically speaking, in a language learning context the goal of communication acquires more significance due to its transference of shared meaning. Consequently, the ability to choose a communicative behavior which is both appropriate and effective for the learner of language becomes a great challenge.
In this regard researchers like Helm(1989) and Yero (2002) studied use of variety of instructional techniques to improve communication with the students. They believed that language teachers in particular must use “every possible tool” and NLP is one of the most useful instructional strategy that can enhance students performance, in this regard. Therefore, employing NLP techniques in classroom environment especially while teaching languages may turn into a groundbreaking development in field of education.

2. Communicative Competence and Language Teachers: Language teachers tend to be capable and apt in the use of socio-interactive procedures for teaching. It has been historically proven that communication competence of teachers enhance communication competence of students. Communication is thus, the most important manifestation of social interaction. As a result the effectiveness of language teaching is largely a product of communication process.

Bjekić et al. (2008) defined teacher’s communicative competence, building on Spitzberg and Cupach’s (1989) model of the communication competence. According to this definition, the communicative competence includes teacher’s formative professional competence, knowledge, skills, abilities and motivational disposition which enable effective communication in the teaching process and other educational social interactions. This indicates that teachers with better communicative strategies are more competent in conversating, behavioral manifestations (gests, visual direction), social relations, empathy, and listening skills. The language teachers for this reason have to pay much attention to communicative aspect based on new instructional strategies. These strategies offer a wide spectrum of possibilities for teaching language and acquiring competence. NLP is one such strategy that can be used to improve communication competence. Thus, the present research aims to assess and improve communication competence of language teachers by using NLP as an instructional strategy.

Usage of NLP as an instructional strategy for Language Teachers: Neuro Linguistic Programming, a term and an approach, initially developed by Bandler and Grinder in 1970’s focuses on fostering communication process and facilitating the learning process in the individual’s development. They proposed that if people were able to figure out the way they attempt something successfully then by understanding the thoughts, experiences of life and communication, they can emulate the process in training other people too.

Similarly, O’Conner and Seymour (2002) view NLP as an amalgam of art and science aimed at personal excellence (p.1) encapsulating uniqueness of personal style. In an educational setting Tosey, Mathison, and Michelli (2005) argue that it is a field which has prospects of innovation due to its wide range of techniques such as representational style, modeling and meta-analysis. They believe that learners and teachers together can make use and apply these techniques both within the formal and informal education settings. In the same vein, Craft (2001) tried to explore the relationship between NLP and learning. She asserted that NLP is a set of practical strategies people use to achieve the desired outcomes in their lives to be successful. According to her views, NLP collects and gathers words, thoughts, and behaviors to achieve the goals.

Sharpley (1985), and Tosey and Mathison (2003), NLP educators, are of the opinion that all teachers in some manner influence their learners’ responses by virtue of language usage. Many of them use NLP techniques to achieve educational objectives without being aware of it, or may unintentionally use language in its negative way. Therefore, using NLP helps teachers to reflect on their behavior and be conscious of what they are doing and saying in the classroom which in turn makes the learning environment more conducive. Furthermore, Millroad (2004) conducted three workshops, for 16 experienced English teachers of at least five years of teaching experience, to enhance their awareness of NLP in their classroom discourse. The result was that teacher discourse could be considered as a tool of success or failure in learners through creating congruence via NLP strategies. In another attempt, Legall and Dondon (2006) mentioned the problem of recent student’s behavior evolution and suggested NLP as an instrument to motivate students and enrich the quality of teacher learner relationships.

In essence, based on NLP, teaching becomes a process of creating states which encourage learning by facilitating learners’ exploration of their internal representations and help achieve desired goal. Helm (1989)
stated that NLP techniques give a good chance to foster learners’ learning and communication skills. NLP principles have proven to be notably influential in language acquisition specially second or foreign language learning (ESL/EFL). In this regard Richards and Rodgers (2001) have found NLP an ancillary technique in teaching second language learners. Besides, Tosey and Mathison (2003) offered NLP strategies a viable solution to classroom problems. Millroad (2004) views this technique as “An approach to language teaching which is claimed to help achieve excellence in learner performance” (p. 28). Kudliskis and Burden (2009) suggested NLP principles as “given away” to teachers and students facing exam anxiety and other related pressures.

The NLP model links many behaviors and verbal cues to thought processes. One of these discovered links is between eye movements and representational systems. Thus, by studying both verbal cues and eye movements, a person can develop a much better understanding of others internal thought processes.

**Purpose of the study:** The research is an attempt to explore the application of NLP in the language learning context, especially to improve instructional strategy of teachers. The relationship between NLP and variables in teaching for instance emotional management, ability to get the message across, effective communication, feedback and empathy were studied as part of communication competence.

The study attempted to answer the following questions:

1. Does the use appropriate use of representational system (NLP technique) enhance the communication competence of teachers?

2. Does the enhanced communicative competence influence teacher’s instructional strategies in language teaching/learning context?

**Problem Statement:** To assess the difference in performance of communicative competence of teachers by using NLP Technique (representational system styles)

**Sample of the Study:** The sample of the present study included 20 male and female ELT teachers of a private university and at least 20 students from to assess the communication competence. The sample was selected purposefully as in-depth information was required to study the differences in communication competence of teachers due to training of representational system styles.

**Description of scale (communication competence scale):** Communication Competence Scale was developed by Aftab in 2005. The scale consist of 36 items. A high score indicates competent communication and vice-versa. The scale measures communication competence of an individual.

**Scoring of communication competence scale:** The communication competence scale is five point likert type scale statements are scored on a rating scale ranging from "strongly disagree, disagree, neutral, agree, strongly agree". The minimum score is 58 and maximum score can be 209. It consists of both positive and negative items. The scoring is revised from the negative items. Emotional management (4, 10, 13, 22). Ability to get the message across (1, 12, 9). Effective communication (3, 7, 17, 23, 24, 25). Feed back (6, 19, 20, 21, 36). Compulsive communication (8, 9, 18).

**Operational Definition of Communication Competence:** Communication Competence is the ability of a person to initiate and complete the process of communication successfully or even satisfactory to gain once objective. (Aftab, 2005).

**Methodology:** The study was divided into three phases. First phase included a brainstorming session where few questions were asked from a group of 20 university ELT teachers to assess this connection. For example, asking the teachers a series of questions involved some decision making in the past. Then the questioner observed, the eye movements of the respondent as he or she goes through the decision-making process, thus helping the interviewer discover which representational
systems, the individuals used at each stage in the process. Eye movements are similar in most people and usually indicate the following:

- When people look up and left, they are visualizing something from the past. Thus, they have visual representational styles and the preferred modes of communication with them are visual.
- When people look sideways to the left, they are hearing sounds from the past. Thus, have auditory representational style and predicates to be used with them include auditory words.
- When people look down and to the left, they are talking with themselves in a kind of internal dialogue. They have kinesthetic mode of communication.

After assessing their representational systems these teachers were then dispersed and were requested to come again after a week. Meanwhile researcher collected data on communication competence of each teacher by asking their students to fill a questionnaire measuring it. Observations were also done to assess the usage of NLP in class room by teachers.

In the next session teachers were elaborated on their specific representational system styles and were grouped according to them. They were taught to be aware of their specific representational system style and then to use them in everyday life especially to increase competence in classroom. Observations were again recorded to assess their usage of NLP in classroom.

In third phase of study, communication competence questionnaire for each teacher was refilled by their students and the differences in phase 1 and phase 2 were then assessed.

**Results**

Table 1. Alpha Reliability Coefficient of Communication Competence Scale

<table>
<thead>
<tr>
<th>Sub scales</th>
<th>No. of items</th>
<th>Alpha Reliability</th>
<th>Total n=20</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Males (n=10)</td>
</tr>
<tr>
<td>Emotional Management</td>
<td>4</td>
<td>.380</td>
<td>.384</td>
</tr>
<tr>
<td>Ability to get the message across</td>
<td>3</td>
<td>.532</td>
<td>.351</td>
</tr>
<tr>
<td>Effective Communication Feed Back</td>
<td>6</td>
<td>.679</td>
<td>.592</td>
</tr>
<tr>
<td>Listening</td>
<td>2</td>
<td>.577</td>
<td>.564</td>
</tr>
<tr>
<td>Empathy</td>
<td>5</td>
<td>.629</td>
<td>.630</td>
</tr>
<tr>
<td>Compulsive Communication</td>
<td>3</td>
<td>.582</td>
<td>.502</td>
</tr>
</tbody>
</table>

Alpha reliability of sub-scales of Communication Competence within different sample categories (N=20)

The table depicts that the communication competence scale and subscales are reliable ranging from .380 to .679.

Table 2. Frequency of NLP usage by Language teachers during pre-test and post-test phases

<table>
<thead>
<tr>
<th></th>
<th>Pre test Group</th>
<th>Post test Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 out of 20 teachers</td>
<td>20 out of 20 teachers</td>
<td></td>
</tr>
</tbody>
</table>

During the initial phase of study teachers were interviewed and observed to assess their usage of NLP as instructional strategy in their classroom and it was found that after teachers became aware of their own
representational styles, they became more apt in using them in class room.

Table 3. Mean, Standard Deviation & paired sample t-scores of pre-test and post-test groups on communication competence

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>M</th>
<th>S.D</th>
<th>Paired sample t test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>20</td>
<td>12.8</td>
<td>11.08</td>
<td></td>
</tr>
<tr>
<td>Post test</td>
<td>20</td>
<td>10.5</td>
<td>10.78</td>
<td>10.46</td>
</tr>
</tbody>
</table>

Level of Significance (alpha) $\alpha = 0.05$

Mean differences among pre-test and post-test groups depict that usage of NLP has significant impact on communication competence.

Table 4. Correlation between Communication Competence and Usage of NLP (N=20)

<table>
<thead>
<tr>
<th>Teachers</th>
<th>1</th>
<th>2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- CC</td>
<td></td>
<td>.082**</td>
</tr>
<tr>
<td>2-Usage of NLP</td>
<td>.082**</td>
<td></td>
</tr>
</tbody>
</table>

Note. CC=Communication Competence, NLP=Neuro linguistic Programming

The table shows positive correlation between usage of NLP and communicative competence of teachers.

3. Conclusion: The findings of the study indicate a significant relationship between use of NLP techniques and an enhanced learning atmosphere. This finding confirmed that NLP factors have a positive correlation with communicative competence of teachers which in turn benefits the learners. This study was an attempt to find a co-relation of communicative competence in educational settings in relation to NLP. Further studies can be conducted to examine additional discrepancies as well as the impact of other variables including teachers’ personality types, emotional intelligence and IQ with regards to NLP. The exploration of effectiveness of NLP strategies in educational setting can prove to be the potential research areas of future researchers. Moreover, the findings substantiate the fact that language teachers are more successful in their career if they improve their instructional strategies with new research methods like NLP strategies. On the other hand, it seems that teachers in language institutes are more eager to use NLP techniques even if they are not so experienced in the realm of teaching.

Communicative competence of teachers has vast impact on student learning ability. As the profession of teaching is an interactive communication process, so the communicative competence as a potent teaching tool is to be strengthened with the help of systematically organized in-service training programs.

Considering the teachers’ role in today’s world, it is need of the hour to educate and train the teachers who will be capable of facilitating classroom communication to meet demands of a highly competitive socio-industrial set up. Development of interactive skills and improvement in communication strategies along with communication alternatives could redefine the entire learning process and benefit students in the long run. For this matter an approach to understand causes and consequences of their communication actions in a classroom setting ought to be devised. Moreover, new techniques and approaches like NLP could pave path for finding and applying the best communication alternatives in order to devise suitable strategies for various learning settings to maximize learning outcomes.
REFERENCES


SCALABILITY ANALYSIS OF MPLS LABEL DISTRIBUTION PROTOCOLS RSVP

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ABSTRACT: MPLS has a choice of two signalling protocols CR-LDP and RSVP-TE. Both protocols have the ability to provide QoS, constraint based routing, explicit routing and traffic engineering in the core network. In this paper both signalling protocols performance is analyzed and its conclusion helps ISP and carrier providers to make a better choice of signalling protocol as per their needs. The paper reviews the advantages and disadvantages of both signalling protocols and then compares the CR-LDP and RVSP-TE in term of bandwidth and throughput of a link for a small and large scale network using video traffic.

Keywords: MPLS; RSVP-TE; CR-LDP; LSP; LSR.

1. Introduction. Since the internet becomes widely available for public and commercial use, there has been a tremendous growth in the internet traffic. Many multimedia, real time applications and services have been developed in the internet market. These applications have created a significant demand for guaranteed bandwidth and Quality of Services (QoS) demand on from the internet core services [2]. Initially the Internet used relatively simple protocols for routing purposes. In this traditional layer – 3 IP routing method, packet forwarding decisions are made after looking up the destination IP address from the routing table maintained by each router [4][3]. This simple IP based network neither support Resource Reservation nor guarantees bandwidth to carry their customer’s heavy and delay sensitive traffic [9].

Multiprotocol Label Switching (MPLS) is intended for service provider core network or large enterprise networks. MPLS enabled network provide traffic engineering, bandwidth management, and quality of services to IP and other protocol traffic. MPLS has a choice of two signalling protocols CR-LDP and RSVP-TE. Both protocols have the ability to provide QoS, constraint based and explicit routing and traffic engineering in the core network. It is not an easy task to select a route that can offer the correct resources. These resources must be retained to guarantee that they are not stolen or shared by any other traffic [1]. This paper analyzes both protocols performance and its conclusion helps ISPs and carrier service providers to make better choice of signalling protocols as per their needs.

1.1 Why MPLS: For the past two decades, following are the carrier network technologies, which were used for the purpose of providing WAN connections.

1. Frame Relay
2. ATM
3. X.25
4. IP

In all these pre-MPLS technologies the same techniques were used to divide the network traffic into the discrete and manageable, smaller chunks and assigned them IDs to each of them to manage their flow separately. Then, these individual units were called Packets in IP network, Frames in Frame Relay network and Cells in ATM network [10]. In the start, the WAN links use to carry out their traffic of different protocols with the help of Frame Relay or ATM networks. But customer started to use these layer-2 links to build their layer-3 private networks over it, after the development of the widely spread of IP and Internet.

Now there was a desperate need to find out a mechanism to map layer-2 and layer-3 connection. The problem was that, that ATM had many service classes but it was not an easy task to translate them into an IP Classes [10]. What MPLS does here is, it merges both of the layer i.e. layer-2 and layer-3 in way that it gets the properties of both techniques and illuminates the weaknesses of both. In detail, on one hand MPLS is making use of ATM switches to have a feature of faster layer-2 switching and on the other hand MPLS uses these switches to use IP control plane to have one IGP peer relationship only with its neighbouring nodes.

![MPLS Basic Network](image)

2. MPLS. It was designed by Internet Engineering Task Force (IETF) for the purpose of traffic forwarding. The MPLS provides an efficient and effective traffic flow through the network. In MPLS network for the flow of packet this mechanism is followed. Information is contained in a fixed-length Label, which routes the packet through the MPLS network. With each IP packet this Label is attached between the layers 2 and 3 headers, by Ingress Label Edge Router (LER). The Ingress Label Edge Router (LER) Receives the packet form the IP network via incoming connected interface and performs the lookup in the Forwarding Information Base (FIB) for the purpose of finding corresponding label to this destination address. If it finds the label inserts a label with this packet, if it does not than the packet is forwarded through the normal IP routing protocol. For incoming packets the complex process of filtering, analysing and classification are performed and then the packet is assigned to Forward Equivalence Class (FEC). Now it’s the responsibility of Forward Equivalence Class (FEC) to determine the requirements for this packet like bandwidth, QoS and than deciding which Label Switch Path (LSP) should be used for this packet. Than the next step is the forwarding of this FEC assigned and label attached packet to its neighbour downstream Label Switch Router (LSR). The packet through the MPLS network arrives at the Label Edge Router (LER), it receives this labelled packet through the incoming connected interface and performs the lookup in the Forwarding Information Base (FIB) for the purpose of finding the outgoing label for this packet. The process of swapping and mapping of the label takes place for the incoming packet with outgoing label if it finds any. The process of swapping and mapping is also known as Label Push and Label Pop. The packet finally arrives at the egress Label Switch Router (LSR) through this repeated process of Label Push and Label Pop. Now finally, the
removal / Push last Label from the packet takes place at the egress Label Switch Router (LSR) and then the packet is forward through layer-3 routing to its outgoing interface.

2.1 MPLS Signalling Protocols. The LSP setup and the Label assignment processes should be completed in an MPLS network before the traffic forwarding process takes place.

LSP can be setup using two major methods:
- Control Driven LSP
- Explicitly routed LSP also referred as CR-LSP

The main difference among these techniques is, in control-driven LSP method path definition is decided by the routing protocol and on the other hand in explicit routing method this path is decided by the network engineers and management. The IP protocol determines the outgoing interface for each LSR, through which a label request is send to its next hope node. This process takes place in control-driven LSP method.

In case of CR-LSP LSP method, setup message contains and specifies the route information, then this message travels via all the LSRs and finally to the egress LSR. Each node on the way sends a label request to its neighbour or next-hop LSR, which is already defined in the setup message.

The MPLS network requires a mechanism to send control signals to and from LSRs to establish and manage LSP operation.

There are two different types of protocol proposed by the Internet Engineering Task Force (IETF) for each method of LSP setup and maintenance.
1. Label Distribution Protocol (LDP) for control-driven LSP
2. RSVP-TE and CR-LDP for CR-LSP

Both CR-LDP and LDP are similar, with extra capabilities like setting up CR-LSP, and support of QoS and Traffic Engineering features. Similar type of case is with RSVP-TE, which inheriting all the features from generic RSVP with plus like traffic engineering and ER-LSP capabilities [11].

2.2 Requirements for MPLS signalling protocol. For smooth MPLS operations and efficient signalling mechanism the signalling protocol should have the following features.

Robustness- In this feature of signalling protocol the signalling system should ensure in time message delivery and reliability in terms of a prompt.

Scalability- In order to provide a large scale carrier services, the signalling protocol should support huge number of sessions, LSPs and LSRs and should provide the desired level of performance. Each and every signalling protocol requires more or less computing and memory overhead form LSRs and Bandwidth form link, in order to perform their operations.

QoS Specification- To ensure the requirements of QoS for sensitive traffic and for multi-media traffic, the signalling system should be able to able to encounter the delay, bandwidth and losses associated with LSPs.

LSP Setup/Teardown/Maintenance- In the signalling protocol the basic and most important functionality of the signalling system is to make setup, maintain it and then drop LSPs when not required. LSP Priority/Pre-emption- In the signalling protocol this is the feature of QoS. Using this feature to prioritise LSPs the particular LSP can maintain the required bandwidth associated with it. With the help of this feature of LSP prioritising, LSPs having a higher priority can pre-empt lower priority LSPs and they can occupy the lower priority LSPs resources, if there is not enough bandwidth available for the higher priority LSP. This feature of LSP priority ensures smooth and permanent flow of traffic through an LSP which has highest priority.
**Route flexibility** - This feature of route flexibility offers great flexibility especially in the absence of the information about the specification of a complete network. This feature gives great ease and configuration flexibility to the network operator when he is defining the LSP path. Operator has the choice of defining a loose or strict CR-LSP and plus can define a pin loose LSP to make sure it existence when it is setup.

**Re-routing and convergence** - In MPLS networks this is one of the most important feature, this feature of MPLS network makes sure that the customer get the non-stop flow of his traffic through the core network. This will also include completing setup an optimized backup link ready to use before the failure of the primary link. Further more in case if the link fails the signalling system should be capable of sending a small message even through a busy link and should identify the failure and replace it with the new one [11].

3. **Comparison of Signalling Protocol Topologies.** In this section we will compare the capabilities of signalling protocols CR-LDP and RSVP-TE, with respect to related key issues, problems and network requirements. Which have the ability to impact the network performance?

3.1 **Scalability.** If we define the term Scalability in signalling protocol, the scalability is measured in terms of traffic flow of the control signals. I.e. resource requirements (computational and memory overhear of LSRs), bandwidth utilization. As we know that CR-LDP makes use of hard state algorithms, so it creates, maintains and releases LSPs using these algorithms. Another advantage of CR-LDP is that it sends minimum number of messages for the status of each session.

![Comparison of Bandwidth Utilization by Using RSVP and CR-LDP](image)

*Figure 2: link utilization as number of LSPs increase [11]*

To maintain TCP session the CR-LDP will only send the Hello and KEEPALIVE signals to peer LSR. Due to this end-to-end connection oriented approach there is no increase in the overhead and effects on network performance when the number of LSPs increases. On the other hand in RSVP, it sends large amount of refreshing traffic over the network after a specific amount of time or interval for each session this is because of using IP datagram which is connection less approach. In this approach there is a risk of signal lost while on their way to destination.

These overheads consume significant amount of network resources, although there has been massive increase in the hardware specification and network bandwidth. RSVP has undergone through many extension in order to reduce these refreshing message overhead, so that we can make use of the bandwidth effectively for the transmission of data not for signalling traffic itself. Changes include suppression of refresh messages, message aggregation and extensions to hello protocol for the purpose of peer loss detection. With the addition of these changes the RSVP is being mould from soft-state model i.e. by adding hard-state properties. Instead of sending individual refresh message it send group/aggregate refresh message. Moreover it makes a good use of message ID to know the status of the session, which reduces the cost of computing on the node to check each refresh message. In this process, only ID of the message is checked by the node if the id is different from the previous message this will depict the change in state from last. If the message ID is same the time and resources are not wasted reading it. These changes are
effective but on the other hand these changes also again introduce some additional processing overheads. These changes introduce the following overheads like detect changes, manage message ID, duplication ID, loops and avoid errors etc. These overheads results in reducing the capability of a node to support number of LSPs, so extra computing and memory load on nodes. In the new versions of RSVP, it hasn’t got prompt refresh message, which effects RSVP badly on some features such as rerouting, recovering notification and failure. These changes have entirely modified the nature of RSVP and it has lost feature like reusability.

3.2 Interoperability: The manifestation of CR-LDP multi-vendor Interoperability trail proves the interoperability of CR-LDP. It is an open standard protocol which is fully capable to work with other vendor protocols. Moreover the CR-LDP signalling protocol is backward compatible with the legacy protocols. On the other hand, there have been no compatibility test manifestation for RSVP so far and it is going through transition phase.

3.3 Reliability: In order to ensure a reliable transfer of the customer data, reliability has become the core issue for the core network. CR-LDP makes use of TCP as a transport protocol which is connection oriented for the LSP setup/maintenance, peer discovery, failure recovery and label creation/distribution etc. Especially in the case of node or link failure prompt indication message is sent, which goes through the transport layer reliably to end-point node to let him know about the failure. Using same architecture a response is sent to that end point which sends recovery or route signals to other node [6]. On the other hand, RSVP is making use of connection less UDP as a transport protocol which is unreliable. There is an absence of notification message in case a failure occurs. As an alternative the RSVP sends periodic refresh messages using the same unreliable process to verify the session status. The CR-LDP has the explicit tear down message but the edge LSR will not start rerouting until the expiry of cleanup timeout interval. This is because of unreliable transport. The recommended cleanup timeout interval is 90 seconds and refresh interval is 30 seconds according to RFC 2205. The recommended time to start rerouting is too long for fast, reliable and efficient carrier generally. But on the other hand if we reduce this time interval it will cause update traffic load on the network and gives birth to scalability problem.

The same unreliable protocol is used for the purpose of sending recovery and rerouting message. The RSVP protocol is unable to guarantee QoS and traffic engineering to the customer traffic, due to these unreliability and latency issues.

3.4 Simplicity: The RSVP signalling protocol makes use of ‘downstream-on-demand’ as a distribution, label allocation and binding mode. The RSVP hasn’t got the ability of supporting any other mode. In case if want to use other mode like ‘downstream unsolicited’ mode, both the signalling protocols RSVP and CR-LDP have to be running on the same network at the same time. This will make the network very complex and very difficult to manage and configure, which will result in increasing the cost. Plus in order to define network policy and provision of QoS and service class, network operator will have to configure the sender and receiver end individually.

![CR-LDP LSP Setup Mechanism](image)

**Figure 3: CR-LDP LSP Setup Mechanism [1]**
In contrast to RSVP, in CR-LDP configuration for all these settings are needed only on sender side, end-node is configured. Plus using the features of CR-LDP like multi-modes support makes it easier and simpler to manage and setup [7, 5].

4. Conclusions: Both RSVP and CR-LDP are equally capable to provide MPLS network QoS and traffic engineering features. Mainly, they use different transmission protocol for signalling which makes big difference in their performances. CR-LDP is originally designed for signalling and solves many issues except security and multicasting. Main advantages of CR-LDP are its scalability and reliability due to its connection oriented TCP based operation. CR-LDP creates session with its peering node and sends hello packets only to its neighbouring node through TCP to update the path and node status.

REFERENCES

COMPUTATIONAL ANALYSIS REVEALS THREE MICRO RNAs IN HEPATITIS A VIRUS GENOME

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ABSTRACT: Micro RNAs (miRNAs) are a class of endogenous non-coding RNAs, 19—25 nt in length, that play a pivotal role in the regulation of gene expression by degrading the messenger RNAs of target genes in a sequence-specific manner. Dysregulation of miRNAs results in abnormal gene expression and has been linked to the initiation, advancement and maintenance of some human diseases. Recent studies show that genomes of both virus and host have the potential to encode miRNAs, which may be beneficial either for host or for virus. Hepatitis A is one of the liver inflammations, instigated by the hepatitis A virus (HAV). In this study we, for the first time, computationally identified miRNAs in HAV genome. Initial searches through VMir software extracted 7 sequences with potential hairpin-like structures from HAV genome. MiPred program confirmed 6 candidates as real pre-miRNA hairpin structures. After measurements of free energy and applying other parameters, we confirmed three mature miRNAs in HAV genome. These findings will not only help researchers to explore the role of these miRNAs in viral pathogenesis but also in developing novel antiviral therapies.

Keywords: MicroRNAs; miRNAs; Hepatitis; Hepatitis A Virus; HAV

Introduction: MiRNAs, previously known as small temporal RNAs (stRNAs), represent a class of 19—25 nt long, endogenous RNA molecules that play a vital role in post-transcriptional regulation of gene expression by guiding the RNA induced silencing complex (RISC) to bind the messenger RNAs of target genes in a sequence-specific manner thereby causing their cleavage or translational repression (Dong et al., 2013; He & Hannon, 2004; Moreno-Moya, Vilella, & Simón, 2013). These tiny molecules have been implicated in plethora of cellular processes including developmental timing, cell fate determination, neuronal plasticity, cholesterol metabolism, immune responses, apoptosis, cell cycle and tumorigenesis (Grundhoff & Sullivan, 2011). Lines of evidences suggest that miRNAs are embedded not only in the intergenic regions of genomes but also in protein coding genes (Dong et al., 2013). MiRNAs are first transcribed as long transcripts known a primary miRNA (pri-miRNAs). One to several precursors of miRNA (pre-miRNAs) may be embedded inside each pri-miRNA transcript. Consequently, the nuclear RNase III enzyme, Drosha processes each primary miRNA into its constituents of 60—70 nt long precursors of miRNA which fold into an imperfect stem-loop structure(s) and acquire characteristic hairpin shape while still in the nucleus. The resultant miRNA precursors are transported to the cellular cytoplasm by the exportin-5. Here these precursors are further sliced into ~22 nt long duplexes under the action of RNase III Dicer enzyme (Dong et al., 2013). The mature miRNA then enters the multiprotein RNA induced silencing complex (RISC). RISC then leads to either degradation or translational silencing of the target mRNA, which in turn depends on the extent of
complementarity among the RISC bound micro RNA and target messenger RNA (Moreno-Moya et al., 2013; Okamura, Ishizuka, Siomi, & Siomi, 2004).

Beside animals, plants and insects, many virus genomes have been reported to contain miRNAs (Grundhoff & Sullivan, 2011). These virus encoded miRNAs have been shown to play key roles in virus-host interactions by targeting both host and virus miRNAs of various important genes (Grundhoff & Sullivan, 2011). The Epstein–Barr virus (EBV) genome was shown to encode five miRNAs, each of which has not only the capability to regulate the expression of virus gene involved in latency but also modulates host cell gene expression (Pfeffer et al., 2004). The identification of miRNAs in some double stranded DNA viruses revealed their evolution to use RNA silencing potential for regulation of the expression of viral genes, host cellular genes, or both, which needs further investigation to assess whether net benefit is to virus or host (Sullivan & Ganem, 2005). Some of these miRNAs have been identified through experimental strategies like cDNA cloning and confirmed by Northern blotting while the rest are identified computationally (Grundhoff & Sullivan, 2011). Experimental techniques for identifying viral miRNAs are technically challenging, laborious and time consuming. Computational prediction methods serve as fast, better and more affordable for exploring novel miRNAs and range from custom-made programs used to search for hairpin loops and other features like thermodynamics stability to advanced algorithms using machine learning approaches (Gomes et al., 2013).

Hepatitis A is one of the liver infections, caused by hepatitis A virus (HAV) which has a single chain RNA genome of 7478 nt size. Hepatitis A happens sporadically and in epidemics all over the world. Every year, approximately 14 lac people around the world suffer from this disease (Matheny & Kingery, 2012). To query whether the strategy of transcribing miRNAs is employed by HAV also, we computationally analyzed HAV genome for miRNA-encoding potential.

Materials And Methods:
Source of Genome: In silico prediction of miRNAs in hepatitis A virus (HAV) was performed by downloading the complete genome sequence of hepatitis A virus. The retrieval of the genome sequence of strain K02990 was carried out by the genome data bank (NCBI). The GenBank entry is (http://www.ncbi.nlm.nih.gov/nuccore/329596?report=genbank). The genome size of this strain is 7478 nucleotides.

Pre-miRNA Extraction: HAV genome was scanned through VMir software (program version 2.3, scoring algorithm version 1.4) for hairpin-structure miRNA precursors (pre-miRNAs) (Sullivan & Grundhoff, 2007). Initially, sequences which acquired fold-back, hairpin shape were considered as potential pre-miRNAs candidates.

Extraction of Potential Pre-miRNA Candidates: Pre-miRNA candidates were investigated for secondary structure prediction and minimum free energy (MFE). Sequences with a hairpin-like secondary structure, having lower MFE (equal or less than −25 kcal/mol) were selected as potential miRNA precursors.

Confirmation of Real Pre-miRNAs: In the next step, real and pseudo miRNA precursors were distinguished using MiPred program (Jiang et al., 2007) with RF algorithm (http://www.bioinf.seu.edu.cn/miRNA/) (Xue et al., 2005). BLASTn tool on the NCBI database was used to keep only unique sequences and remove any repeated sequences.

Prediction of Mature miRNA: Finally, mature miRNA sequences were predicted by Bayes-SVM-MiRNA online web server v1.0. The web tool can be accessed at (http://wotan.wistar.upenn.edu/BayesSVMmiRNAfind/). The overall computational prediction procedure is represented in the form of a flowchart Figure 1.

Results And Discussion: VMir analysis of HAV genome reveals that miRNA precursors are extensively distributed across the viral genome and seven high scoring filtered hairpins (with scores between 133 and 220) are located between nucleotides 2500 and 7500.
These candidate miRNA precursors were assigned a VMir score. These candidates are widely dispersed across the viral genome and seven high scoring filtered hairpins (with scores between 133 and 220) are located between nucleotides 2500 and 7500. Figures 2.a and 2.b show the locations and VMir scores for unfiltered and filtered hairpins. These seven sequences with potential hairpin-like structures were analyzed for the secondary structure validation through RNAfold web server (Figure 3). The web tool is available at (http://rna.tbi.univie.ac.at/cgi-bin/RNAfold.cgi).

Almost all miRNA precursors attain the characteristic stem-loop hairpin shapes. Therefore, numerous pseudo pre-miRNAs (sequences with analogous stem-loops) can be found in many genomes. In order to distinguish the real pre-miRNAs from pseudo ones, we used MiPred program, a hybrid tool with combined features like local contiguous structure-sequence composition, MFE and a Monte Carlo randomization test (Jiang et al., 2007). MiPred makes prediction at 98.21% specificity and 95.09% sensitivity. MiPred was used with default parameters to analyze these 7 sequences. Out of the total 7 sequences, MiPred confirmed 6 candidates as real pre-miRNAs like hairpin sequences. After performing BLASTn searches, and analyzing these sequences for MFE, a total of 4 sequences were screened as potential miRNA candidates.

Bayes-SVM-MiRNA web server v1.0 offers two classifiers i.e. SVM and Naïve Bayes for the identification of mature miRNA candidates. This web server predicted the formation of mature miRNAs in only three sequences. The positions of these 3 mature miRNAs inside the stem-loop hairpin structures are shown in Figure 3. Computational methods are widely used for the identification of miRNAs most of which mainly rely on hairpin structures of pre-miRNAs as well as other features like evolutionarily conserved nature of sequence. Similarly, other approaches like phylogenetic shadowing strategy remained effective for identification of novel miRNAs. Recently proposed algorithms are independent of microRNA sequence conservation and have facilitated in detection of mouse, human and viruses microRNAs. However, it is quite interesting to know that virus encoded miRNAs have undergone rapid evolution i.e. their homologs are lacking in other viruses (Cai et al., 2005). This demands the development of novel and improved algorithms for ab initio prediction of microRNAs.

Previous studies targeted on viral miRNAs, mainly in herpesvirus family, shed light on the role of these miRNAs on virus-host interactions during viral infections and pathogenesis (Pfeffer et al., 2005; Veksler-Lubinsky, Shemer-Avni, Kedem, & Ziv-Ukelson, 2010). It has been reported that viral miRNAs down-regulate host’s immune defense genes and hence take part in immune evasion (Stern-Ginossar et al., 2007). Viruses increase the chances of their survival by resisting the host defense system through an intricate strategy which is comprised of protein-facilitated as well as microRNA-facilitated regulations. Viruses, for instance herpesviruses, which have extended dormancy stages, required to retain infected cells of the host alive for a long time period. This session is significantly prolonged by those viruses which cause latent infection. Thus, viral miRNAs can support virus replication by at least two ways i.e. extending cell existence and eluding immune recognition. It has been suggested that those microRNAs which are transcribed by dormant or tumor developing viruses may interact with the host cellular factors which are assumed to be responsible for antiviral processes and hence creating the cellular environment favorable to viral latency and oncogenesis (Yao & Nair, 2014).

Future studies combining bioinformatics with microarray would be helpful to clear the image of host-pathogen interactions modulated by viral microRNAs. Moreover, the functional analysis of the identified HAV microRNAs in pathological processes is mandatory which would be helpful in designing new preventive and antiviral therapeutic strategies.

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Table 1. Sequences and Genomic Positions of Predicted miRNAs in HAV Genome

<table>
<thead>
<tr>
<th>S.No</th>
<th>Predicted mature miRNA sequence (5’ to 3’)</th>
<th>Position, orientation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>AGGAGCCACUGAUGUGGAUGG</td>
<td>2653-2673, +</td>
</tr>
<tr>
<td>2</td>
<td>AAGGACUGUCUUGUGUUGGUA</td>
<td>4868-4888, +</td>
</tr>
<tr>
<td>3</td>
<td>AUCUGGUUCAGUUUGGAGUUG</td>
<td>5325-5345, +</td>
</tr>
</tbody>
</table>
Hepatitis A Virus genome (7478 nt)

VMir Analyzer

341 miRNA precursor candidates

VMir viewer

7 pre-miRNAs candidates passed the filter

MiPred

6 sequences selected as real pre-miRNAs candidates

Lower minimum free energy and BLASTn searching

4 mRNA precursor candidates

Bayes-SVM web server

3 mature sequences predicted

Figure 1. Flowchart of the Computational Prediction Process

Figure 2.a

Figure 2.b

Figure 2. VMir analysis of the HAV genome; (a) represent the unfiltered output from the VMir prediction. All hairpins that fold in 35 or more windows and achieved a VMir score of 115 or above are shown. (b) only those
hairpins are shown which passed the filter and achieved a VMir score of 130 and above. Hairpins are plotted according to genomic location and VMir score.

**Figure 3. Secondary Structures Of Pre-Mirna**

A.

B.

C.

**Figure 3:** Secondary structures of the three pre-miRNAs using RNAfold program
Figure 4. Secondary Structure Predictions of HAV Pre-miRNAs. The putative mature miRNAs sequences are shown in red

REFERENCES:

A.  

A AA CAAU UUC A GGA A  
UACCAUC ACAUU GGUGGCCUUU UUGU AGUUGU UAGA CC U  
AUGGUAG UGUAG UCACCGAGGA AAUA UUAACA AUUU GG —  
G -- CACU --- — A-- U

B.  

UU A— CU U —— A UA— GCC  
UUCAUU UUA AAAUC CACA GAUAUGUU GA UGU AUUUG A  
AGGUAG AUA UUUG AGUGU CUGUACAG UU ACN UAAAC —  
GU AA UU — GAA A UAG AAA

C.  

G GUAGAG C G AAU A AGUU  
GCA AUCCA UC CA UCAACUCUAGA AGC GGAUU A  
UGU UAGGU AG GU GGUGAGGCUU UUG UCUAA G  
G AAAAA— A — GAC G AAAG


A NOVEL SURVEY ON: MOBILITY BASED ROUTING IN VEHICULAR AD-HOC NETWORKS (VANETs)

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ABSTRACT: Vehicular Ad-hoc Network (VANETs) is a derived version of Mobile Ad-hoc Network (MANETs). They are on its own configured infrastructure-less network. They provide communication facility between vehicle to vehicle (V-V) and vehicle to infrastructure (V-I). Vehicles follow different mobility patterns due to variations in speed. As vehicles have high mobility and dynamic topology; the tendency of change in mobility pattern is always a critical issue for VANETs. Many protocols have been proposed for solving mobility problems in VANETs. In this paper a qualitative outlook of the protocols commonly used are shown and discussed.

Keywords: Ad-hoc Networks, VANETs, Wireless Sensor Networks (WSN), Mobility.

Introduction: Vehicular Ad-hoc network is a derived form of MANETs. It may be vehicle to vehicle (V-V) and vehicle to infrastructure (V-I) wireless communication network [4]. It is self-configuring and autonomous wireless network. Currently, there are many research projects [5] around the world which are under the domain of VANETs. Communication in VANETs contains information flow from vehicle to vehicle (V-V) or vehicle to road side fixed access point (V-I). There are various applications [16, 26] such as driver assistance, map location, automatic parking, driverless (autonomous) vehicles etc.

For the wireless access in vehicular environments (WAVE) IEEE 802.11p standard is defined by IEEE 802 committee. 75 MHz of the bandwidth has been assigned to vehicle to vehicle (V-V) for short range communication while 5.9 GHz for vehicle to infrastructure (V-I) communication respectively. Dedicated short range communication (DSRC) is also used by VANETs [9]. DSRC is suitable for 1km range used both by (V-V) and (V-I) [32].

As in figure 1, VANETs, have vehicles which tends to move with high speed. Causing the topology to change frequently. The expected mobility in VANETs have some characteristics which make it different from MANETs. Mobility may lead to topology changes, link failure, Quality of service degradation, overhead, and latency [20]. This paper will focus on mobility problem of nodes and provides a qualitative outlook of the unicast routing protocols commonly used in VANETs and also the parameters of those protocols like Quality of service, performance, link failure, overhead, latency [20] etc. The rest of the paper is organized as follows. Section II presents routing protocols whereas section III defines related work. In section IV selected routing protocols and there critical study is discussed. Section V contains discussion and results and section VI presents comparison table and finally this paper is concluded in section VII.
Routing Protocols: This paper gives details on routing protocols used in VANETs and how these protocols work. Different author’s research work will be considered and how they use these protocols to solve the problems related with mobility and there future works.

1. Routing protocols Classification
Routing protocols can be categorized into three main groups.
- Proactive(Table-Driven)
- Reactive(On-Demand)
- Hybrid(combination of Proactive & Reactive)

1.1. Proactive Routing Protocol: Proactive protocols also called as Table-driven routing protocols. In proactive routing every node maintains routing table [6]. The nodes send update messages periodically, in this way all the nodes update their routing tables. Protocols in this group do not have route discovery delay because routes are already maintained. But these protocols consume lot of bandwidth due to periodic update messages [13].

1.2. Reactive Routing Protocol: Reactive protocols are also known as on-demand routing protocols. In these protocols, nodes having no routing information in case of no data transferring. When a node wants to communicate with another node then these protocols are invoked [6] by sending route request message (RREQ). Protocols in this category have low overhead because links are only maintained during data transfer. But these protocols having high delay because initially nodes does not have routing information [17]. Protocols present in this category are DSR, AODV (may be any cast [1] or unicast or broadcast), and TORA etc.

1.3. Hybrid Routing Protocol: Hybrid protocols combine the best features of both proactive and reactive routing protocols [17]. Its main purpose is to condense the route discovery delay in reactive scheme and routing overhead in proactive scheme. In this scheme network is divided into zones. Intra zone (inside the zone) use proactive mechanism and inter zone (between zone to zone) use reactive mechanism [21].

Hybrid routing protocol (HRP) includes some protocols like ZRP, HARP and CBDRP.

Figure.2 Classification of routing protocols
III. Related Work: In recent years, researchers have more focus on VANETs due to their several applications [5, 14, 16]. VANETs provide internet facility, important information and weather condition etc. Due to high mobility of vehicles and quick topology alterations, routing in VANETs is a challenging task. Many protocols proposed [32, 36, 37] in recent years to solve the problems related with mobility.

In research papers [4, 5, 13, 30, 31] the protocols are compared according to some parameters in order to find out an adaptive protocol for VANETs.

In this paper we compared the unicast (some have multicast capability) routing protocols for VANETs by selecting 2 parameters (overhead and latency) related with vehicles mobility.

1. Quality of Service Parameters
   1.1 Latency
   In VANETs, the term latency refers to the quantity of time a data packet takes while transferring from one node (vehicle) to another node (vehicle), so latency refers to time interval or delay [15, 29]. The network latency is low if it having small interval/delay times and high if large delay/interval times.

   1.2 Throughput
   The amount of data packets transferred from one node (vehicle) to another node (vehicle) successfully in a unit time [7]. The greater the throughput will give result in faster data delivery.

   1.3 Overhead
   The overhead [26] in the VANETs refers to the amount of extra resource utilization like bandwidth, battery life etc. Network performance is degraded when the overhead is greater and vice versa.

   1.4 Link failure: Link failure is the failure or break down of the connected link through which the data is sent. Link failure is due to mobility, node fails, fault etc. [10]. For the detection of link failure nodes send small messages.

   1.5 Jitter: Jitter refers to the variations between the times of incoming packets [27]. Jittering is caused by network overhead and transmission link changes.

2. Mobility Models: Mobility models determine the movement pattern of nodes (vehicles), and also describe how the acceleration, velocity and the position of nodes (vehicles) change with respect to time [23]. These models estimate the future position of nodes and they are used for the simulation of protocols. To conclude the performance of protocol mobility patterns plays a key role. Various mobility models are proposed for wireless ad-hoc networks like Random way point model [28], Random walk model, Manhattan mobility model. The selection of specific model affects the results of simulated protocol [11]. That’s why it is important to select a suitable model.

IV. Selected Routing Protocols

1. Optimized Link State Routing Protocol (OLSR): The OLSR routing protocol is designed for ad-hoc wireless networks [24]. This protocol is table driven (proactive) and optimized form of link state protocol for ad-hoc networks. Every node (vehicle) in this protocol maintains routing table which contains routes information to all others nodes (vehicles). For routes information this protocol periodically exchange update messages. Proactive nature of this protocol provides immediate route whenever the route is needed. This protocol uses reduced control packet size and also reduces flooding of control packets by using selected nodes only. In reaction to link failure this protocol does not produce any extra control traffic. This protocol does not depend upon any central node and works in distributed fashion.

2. Destination Sequenced Distance Vector Routing Protocol (DSDV): DSDV is a table driven routing protocol for ad-hoc networks that works the distance vector approach [38]. Each node (vehicle) transmits update messages to its neighbors periodically in order to maintain routes. DSDV update message contains three things
   a) Destination address
   b) Hop Count
   c) Sequence Number.

Every entry in the routing table must contain sequence number generated by destination node. Sequence number may be even or odd, even sequence number means link is present. When the link has been broken odd sequence number is assigned. The protocol uses shortest path to implement only one route with less number of hopes to the destination and also this protocol provides loop free routes. The distribution of route information could be sent in 2-ways.
   a. Incremental updates (transmitted more frequently when small changes occur).
   b. Full dumps updates (the whole routing table is sent infrequently to its neighbors when no movement is occurs).
New sequence numbers are generated when the topology of the network is changed. Periodic update messages are consuming small bandwidth when there is no data transmission.

3. **Dynamic Source Routing Protocol (DSR):** DSR is an On-Demand (Reactive) routing protocol designed to eliminate the bandwidth consumption in table driven approach by control packet [35]. In DSR the source specifies the whole optimum path to the destination in the packet header, that’s why it’s called source routing protocol that refers to route discovery. Each node contains a route cache in which routes are stored. No route discovery is performed if route is already in routing table. If a route cache has many paths to the destination then choose optimum path according to some criteria that refers to route maintenance. Path is invalidated and error message is sent to the source when link failure occur.

4. **Ad-hoc On-demand Distance Vector Routing Protocol (AODV):** It is an on-demand (Reactive) source initiated routing protocol, source sends RREQ (Route Request) message to its neighbors. By receiving the route RREQ message the destination sends RREP (Route Reply) to the source [22]. This protocol is designed to overcome routing overhead because node having information about next hop [12], unlike DSR in which the source specifies the whole path to the destination. AODV use sequence number to offer loop free paths, also it recognizes the latest path on the basis of that sequence number. This protocol have larger delay as compare to table driven protocols. Intermediate nodes having information only about its neighbor which can lead to inconsistent path (Hidden terminal problem). In case of node failure on active route RERR (Route Error) is generated by its neighbor. When link is failed new route RREQ is initiated which leads to extra delays and causing overhead.

5. **Zone Routing Protocol (ZRP):** In this protocol [25], the overall network is partitioned into intersecting zones. ZRP is a hybrid routing protocol which combines the best functionalities of table-driven and on-demand routing protocols. This protocol use reactive mechanism for inter-zone (zone to zone) communication when destination node and source node are not in the same zone, while for intra-zone (same zone) use proactive mechanism when both destination & source nodes are in the same zone. The benefit of this protocol is to reduce overhead among different zones by using reactive approach and proactive approach used to reduce delay with in the same zone. The maintenance of routing information is easier in intra-zone because the number of nodes are limited.

6. **Cluster Based Directional Routing Protocol (CBDRP):** CBDRP is a hybrid routing protocol designed for ad-hoc networks [36]. In this protocol nodes (vehicles) are divided into clusters having same traveling direction. In every cluster there is a cluster head which is responsible for exchanging of routing information. Cluster heads of different clusters communicate with each other. In CBDRP source node forwards its message to the header of its own cluster. If destination is in the same cluster then the cluster head forward message directly to the destination, if destination is not in the same cluster then the header forwards the message to the cluster head having the destination node, then cluster head deliver message to the destination node. In CBDRP links are maintained when there is one cluster head in in-between clusters. Unlike other protocols overhead is less because the cluster head are responsible for exchanging of routing information. And overhead depends on the number of clusters not on individual nodes.

**V. Discussion and Results:** In this section, performance evaluation of selected routing protocols: OLSR, DSDV, DSR, AODV, ZRP and CBDRP for CBR (UDP) traffic connection is achieved using two basic parameters of performance i.e., throughput and delay while speed is varying [3, 8, 18]. We analyze these protocols in two different scenarios where number nodes are different.

**Scenario A:** In scenario A, the selected protocols are analyzed for nodes in the range of 1 to 10 where packet size is 512 bytes and rate of transmission is 5 Packet/Sec. Variation in speed occurs and is changed from 0 m/s to 30 m/s. Results are collected from [3, 18, 19, 34].

**1.1 Throughput:** In figure.3, comparison of nodes in terms of throughput is shown. It is observed that ZRP gives lower throughput as compared to other protocols. In all selected protocols, in scenario A, DSDV and AODV throughput in the given speed variation is comparatively high.
1.2 Delay: In figure 4, comparison of nodes in terms of latency is shown. It is noted that the DSR protocol has fluctuating delay. In all selected protocols, in scenario A, ZRP delay in the given speed variation is comparatively low, while the delay of CBRP is comparatively high.

2. Scenario B: In scenario B, selected protocols analyzed for nodes in the range of 40 to 50 where transmission rate is 1Mb/s and packet size is 512 bytes. Speed is changing from 0 m/Sec to 60 m/Sec. Results are collected from [2, 8, 18, 33, 34] as shown in figure 5 and figure 6.

2.1 Throughput: In figure 5, comparison of nodes in terms of throughput is shown. It is pointed out that the throughput of AODV is higher as compared to other selected protocols. In all selected protocols, in Scenario B, DSDV throughput in the given speed variation is comparatively low.
2.2 Delay: In figure 6, comparison of nodes in terms of delay is shown. It is observed that the Delay of DSR is higher than other protocols, while the delay of AODV is lower than DSR. In all selected protocols, in scenario B, ZRP delay in the given speed variation is comparatively low.

VI. COMPARISON OF SELECTED ROUTING PROTOCOL

<table>
<thead>
<tr>
<th>Protocols</th>
<th>OLSR</th>
<th>DSDV</th>
<th>DSR</th>
<th>AODV</th>
<th>ZRP</th>
<th>CBDRP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameters</td>
<td>Latency</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
<td>High</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Throughput</td>
<td>Good</td>
<td>High</td>
<td>High</td>
<td>Average</td>
<td>Low</td>
</tr>
</tbody>
</table>

Table 1. Comparison of different R. Protocols

VII. Conclusions: In VANETs routing is an essential parameter. This paper has presented a survey of existing routing protocols and their critical study. We have selected certain parameters associated with mobility and compared routing protocols such as OLSR, DSDV, DSR, AODV, ZRP and CBDRP according to those parameters.
In scenario A, one protocol outperforms than the other but the same protocol is not efficient in the other scenarios. Also one QoS parameter have good value for one routing protocol and other QoS parameter have good value for the other protocol. That’s why one protocol is not fit to meet all traffic scenarios. Therefore protocol should be designed according to the environment. This research paper will be helpful for the researchers and students interested in the field of VANETs. Also, it will facilitate them in having brief and concise information provided. Future work may include implementation of all protocols in particular scenario in term of environment irrespective of number of nodes. Analyze protocol performance, for other QoS parameters like link failure, jitter, etc.
REFERENCES


COURSE GRADE PREDICTOR USING ASSOCIATION RULE MINING

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ABSTRACT. Higher education is delivered to the universities and recognized academics institutes. One of the biggest challenges to the higher education is to explore the data and use the data to improve the quality of education. In this paper we perform a case study on computer science courses of a university in Pakistan. This study is used to predict the grade of the student in a course on the basis of the previous grades. The association rule mining is used to find out the interesting pattern from the data. This technique is very useful for grade prediction. We performed the preprocessing of data to get quality results. In order to show the effective results, the data is divided into two parts, first part shows the preprocessed data and other was without preprocessed data. We compare the results and found reasonable accuracy.

Keywords: educational data mining, association rule mining, course grade predictor

1. Introduction. Teacher evaluation plays an important role in predicting the grade of student. We can predict the grade of a student in a course if teacher evaluate the students correctly and honestly. This information helps in making decision to keep the quality of education high. Students are allocated sections on random basis as a result there is a mix quality of students in each section. Even if the instructor takes an average approach students at extreme will suffer. So it would be better if the there is less diversity in the class in terms of student quality. One can predict the grade in a course by passing his own parameters in the system. This way he would be in a better position to make decision if that is the right time to take the course or not. The students are future of the nation. The pass out students of university play a vital role in their field. If the students are passed out from the university in good grades it is better for their future progress. Sometimes the student takes more time to pass out their degree, because of improving grades in the course. The poor practice to pass the course is to enroll in the course until get best grade in the course. It will consume a lot of time and wastage of money as well. Most of the student cannot afford to get lower grade, to maintain or improve their
GPA. Another thing, which will make difference by these students, are the class environment. The teacher can perform well according to his/her abilities. When the student come to the class and has an idea of securing grade in that course, will eventually has positive effect on the attitude of the student.

In order to avoid these conditions, prediction of grade in the course before enrollment will be a good practice. The action happens and then human mental approach work on it. We can predict through previous record. To predict the grade in the course, it will be easy for student to take decision on enrollment of next courses. This will save the time and money as well. It will improve the quality of education. The enroll students are very determinant towards their goal in course either they will get more than the predicted grade. It is very good for the instructor to deliver their best with good environment in class. The prediction of grade can be accomplished through data mining technique [1-3].

One of data mining technique is association rule mining. It mines the interesting pattern from the data. The association rule mining can generate the strongest rule which shows the association of the course grades. One student get the good grade in C1 course what grade one can take in C2 course by finding the strongest rule of C1 and C2.

In this paper we are going to apply the association rule mining [4] on the grades of the student in a course. The data is divided into two parts. The data is preprocessed by cleaning the duplicate data, removing useless attribute, merging and grouping the data by finding maximum from the instance. The association rule mining is implement on both parts of the data. It will helpful to identify the quality of results.

2. Paper Organization. This paper has different section. Section 3 describe the motivation and contribution of this work. Section 4 give the literature review of the work. Section 5 defines the methodology of the work. Section 6 defines the result of our work.

3. Contribution. Our study will have significant effect on student as well as on educational environment. It will improve the student’s decision making on course enrollment. The teachers have also dedicated and determinant students, which make healthy classroom environment. At the end, improve the quality of education. This study predicts the grade in the course through association rule mining.

4. Related Work. A lot of work is done to implement data mining techniques on the student record in semester to predict the performance of the student. The different algorithm of data mining has been used in education sector in different perspective. It is used to enhance the education system by discovering multiple patterns.Behrouz et al. [5] work on the prediction of final grade on the basis of homework done throughout the semester. There are tree classifier and non tree classifier applied on the web-based data of students.W.M.R. Tissera et al. [6] presents a real-world experiment conducted in an ICT educational institute in SriLanka. A series of data mining tasks are applied to find relationships between subjects in the undergraduate syllabi. This knowledge provides many insights into the syllabi of different educational programs and results in knowledge critical in decision making that directly affects the quality of the educational programs.Amelia et al. [7] present the G3P-MI to solve the problem of predicting a student’s final grade based on his/her work in VLE from MIL perspective. The effectiveness of solving the problem is checked through representative paradigm of multiple instance learning and the results are compared. Experiments show that G3P-MI has better performance than the other techniques at an accuracy of 0.743 and achieves a trade-off between sensitivity and specificity at values of 0.702 and 0.775.Sajadin et al. [8] take University Malaysia Pahang (UMP) student data of semester 2007/2008 and describe the relationship between behavioral of student and their final academic performance. They apply decision tree j48 on the data and generate the strongest rule from it. The SSVM is applied on the rules to predicate student final grade. They apply k cluster to represent the strongest correlation between behavior of student and final grade. M.A Anwar et al. [9] applied Apriori algorithm on undergraduate engineering student English, mathematics and programming course data. The purpose is to provide guideline to education administration to improve and revise the teaching methodology and restructuring curriculum and modifying pre-requisite requirement of the various courses. This study identify that the student which perform better in English and mathematics will definitely perform better in programming courses. One student which is better in English only cannot perform better in programming course.Dr. Varun Kumar et al. [10] applied association rule mining on the graduate and post-graduate student. The study identifies the student’s interest, curriculum design, teaching and assessment methodologies effect on student’s grade. Another most interesting thing are found through this study, the post-graduate student which studied same course in graduate improved their grade.
5. **Methodology.** We have taken the computer science students grades data from one of the university of Lahore in Pakistan. Data has been taken from department to analyze and predict the grade. The data consist of 808 instances and 36 attributes. The type of data is nominal. There is an assumption of no inter dependency. All the attributes represent the courses offered in a period of time.

We have used WEKA for performing experiment. Excel sheet is used for preprocessing of the data. The possible values of the course are A+,A-,B+,B,C+,C,D+,D,F. It ranges from highest grade to lowest grade. The grade system followed by the university is A+,A-,B+,B,C+,C,D+,D,F. The data is divided into two parts. 1) preprocessed data 2) without pre-processed data. The association rule mining is applied on both the data.

5.1. **Preprocessing.** Data pre-processing is very important in knowledge discovery. The quality of analysis of result depends upon quality of data. The data gathering process are loosely controlled data. The data can be noisy (containing errors or outlier values that deviate from the expected), incomplete (lacking attribute values or certain attributes of interest) and inconsistent (containing discrepancies). Data pre-processing consist of Data cleaning and Data transformation. Data cleaning include the cleaning of data by filling missing values, correcting noisy data, removing outlier and resolving inconsistencies. Data transformation operations like normalization and aggregation are additional data preprocessing procedures that would contribute toward the quality of mining interesting patterns. The student has enroll in a course multiple times to improve the grade in the course. We take the maximum grade from the repeated courses of student. The data is duplicated because of the course code are unique but the names are same. We merge those courses and get the proper grade. There are few steps involve in the pre-processing of data.

1. Grouping
2. Remove useless attribute
3. Remove useless instances
4. Merge
5. Convert into binominal

5.1.1. **Grouping.** There are different grades to the same course in data. The students took the course more than one time to improve the grade. There are multiple grades against one course of a student. The grades are grouped according to students grade in a course. The grouped grades are converted into number. We find the maximum number from the group. The numbers are converted into the grade.

Let S is the set of students \{S1, S2,…Sm\} take the courses \{C1,C2,…..Cn\}. The students took different grades in same course are grouped in set \{g1,g2,…,gk\}. Each element in grade set are values shown in table 2. In order to find out the maximum grade in a course. We have to take the following steps.

1. Replace the nominal values to numeric values shown in table 1.
2. Find out the maximum value from the set in equation 1
3. Replace the numeric value to nominal value.

\[
\text{Max(getgrade(SiCj))}
\]  

(1)

**Table 1. Numeric values given to grades**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>9</td>
</tr>
<tr>
<td>A-</td>
<td>8</td>
</tr>
<tr>
<td>B</td>
<td>7</td>
</tr>
<tr>
<td>B+</td>
<td>6</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>C+</td>
<td>4</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
</tr>
<tr>
<td>D+</td>
<td>2</td>
</tr>
<tr>
<td>F</td>
<td>1</td>
</tr>
</tbody>
</table>
5.1.2. **Remove Useless attribute.** The data consist of the attribute which have same value. It does not make difference in the result. We have to remove the useless attribute from the data.

5.1.3. **Remove Useless instances.** The data consist of useless instances. The useless instance in data is EX. There are 22 instances of EX we have remove such instances from the data.

5.1.4. **Merge.** The data consist of the different codes of the same course. We merge these courses. The maximum value are extracted from same courses with different codes. Let the course is $C = \{C_1, C_2, C_3, \ldots, C_n\}$, the course code is $CC = \{CC_1, CC_2, CC_3 \ldots CC_n\}$. If the same course has different course codes, e.g. $CC_1$ and $CC_2$,is the course code of the course $C_1$. The maximum grade of the code of course is selected by using in equation 2.

$$\text{Merge}(CC_n(\text{getmax}(SiC_j)))$$

(2)

5.1.5. **Convert into Binominal.** The data consist of the attribute which have same value. It does not make difference in the result. We have to remove the useless attribute from the data.

6. **Mining Frequent items and Association.** Association rule mining finds interesting relations and/or correlation among large set of data items. In order to understand the mechanism of association rule mining on the data, it is discussed below.

Let $\{C_1, C_2, \ldots , C_{44}\}$ be set of items of courses. Let $D$, be the set of database of students, where each student $S$ is a set of items of grade such that $S \subseteq C$. Each record shows the student grades in courses, this is represented as student identifier (SID). Let $A$ be a set of grades in courses. A student has grade in course $A$ if and only if $A \subseteq S$. The implication form of association rule is $A \Rightarrow B$, where $A \subseteq S$, $B \subseteq S$, and $A \cap B = \emptyset$

Support(s) and confidence (c) are the parameter to measure the rule interestingness. They reflect the effectiveness and confidence of the discovered rule respectively. A support of 4% of the rule $A \Rightarrow B$ means that $A$ and $B$ exist together in 4% of the student grade database. The rule $A \Rightarrow B$ having confidence of 60% in the student grade database means that 60% is the percentage of student grade database in $D$ containing $A$ that also contains $B$.

7. **Result and Discussion.** We have used Apriori to get the interesting rules because we had not the large amount of data however if that would be the case frequent pattern growth could be applied to overcome the performance barrier. We have experimented with different values of min support and confidence to get the interesting rules. We have found some interesting hidden rules that could be of significant help for the academician in decision making. The top 5 rules are mentioned in table 2. The Rules gives an insight in the system that is also validated by Teachers e.g Rule 1 Suggests that those students who are good in Mathematics gets good grades in programming courses that are offered earlier in degree. Rule 2 Suggests that those who are not good in the prerequisite courses maintains there grades in the subsequent course. Rule 3 and Rule 4 Suggest .Those who are good in the humanities courses are unlikely to get good grades in programming courses.

These rules will be helpful for the new comers enrolled in the earlier semester. They will be familiar how the core courses will help them to maintain the CGPA. These result will help student to decide the enrollment in the course.

In future we will also consider the other physiological and environmental behavior as parametrs. We will infere the rules by using intelligent techniques. We will optimize the rules to predict the grades in better way.

<table>
<thead>
<tr>
<th>Rule</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>calculus=A -&gt; computer programming=A</td>
</tr>
<tr>
<td>2</td>
<td>PF = C -&gt; OOP = C</td>
</tr>
<tr>
<td>3</td>
<td>English=A and communication skill=A -&gt; computer programming=C</td>
</tr>
<tr>
<td>4</td>
<td>Programming=A and calculus=A and oop=A-&gt; management=C</td>
</tr>
<tr>
<td>5</td>
<td>Linear Algebra = A -&gt; Computer Vision = B</td>
</tr>
</tbody>
</table>

Table 2. Top-5 rules from Weka
REFERENCES


IDENTIFICATION OF COMMUNICATION NEEDS AND SPOKEN COMPETENCE OF BUSINESS EDUCATION STUDENTS IN ENGLISH FOR SPECIFIC PURPOSES

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ABSTRACT: Policy makers and academicians are focusing on designing innovative research areas for professional development of students. Communication skills shape an important part of and lead towards successful segment of professional development. The purpose of this study research was to study the communicative needs of business students in English for Specific Purposes context. It further aimed at examining the weaknesses in English speaking skills and the spoken competence level of business students. The sample of the study was 160 students of Business Education Program of a university. The sample was selected using convenient sampling technique. Oral Proficiency test and Checklist were used to collect data on grammar, accent, comprehension, coherence, vocabulary, fluency and confidence. The collected data was analyzed in quantitative terms. The results revealed that the students of Business Education Program lacked grammar, comprehension, fluency and confidence regarding using English for Specific Purposes. They were found good at technical vocabulary, accent and coherence. The study recommended measures to improve spoken competence of business education students for ESP.

1. Introduction. English is dominating at national and international level in all domains of life. New learners of English have got much importance because they are required specific English according to their profession and demands of the markers. The language teaching professionals have developed the courses to fulfill the needs of the learners. However, professionals and students are facing problems particularly the students of second/foreign language because the designing of specific course in the ESP context is not fulfilling the needs of the students.

The professional students need to develop English proficiency and the ability in order to execute it in personal and group communication activities in both oral and written forms. The industry, academy, core subject teachers, students and the English teaching fraternity themselves often found that the students ability to produce their own language to communicate in English is fairly feeble and quite incomprehensible.

Apart from specific career selection, one should be proficient to English speaking and formal writing to achieve something in this most demanding world. On the other hand communication has become the lifeline of every organization and organization is a group of people, to flourish and function their organization they have to communicate and exchange information to set rules for making decisions, agreements and contracts etc. (Herbert & Murphy 1997). Speaking skills enhance Communication as well as professional skills, helps in personality development and improves relationships among societies.
In Pakistan, focus is on teaching/learning grammatical structures and vocabulary rather than its usage in varied contexts. Students are often seen tumbling in speaking skill especially when they step into their professional life. This test is concerned to know the proficiency level of business students in order to suggest the ways to improve their spoken to pacify the demands of profession. Speaking is a very important communication skill. This study is aimed at knowing the level of oral communication skills of the sample, as it is essential for survival in professional field where English is the language of communication.

The present study may be useful for:

- Institutions to provide suitable infrastructure.
- Policy makers to modify the syllabus according to the students needs.
- Teachers to improve their teaching methodology.
- Students to improve their learning styles.

The study is designed to identify, investigate and examine the communicative needs of business (MBE) students in ESP context.

1.1 Objectives of the Study

1. To identify communicative needs of the business students.
2. To examine the spoken competence level of M.BE students.
3. To suggest some guidelines to improve spoken communication of M.BE students.

1.2 Research Questions

1. What are the communicative needs of business students?
2. What is the spoken competence level of MBE students?
3. How they can improve spoken communication?

2. The Future of English for Specific Purposes: Bovee (2010) states that in 1960’s, as General English courses turned into failure to meet learner’s wants then English for Special Purposes occurred as a term. To design ESP courses, register analysis was accustomed in commencement; however, to meet preferred results, using just register analysis was unsuccessful and accordingly to meet these supposed failures, novel courses were planned. In ESP course design, Target situation analysis turned into the foremost as the stakeholders and employers required in order to make courses better meet their needs. Dudley & Johns (1998) stated that all over the world, English for specific purposes is demanded.

2.1 Needs Analysis

Munby's approach to needs analysis.: He proposed his approach to need analysis in his attempt to contribute to syllabus design which rapidly depicted immense interest of syllabus designers, mainly the originators of ESP. His work is summed up in brief that his model contains two stages:

Communication Needs Processor (CNP) and the interpretation of the profile of needs derived from the CNP in terms of micro-skills and micro-functions. Under eight variables, the CNP is commenced that influence communicative needs by systematize them as stricture in a dynamic relationship to each other. By coming across at its ‘Inputs’; the foreign language contestants and information regarding the contestant’s identity and language.

Jordan (1997) termed Munby's model as 'target-situation analysis' approach, one among many approaches to needs analysis. Jordan remarks Munby's work is considered as a signpost/landmark in the development of needs analysis in ESP and a huge influence on ESP as it offered a novel image on individual needs plus almost certainly the finest recognized framework for target-situation analysis.
Helen (2010) states that needs analysis is referred to a course expansion procedure in ESP. For the learners’ current status of knowledge, the language and skills are recognized and regarded that the learners will utilize in their professional workplace in this procedure, plus their needs’ insights and the teaching context’s realistic possibilities and restrictions. From this procedure, the acquired information is applied in establishing and improving the content and scheme of the ESP course. The needs analysis process consists of: Target situation analysis, Discourse analysis, Learner factor analysis and Teaching context analysis.

McDonough, (1984) says that Munby’s representation’s heart (model) is called ‘Communicative Needs Processor (C.N.P)’. Participant’s details as in his/her age, sex, mother tongue etc is provided into the C.N.P which involves numerous sorts and one finishes with a needs’ profile after these types have been worked. This profile is construed in order to get information about the learner’s language skills.

![Diagram of C.N.P and Profile of Needs]

English for specific purposes means English for particular group in a specific situation and to achieve these purposes. Dudley and John (1998) explain stages of ESP process as needs analysis, Course design, teaching methodology, assessment and evaluation. There is no single one most prominent but equally essential as well interdependent. These stages develop a cycle in which each stage provided bases to its next as needs analysis provide bases to collect and product material and according to material methodology are selected and methodology directed toward specific type of assessment.

![Diagram of ESP process stages]

2.2 Business Communication: Communication involves conveying or expressing one’s thought and ideas in a useful or effective manner. The main objective of communication is to enhance one’s performance in professional and social life. A business communication is how you communicate in your line of work. Good business communication is elemental to meet the demands of the business environment. This is the fact that with skillful communication one’s has good and effective business. In business, mainly we deal with the oral and written communication. So, verbal or oral communication is as important as written. Many people or even professionals lack aptitude and confidence to make oral communication. Strong Business Communication skills are decisive to the success of any organization irrelevant its size, geographical location, and its mission. The organization has to
frequently altered and adopted the ways of effective communication processes for its well reputation and development. This global environment forces us to think about communication issues against the backdrop of culture, technology and competition, which continually raise legal and ethical concerns. Eventually, any organization can achieve its objectives or targets within both internal and external environment with the augmentation of good business communication skills. (Murphy, 1997 & Bovee, 2010 & Pearson - Nelson, 1991)

2.3 Business English in Pakistan: Azra Ahmed, (2012) states that in Pakistan, accompanied by numerous regional languages more than sixty languages are spoken hence Pakistan is a multilingual society. More than 75% of Pakistani comprehend Urdu, the lingua franca, because it is the national language of Pakistan but English is the official language and utilized for official business, government and legal agreements purposes further English which is spoken now in Pakistan is recognized as Pakistani English having local dialect like the Indo English etc. In business communication, English and Urdu are the languages which are used most frequently and in Pakistan, English is normally applied both for peripheral being as a dominating language, that is, for in-company usage every sort of information is intended, work in partnership, systematize, plan, etc., and, for planned ideas anterior communication is utilized, communication by the exchange of letters expected at organization’s transmission and demonstration, verbal & written, generally exterior the organization. However, which language should be used to a larger level is decided by the business’ size and nature. However, written communication is generally used in English whereas oral communication is primarily in Urdu but an amusing fact is that most of the business English (BE) learners desire to be competent in English in order to communicate orally, conceivably getting back to its position as the language that opens up chances termed as a nation’s language having a socio-economic periphery in society and the ruling privileged. Another fascinating fact is that frequently job interviews are not in English even when speaking in English is not requisite from the employee and in countries, business English a significant constituent of ESP is formulated by this state of affairs such as Pakistan who have yet to get over their imperial past.

2.4 Principles for Effective Business Communication

The seven essentials of business communication.: There are seven essentials of business communication proposed by Mary Ellen. To communicate effectively, one should utilize these essential elements to deliver successful business communication. The seven essential elements to successful business communication by Hopkins (2011) are: Structure, Clarity, Consistency, Medium, Relevancy, Primacy/Regency, Psychological Rule of 7±2

If one is going to communicate effectively in business it is essential that s/he has to take hold of these seven elements.

Structure: actually deals with the organization of communication. It is about how one structures/organizes his/her communication to make it fully understandable by the receiver. A good communication is always consisting on three structural elements:

- An opening – It allocates the receiver to know what communication is about (describes clearly desired action)
- A body – It is said t be the heart of one’s message. Explanation of the nature of arguments by providing details regarding the action.(the message that one communicates all the facts and figures)
- A closing – conclusion or summing up the communication (End pleasantly with goodwill statement)

This structural rule grasp true no matter what your communication is -- a memo, a phone call, a voice mail message, a personal presentation, a speech, an email, a webpage, or a multi-media presentation.

Clarity: demands the use of simple language and easy sentence structure. Message should be clear and to the point in order to make the communication understandable. It is easy for decoder to grasp the meaning being conveyed by the encoder, if message is clear in presenting ideas. Giving a confused message to audience only ends up with them being confused and your message being ignored.

Consistency: The process of business communication needs consistency/reliability. It deals with the level of intensity of the message. The ideas must not be fluctuating because this can prevent suspect of the audience towards the communicator. When/if distrust is obtained it should be resolve effectively.
Medium: It is the most important element while communication. Communicator should decide first the appropriate medium to deliver the message. Medium works as a tool in effectively communicating with the audiences. One should communicate message with accuracy and in an understandable way.

Choosing the right medium is obviously critical. Choosing wrong medium and you could end up spending a whole lot of time and money on a very visually attractive business communication that delivers next-to-zero ROI (return on investment).

Relevancy: It is very important in every message to be communicated or pass on. One should deliver or communicate that is needed and interesting for the receiver. If one needs receiver/audience to pay close attention then s/he must avoid dull presentations or way to communicate. One should provide relevant information that is needed and to grasp audience’s attention one should use interesting alternative resources that more fully convey message.

Primacy/Recency: It deals with the business communication’s ability to be remembered by one or both of two (following) things:

- The power and memory ability of its opening
- The power and memory ability of its close

According to psychologists, “Primacy Effect” is the effect of remembering the first few items presented/delivered in a message/communication. “Recency Effect” is the effect of remembering the last few items presented/delivered in a message/communication. Both opening and closing effects are important to keep things in memory. A powerful opening can be anything that captures the audience's attention like a joke, a quote, a short story or a short activity.

Business communication skills also use the psychological rule of 7±2. The audience have tendency to only remember seven plus or minus two. This is the normal capacity of one’s memory to store information. Therefore this might prevent learning process to happen.

2.5 Previous Researches: A research was conducting by Rayan & Shetty (2008) to assess the learners’ needs and to assess what skills set employers look for when they recruit engineering graduates and to evaluate the existing course materials. The research tools used for analyzing learners ‘needs and evaluating Engineering English curriculums was: Researcher’s observation, Questionnaires, Interviews, Job advertisements, End-semester results, Communication apprehension tests, Proficiency tests, Literature related to ESP / EST, Documents related to engineers ‘communicative needs.

The sample was selected of 110 from different sections and the conclusion was: there is a gap between the target situation (employment market) and the existing proficiency of learners. The reasons for this gap are absence of effective syllabus, methodology, course organization, assessment and learning outcome. The absences of standard course books contribute to students ‘lack of English language and communication skills.

A study conducted by Agarwal and Chintranshi (2012) concluded that business management teachers were more deficient in oral communication than written communication. It was recommended to introduce spoken English classes and might be offered in two semesters instead of one.

This study was conducted by Rajabi and Azarpour (2011) to investigate the academic needs of the Business Administration students in the use of English for Specific Purposes (ESP) at Malayer Islamic Azad University. A total of 45 male senior students majoring in Business Administration were selected through random sampling. They were taking ESP as a compulsory course during their university studies at Malayer IAU. Besides, two ESP instructors who were teaching English to the subjects were interviewed to investigate their ideas about the questions of the study. The methodology underlying the research was both quantitative (through the implementation of the students' questionnaire) and qualitative (the teachers' interviews). The findings revealed that reading and writing skills have great importance in classroom practice while speaking got high priority in success in future jobs of these students.
3 Method And Procedure

3.1 Design of the study: The purpose of the research is “to study the communicative needs of M.BE students in ESP context.” This study under reference is quantitative research a formal, objective, systematic process for obtaining information about the world.

3.3 Sample of the study: The sample was 80 students studying in masters in business administration in a public sector university in Lahore. It was selected through convenient sampling techniques. The average age of the participants was 23 years old.

3.4 Instrument of the research: For the purpose of the research, two instruments were used to collect data.

- Oral proficiency test
- Checklist

Oral proficiency test.

Test’s specifications. It aims at assessing students’ ability to apply grammatical principles and to use lexical items accurately and appropriately in varied contexts. It comprises on the following content area:

- Vocabulary should be related to the technical field.
- Fluency students must speak fluently.
- Accent student’s pronunciation.
- Cohesion and coherence: ideas should relate to each other logically.
- Grammar students’ ability to apply rules and their grammatical forms. Student’s ability to use forms accurately and appropriately according to language functions.
- Confidence and comprehension students must speak with confidence and their opinions should be understandable to the listener.

The oral proficiency test includes 5 questions that will measure different aspects of interviewees’ speaking ability. The test lasts approximately 5 minutes. For each type of question, examinees will be given specific directions, including the time allowed for Preparation and speaking.

<table>
<thead>
<tr>
<th>Questions</th>
<th>Task</th>
<th>Criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Read the text aloud</td>
<td>Accent</td>
</tr>
<tr>
<td></td>
<td>Respond to the questions</td>
<td>Relevancy to content</td>
</tr>
<tr>
<td>1-2-3</td>
<td></td>
<td>Grammar</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vocabulary</td>
</tr>
<tr>
<td>5</td>
<td>Presentation</td>
<td>Confidence</td>
</tr>
<tr>
<td></td>
<td>Or</td>
<td>Cohesion</td>
</tr>
<tr>
<td></td>
<td>Describe a picture</td>
<td>All above</td>
</tr>
</tbody>
</table>

Checklist.

The checklist was prepared by the researchers to check and rank the oral proficiency of the sample and the prepared checklist. This was 5 Likert scale indicating:

5: Poor
4: Satisfactory
3: Good
2: Very Good
3.5 Procedure of Data Collection: The subjects were contacted and explained about the nature of research and a letter was signed by the business students to get their willingness for oral test. Possible use of data was told to them. For the collection of data, the structured interview was conducted with business students, they were asked to speak freely to answer the questions. It was ensured that same level of guidance was given to each respondent. Ample instructions were given by both the researchers to the respondents so that they could speak freely about that and the samples’ responses were recording. After listening the recordings the 5 likert (excellent, very good, good, satisfactory, poor) checklists were ranked individually. There was no biasness in data collection. The nature of the research had been explained to each and every respondent equally and clearly.

3.6 Reliability Statistics: The measure was taken the reliability by the application of Cronbach’s Alpha. The value of data was computed with the help of SPSS. The value for the study was 0.824 which is considered good for educational research.

4 Results and Discussion

Table –1 Accent description on Oral Proficiency Test

<table>
<thead>
<tr>
<th>Accent</th>
<th>Percentage</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale</td>
<td>Excellent</td>
<td>V.Good</td>
<td>Good</td>
</tr>
<tr>
<td>Pronunciation</td>
<td>8.8%</td>
<td>30.0%</td>
<td>35.0%</td>
</tr>
<tr>
<td>Intonation</td>
<td>1.3</td>
<td>25.0</td>
<td>36.5</td>
</tr>
<tr>
<td>Stress</td>
<td>2.5</td>
<td>18.8</td>
<td>33.8</td>
</tr>
</tbody>
</table>

Table 1 indicates that most of the respondents were good in pronunciation (Mean= 2.85), similarly most of the respondents were good and the satisfactory in intonation (Mean= 3.15), and then in stress area, most of the respondents got score on satisfactory and then on good (Mean= 3.28). Students got low score on intonation, pronunciation and stress respectively.

Table –2 Grammar description on Oral Proficiency Test

<table>
<thead>
<tr>
<th>Grammar</th>
<th>Percentage</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale</td>
<td>Excellent</td>
<td>V.Good</td>
<td>Good</td>
</tr>
<tr>
<td>Use of Pronouns and gender</td>
<td>10.0</td>
<td>26.3</td>
<td>45.0</td>
</tr>
<tr>
<td>Use of Singular and Plural forms</td>
<td>11.2</td>
<td>26.2</td>
<td>41.2</td>
</tr>
<tr>
<td>Use of appropriate sentence structure</td>
<td>17.5</td>
<td>18.8</td>
<td>36.2</td>
</tr>
</tbody>
</table>

Table 2 indicates that most of the respondents were good in use of pronouns and gender (Mean= 2.75), similarly most of the respondents were good and then very good in use of singular and plural forms (Mean= 2.73), and then in the use of appropriate sentence structure, most of the respondents got score on good and then on satisfactory (Mean= 3.28).
Table 3 Comprehension description on Oral Proficiency Test

<table>
<thead>
<tr>
<th>Comprehension</th>
<th>Percentage</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscale</td>
<td>Excellent</td>
<td>V.Good</td>
<td>Good</td>
</tr>
<tr>
<td>Clarity</td>
<td>7.5</td>
<td>33.8</td>
<td>27.5</td>
</tr>
<tr>
<td>Completeness</td>
<td>13.8</td>
<td>16.2</td>
<td>43.8</td>
</tr>
</tbody>
</table>

Table 2 indicates that most of the respondents were very good on (Mean= 2.58), most of the respondents were good on completeness (Mean= 2.86).

Table 4 Vocabulary description on Oral Proficiency Test

<table>
<thead>
<tr>
<th>Vocabulary</th>
<th>Subscale</th>
<th>Excellent</th>
<th>V.Good</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Poor</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical Vocabulary</td>
<td>12.5</td>
<td>21.2</td>
<td>27.5</td>
<td>31.2</td>
<td>7.5</td>
<td>3.00</td>
<td>1.15835</td>
<td></td>
</tr>
<tr>
<td>Wide vocabulary</td>
<td>7.5</td>
<td>26.2</td>
<td>27.5</td>
<td>23.8</td>
<td>15.0</td>
<td>3.50</td>
<td>3.54358</td>
<td></td>
</tr>
<tr>
<td>Flexibility</td>
<td>7.5</td>
<td>26.2</td>
<td>20.0</td>
<td>28.8</td>
<td>17.5</td>
<td>3.2250</td>
<td>1.23222</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 indicates that performance of most of the respondents was satisfactory (31.2%), 27.5% got good, and 21.2% were very good in the use of technical vocabulary, then in the use of wide vocabulary, the respondents were good (27.5%) but 15% got poor performance. On flexibility subscale, 28.8% got satisfactory, 26.2% got very good, 20% got good, 7.5% were on excellent and 17.5% were poor in the use of flexibility.

5. **Conclusions**: The conclusions were drawn regarding English spoken proficiency of business students are;

1. Students are very good at technical vocabulary with highest rank.
2. Students’ performance is good regarding accent with high rank but less than vocabulary.
3. At coherence their performance is overall good.
4. Students are lacking at comprehension but better than grammar.
5. Grammar is weak area of spoken English of business students.
6. Confidence and fluency got lowest rank and these are weakest areas of English speaking skill.
7. Overall students’ performance is good at vocabulary, coherence and accent comparatively to Grammar, comprehension, confidence and fluency.
8. It was found that overall competence level is low.

After investigating the communicative needs of business students, the researchers have reached to the conclusion that most of the students are lacking in grammar, comprehension, fluency and confidence. The researchers also found them good at technical vocabulary, coherence and accent and conclude that overall their oral competence level is low. After knowing the weak areas researchers have suggested some guidelines to improve their lacking areas. It is hoped that this study may bring benefits to students in enhancing their learning.

6. **Recommendations**: In English language, speaking skill includes fluency, pronunciation, and grammatical accuracy, confidence, cohesion & coherence and comprehension. It means one has to focus on improving these areas in order to be proficient in communication. There are several ways to enhance speaking skill in English language.

1. One should start participating in discussion on certain topics in English with your friends, classmates and teachers as much as you can. Usually students feel hesitation and fear of being criticized by others. One should not feel hesitation even if mistakes are occurred while speaking in English because mistakes are part of learning process and one can’t learn until s/he makes mistakes.
2. Correct pronunciation plays vital role in speaking because pronunciation can change the meaning of a word. One should watch TV shows that are in English in order to get a rich exposure to the local dialects and speech mannerism because pronunciation can be enhanced by listening rather than learning. One can improve pronunciation by listening to English news daily, songs, watching English movies and another better way is to use “Talking Dictionary”. The best but interesting way to terminate the supposed ‘Thick Accenctor Non-Standard’ is by imitating local (American or English) style and slang. Another way is that one can record his/her audio and listen to it, after that practice more to get better in the pronunciation.

3. Grammatical accuracy is the significant element of fine speaking skill. There is a little time to think of grammatical rules in speaking relatively as in writing. To enhance and develop grammatical accuracy, the way is by practicing the application of grammar rules by using accurate verb forms, tense and parts of in spoken English. One can get command on it by speaking in English and paying attention to grammatical accuracy.

4. One should use CALL software to improve language skills.

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IMPACTS OF MEDIA (CABLE TELEVISION) ON FEMALE’S PERSONALITY

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ABSTRACT: The introduction of any new technologies always leaves impact on society, the impact may be positive or may be negative it depends upon its user. In early 1980 cable television was first time introduced in Karachi (Pakistan). Cable television fire ups the impact on society. Females are considered the centre of household and mothers are the primary source of education and learning for their children. Change in their attitude, behavior and language leads to change the society culture, values and tradition. This study was conducted to determine the impact of cable television on female personality. Total 350 questionnaires were distributed among the selected sample, out of which response of 286 was received back and 26 were found incomplete/wrongly filled. The remaining were analyzed by using SPSS. The results reflect that cable television leave impact on the viewer but not affect their domestic life. However, cable television is found best source of information i.e. religious, other languages, fashion and style etc. and also increases the viewer expenditures.

Key words: Cable television, customs & values, domestic & social life, fashion & style, tradition & celebration

1. Introduction
The effect of media on their users depends upon the user’s sense of utilization as well as concentration. The research topic as much significant is as the subject is popular. However, the audience is also worried that how easily media convey their messages and bring changes in their tradition, culture, attitude, behavior, customs and values.

Initially the network of cable television started in Karachi in 1980 and covered all big cities of Pakistan up to 1998 without any rules and regulations. The government of Pakistan legalized cable television in June 2000 with clear policy that it will deliver the knowledge, information, education and provide healthy programs as well as entertainment to their audience. Today cable television has become very readily available to almost all Pakistani citizens and thus is no longer considered to be a luxury. Instead, it has become a necessity for everyone. According to World Edition of BBC News on 05 February 2003, research study highlighted that exposure to images of young, thin and air-brushed female bodies are associated to depression, eating unhealthy dishes habits and self-esteem loss in girls and women. Researcher concluded that, female are much conscious about their diet because they are much impressive from the regular watching on television as well as reading of magazines. In real life majority of female suffering from dieting and applies others devastated health formulas to look like the television actresses.

2. Statement of the Problem: After the popularity of foreign channels, it has been assumed that it will affect the lifestyle of their viewers. Foreign channel dramatically hold the attention of audience due playing of soap operas programs and exclusive types of entertainment. Nowadays the cable television consumers become cable oriented and that much impressed from the cable television that their real life decision also depend on cable directly or indirectly. Pakistani females are that much impressed from cable television that their behavior and way conduct with husbands, their children, relatives, neighbor and also friends are totally changed. When new technology launched in the society, it must leave its effect on that society; this effect may be positive or may be negative it depends upon the users. So, cable television also reinforces its impact on the society. The rapid spread and acceptance of cable television across Pakistan required systematic research study to determine its effects on the viewers.
3. Objectives of the study: This study determines that effect of cable television on the female’s personality with a view to measure the association between viewing of cable television and change in family / social interaction, personal appearance & style, cultural practices and expenditure patterns in female.

4. Research Hypothesis

\[ H_1 : \] The cable television have effect on female social life.

\[ H_2 : \] The cable television have effect on female fashion & style.

\[ H_3 : \] The cable television have effect on female culture & tradition.

\[ H_4 : \] The cable television increases the female expenditure.

5. Evidence from Literature: Bob Paxman (2009), concluded that media have stronger influence in audience life. Any single media have not to be considered to leave their impact on their viewers the influence is increasing with the increasing of media option with audience such as Twitter, Facebook and other Micro Logging. Media always develop to allow lay people to influence each other. People like to reveal the news from relative, friends or neighbor instead of selected media. Even that all these are still valid and not yet vanished and consider the main instrument of news. However, social media permit the audience to circumvent the understanding perceptive of journalists more frequently than they have before. Arooma (2009), research study found that enormous fires always start from a small amount of flame. This is because he undertakes immoral or unethical presentation, semi naked pictures, attractive panorama and other harmful dialogue etc. It indicate that how people cheat with each other, steal their rights, prepare plans against others and perform this act of violence. Blazer (2009), research study concludes that cable television leave negative impression on the culture. Due to the creeping of global culture, numerous values, tradition and custom from local society culture are seemed to be eliminated and it is going toward decline.

Researcher also determined that given the huge and serious cable television messages change lifestyle of the people continuously, students required to think that these cable television messages how much affect their internal thoughts and views (CC, 2009). They also need to be vigilant and aware that media act on certain agenda and when once their internal ideas / taught are changed it should never be undone. Research study recommended that society consists on people who need accurate information and way of communication to move towards right direction to perform daily activities that is work, health care, entertainment, education, traveling and personal relationships etc. When research is the focus of the popular press, the media are believed to have a strong influence on public opinion. Benbow and Stanley (1980), study concluded that parents of teenagers were targeted as the population most likely to be influenced by the research findings. Parents who had responded to surveys regarding their children's math abilities prior to the media coverage were contacted and their beliefs were checked. The results provide indication that research reported in the media can have an effect on the beliefs of people who are exposed to it.

Daniel and Stacey (2004), find that Mass media are believed to be a persistent force in shaping physical appearance ideals and have been shown to negatively impact females' body image. Elnur (2009), determined that the mass media have affects on public opinion as well as society. It is very easy that viewers not judge by themselves but leave themselves on cable television to affect their lives. Research study considered that it is easy to wedge the emotions about what happened is going on, even that media highlighted the same and want response on it. It's harder to shake that influence.

Posavac, Heidi D., Steven S. Posavac, and Richard G. Weigel (2001), observed that recent research has shown that exposure to the ideal thin standard of female beauty commonly presented in advertising and the broader media contributes to body image disturbance among women. Researchers have estimated that social comparison processes underlie this phenomenon; women may normally compare their bodies with images of feminine beauty contained in the media and consequently become less satisfied with their own bodies. Raheel (2010), implies that where the beautiful relation is concerned, I infer that everyone just has a will to gain the beauty but not the inner-sole of a character because nobody undertakes to have words either the male or a female due to reluctance. They just require each other for only immoral purpose which is exclusively un-natural must be avoided. Yuko Yamamiya et al. (2005), research study conclude that with regard to community level, the presentation of attractive image about the beauty and thin body posture adversely affects the audience at international level.
Poran (2002), revealed about the beauty perceptions of black American and White / Latino females were found that all these desired to look like media personas, but black American wished to be more beautiful as compared to others. The finding of Poran also vetted by Abrams and Stormer’s (2002), by concluding that the beauty satisfaction level of black American female is higher than white or Latino females. They wished to be more beautiful and as ideal beauty of the society as compared to others. Johnr (2009), suggested that cable television easily effect the teen age people because the nature of teenage people easily fragile. Even Disney channel are also found harmful for their nature it leave impact on their nature indirectly. They also don’t know that how much easily shapes the observations of a young mind. Janis and Jacquelynne (1985), determined that popular press and media have strong influence on public opinion.

Maria (2009), concluded that for cable television is entertainment instrument for the users however, it is source of salary and status for their employers i.e. journalists. As well as the cable television is considered the source of income and political influence. With regard to public belief, cable television is considered the gigantic creators which hold seventh force. Layman take much time by understanding that cable television is not art, but it deals only depleted IQ level people.

Noshina Salim (2000), revealed that this study critically evaluates the image of the United States in the perspectives of two Pakistani dailies, The Pakistan Times and Dawn, from December 1979 to May 1988. During the 1980s, the South Asian region gained high level importance in the United States policy agenda because of the Soviet military intervention in Afghanistan. As a neighbor of Afghanistan, the importance of Pakistan was keen in the eyes of American policymakers as a means of uncertain Soviet colonialism towards the Indian Ocean. The United States of America declared that Pakistan was a frontline state and its main ally against Soviets in this war. Pakistani media supported the U.S. policy towards Pakistan because it protected Pakistani interests and also offered economic and military assistance to Pakistan.

Raheel (2010), analyzed that Mass media have significant effect to education, environment as well as family life. Cable television may leave positive impact on their user and may be it leave negative impact. Whether or not exposure to media violence causes increased levels of aggression and violence in young people is the perennial question of media effects research. Generally men and woman, boys and girls watched television from two to four hours daily. The presence or absence of role models presented, and activities they participate on the screen powerfully affect on their daily lives, and they try to locate their role models in the real world.

Revel from the research study that media shape human approaches regarding all matters like purchasing behaviors, dealing with relatives, colleagues, friends, family members, country politics, way of working and dressing style. It is significant for the viewer to be vigilant about the impact of cable television. They also need to inquire about the actual fact, any matter highlighted by the media instead of blindly trust on media and consider the information as real provided by the media.

Starr writer (2009), research study recommended that cable television workforce were found much devoted and hard worker for transmission the information to their users which build their belief on cable television in all respect. In this way cable television strengthens their power and hold their image in the society. Like other profession journalism is also considered a profession, to enhance the image, achieve bench mark and increase the viewer. This profession required proper maintenance. Saif Ur Rehman (2010), recommended that Mobile and media has changed every girl’s views about LOVE and now it is just a fashion every girl is impressed by every new boy because girls want better to best life partner. He concluded that media has negative effects on females. Sania Javed (2010), suggested that media present fake attraction about marriage especially boys want the girl like a model as a wife, wealth or business settlement also the top most demand. Boys and girls have many expectations from each other. She also revealed that in real life boys are not as much dedicated, devoted or strong manhood behavior, they became more delicate than the girls. In this modern era girls are stronger in their decision making rather than boys. Boys are always rushing for short cuts throughout their life, because they are emotional.

6. Research Methodology

Sample, Sample size and Analysis: Pakistani females were considered population, and Askari- V Housing Society Lahore and Falcon Complex Housing Society Lahore were considered sample for this study. The data was collected through self-administrated questionnaire from Askari –V Housing Society Lahore and Falcon Complex Housing Society Gulberg-III Lahore. Sample size was 350, which was conveniently selected and questionnaire was distributed among them. Out of 350 questionnaires 286 questionnaires were received back from the respondents in which 26 were found to be incomplete / wrongly filled which were not included. After that the collected questionnaires were sifted and analysed by using SPSS 17. Descriptive analysis were carried
out according to variable i.e. years of cable connections, numbers of daily watching TV, wish to watch kind of channel as well program, change their social, cultural as well as life style etc and its relation with level of viewing.

7. Data Analysis And Discussion

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Married</td>
<td>190</td>
<td>73.1</td>
<td>73.1</td>
<td>73.1</td>
</tr>
<tr>
<td>Unmarried</td>
<td>70</td>
<td>26.9</td>
<td>26.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Explanation:** Frequency table with regard to marital status of the viewer’s show that majority of the viewer were found married i.e. 190 (73.1%). However the figures of unmarried reveal from the study were 70 (26.9%). The data is also presented in Pie chart.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>15 to 20 years</td>
<td>70</td>
<td>26.9</td>
<td>26.9</td>
<td>26.9</td>
</tr>
<tr>
<td>21 to 30</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>38.5</td>
</tr>
<tr>
<td>31 to 35</td>
<td>90</td>
<td>34.6</td>
<td>34.6</td>
<td>73.1</td>
</tr>
<tr>
<td>36 to 40</td>
<td>70</td>
<td>26.9</td>
<td>26.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

**Explanation:** Result show that 79 (26.9%) respondent were found between the age group of 15 to 22 years, only 30 (11.5%) were found in the age group of 21 to 30 year of age and the maximum number of respondent i.e. 90(34.6%) were found between the age group 31 to 35 year of age. However 70 (26.9%) respondent fall in the age group 36 to 40 years age. The same are also presented in Pie chart for easy understanding.

<table>
<thead>
<tr>
<th>Year of cable connection</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 years or less</td>
<td>20</td>
<td>7.7</td>
<td>7.7</td>
<td>7.7</td>
</tr>
<tr>
<td>3 years</td>
<td>04</td>
<td>1.5</td>
<td>1.5</td>
<td>9.2</td>
</tr>
<tr>
<td>4 years</td>
<td>08</td>
<td>3.1</td>
<td>3.1</td>
<td>12.3</td>
</tr>
<tr>
<td>More than 4 years</td>
<td>228</td>
<td>87.7</td>
<td>87.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** The impact of anything on human personality is directly proportional to the time period of its usage, as long as the duration of its usage their impact may be strong/deep. So with this perception the question “Since when do you have cable connection at home” was asked from the respondent. The result show that 20
(7.7%) respondent were found having cable connection at home from last 2 years or less than 2 years and only 4 (1.5%) respondent replied that from previous 3 years they have cable connection which are the minimum number. The second minimum number were found 8 (3.1%) have hook up the connection from last 4 years. The maximum numbers of respondent 228 (87.7%) have connect with cable television from more than 4 years. Pie chart also reflects the results.

<table>
<thead>
<tr>
<th>Numbers of hours daily watching TV</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>01 to 02 hours</td>
<td>100</td>
<td>38.5</td>
<td>38.5</td>
<td>38.5</td>
</tr>
<tr>
<td>03 to 04 hours</td>
<td>90</td>
<td>34.6</td>
<td>34.6</td>
<td>73.1</td>
</tr>
<tr>
<td>More than 04 hours</td>
<td>70</td>
<td>26.9</td>
<td>26.9</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** This aim of this study was to determine that respondent’s how many hours watch cable television daily. The result indicated that 100 (38.5%) respondent watch 1 to 2 hours cable television daily, 90 (34.6%) watch 3 to 4 hours and only 70 (26.9%) watch more than 4 hours cable television daily. The same result is also available in Pie chart.

<table>
<thead>
<tr>
<th>Program mostly watch</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cooking shows</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>News</td>
<td>70</td>
<td>26.9</td>
<td>26.9</td>
<td>38.5</td>
</tr>
<tr>
<td>Informative programs</td>
<td>20</td>
<td>7.7</td>
<td>7.7</td>
<td>46.2</td>
</tr>
<tr>
<td>Movies and Dramas</td>
<td>110</td>
<td>42.3</td>
<td>42.3</td>
<td>88.5</td>
</tr>
<tr>
<td>Fashion and Style</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** To evaluate the respondent aim of watching cable, question which program you are mostly watch. A multiple answered recorded by the respondent. 30 (11.5%) respondents opted cooking shows and fashion & style. However, 70 (26%) prefer to watch news channels, only 20 (7.7%) marked to watch informative programs and majority of respondent prefer to watch movies and dramas channel. The result of the respondent is given in the Pie chart.

<table>
<thead>
<tr>
<th>Effect on domestic activities</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>40</td>
<td>15.4</td>
<td>15.4</td>
<td>15.4</td>
</tr>
<tr>
<td>Disagree</td>
<td>190</td>
<td>73.1</td>
<td>73.1</td>
<td>88.5</td>
</tr>
<tr>
<td>Undecided</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** This study aim was to investigate and determine the impact of cable television on female’s personality. So how much cable television affects the domestic activities of the viewers. The above table show that 40 (15.4%) agreed with question, they reply that cable television affect their domestic activities and
majority i.e. 190 (73.1%) disagreed with the question. However, only 30 (11.5%) answered are undecided. Moreover the result is also display in Pie chart.

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>230</td>
<td>10</td>
</tr>
<tr>
<td>7.7%</td>
<td>88.5%</td>
<td>3.8%</td>
</tr>
<tr>
<td>7.7%</td>
<td>96.2%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Explanation:** To examine the respondent interaction with relatives, question “interaction with my relatives / neighbors is decreasing these days due to cable television” was asked from the respondents. The response show that 20 (7.7%) agreed with the question that their interaction with relatives were decrease, however majority of the respondent 230 (88.5%) disagreed with the question and only 10 (3.8%) respondents result were found undecided. The above Pie chart show the respondent replies.

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>120</td>
<td>130</td>
<td>10</td>
</tr>
<tr>
<td>46.2%</td>
<td>50.0%</td>
<td>3.8%</td>
</tr>
<tr>
<td>46.2%</td>
<td>96.2%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Explanation:** In this portion of the study researcher investigate about the audience food habits to include / added foreign dishes in their everyday food. The table show that 120 (46.2%) agreed to included foreign dishes in their everyday food, the majority 130 (50.0%) response were found disagreed, whereas only 10 (3.8%) response were fund undecided. The results are shown in Pie chart for ready reference.

<table>
<thead>
<tr>
<th>Agree</th>
<th>Disagree</th>
<th>Undecided</th>
</tr>
</thead>
<tbody>
<tr>
<td>180</td>
<td>80</td>
<td>260</td>
</tr>
<tr>
<td>69.2%</td>
<td>30.8%</td>
<td>100.0%</td>
</tr>
<tr>
<td>69.2%</td>
<td>100.0%</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** The research aim was to determine the impact of cable television on female personality, so question “Television is the best source for learning new food recipes” were inquiry from the targeted viewers. Figure shows that majority of the people 180 (69.2%) considered cable television as best instrument to learn new food recipes, whereas 80 (30.8%) of people disagreed with the question. The result is available in Pie chart.
### Prefer to wear foreign dress

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>50</td>
<td>19.2</td>
<td>19.2</td>
<td>19.2</td>
</tr>
<tr>
<td>Disagree</td>
<td>200</td>
<td>76.9</td>
<td>76.9</td>
<td>96.2</td>
</tr>
<tr>
<td>Undecided</td>
<td>10</td>
<td>3.8</td>
<td>3.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** In the section of fashion and style that how much Pakistani female impressed from cable television and prefer to wear foreign dresses. The figure of above table reflect that 50 (19.2%) were agreed to wear foreign dress casually, and 200 (76.9%) respondent were disagreed to wear foreign dresses, this may be due to cultural taboos regarding foreign dress. Whereas 10 (3.8%) have no choice and opted undecided. The result of the study is presented in Pie chart.

### Source for new fashion

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>190</td>
<td>73.1</td>
<td>73.1</td>
<td>73.1</td>
</tr>
<tr>
<td>Disagree</td>
<td>50</td>
<td>19.2</td>
<td>19.2</td>
<td>92.3</td>
</tr>
<tr>
<td>Undecided</td>
<td>20</td>
<td>7.7</td>
<td>7.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** Above table indicate the result of respondent about cable television as a source of new fashion and style. The figure 190 (73.1%) show that majority of targeted audience agreed with statement that cable television as the best source of new fashion and style, 50 (19.2%) were not agreed with the statement and very smaller numbers were marked the undecided option. The response of the respondent regarding the statement cable television is the best source of new fashion and style presented in Pie chart.

### Like to speak foreign languages

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>140</td>
<td>53.8</td>
<td>53.8</td>
<td>53.8</td>
</tr>
<tr>
<td>Disagree</td>
<td>110</td>
<td>42.3</td>
<td>42.3</td>
<td>96.2</td>
</tr>
<tr>
<td>Undecided</td>
<td>10</td>
<td>3.8</td>
<td>3.8</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** In the language portion of the study, question “usually speak words of foreign language like English or Hindi etc. in daily conversation” was asked from the targeted population. Figure 140 (53.8%) shows that majority were found agreed with the statement to use Hindi / English words in their daily conversation, 110 (42.3%) found disagree. However, only 10 (3.8%) was not decided about the statement and opted undecided. The result is shown in Pie chart.
Explanation: The respondent recorded their response for the question “cable television is considered source to learn other languages”. The frequency table show that 120 (46.2%) respondent were found agreed with the statement mean while the same figures of respondent were also found disagreed with the statement. However, only 20 (7.7%) respondents reply were found undecided. The result is presented in Pie chart.

<table>
<thead>
<tr>
<th>Source to learn other languages</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>120</td>
<td>46.2</td>
<td>46.2</td>
<td>46.2</td>
</tr>
<tr>
<td>Disagree</td>
<td>120</td>
<td>46.2</td>
<td>46.2</td>
<td>92.3</td>
</tr>
<tr>
<td>Undecided</td>
<td>20</td>
<td>7.7</td>
<td>7.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Effect on marriage ceremony

Explanation: In the section of traditions and celebration the question “cable television effected the marriage ceremony and tendency is increasing to perform foreign rituals with addition to Pakistani tradition in marriage ceremony” result show that majority of the targeted population 210 (80.8%) accepted the statement, only 30 (11.5%) answered that there is no evidence that cable television effect the marriage ceremony and increasing tendency of perform foreign rituals in marriage ceremonies. Whereas 20 (7.7%) answered were undecided. It clearly indicated that adoption level of foreign traditions is increasing in our society which is shown Pie chart.

<table>
<thead>
<tr>
<th>Effect on marriage ceremony</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>210</td>
<td>80.8</td>
<td>80.8</td>
<td>80.8</td>
</tr>
<tr>
<td>Disagree</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>92.3</td>
</tr>
<tr>
<td>Undecided</td>
<td>20</td>
<td>7.7</td>
<td>7.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Wish to celebrate Valentine day

Explanation: Above table presented the result of respondent regarding “wish to celebrate valentine day”. The response show that very smaller number i.e. 30 (11.5%) wish to celebrate the valentine day and majority 210 (80.8%) answered did not wish to celebrate valentine day and 20 (7.7%) answered was not decided about the matter to celebrate the valentine day or otherwise, the result is shown in Pie chart for reader understanding.

<table>
<thead>
<tr>
<th>Wish to celebrate Valentine day</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>11.5</td>
</tr>
<tr>
<td>Disagree</td>
<td>210</td>
<td>80.8</td>
<td>80.8</td>
<td>92.3</td>
</tr>
<tr>
<td>Undecided</td>
<td>20</td>
<td>7.7</td>
<td>7.7</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
**Source of religious information**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>130</td>
<td>50.0</td>
<td>50.0</td>
<td>50.0</td>
</tr>
<tr>
<td>Disagree</td>
<td>90</td>
<td>34.6</td>
<td>34.6</td>
<td>84.6</td>
</tr>
<tr>
<td>Undecided</td>
<td>40</td>
<td>15.4</td>
<td>15.4</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** In the religious portion of the questionnaire respondent recorded their opinion about cable television is source of religious information. Result show that majority 130 (50.0%) were found agreed with the statement, 90 (34.6%) were disagreed and 40 (15.4%) answered were undecided. The result is also shown in Pie chart.

**Decline religious tendency**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>40</td>
<td>15.4</td>
<td>15.4</td>
<td>15.4</td>
</tr>
<tr>
<td>Disagree</td>
<td>190</td>
<td>73.1</td>
<td>73.1</td>
<td>88.5</td>
</tr>
<tr>
<td>Undecided</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** It has been commonly observed when audience are engaged in watching their favorite program, the time rid off very fast and their social as well as religious activities remain left. So with this perception question “religious tendency is decline these days due to cable television” were also included in the questionnaire. The response show that only 40 (15.4%) respondent agreed with statement. 190 (73.1%) were disagreed and 30 (11.5%) response were found undecided about the statement. The response of the respondent about the question “religious tendency is decline these days due to cable television” is also available in Pie chart.

**Expenditure increase**

<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>150</td>
<td>57.7</td>
<td>57.7</td>
<td>88.5</td>
</tr>
<tr>
<td>Disagree</td>
<td>80</td>
<td>30.8</td>
<td>30.8</td>
<td>30.8</td>
</tr>
<tr>
<td>Undecided</td>
<td>30</td>
<td>11.5</td>
<td>11.5</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>260</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

**Explanation:** To investigate the impact of cable television on expenditure like shopping, make-up, jewelry and clothes, the frequency table show that majority 150 (57.7%) respondent were found agreed with the statement, only 80 (30.8%) were found disagreed with the statement that cable television also affect their expenditure. However 30 (11.5%) reply were record undecided about the statement. The same response of the respondent is also presented in Pie chart for easy understanding.
8. Research Findings  Research study found that majority of respondent were married and from the different age groups. Also revealed that majority were found having cable connection from more than 04 years and watching different programs but majority prefer movies and dramas from 1 to 2 hours daily. It has been found from the research study that cable televisions have no effect on domestic activities of the viewer and also not create any hurdle in the way of interaction with relatives / friends. So, statement of first hypothesis “cable televisions have strong effect on female social life” is rejected and alternative hypothesis “cable television’s have no effect on female social life is developed as well as accepted.

From the analysis of data it has been noted that cable television have no effect in the food habits of the viewer. The result show “may be, may not be” means 50/50, because 46.2% were found agreed, 3.7% were found neutral and 50% were found disagreed with the statement, the undecided respondent not in support of anyone. This may be due to majority of respondents watching moves and drama channel as well as news channel and only 11.5% viewer watch cooking and foods channel. However, there is strong evidence that cable television is the best source of learning new food recipes. It has also been noted that cable television have no impact on female dress, even that it is considered best source of information about new design, fashion and style but audience refuse to wear these dress casually. So, the first part (fashion) of second hypothesis is accepted, whereas, the second part i.e. style has been rejected and alternative hypothesis is developed for acceptances.

Females are considered the centre of household and mothers are the initial source of primary education and learning for their children. Generally, children speak the language of their mothers. So, the mixing of other languages words i.e. Hindi or English in Urdu by female lead to change the complete language of the society. Evidence has been found from the study that majority of the television add the English and Hindi words in their daily conversation.

Culture and tradition are the terms which established the society and gave identification to their lives. Culture, tradition and celebrations are considered significant for every society, it differentiate one society from others. Usually, in foreign countries two type of ceremonies are celebrated one is civil ceremony and second is religious ceremony. However, religion Islam is complete code of life, so in Islam only religious ceremony is celebrated. The same are also vetted by the responded and disagreed with the statement to celebrate “Valentine day”. On the other hand, evidence also received from the study that the event of marriage ceremony tendency is changing very fast and majority perform the foreign rituals in addition to Pakistani tradition under the influence of television. Even that marriage is Islamic ceremony but their celebration culture is changing promptly.

In the global world everyone is much committed and engaged in their social life. People not have sufficient time to discuss the matter or problems with expertise. They search the solution of their problems from internet or watch concern program on cable television. Now a day’s on cable television scholar’s resolve the viewer problem online or provide platform for solution. Research study also vetted the statement that cable television’s have impact on the audience and provide religious information. However, it is also pertinent to mention here that the religious tendency of the viewer is not declining due to enjoying cable television. Here the hypothesis “the cable televisions have strong effect on female culture & tradition” is vetted.

Basically every female desired to good looking, well dressed and groomed. So they spend some amount on their dressing, grooming, clothes and jewelries etc. Research study found that in early era due to lack of communication the fashion trends were not easily transmitted. So, very less amount of expenditures were overcome on female dressing, grooming, clothes, jewelries and make-up etc. In this modern era due to the fast communication and regular watching of contemporary fashion and style in cable television the expenditure overcome on female dressing, grooming, clothes, jewelries and make-up etc are dramatically increased day by day. The fourth hypothesis “The cable television increases the female expenditure” of the research is proved valid and accepted.

The main hypothesis of this study i.e. “cable television’s have impact on female personalities” has been verified through four hypothesis developed for this study. The research study prove that cable television have no impact on female social life, not disturb their domestic as well as personnel activates and also create any hurdles in the way of interaction with relatives or friends etc. However it has great impact on the other variable such as fashion and style, culture and tradition as well as increases the viewer expenditure and gave the vetting proof for these hypotheses. It concluded that cable television have significant role in female personality and considered responsible for culture change. The evidence has been noted from the study that cable television affect and change the celebration, language and increase the expenditure of their viewer. Cable television provide information to their viewer about foreign culture, food habits, dresses & fashion, tradition, culture, celebrations and also religious information as well as languages for which audience is ready to adopt according to their level
and limits. According to the finding Blumler and Katz’s study “viewer select the channel which they like to watch”. This study found that majority of female prefers to watch fantasy program to escape themselves from real life. Majority of audience watch cable television for learning purpose not to seek reality. This study also strengthen the Uses and Gratifications theory that viewer have open option how much they watch the cable television and up to what level are effected from it. Even that assortment channels likes cooking shows, sports, geographic, educational, informative, planet, entertainment and news are playing for audience but this study reveal the majority wish to watch entertainment, because for entertainment cable television is the only source accessible to the female for satisfaction of all recreational. This study also found that watching of cable television is now included in daily routine activities. Even that cable television is watching only for entertainment purpose but some time the viewer is that much unconsciously affected to change their attitude, behavior and go beyond from the real life and personal values.

9. Recommendations: Cable television is one more vigorous instrument like other communication instruments which dramatically affect the life style of their users. So, user needs to vigilant and utilize the same with sensibility. It is recommended that policy makers should take tremendous care during the formulation of term and condition or rules and regulation for its operation. This study also strengthens the recommendation of George Gerbner Cultivation theory that as much as the audience watch the cable television that much they impressed from it. The same statement was also vetted by Altman and Taylor (1973), when he said that the cable television influence in the audience life depends up their involvement in characters and consumption of time by watching cable television. Research study found that those who spend more time by watching cable television with deep sagacity were found closed to persona as compared to those who stay in real life. Cable television promptly changes the life style of viewer and makes them emotional. Such types of situation groom up because Pakistani society is not aware about the media. Maximum people don’t know about the utilization of media diverse i.e. cable television, radio, internet and newspapers etc. It is strongly recommended that government needs to make efforts and educate the general people about the utilization of different media forms and also enhance their literacy about the media.

Cable television changes the life style across the border. Television program producer are completely responsible for bringing this change in society. It is recommended that media researcher or scholar need to take this issue seriously and also make efforts to aware and sensitize the programs producers as well as broadcasters to improve the quality of programs which they presented / played for common layman. To eliminate the imported culture and tradition and also reduce the impact of foreign channels, it is recommended that quality of local channel may be improved up to the international level and presented in Pakistan society, in line with the culture, values, norms and traditions. These may also be helpful in the promotion of Pakistani cultures at intercontinental level as well as strengthen at domestic level. A lot numbers of channels contained local as well as foreign channels launched from cable television and they play variety of programs. The impact of any particular programs broadcasted by foreign channel has not been included in this study. In the foreign channel the viewers easily find out the sexual media content. It is suggested that further research efforts are to be made to determine the effects of these foreign channels on Pakistani society especially in the area of media sexual contents. Cable television network rapidly increased and covered the whole country and its viewers are also increased day by day because it provides a lot number of channel, low charges, easy access and the major cause is its legalization. So, it is recommended that government should make efforts to hoard the society psychological, sexual, cultural, economical and social values from the foreign channel. The soap operas provide exclusive types of entertainment to their viewer especially female and its effect is that much strong on the female which leads to the destruction of society. It is recommended that research should be conducted on these soap operas particularly the emotional series, love and sexual behavior. In Pakistani society there is no restriction on the male with regard to selection of channel and watching of cable television as compared to female because this society is considered a male dominated one. The effect of cable television is varying for man to woman. So, it is suggested that research efforts may be make to determine the effect of cable television with gender difference and according to its environment. This study was conducted on a very small level and targeted only female of specific population, so its reliability and validity should not be considered in general level. However, it is strongly recommended to conduct systematic research study on this topic with variety of approaches, starting from small scale up to large scale with diverse populations.
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JOB DEMANDS AND RESOURCES ABOUT HUMAN SERVICES PROFESSIONALS: AN INDIGENOUS THEMATIC PERSPECTIVE

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ABSTRACT. This study aimed to explore and identify job demands and resources with a comprehensive approach to consolidate existing literature and exploratory facts about Pakistani human services professionals. The study assembles arguments from Job Demand-Resource (JD-R) model & theory to explain the process in light of Conservation of Resource (COR) theory. Human service professionals (doctors, lawyers, lecturers and bank managers) are more prone to burnout but are very crucial for societies, in spite of the difference of their work; these professionals are linked with human being and are being influenced by human being in both ways. Keeping in view the specificity of Job demands and job resources about sample and culture, an indigenous exploratory study has been conducted to find out the facts of Pakistani society about demands and resource of human services professional; including doctors, lawyers, lecturers and bank managers. Extensive literature has been reviewed to consolidate job demands and resources across different culture for variety of professions. Indigenous qualitative work has been considered with reference to job demands and resources of exploratory nature. Alongside, twelve focus group discussion sessions have been conducted with above mentioned professional respectively, eighteen semi-structured in depth interviews have been administrated with senior human service professionals and psychologists dealing with such cases. Twenty four themes have been emerged including ten about job demand and fourteen for job resources.

Keywords: Job demands, job resources, indigenous factors

1. Introduction. Job burnout is the outcome of excessive job demands and lesser job resources, those prove insufficient to meet the needs of work requirements, although each profession has different demands and resources yet these can be segregated into two broader divisions which are pertinent for many of professions with some common objectives such as human service professionals. There are pragmatic support that multiple factors contribute in the perception of organizational burnout [26] among these factors, the Organizational factors; workload[15] time pressure [26] role conflict, role ambiguity [28] an absence of resources [31] etc are most common. Among individual factors personality characteristics like self-efficacy [31] self-esteem [12] locus of control, emotional stability, extraversion, conscientiousness, positive affectivity, negative affectivity, optimism, proactive personality[11] and hardworking [24] are prevalent. In demographic variables; Different age group [18] Marital status [25] Working experience [1] salary structure and working hours [14] have been studied with reference to burnout. Then situational or contextual factors have been explored as role conflict [19]
Experiencing incompatible [32] and political skills [19] which are some of the examples of these factors those have been studied in relation with burnout.

1.1. **Conservation of Resources (COR) Theory.** One of the leading theories in explaining job stress and burnout is the Conservation of Resources (COR) theory [17] According to COR theory, people strive to maintain, protect and retain their resources against demands. This integrated resource theory distinguishes four broad classes of resources: material, condition, personal, and energy resources. An important premise of COR theory is that in order to prevent stressful loss cycles of resources and to enhance motivating resource gain spirals, people need to invest resources. The more resourceful people against are, the better they are able to do so. Job Demand-Resource Model elaborates the COR theory.

1.2. **Demand–Resource (Jd-R) Model.** According to the theoretical framework of Job demand–Resource (JD-R) model, certain factors asserts stress upon employees and certain factors help them to deal with these stressors [5]. There are numerous studies which focused on burnout within JD-R framework and this model has been tested in various countries including Germany [13] the Netherlands [22] Finland[18], Spain [16] and Pakistan[27] as well as in various occupational groups such as nurses [6] home care professionals [7] white-collar workers [22] blue-collar workers [20] teachers[8] and call-center employees [2].

2. **Literature Review.** These studies have well established the effective role of Job demand and Resource model in exploring, confirming and explaining role of various variables in employee performance and their overall well being, for example The job demands–resources (JD-R) model was used to examine the relationship between job characteristics, burnout and performance [9]. Since after the development of Job demand and resource model[5], it has been examined with almost all kind of research designs; quantitatively, qualitatively, cross sectional and longitudinal studies in different regions of the world to enhance its practicality. Some quantitative researches confirmed the role of organizational and personal variables within it [3]. On the other hand qualitative efforts have been done to explore the regional realities to address the cultural sensitivity issues [21]. Whereas cross sectional and longitudinal studies cater developmental milestones within Job demand and Resource framework [5]. Although researches mostly focused on organizational demands, in Job demand and resource model but it is likely that burnout may also be a symptom of broader social concerns that reach beyond the particular organizational environment [29].

3. **Feasibility of Present Study.** The present study has been conducted to develop themes about indigenous job demands and resources, since the development of Job demand and resource model [9] and afterwards development of job demand and resource theory, researches have been using incorporating different variables as demands and resources keeping in view specific research sample. But elaboration is missing in any research design that why some of the demands and resources have been specify for this particular research purpose. If at one side it provided flexibility to researchers for selection of different job demands and resources as per their need, on the other hand it provide weak theoretical foundation of research. In 2005, Ruthmann developed a scale comprised of different job demands and resources. It’s a generic nature instrument applicable to many a job setting to gauge general job demands and resources. Theory of job demands and resources highlight the flexibility of job demands and resources. According to this theory, there are four main demands and resources for example physical, psychological, social and organizational. Although there are no hard and fast operational definitions of all above mentioned demands and resources. It assumed that physical work demands and resources are included in the category of physical, whereas attitudinal aspects are included in psychological, hence support of family, colleagues, supervisors and other agents of society are included in social then physical environment and instrumental support is included in organizational domain. Flexibility of job demands and resources open new horizons for further exploration to introduce more categories for job demands and resources that may indicate more contributing factors for occupational health and risk factors. Extensive literature review of job demands and resources reveals that not only cross sectional but also there is a small number of quality longitudinal studies available to identify the job demands and resources which are ultimately contributing towards occupational health outcomes. Such studies conclude that other than personal, social and organizational factors there is major influence of environmental factors where individuals survive, it has great influence on the health related outcomes. A recent meta analysis of region wise job demands and job resources revealed that region has great influence on nature of job demands and resources. Keeping in view above factors, a feasibility of indigenous themes about job demand and resource emerges that may cater regional characteristics of third world country like Pakistan and in accordance to it can identify job demands and resources of human services professional indigenously.
4. **Method.** Following methodology has been opted.

4.1. **Objectives.** Main objectives of present study are as below:

4.1.1. How are job demands and job resources conceptualized in the literature?

4.1.2. What are indigenous job demands and resources in Pakistani society?

4.1.3. Is third world country like Pakistan possessing same domains of job demands and resources like advanced countries?

4.1.4. To establish a sound theoretical foundation for Job demand and resource indigenous scale.

4.2. **Main study.** To fulfill the objective, following was the plan of study.

4.2.1. **First Phase.** It includes the following steps:

4.2.1.1. **Literature review.** It was consisted upon further two steps;

4.2.1.1.1. **Review of last ten years studies of job demand and resources.** At this step, studies trends have been recognized that what kind of demands has been identified with respect to different samples of professionals and what new demands and resources have been identified with reference to these researches.

<table>
<thead>
<tr>
<th>Professionals</th>
<th>Job Demands</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Workload, emotional demands, physical demands, work–home interference, sexual harassment, Client contact, Shift work, Organizational support, Extra-role</td>
</tr>
<tr>
<td>Doctors</td>
<td>89% 85% 55% 81% 29% 95% 87% 75% 36%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>85% 69% 51% 68% 78% 94% 51% 81% 78%</td>
</tr>
<tr>
<td>Teachers</td>
<td>91% 56% 52% 64% 34% 89% 82% 87% 93%</td>
</tr>
<tr>
<td>Services Manager</td>
<td>96% 70% 72% 86% 25% 95% 68% 96%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Professional</th>
<th>Job Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>empowerment (competence and meaning), Autonomy, recognition by Client, supervisor support, Colleague support, Role clarity, social climate</td>
</tr>
<tr>
<td>Doctors</td>
<td>82% 71% 41% 82% 43% 62% 69%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>79% 75% 53% 84% 56% 61% 85%</td>
</tr>
<tr>
<td>Teachers</td>
<td>81% 63% 68% 67% 49% 78% 81%</td>
</tr>
<tr>
<td>Services Manager</td>
<td>56% 91% 84% 69% 76% 85% 89%</td>
</tr>
</tbody>
</table>

4.2.1.1.2. **Review of indigenous (Pakistani) studies of job demands and resources.** At this step, both exploratory and confirmatory studies were reviewed to find out the indigenous factors that are influencing job demands and resources and what are local job demands and resources with special focus on sample of study. Is profession has any influence on demands and resources. Following are the findings which are different from literature of review of other countries; It explores the historical neglect poverty and socio-political marginalization,
complemented by natural disasters and anti terrorist military operations. These are causes for less development in the sector. Other studies reported[27].

<table>
<thead>
<tr>
<th>Sr.#</th>
<th>Excessive demands</th>
<th>Sr.#</th>
<th>Resource constraints</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Emotionally demanding patient interactions</td>
<td>1.</td>
<td>Lack of time</td>
</tr>
<tr>
<td>2.</td>
<td>Unfavorable physical environment</td>
<td>2.</td>
<td>Lack of facilities</td>
</tr>
<tr>
<td>3.</td>
<td>Conflicting role demands of work and family</td>
<td>3.</td>
<td>Out dates machinery and equipments</td>
</tr>
<tr>
<td>4.</td>
<td>High expectation of society</td>
<td>4.</td>
<td>Inefficient supporting staff</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5.</td>
<td>Lack of positive feedback</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lack of social support</td>
</tr>
</tbody>
</table>

4.2.2. **Second Phase.** It is comprised of two parts:

4.2.2.1. **Part 1.** On the basis of COR (Conservation of Resource theory) JD-R theory focused group guidelines have been devised to conduct this qualitative part of research. This qualitative part is to find out the indigenous demands and resources of human service professionals; twelve focused group discussions sessions have been conducted with human services professionals (Doctors, lecturers, lawyers and managers from 7 to 9 in each session). Fifteen semi structured interviews have been conducted with senior professional of above mentioned area; three interviews have been conducted with psychologists having researches in organizations about occupational health concerns.

4.2.2.1.1. **Results.** Following are the result after focus group discussions and semi-structured interviews with doctors;

<table>
<thead>
<tr>
<th>Demands</th>
<th>Description</th>
<th>Themes</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Most of the doctors reported that they have to work in long shifts and on alternative day shifts of 48 hours.</td>
<td>Long shifts</td>
<td>Physical demand</td>
</tr>
<tr>
<td>2</td>
<td>They have to attend a large number of patients which is not time specific; they have to perform their duty on Eidians, public holidays and other days.</td>
<td>Workload</td>
<td>Social demand</td>
</tr>
<tr>
<td>3</td>
<td>Most of the doctors shared that due to long hours at hospital and limited leaves, their family life is influenced greatly. They reported that not only their immediate family but other relatives are also complaining about their unavailability on family functions.</td>
<td>Work-family</td>
<td>physical demands</td>
</tr>
<tr>
<td></td>
<td>They have to physically present, operations and surgeries require their mental and physical coordination.</td>
<td>interference</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Doctors reported that they have to deals their patients and having their direct interaction with their clients, so it is also demanded that Doctors have to deal politely, courteously and with sympathetically.</td>
<td>psychological</td>
<td>Psychological &amp; Emotional</td>
</tr>
<tr>
<td>5</td>
<td>Doctors shared that they have to deal patients with pains, struggling for life, wounds, depression; they require high emotional stability to deal with patients.</td>
<td>情感</td>
<td>demand</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Most of the doctors shared that their work demands independence to decide about their method of treatment and taking decisions as per need and requirements.

<table>
<thead>
<tr>
<th>7</th>
<th>Most of doctors acknowledged that Pakistani doctors are appreciated in internal world for their professional competency. They also appreciated the level of medical studies at Pakistan.</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Doctors find their salary and income incompatible with their workload and duty hours. They shared that they have to spend high amount of money on MBBS studies and tough study requirements but when hardly they get job their salary is not sufficient to meet their needs adequately.</td>
</tr>
<tr>
<td>1</td>
<td>The hygienic conditions of the hospitals also affect doctors’ health badly. In the government hospitals, there are neither clean toilets nor reasonable places to have meals. Doctors on night duty, face problems if they want to take a nap or rest for a while.</td>
</tr>
<tr>
<td>2</td>
<td>Lack of resources and research facilities in most of the teaching hospitals is another setback to the doctors. Availability of internet and access to the paid medical journals, is limited to a handful of tertiary care hospitals only. Hence, most of the doctors can’t access the up to date information nor can benefit from telemedicine. Most of the machinery and apparatus is outdated, there is a rigorous process to get issued or repair the out of order instruments.</td>
</tr>
<tr>
<td>3</td>
<td>It is one of the highlighted problem of doctors they shared that they don’t have permanent jobs, they shared as per statistics Pakistan has only 8/10000, while the global average is 14/10000. It increased the workload at one end and give rise to doctors unemployment on other hand. Most of the doctors are on contract, they no job security and this uncertainty develop hopelessness among them.</td>
</tr>
<tr>
<td>4</td>
<td>Doctors shared that they have no facilitation from hospitals for their family health security, residence matters and other allowances which may give them sense of security or facility, they have to live on their limited salary and have to accommodate all of their needs within it.</td>
</tr>
<tr>
<td>5</td>
<td>Doctors shared that paramedical staff, other technicians are not very supportive and cooperative, they have to give repeated reminders for tiny tasks, and this complaint is high in public hospitals.</td>
</tr>
<tr>
<td>6</td>
<td>Most of the policies are not well documented, many of them are in practice but no document evidence is available. Doctors are unaware about their service path, in other words service path is not existed.</td>
</tr>
<tr>
<td>7</td>
<td>A very few amount annually is being allocated in budget at Government level, that amount is also not disseminated properly to health department. No job opportunity at Government level opened for Doctors,</td>
</tr>
<tr>
<td>8</td>
<td>Doctors from public hospitals shared that they have to face pressure because of reference culture, patients come with reference slip of some MNA or MPA, and then patients require special treatment and want to get best medicines, irrespective</td>
</tr>
</tbody>
</table>

| Autonomy | Cognitive, psychological & Physical demand |
| Resources | Physical & Psychological resource |
| Low income | Physical & Psychological resource |
| Working environment | Physical Resource |
| Instrumentation facility | Psychological Resource |
| Job security | Physical, social & Psychological resource |
| Organizational support | Social resource |
| Co-worker support | Physical resource |
| Documentation | Ecological Resource |
| Role of state & Law | Ecological Resource |
| Reference Culture | Ecological Resource |
Doctors indicated that poor law and order conditions of the country are also a source of stress at workplace, bomb blast victims are being brought to hospital, which unexpectedly increase the workload and create feelings of insecurity and workplace emotional trauma. Most of the doctors want to move abroad. They are highly disappointed about their future in Pakistan.

Almost all of the doctors admitted that they received regard and acknowledgement being a doctor in Pakistani society, although they shared the negative role played by media to blur doctors’ image but they still enjoy highly respected profession.

Another very interesting fact revealed that doctors have more chances of professional exposure at Pakistan, in abroad countries although they get good pay but because of many legalizations they have very little chance to get exposure of multiple surgeries etc.

For lawyers following themes have been generated after analyzing their statements:

<table>
<thead>
<tr>
<th>Sr.#</th>
<th>Description</th>
<th>Themes</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Most of the lawyers stated that they have not a balanced work load; some of the lawyers are enjoying good fame and have a lot of work to do, on the other side some of the lawyers have very little work to do. Lawyers shared a very interesting kind of work-family interference, according to them their family have to support them financially even after 5 years of their professional life, because in starting years they have work to do but no money at all being a junior lawyer, so instead of supporting family they have to depend on family for their professional sustainability. Some time their struggle period prolonged which influenced their family relationship.</td>
<td>Workload</td>
<td>Psychological &amp; Cognitive demand</td>
</tr>
<tr>
<td>2</td>
<td>Lawyers shared that their work demands cognitive sources for planning execution and finally satisfying client. Waving case as per laws and knitting proceedings all needs cognitive work. Lawyers shared that they have first hand interaction with their clients, clients are mostly uneducated, unaware of laws and rules, they perceived lawyer as all in all for their solutions. These high expectations of clients increase pressure and stress on lawyer.</td>
<td>Work-family interference</td>
<td>Cognitive Demand</td>
</tr>
<tr>
<td>3</td>
<td>Lawyers are of the point of view that they have no autonomy related to their work, they have to depend on judges, they have to depend on strikes, they have to depend on case proceedings of next lawyer (opponent to them in a case), in case such dependencies lawyers can just act accordingly without any independence to plan and execute work.</td>
<td>Client contact</td>
<td>Psychological Demand</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td>Psychological Demand</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td>Autonomy</td>
</tr>
</tbody>
</table>
Most of the lawyers acknowledged that there is an urgent need to take drastic measures in the outdated system law education. A purposeful and well planned law-education system not only checks the rapid growth of incompetent lawyers but also rescue young competent lawyers.

Lawyers are of the opinion that they get very low income in return of their efforts.

Lawyers shared that they have to face very poor working environment, low spacing, noisy surroundings, strikes, now-a-day insecurity for bombers attacks, rush area where they have to spend long hours which increase their mental stress.

Lawyers told that a few lawyers received government job and rest of a large number have to depend on their private practice, there is no professional security to lawyers at Government level.

Most of the lawyers are of the opinion that they are not playing a well defined role, there are multiple reasons for so for example expectations of the client where they have to dual role, for work place disturbances, most important absence of work hierarchy at court and law chambers.

With reference to law professions lawyers are of the point of view that there is no support to lawyers on state level.

Lawyers are complaining that their profession has no recognition and security at state level, they have no rights, there is no planning at government level for promotion and protection of lawyers, if a lawyer has been since years in this profession and can’t earn government will not give any opportunity and security to him.

Profession of lawyers are under influence of political and feudal powers, lawyers shared that people from political powers or feudal want their supremacy on law and forced lawyers to mould laws as per their will.

Profession of law has faced a long period of crisis at Pakistan during last years, attacks on lawyers, strikes, rift between government and lawyers have created an environment of disappointment on lawyers end.

Lawyers shared a very interesting fact about position of lawyers in an Islamic country, they said is difficult for people to accept Brittan law, some tribes of FATA follow only “jerga” system and they are not accepting law and lawyers. in some joint cases lawyers have to “peshe” their and have to accept decision according their laws, in many day to day important matters people do not consider lawyers but at the time when situation went worse. For example “Nikha” partnership deals.

Most of the lawyers are not satisfied with their profession, law professions is seems not of choice but of no choice.
Lawyers shared that they are not honored being associated with law professions, people have different myth beliefs about dishonesty, lack of dutifulness and lusty behavior of lawyers.

Female lawyers shared that their problems are times higher than male lawyers and additional issue is their gender, workplace bulling and sexual harassment are common problem which they have to face for survival in this profession.

After analyzing lecturers verbatim following themes have been emerged:

<table>
<thead>
<tr>
<th>Sr.#</th>
<th>Description</th>
<th>Themes</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Teachers shared that other than teaching classes they have pressures of enhancing their education, increasing their publication, other responsibilities at workplace other than core job.</td>
<td>Demands</td>
<td>Workload</td>
</tr>
<tr>
<td></td>
<td>Most of private college teachers shared that they have to work after college hours to enhance their monthly income, these shifts prolong late evening, they have to bring their college work to home as well, so most of the time they remain busy in their professional work hence spare less time for their family affairs.</td>
<td></td>
<td>Work-family interference</td>
</tr>
<tr>
<td>2</td>
<td>Most of the lecturer of the opinion that teaching profession requires cognitive abilities, preparing and delivering lecture, developing linkages with practical life and delivering conceptual clarity all require sound cognitive abilities.</td>
<td></td>
<td>Cognitive work</td>
</tr>
<tr>
<td>3</td>
<td>Teachers stated that their clients are their students and they have direct interaction with their clients, students have changed perception about teachers in old times students were obedient towards their teachers, they never thought to dishonor teachers but now-a-days situation is worst, students are away from respectful attitude, they need degrees but don’t want to put efforts, In such condition satisfying students and getting good results is a hard target to achieve.</td>
<td></td>
<td>Client contact</td>
</tr>
<tr>
<td>4</td>
<td>Teachers shared that there was a time when it assumed that teacher is king inside the class because students thought him source of all knowledge but now situation has been changed not only teacher is bound to teach as per scheme of study but also he has to be careful for any sentence he utter in the class as students may put complaint against him as per their interpretation of saying. In private colleges such problems are matter of routine.</td>
<td></td>
<td>Autonomy</td>
</tr>
<tr>
<td>5</td>
<td>College teachers shared that they have lot of workload other than teaching, its about course planning &amp; designing, assignment evaluation, during term exams and other than there is work pressure of administrative work at college, membership of different committees, supervision of co curricular &amp; extra activities.</td>
<td></td>
<td>Extra-Role</td>
</tr>
</tbody>
</table>
Resources

At government colleges, working environment is not facilitating, electricity load shedding, old furniture, outdated instruments for practical work, red tapism, work place politics, favoritism are some of the common problems which college teachers have to face.

Many lectures having permanent jobs and enjoying job security but there is a big number of lecturers those are on contract, they are putting hard but little opportunities to be confirmed.

Most of the lecturer shared that they are getting not high support from their colleges; for official responsibilities policies, procedure, updated knowledge and other supports other than official role facilities like medical, residency, transportation are also missing.

Lecturers shared that they faced problems from admin department, examination department and other departments supposed to facilitate their work. In their opinion these departments could not understand the urgency and importance of the task and their little neglects caused big delays in their work.

Most of lectures of government and private colleges shared that although pays have been raised but still these are not compatible with inflation and needs of life. Every year annual budget has little amount for education which is times low than other under developing countries.

Many of the senior members shared that after spend all of their life in this profession we are not able to have our own house, and we are unable to give better status of life to our children.

Most of the lecturers are of the opinion that energy crisis in the country, life insecurity, terrorism are permanent source of restlessness for teachers and students and ultimately influencing their teaching role.

Many lecturer shared that they have to do some side by business other than teaching job. Although it is a source of satisfaction for them but not sufficient for survival.

Teachers are regarded in society but are not honored being lecturers.

Teachers acknowledged that students’ response proved great motivation for them.

When services managers were asked about their demands and resources following themes came out from their discussions:

<table>
<thead>
<tr>
<th>Sr.#</th>
<th>Description</th>
<th>Themes</th>
<th>Categories</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Working environment</td>
<td>Psychological resource</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Job security</td>
<td>Physical, social &amp; Psychological resource</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Organizational support</td>
<td>Social resource</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Co-worker support</td>
<td>Ecological Resource</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>Role of state &amp; Law</td>
<td>Physical &amp; Psychological resource</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>Low income</td>
<td>Ecological Resource</td>
</tr>
<tr>
<td>7</td>
<td></td>
<td>Country Law &amp; order conditions</td>
<td>Psychological Resource</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td>Sense of Accomplishment</td>
<td>Psychological Resource</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td>Profession source of Regard</td>
<td>Psychological Resource</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Client Feed back</td>
<td></td>
</tr>
</tbody>
</table>

313
Demands
Most of the services providing managers are of the opinion that they have no time limits for their job; they are supposed to be available at any time of need.

They remain over loaded with work because domain of their work is very vast.

Most of the service managers shared that work boundaries areblur which caused their work life interfere with home life and home life also interfere with work life.

Most of manger heir physical shared their work require physical presence for smooth transition of services delivery.

Services managers are in direct contact with their clients, they are getting first hand information about the level of satisfaction of their client.

Service managers have to perform many of the tasks which are not well defined but needed to complete their assigned task.

Services mangers have control on minor kind of tasks that how to perform a task, how much man power is required what may be the quality of equipment but level of services, quality assurance and extend of services are out of the range.

Resources
Although most of the manger considered client satisfaction source of motivation but almost all of them considered services as thankless job, the major reason for un satisfaction is the subjective nature of client judgments.

Supervisor support very important for their work motivation, non supportive supervisor himself a source of stress and strain.

All of the service manager either of public departments or of private organizations, considered their role highly ambiguous, no clear job description has been handed over to any services manager and this ambiguity remain constant in all of their service tenure.

Mostly manager from private organizations are complaining about job insecurity, they shared that they remain always under the fear of joblessness.

Services providing is liaisons depending profession, Services managers shared that co-workers support either colleagues or subordinates is very important in absence of cooperation services delivery is impossible.
Most of the managers irrespective of government or private sector dissatisfied with their monthly income, they find it hand to mouth and helpless as can not start any part time occupation for long hours requirement of their job.

Services managers are highly influenced with country law and order conditions, interestingly some of them shared that we use disturbances as excuses for late service delivery but other indicate it source of stress for themselves being late in completion of due tasks.

Most of them are not willing to continue it as their preferred profession, even those who are in this profession since years are in search of some other opportunity and stick with it. They have no service track for promotion and progress, most of them have accepted that they will retired from same designation.

Managers thought it a thankless job, people give them very little acknowledgement for big share of their services.

Managers indicated that their work is a totally dependent on many factors, people and coordination, any missing part may cause failure of satisfactory delivery of services.

Client feedback is the core or outcome of their performance which is seldom highly encouraging.

Managers also reported that their evaluation parameters are also non clear to them exactly like their job description, range of their job seems very vast and their evaluation is also not in objective term.

4.2.2.2. Part II. This part of this study was consisted upon rating of the judges about selected themes so that highly rated themes can be included as overall themes for job demands and resources scale about human services professional in our country.

<table>
<thead>
<tr>
<th>Profession</th>
<th>Categories</th>
<th>Themes</th>
<th>Judges</th>
<th>Rating</th>
<th>% of rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors</td>
<td>Physical demand</td>
<td>Long shifts hours</td>
<td>6</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>Doctors</td>
<td>Psychological &amp; Cognitive demand</td>
<td>Workload</td>
<td>5</td>
<td></td>
<td>78%</td>
</tr>
<tr>
<td>Doctors</td>
<td>Social demand</td>
<td>Work-family interference</td>
<td>6</td>
<td></td>
<td>94%</td>
</tr>
<tr>
<td>Doctors</td>
<td>physical demand</td>
<td>physical demands</td>
<td>4</td>
<td></td>
<td>67%</td>
</tr>
<tr>
<td>Doctors</td>
<td>Psychological &amp; Emotional demand</td>
<td>Client contact</td>
<td>4</td>
<td></td>
<td>61%</td>
</tr>
<tr>
<td>Doctors</td>
<td>Emotional demands</td>
<td>Emotional demands</td>
<td>6</td>
<td></td>
<td>94%</td>
</tr>
<tr>
<td>Doctors</td>
<td>Psychological Demand</td>
<td>Autonomy</td>
<td>4</td>
<td></td>
<td>61%</td>
</tr>
<tr>
<td>Profession</td>
<td>Categories</td>
<td>Themes</td>
<td>Judges Rating</td>
<td>% of rating</td>
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<td>---------------</td>
<td>-------------</td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td>Cognitive, psychological &amp; Physical demand</td>
<td>competency</td>
<td>5</td>
<td>83%</td>
<td></td>
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<tr>
<td>Doctors</td>
<td>Physical &amp; Psychological resource</td>
<td>Low income</td>
<td>4</td>
<td>61%</td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td>Physical &amp; Psychological resource</td>
<td>Working environment</td>
<td>5</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td>Physical Resource</td>
<td>Instrumentation facility</td>
<td>6</td>
<td>94%</td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td>Psychological Resource</td>
<td>Job security</td>
<td>5</td>
<td>78%</td>
<td></td>
</tr>
<tr>
<td>Doctors</td>
<td>Physical, social &amp; Psychological resource</td>
<td>Organizational support</td>
<td>4</td>
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<td></td>
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<td>Doctors</td>
<td>Social resource</td>
<td>Co-worker support</td>
<td>5</td>
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</tr>
<tr>
<td>Doctors</td>
<td>Physical resource</td>
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<td>Role of state &amp; Law</td>
<td>4</td>
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<td></td>
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<tr>
<td>Doctors</td>
<td>Ecological Resource</td>
<td>Reference Culture</td>
<td>4</td>
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<td></td>
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<td>Doctors</td>
<td>Ecological Resource</td>
<td>Country Law &amp; order conditions</td>
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<td>Psychological Resource</td>
<td>Job satisfaction</td>
<td>4</td>
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<td>Doctors</td>
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<td>Doctors</td>
<td>Cognitive &amp; Psychological Resource</td>
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<table>
<thead>
<tr>
<th>Profession</th>
<th>Categories</th>
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<th>Judges Rating</th>
<th>% of rating</th>
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</thead>
<tbody>
<tr>
<td>Lawyers</td>
<td>Psychological &amp; Cognitive demand</td>
<td>Workload</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>Social demand</td>
<td>Work-family interference</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>Cognitive Demand</td>
<td>Cognitive work</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Lawyers</td>
<td>Psychological &amp; Emotional demand</td>
<td>Client contact</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Profession</td>
<td>Categories</td>
<td>Themes</td>
<td>Judges Rating</td>
<td>% of rating</td>
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</tr>
<tr>
<td>Lawyers</td>
<td>Psychological Demand</td>
<td>Autonomy</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Cognitive, physical &amp; psychological resource</td>
<td>competency</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td></td>
<td>Physical Psychological resource</td>
<td>Low income</td>
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<td>78%</td>
</tr>
<tr>
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<td>Working environment</td>
<td>4</td>
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</tr>
<tr>
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<td>Psychological Resource</td>
<td>Job security</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
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<td>Cognitive &amp; psychological Demand</td>
<td>Role clarity</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Physical, social &amp; Psychological resource</td>
<td>Organizational support</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Ecological Resource</td>
<td>Role of state &amp; Law</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Ecological Resource</td>
<td>Reference Culture</td>
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<td>44%</td>
</tr>
<tr>
<td></td>
<td>Ecological Resource</td>
<td>Country Law &amp; order conditions</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Ecological Resource</td>
<td>Contradiction of Law &amp; Religion</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Psychological Resource</td>
<td>job Satisfaction</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Psychological Resource</td>
<td>Profession source of Regard</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Psychological Resource</td>
<td>Sexual harassment</td>
<td>4</td>
<td>61%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profession</th>
<th>Categories</th>
<th>Themes</th>
<th>Judges Rating</th>
<th>% of rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecturers</td>
<td>Psychological &amp; Cognitive demand</td>
<td>Workload</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Social demand</td>
<td>Work-family interference</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td></td>
<td>Cognitive Demand</td>
<td>Cognitive work</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td></td>
<td>Psychological &amp; Emotional demand</td>
<td>Client contact</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Profession</td>
<td>Categories</td>
<td>Themes</td>
<td>Judges Rating</td>
<td>% of rating</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------</td>
<td>------------------------------------------</td>
<td>---------------</td>
<td>-------------</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Psychological Demand</td>
<td>Autonomy</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>physical Demand</td>
<td>Extra-Role</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>Physical &amp; Psychological resource</td>
<td>Working environment</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Psychological Resource</td>
<td>Job security</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Physical, social &amp; Psychological resource</td>
<td>Organizational support</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Social resource</td>
<td>Co-worker support</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Ecological Resource</td>
<td>Role of state &amp; Law</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Physical &amp; Psychological resource</td>
<td>Low income</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Ecological Resource</td>
<td>Country Law &amp; order conditions</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Psychological Resource</td>
<td>Sense of Accomplishment</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Psychological Resource</td>
<td>Profession source of Regard</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Lecturers</td>
<td>Psychological Resource</td>
<td>Client Feed back</td>
<td>6</td>
<td>94%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Profession</th>
<th>Categories</th>
<th>Themes</th>
<th>Judges Rating</th>
<th>% of rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Services Manager</td>
<td>Physical demand</td>
<td>Non defined time limits</td>
<td>5</td>
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</tr>
<tr>
<td>Services Manager</td>
<td>Psychological &amp; Cognitive demand</td>
<td>Workload</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Services Manager</td>
<td>Social demand</td>
<td>Work-family interference</td>
<td>4</td>
<td>61%</td>
</tr>
<tr>
<td>Services Manager</td>
<td>physical demand</td>
<td>physical demands</td>
<td>5</td>
<td>78%</td>
</tr>
<tr>
<td>Services Manager</td>
<td>Psychological &amp; Emotional demand</td>
<td>Client contact</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Services Manager</td>
<td>physical Demand</td>
<td>Extra-Role</td>
<td>6</td>
<td>94%</td>
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<tr>
<td>Services Manager</td>
<td>Psychological Resource</td>
<td>work-control</td>
<td>6</td>
<td>94%</td>
</tr>
<tr>
<td>Services Manager</td>
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<td>Client satisfaction</td>
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</tr>
<tr>
<td>Services Manager</td>
<td>Social resource</td>
<td>Supervisor Support</td>
<td>5</td>
<td>78%</td>
</tr>
</tbody>
</table>
5. **Final Themes.** On the basis of rating of the judges and commonalities among maximum professional, following themes have been selected which may represent overall job demands and resources of human services professionals;

<table>
<thead>
<tr>
<th>Demands</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cognitive Demand</td>
</tr>
<tr>
<td></td>
<td>Cognitive, psychological &amp; Physical demand</td>
</tr>
<tr>
<td>2</td>
<td>Physical demand</td>
</tr>
<tr>
<td>3</td>
<td>Physical Demand</td>
</tr>
<tr>
<td>4</td>
<td>Physical demand</td>
</tr>
<tr>
<td>5</td>
<td>physical Demand</td>
</tr>
<tr>
<td>6</td>
<td>Psychological &amp; Cognitive demand</td>
</tr>
<tr>
<td>7</td>
<td>Psychological &amp; Emotional demand</td>
</tr>
<tr>
<td>8</td>
<td>Psychological Demand</td>
</tr>
<tr>
<td>9</td>
<td>Social demand</td>
</tr>
<tr>
<td>10</td>
<td>Work-family interference</td>
</tr>
</tbody>
</table>

Following are the common resources or resource constrains.
6. **Conclusion.** After this exploratory phase themes have been generated to specify the factors with reference to job demands and resources, interestingly a new domain has been emerged that can be titled as Ecological factor, it may consider as broader social perspective but differentiating it from existing domains, this term is serving the purpose. Such demands and resources can be included in it which is other than organizational and immediate social surrounding but these are more about government policies, political conditions of country, basic needs of human beings which are directly influenced by state policies and planning along with these culture values can be part of it. As elaborated below:
REFERENCES


DETERMINANTS OF LEATHER EXPORTS FROM PAKISTAN: A TIME SERIES ANALYSIS

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ABSTRACT: This paper attempts to evaluate impact of major factors affecting leather exports from Punjab, Pakistan employing secondary sources of data. For time series analysis, data (1980 to 2010) were collected from various sources and used to develop an export supply function at macro-level. The value of the finished leather exports from Pakistan was taken as dependent variable, whereas export price, real exchange rate, trade openness and number of animal skins and hides were taken as independent variables. Co-integration analysis and Error Correction method were employed to estimate short and long run elasticities. According to the findings, exchange rate showed a negative effect on exports of finished leather. The coefficient of this variable explains that for every one percent increase in exchange rate there might be 5.2 percent decrease in exports of finished leather in the long run. In the similar context, Real GDP, share of semi manufactured goods exports and trade openness showed effect of 3.1, 0.72 and 2.4 percent increase in the export supply of finished leather in the long respectively. Export prices showed negative relationship with value of finished leather exports. The coefficient of this variable suggested that for every one percent increase in the export prices there might be -3.5 percent decreases in the export supply of finished leather in the long run. Based upon the findings, it is suggested exchange rate of Pakistani rupee should be stabilized with strengthening industry of semi manufactured leather goods in the country.

Key Words: Leather, Exports, Cointegration Analysis and Error Correction Method

1. Introduction: Livestock sector is the important sub sector of agriculture which significantly contributes to overall agriculture by sharing 55.1 percent of value added and 11.5 percent to GDP during 2010-11, but unfortunately this sector was impacted by the massive floods and witnessed marked slowdown recorded growth at 3.7 percent in 2010-11 as against 4.3 percent last year. This sector was also immune from weather related problems and thus offered prospects for consistent growth (GOP, 2011). The leather sector is Pakistan's second most dynamic sector after textiles. It contributes 5 percent to manufacturing GDP, about 7 percent to export earnings and provides employment to more than 200,000 people. The leather industry consists of six sub-sectors namely, tanning, leather footwear, leather garments, leather gloves, leather shoe uppers and leather goods. Leather and leather products industry is concentrated mainly at Karachi, Sialkot, Kasur and Lahore. Pakistan's leather industry is export oriented, as 90 percent of the leather produced is exported abroad either in the form of finished leather or leather products. Leather sector is one of the established indigenous manufacturing sectors that have developed reasonably well. Leather exports have increased at an average rate of 11 percent per annum. There are more than 2500 tanneries and footwear manufacturing units, mainly located in Karachi, Lahore, Sialkot and Kasur (Mehmood, 2008). Leather is one of the important products of the livestock industry in Pakistan. The material made from the skin and hides of the animals by tanning or similar processing is called leather. Supply of leather mainly depends on the livestock population of the country. Pakistan is fortunate that the raw material required by the leather industry is available in the country in abundance. Local availability of raw materials and low wage cost gives the country a competitive edge in the world market. The above mentioned are the types of basic raw materials which are being used by this industry i.e. cow hides, buffalo hides, goat skins and sheep skins. The quality of raw hides and skins generally depends upon the quality of livestock. The hides and skins removed out of young and healthy cattle may be taken as the best in its
quality provided the conditions in which these are removed and also their collection, preservation and storage is satisfactory.

Pakistan is well known in the world for high quality and wide-range of finished leather, garments, (sports jackets) and gloves (working and industrial). However Pakistan's contribution of leather goods (hand bags, purses, suitcases, key chains, belts etc.) and footwear is small in the international market, mainly because the former sub sector is least developed and the other is inward/domestic market demand-oriented. Leather garments sector constituting 52.9 percent of the total value of leather export, ranking highest among exports of leather industry in Pakistan, followed by finished leather constituting 35.8 percent of the total export earnings. In Pakistan leather industry is running under capacity and working at 50 percent of there existing potential. Reason of this under capacity production is unavailability of raw material, unskilled labor, high utility bills and high running cost of machinery that energy consumptions is very high and their labor intensive nature (Syed, 2009).

The largest concentration of leather garments production in Pakistan is found in Sialkot, which has 186 units and having around 52 percent of the total number of units located in Pakistan. Whereas the second largest concentration of leather garments production in Pakistan is in Karachi where 130 units are located, which is around 36 percent of the total number of units located in Pakistan. Lahore has 21 units, which is nearly 6 percent of the total number of units.

According to the Trade Development Authority of Pakistan, Pakistan stands at 21\textsuperscript{st} position in the world market of finished leather having the percentage contribution of 0.99 percent. If we talk about the leather garment sector, raw hides and skins, leather gloves, leather footwear and leather goods, Pakistan is contributing 6.17 percent, 1.12 percent, 10.76 percent, 0.28 percent and 0.21 percent respectively in the world market of leather goods respectively.

Some of the leading importers of Pakistan's Leather include USA with 10.69 percent share, Germany with 9.33 percent, UK with 7.35 percent, China with 7.1 percent and Italy with 6.54 percent share of total exports of leather from country. Pakistan imports raw leather material from Saudi Arabia, China, Kenya, Sudan and Tanzania. Saudi Arabia and China has major share of leather raw material supply to Pakistan by contributing 13.54 and 12.89 respectively. Mostly Pakistan import raw material and related products of leather from the developing countries and export value added products to developed countries like USA. Considering above facts, it may be concluded that leather sector is an important component of Pakistan’s economy. Leather export is a dynamic activity but still under utilized as the country exports semi-manufactured leather exports. Given this background, this study aimed at examining the impact of major determinants of leather exports identified using time series analysis.

2. An Overview Of Literature: Review of the available studies on exports of agricultural commodities in general and leather in particular revealed that limited and scanty literature is available which delineate effect of major variables affecting leather exports in Pakistan. There is however some relevant literature from other countries.

In Bangladesh, Sharif and Mainuddin (2003) narrated had been a continuous shift of leather, footwear and leather goods production from developed to developing countries mainly caused by price competitiveness. The developed countries imported low and medium end market leather footwear and leather goods from developing countries keeping their manufacturing limited to high fashioned costly products. Bangladesh had not yet been able to make a significant breakthrough in its leather sector through diversification and improvement of the quality of leather products. Bangladesh needed to improve the quality of leather products for better market access and economic benefits from the international export market including the developed countries. Jordaan and Eita (2007) analyzed the determinants of South African exports of raw hides and skins (other than fur skins) and leather (H41) using annual data covering the period 1997 to 2004 for 32 main trading partners. The results showed that importer’s GDP, South Africa’s GDP, importer’s population, South Africa’s population, infrastructure of South Africa and importing country and some regional trade agreements were the main determinants of raw hides and skins (other than fur skins) and leather exports. The paper then investigated if there was unexploited trade potential. The investigation revealed that among others, South Korea, United Kingdom, USA, Zambia and Zimbabwe had unexploited export potential. It was important to focus efforts on the unexploited trade potential accelerated growth and alleviated poverty in South Africa. Bekele and Ayele (2008) described that in their study, it was clear that Ethiopia had a clear comparative advantage in raw skin and hides production. However, the comparative advantage was not yet turned into a competitive advantage in the global market. Globalization had brought value chain and competitiveness issues, where individual efficiencies are at less important.
In Pakistan, Siddiqui (2001) stated that the leather and leather products industry was mainly located at Karachi, Gujranwala, Multan, Peshawar, Lahore, Kasur and Sialkot. The major clusters of leather products were located at Korangi, Sialkot, Lahore and Kasur. There were 784 units, 461 leather garments manufacturing units, 348 gloves manufacturing units and over 524 footwear manufacturing units in the country. The leather sector was mainly an export oriented sector of our country. The major countries to which Pakistan was exported leather and leather products were Italy, Portugal, Germany, France, USA, Dubai and Singapore etc. The leather sector during the last decade had shown remarkable progress in exports of value added products. Bashar (2003) stated that high quality leather was mainly exported and was not available for high value-added leather products. Leather garments in Pakistan were made mostly from low quality and low grade leather. These garments faced tough competition from Chinese and Indian leather products. Because the cost of production was very high in Pakistan as compared to the China and India. The high cost of various kinds of raw material especially utilities and taxes made our products more costly in international markets. Pakistan could gained lost market share of leather industry by reducing the cost of production. Massood (2009) narrated that Pakistan's leather exports showed a decline of 29 percent in the period of 2008-09 after a decade of constant growth. This sharp decrease in the exports of high value added and labor intensive leather products, because this sector was Pakistan's second largest foreign exchange earner after textiles and provided employment to 500,000 workers, was a matter of serious attention, demanding for immediate remedial steps to stem the tide. Kalimullah (2010) stated that country’s leather exports were likely to decrease by at least 30 percent due to the killings of animals in vast numbers in the ongoing deluge in Khyber Pakhtunkhwa, Punjab, Sindh and Balochistan. President RCCI Kashif Shabbir talked to a group of businessmen and industrialists at his office, one billion dollar of leather industry had badly affected due to floods. Prices of leather products were likely to jump further due to the dearth of leather emerging fast after the killings of animals in the floods.


3. Methodology and Data

3.1 Time Series Analysis: Secondary data were used to capture effect of different variables which have direct or indirect impacts on export supply of leather at country level. Data for export supply was collected for a period of 1980-2010. Data of export value of finished leather taken from the agriculture statistics of Pakistan and data on other variables like hides and skins production, exchange rate, real GDP, Share in semi manufactured goods exports, domestic prices, export prices and trade openness collected from various issues of Economic Survey of Pakistan.

3.2. Theoretical Model: Co integration (Granger 1981) was designed for testing and estimating the long run and short run relationship among the variables. The estimation of long run relationship required the time series to be non stationary in the level form. If the time series data are non stationary then the common statistical tools are not suggested and regression becomes spurious in nature (Granger and Newbold, 1974). In co integration approach, first step is to test for stationary or non stationary of data set. Second step is to test for long run relationship between variables.

3.3 Testing for Unit Root: A series is stationary if its mean, variance and covariance all are independent of time or in other words remains constant over time. Conversely, a series is non stationary if it fails to satisfy any part of the above definition i.e., its mean, variance or covariance change overtime. Various approaches are used to test the hypothesis of unit root but the most commonly used technique is Dickey-Fuller (DF) test (Dickey and Fuller, 1979) and (Dickey and Fuller, 1981). For the DF test, I have specified the number of lags and used Schwarz Bayesian Criterion (SBC) for each series.  DF test estimates the following equation by OLS:

\[ Y_t = \Phi_1 Y_{t-1} + \mu \]  

If \( \Phi_1 < 1 \), the series \( Y_t \) is stationary and it is non-stationary if \( \Phi_1 =1 \). The null hypothesis of unit root, \( H_0: \Phi_1 =1 \) is tested against the alternative hypothesis of no unit root, \( H_1: \Phi_1 <1 \). if \( H_0 \) is rejected; the series is stationary and vice versa.

3.4 Testing for Co integration: Co integration technique identifies equilibrium long run relationships between variables. If long run relationship exists between variables, then variables are co integrated. For implementation of co integration, two conditions must be fulfilled. First, at least two individual variables should be integrated of same order. Second, linear combination among variables should exist. Consider the co integration regression;
If the series $Y_t$ and $X_t$ are both I(1) and the error term $\mu_t$ is I(0), then the series are co-integrated of order I, (1, 0). In above equation, $\beta$ measures the equilibrium relationship between the series $Y_t$ and $X_t$ and $\mu_t$ is the deviation from long run equilibrium path.

If the DF test fails to reject the null hypothesis of unit root in levels but reject the null hypothesis in first differences, then the series contain one unit root and is of integrated order one I(1). If the test fails to reject null hypothesis in levels and first differences but reject the null hypothesis in second differences, then the series contains two unit roots and is of integrated order to I(2) (Mencet et al., 2006).

Following functional form of export supply function of finished leather was employed.

$$\log (E_V_t) = a_0 + a_1 \log (E_R_t) + a_2 \log (R_GDP_t) + a_3 \log (S_SMAN_t) + a_4 \log (H_S_t) + a_5 \log (D_P_t) + a_6 \log (T_O_t) + a_7 \log (E_P_t) + \mu_t$$  

Where

- $\log (E_V_t)$ = Logarithm of export value of finished leather (Million Rs.)
- $\log (E_R_t)$ = Logarithm of exchange rate (Pak.Rs./U.S.$)
- $\log (R_GDP_t)$ = Logarithm of real gross domestic product (Million Rs.)
- $\log (S_SMAN_t)$ = Logarithm of share in semi manufactured goods (Percentage)
- $\log (H_S_t)$ = Logarithm of hides and skins (Million No.)
- $\log (D_P_t)$ = Logarithm of domestic prices (Per Sq.M)
- $\log (T_O_t)$ = Logarithm of trade openness (Ratio)
- $\log (E_P_t)$ = Logarithm of export prices (Per Sq.M)

$a_0$ is the intercept term and $a_1, a_2, a_3, a_4, a_5, a_6$ and $a_7$ are parameters.

4. Empirical Findings: This section is divided into three parts. First part presents the descriptive statistics of the variables used for analysis; Second part reports unit root results, while third part presents co integration results.

4.1. Descriptive statistics of the variables under study: Table 1 presents the descriptive statistics of the variables used for analysis for period 1981 to 2010. During the study period, Pakistan exported 16.45 Million Sq.M of finished leather annually on an average, with minimum 10.60 Million Sq.M and maximum 24.20 Million Sq.M of finished leather. Export prices of finished Leather varied from 102.26 Rs/Sq.M to 1202.84 Rs/Sq.M and its mean value was 559 Rs/Sq.M. The mean, minimum and maximum value of Domestic prices of finished Leather was 504.65, 75.23 and 1158.79. Hides and Skins production of Pakistan varied from 31.91 Million No. to 60.10 Million No. and its mean value was 42.62 Million No.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Units</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leather exports(Q)</td>
<td>Million Sq.M</td>
<td>10.60</td>
<td>24.20</td>
<td>16.45</td>
<td>3.24</td>
</tr>
<tr>
<td>Leather exports Price/Value</td>
<td>Million Rs.</td>
<td>1084</td>
<td>26026.30</td>
<td>9590.81</td>
<td>7180.49</td>
</tr>
<tr>
<td>Exchange rate</td>
<td>Pak.Rs./U.S.$</td>
<td>9.91</td>
<td>83.56</td>
<td>37.35</td>
<td>21.75</td>
</tr>
<tr>
<td>Real GDP</td>
<td>Million Rs.</td>
<td>12242.68</td>
<td>68279.65</td>
<td>31130.71</td>
<td>15200.59</td>
</tr>
<tr>
<td>Percent share of semi</td>
<td>Percentage</td>
<td>9</td>
<td>25</td>
<td>16.32</td>
<td>4.89</td>
</tr>
</tbody>
</table>

Table 1
Descriptive statistics of the variables under study
Percent Share of semi manufactured goods exported increased from 9 percent to 25 percent and its average value was 16.32 percent. The value of Trade Openness varied from 0.213 to 0.355 and its average value was 0.287.

### 4.2 Unit Root Results:
Most time series data exhibit trends (data series changes over time) and are termed non-stationary (Nelson and Plosser, 1982; Perron 1988). It is often the case that an economic series has a unit root when its first difference is stationary. Therefore, the first step in any time series empirical analysis is to test for the presence of unit root in order to avoid the problem of spurious regression. It is important to examine the order of integration of each variable in a model to establish whether it contains unit root and how many times it needs to be differenced to achieve a stationary series. In the first step all the data sets were tested for the presence of unit root. Export value of finished leather (LEV), Exchange Rate (LER), Real Gross Domestic Product (LRGDP), Share in semi manufactured goods exports (LSSMAN), Hides and Skins (LHS), Trade Openness (LTO), Domestic Prices (LDP) and Export Prices (LEP) were tested for unit roots for the period 1980-2010. Table 2 represents the results of tests of the series in logarithms for unit root using ADF test for both with and without linear trend. In non-trended model, the absolute values of the ADF statistics and Φ₃ values for LEV, LER, LRGDP, LSSMAN, LTO and LEP are well below the 95% critical value of the test statistics (2.9706) and (6.73) respectively and hence the null hypothesis of unit root for these variables is accepted. Where as, LHS and LDP are stationary series in level form because the absolute values of the ADF statistics and Φ₃ values for these variables are well above the 95% critical value of the test statistics.

#### Table 2
Augmented Dickey-Fuller (ADF) Unit Root Test Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Non Trended Model</th>
<th>Trended Model</th>
<th>Φ₃</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEV (Export value)</td>
<td>-1.9828</td>
<td>-2.9959</td>
<td>1.9072</td>
<td>I(1)</td>
</tr>
<tr>
<td>LER (Exchange rate)</td>
<td>-1.3865</td>
<td>-2.3445</td>
<td>2.2123</td>
<td>I(1)</td>
</tr>
<tr>
<td>LRGDP (Real gross domestic product)</td>
<td>-.32262</td>
<td>-3.2758</td>
<td>5.4228</td>
<td>I(1)</td>
</tr>
<tr>
<td>LSSMAN (Share in semi manufactured goods exports)</td>
<td>-1.0243</td>
<td>-1.6829</td>
<td>1.6597</td>
<td>I(1)</td>
</tr>
<tr>
<td>LHS (Hides and skins)</td>
<td>-3.049570</td>
<td>-4.6382</td>
<td>11.3315</td>
<td>I(0)</td>
</tr>
<tr>
<td>LTO (Trade openness)</td>
<td>-2.4410</td>
<td>-1.0769</td>
<td>6.7193</td>
<td>I(1)</td>
</tr>
<tr>
<td>LDP (Domestic prices)</td>
<td>-4.8441</td>
<td>3.64241</td>
<td>16.4644</td>
<td>I(0)</td>
</tr>
<tr>
<td>LEP (Export prices)</td>
<td>-1.5539</td>
<td>-2.0877</td>
<td>3.3770</td>
<td>I(1)</td>
</tr>
<tr>
<td><strong>Critical Values</strong></td>
<td><strong>-2.9706</strong></td>
<td><strong>-3.5796</strong></td>
<td><strong>6.73</strong></td>
<td>---</td>
</tr>
</tbody>
</table>

*I(0) = Stationary  
I(1) = Non Stationary  
Note: Critical values (95% confidence interval) are taken from Fuller (1976, pp.373)*

Same is the case in trended model where the absolute values of the ADF statistics and Φ₃ values for LEV, LER, LRGDP, LSSMAN, LTO and LEP are well below and for LHS and LDP are above the 95% critical value of the test statistics (2.9706) and (6.73) respectively. Hence the LEV, LER, LRGDP, LSSMAN, LTO and LEP are non-stationary series and LHS and LDP are stationary series in the trended and non-trended models in the level form.
Table 3 indicates the first differenced results in both non-trended model and trended model. The First differenced absolute values of ADF statistics for all variables (LEV, LER, LRGDP, LSSMAN, LTO, LEP, LHS and LDP) are well above the 95% critical value in both Non-Trended and Trended Model, therefore the null hypothesis is rejected. This means that all the variables have no unit roots and have become stationary after first difference i.e. I (1).

Table 3:
First differenced ADF Unit Root Test Results
I (0) =Stationary
Note: Critical values (95% confidence interval) are taken from Fuller (1976, pp.373)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Non Trended Model</th>
<th>Trended Model</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLEV</td>
<td>-4.9575</td>
<td>-5.6770</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLER</td>
<td>-6.0450</td>
<td>-5.8080</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLRGDP</td>
<td>-6.7074</td>
<td>-6.5756</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLSSMAN</td>
<td>-6.3615</td>
<td>-7.3292</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLHS</td>
<td>-7.2971</td>
<td>-7.5275</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLTO</td>
<td>-4.2221</td>
<td>-4.5194</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLDP</td>
<td>-2.9940</td>
<td>-4.2780</td>
<td>I(0)</td>
</tr>
<tr>
<td>DLEP</td>
<td>-6.4179</td>
<td>-6.8693</td>
<td>I(0)</td>
</tr>
<tr>
<td>Critical Values</td>
<td>-2.9750</td>
<td>-3.5867</td>
<td>---</td>
</tr>
</tbody>
</table>

From Table 2 and 3, it can be concluded that Hides and Skins production and Domestic Prices of finished leather are integrated of order of zero i.e. I (0) and Export value of finished leather, Exchange Rate, Real Gross Domestic Product, Share in semi manufactured goods exports, Trade Openness and Export Prices are integrated of order of one i.e. I (1).

4.2.3 Co integration Results: After testing for unit root, the next step is to test for co integration. For co integration, two conditions must be satisfied. First, at least two of the individual variables going to be integrated, should be of the same order and second, a linear combination of the series should exist which is integrated to an order lower than the individual variables. Johansson’s procedure was applied to test the co integration between the respective variables. The first step in Johansen’s procedure is the selection of order of Vector Auto Regressive (VAR). Adjusted LR test on the VAR with a maximum of three lags was carried out. According to the Table 4, the Adjusted LR test selects the order one of VAR because at order one the parenthesis values (p-values) of Adjusted LR test is greater than 0.05. The value of SBC is maximum at the order one i.e. 149.5417. Thus SBC also selects the order one of VAR. AIC selects order three because maximum value of AIC (227.2454) is at order three but Adjusted LR test and SBC both showed order one, so, order of VAR was taken as one.

Table 4: LR-Test on VAR with Maximum of Three Lags

<table>
<thead>
<tr>
<th>List of variables included in the unrestricted VAR</th>
<th>LEV</th>
<th>LER</th>
<th>LRGDP</th>
<th>LSSMAN</th>
<th>LEP</th>
<th>LTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>List of deterministic and/or exogenous variables</td>
<td>A</td>
<td>LHS</td>
<td>LDP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Order</td>
<td>AIC</td>
<td>SBC</td>
<td>Adjusted LR test</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------</td>
<td>------</td>
<td>------</td>
<td>------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>227.2454</td>
<td>149.4952</td>
<td>-----</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>186.9708</td>
<td>132.5457</td>
<td>39.5498 (.314)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>180.6417</td>
<td>149.5417</td>
<td>61.4982 (.807)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>98.9280</td>
<td>91.1530</td>
<td>122.5349 (.160)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

AIC= Akaike Information Criterion   SBC=Schwarz Bayesian Criterion
After the VAR with order one has been selected, the second step in the Johansson’s procedure is to test the presence and number of co integrating vectors among the series of the model. Table 5 indicates that first statistical value of Maximal Eigen value test (45.6757) is greater than its 95 percent critical value (40.5300), therefore, we reject the null hypothesis of no co integration and accept the alternative hypothesis, i.e., there is one co integrating vector. Where as for the remaining five statistical values of Maximal Eigen value test, null hypothesis of no co integration can not be rejected.

Table 5
Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

<table>
<thead>
<tr>
<th>Null Value</th>
<th>Alternative Value</th>
<th>Statistic</th>
<th>95% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>r = 0</td>
<td>r &gt; 1</td>
<td>137.9325</td>
<td>102.5600</td>
</tr>
<tr>
<td>r &lt;= 1</td>
<td>r &gt;= 2</td>
<td>92.2568</td>
<td>95.9800</td>
</tr>
<tr>
<td>r &lt;= 2</td>
<td>r &gt;= 3</td>
<td>57.4749</td>
<td>59.4800</td>
</tr>
<tr>
<td>r &lt;= 3</td>
<td>r &gt;= 4</td>
<td>28.9332</td>
<td>34.8700</td>
</tr>
<tr>
<td>r &lt;= 4</td>
<td>r &gt;= 5</td>
<td>14.9981</td>
<td>20.1800</td>
</tr>
<tr>
<td>r &lt;= 5</td>
<td>r = 6</td>
<td>3.0616</td>
<td>9.1600</td>
</tr>
</tbody>
</table>

In Table 6 Trace test also proves that there is one co integrating vector at 95 percent critical value because first statistical value of trace test (137.9325) is greater than its 95 percent critical value (102.5600).Where as for the remaining five statistical values of Trace test, null hypothesis of no co integration can not be rejected.

Table 6
Cointegration LR-Test Based on Trace of the Stochastic Matrix

<table>
<thead>
<tr>
<th>Null Value</th>
<th>Alternative Value</th>
<th>Statistic</th>
<th>95% Critical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>r = 0</td>
<td>r &gt; 1</td>
<td>45.6757</td>
<td>40.5300</td>
</tr>
<tr>
<td>r &lt;= 1</td>
<td>r = 2</td>
<td>34.3819</td>
<td>34.4000</td>
</tr>
<tr>
<td>r &lt;= 2</td>
<td>r = 3</td>
<td>28.2417</td>
<td>28.2700</td>
</tr>
<tr>
<td>r &lt;= 3</td>
<td>r = 4</td>
<td>13.9351</td>
<td>22.0400</td>
</tr>
<tr>
<td>r &lt;= 4</td>
<td>r = 5</td>
<td>11.9365</td>
<td>15.8700</td>
</tr>
<tr>
<td>r &lt;= 5</td>
<td>r = 6</td>
<td>3.0616</td>
<td>9.1600</td>
</tr>
</tbody>
</table>

In the Johansen model, parameters in the co integrating vector can be interpreted as estimates of long run co integrating relationship between variables (Hallam and Zanoli, 1993). Therefore the estimated parameter values from these equations when normalized on exported quantity of finished leather are long run elasticities. The results are reported in table 7; the coefficients represent estimates of long run elasticities of exported quantity of finished leather with respect to Exchange Rate, Real GDP, share in semi manufactured goods export, Export Prices and Trade Openness.
Table 7
Johansson’s Normalized Estimates

<table>
<thead>
<tr>
<th>Variables</th>
<th>Long Run Elasticities</th>
<th>Std.Errors</th>
<th>T-Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>LER</td>
<td>-5.2110</td>
<td>2.9255</td>
<td>-1.7812</td>
</tr>
<tr>
<td>LRGDP</td>
<td>3.0659</td>
<td>.96028</td>
<td>3.1927</td>
</tr>
<tr>
<td>LSSMAN</td>
<td>0.71764</td>
<td>.35710</td>
<td>2.0096</td>
</tr>
<tr>
<td>LEP</td>
<td>-3.4988</td>
<td>2.0944</td>
<td>-1.6706</td>
</tr>
<tr>
<td>LTO</td>
<td>2.4914</td>
<td>1.3023</td>
<td>1.9130</td>
</tr>
<tr>
<td>A*</td>
<td>36.0989</td>
<td>12.7200</td>
<td>2.8379</td>
</tr>
</tbody>
</table>

Note: Indicates significant at 5 percent  
* A is an intercept

The cointegrating vector in Table 16 can be written in the form of an equation as shown below:

LEV = 36.0989 - 5.2110 LER + 3.0659 LRGDP + 0.71764 LSSMAN - 3.4988 LEP + 2.4914 LTO

Theoretically, a rise in the price of the foreign exchange rate (Dollar) is a depreciation of the home currency (Rupees). Foreign currency will become more expensive hence the relative value of the home currency will be fallen (Mencet et al., 2006), (Haleem et al., 2005). Table 7 indicates that exchange rate has a negative effect on exports of finished leather as expected. A one percent increase in exchange rate will cause 5.2110 percent decrease in exports of finished leather in the long run. The coefficient of exchange rate variable in the export supply of finished leather is statistically significant at 5 percent level. This empirical result suggests that a depreciation of Pakistani currency will cause a drop in the export supply of finished leather from Pakistan. Real GDP is the measure of Gross Domestic Product that seeks to reflect the actual value of production goods and services produced, by removing the effect of changes in prices, It is an important variable which shows the economic growth of a country in terms of goods and services produced. RGDP is positively related to the export supply of finished leather and is statistically significant at 5 percent level. The implication is that one percent increase in the RGDP will lead to 3.0659 percent increase in the export supply of finished leather from Pakistan in the long run. Share of semi manufactured goods in exports is also an important variable that shows the export concentration of any country in semi manufactured sector. More specifically we can say that with what pace a country exports its semi manufactured goods to other countries. In our model of export supply of finished leather Share of semi in manufactured goods exports is positively related and is statistically significant at 5 percent level. This indicates that one percent increase in the Share in semi manufactured goods exports will lead to 0.71764 percent increase in the export supply of finished leather from Pakistan in the long run. Export prices are considered to be important variable to check the export availability of the product. Theoretically, high export prices mean greater availability of the product in export markets while low export prices mean abundant availability of the product in domestic market. In our model of export supply of finished leather an export price are negatively related and is statistically significant at a 5 percent level. This indicates that one percent increase in the export prices will lead to -3.4988 percent increases in the export supply of finished leather from Pakistan in the long run. The variable of trade openness generated by the addition of total exports and total imports then the sum total, may be called total trade divided with Gross National Product (GNP) of respective year. Trade openness indicates the foreign trade performance of the country. So in our model of export supply of finished leather trade openness is positively related and is statistically significant at 5 percent level. This indicates that one percent increase in the value of trade openness will lead to 2.4914 percent increases in the export supply of finished leather from Pakistan in the long run.

Table 8
The Long-Run and Error Correction Model Estimates for Finished Leather Export

<table>
<thead>
<tr>
<th>Regressors</th>
<th>Short Run Elasticities</th>
<th>Long Run Elasticities</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-14.8970 (-3.9683)</td>
<td>36.0989 (2.8379)</td>
</tr>
<tr>
<td>LER</td>
<td>-1.0095 (-2.1861)</td>
<td>-5.2110 (1.7812)</td>
</tr>
<tr>
<td>LRGDP</td>
<td>1.8269 (3.6878)</td>
<td>3.0659 (-3.1927)</td>
</tr>
<tr>
<td>LSSMAN</td>
<td>0.57475 (2.9188)</td>
<td>0.71764 (-2.0096)</td>
</tr>
<tr>
<td>LEP</td>
<td>0.76458 (1.8953)</td>
<td>-3.4988 (-1.6706)</td>
</tr>
<tr>
<td>Diagnostic Tests</td>
<td>Value</td>
<td></td>
</tr>
<tr>
<td>------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>R-squared</td>
<td>0.64</td>
<td></td>
</tr>
<tr>
<td>DW-statistics</td>
<td>1.8282</td>
<td></td>
</tr>
<tr>
<td>LM-test-(x^2) (1)</td>
<td>0.84689[.369]</td>
<td></td>
</tr>
<tr>
<td>RESET test -(x^2) (2)</td>
<td>5.4722[.060]</td>
<td></td>
</tr>
</tbody>
</table>

Note: Indicates significant at 5 percent, Values in parenthesis are t-ratios, Values in square brackets are p-values and NS indicates non significant

It is also apparent from table 8 that exchange rate is negatively related in short run with export value of finished leather as if one percent increase in the exchange rate there will be 1.0095 percent decrease in the export value of finished leather from Pakistan. If we talk about the signs of Real Gross Domestic Product (LRGDP), Share in semi manufactured goods exports (LSSMAN), Trade Openness (LTO) and Export Prices (LEP) in the short run, these variables showed the same trend as showed in the long run. These variables are directly related with the export value of finished leather, if there is one percent increase in Real Gross Domestic Product, Share in semi manufactured goods exports, Trade Openness and Export Prices, there will be 1.8269, 0.57475, 0.75060 and 0.76458 increase in the export value of finished leather respectively in the short run. Skins and hides production and domestic prices are also directly related but the domestic prices are not statistically significant. Because if the domestic prices of the exports increased then exporters will sell their products in the domestic markets rather than export the products. But in our model the coefficient of the domestic prices showed the opposite result, which is not true. If the production of Skins and hides increased by one percent there will be 0.22287 percent increase in the export value of finished leather in the short run. The coefficient of error correction term has expected negative sign. It measure speed of adjustment towards long-run equilibrium. The coefficient (-0.23194) indicates that about 23 percent of deviation of export value of finished leather, from long-run equilibrium is corrected in the current period. In table 8, the value of R-squared (goodness of fit measure) shows that 64 percent of variation in the export supply value of finished leather is caused by the independent variables included in the model, while remaining 36 percent variation is due to some unknown factors. The value of Durbin-Watson Statistics is near about 2 which indicate the absence of autocorrelation among the variables. For all Diagnostic Tests, the model gives satisfactory results. The LM-test for up to one order indicates no serial correlation problem in the residuals. The p-value for RESET test for functional form misspecification is greater than 0.05. This means that functional form is correct and the residuals are normally distributed.

5. Concluding Remarks: This study estimated the impact of major determinants of leather exports from Pakistan. The findings of this study confirmed that major factors affecting leather exports from Pakistan. The exchange rate has a negative effect on exports of finished leather as expected. A one percent increase in exchange rate will cause 5.2110 percent decrease in exports of finished leather in the long run. RGDP, share of semi manufactured goods exports and trade openness will lead to 3.0659, 0.71764 and 2.4914 percent increase in the export supply of finished leather in the long respectively. Export prices are negatively related and indicate that one percent increase in the export prices will lead to -3.4988 percent increases in the export supply of finished leather in the long run. So in order to promote leather exports from Pakistan, there is need to develop quality standards according to importing countries requirement.

REFERENCES

AN ENERGY EFFICIENT AND FAULT TOLERANT MOBILE WIRELESS SENSOR NETWORK MODEL FOR MILITARY APPLICATIONS

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ABSTRACT. Wireless Sensor Network (WSN), a self organized group of distributed sensor nodes, is a promising technology that can be used in many different areas, e.g., environmental monitoring, health, object tracking, and military applications. This paper presents an energy-efficient mobile sensor network model to be used in military applications. The proposed approach is designed to be fault tolerant regarding the case that mobile nodes may be disconnected and reconnected in the network anytime. Real case military scenarios are considered in simulations such as informing about soldiers’ medical condition unattended by using cardiac rhythm and body temperature sensors. The paper also gives the TinyOS simulation results in terms of energy consumption and lifetime metrics.

Keywords: Wireless Sensor Network (WSN); Clustered Topology; IEEE 802.15.4; Finite State Machine (FSM); TinyOS.

1. Introduction. The subject of Wireless Sensor Networks (WSNs) is an emerging research area that many workshops and conferences have dealt with. Moreover, WSN is a promising field that can be used in many different areas and can be a solution to many different problems. This paper gives an energy efficient and fault tolerant mobile WSN model to be used in military applications where soldiers are simulated as mobile nodes. We aimed to build a WSN system that runs unattended even if a soldier is injured or dead as the considered network does not require any user interaction. By using cardiac rhythm and body temperature sensors embedded on nodes, base station is going to be informed about mobile soldiers' medical condition.

IEEE 802.15.4 MAC protocol standard [1] is selected to be simulated in the system. IEEE 802.15.4 is suitable for WSNs because of its low data rate and low power consumption [2, 3]. As to simulate an appropriate infrastructure for real case groups of mobile soldiers, a clustered topology is designed to overcome challenges that derive from the structure of WSN. The main reasons of choosing a clustering approach are the aim to reduce the volume of inter-node communication and the desire to create a scalable network. The system is implemented in and simulated via TinyOS platform, which is a popular operating system used for WSNs.

This investigation mainly aims the use of the proposed WSN model by Special Forces of militaries. Militaries may face many difficulties because of environmental conditions. Without the necessity of user interaction, a self-organized and self-operating network is required. Regarding the whole integrated system, we believe that WSN is the most suitable platform in such a case.
2. Background. There exist some similar applications specifically in military or in the field of health care. However, our project includes the requirements of both military and health care applications. An example military application is VigilNet [4] which is a WSN designed to detect enemy capabilities and positions of hostile targets. Main aim of VigilNet is to alert allies, enemies’ mobile vehicles or soldiers in hostile region. Moreover, a game scenario that gives us some clues about the challenges we may face is implemented in [5]. The corresponding pursuit–evasion game (PEG) application is deployed in the environment where the game is played and cooperates with the pursuers’ team. The application consists of many interesting research problems in the areas of tracking, control design, security, and robustness. For a PEG, the sensor network must be capable of multiple-vehicle tracking which can distinguish pursuers from evaders. The network requires a dynamic routing ability to deliver information to pursuers in a convenient time. Since the game will be played in a distributed manner, non-central sensing, control, and actuation need to be taken care during controller design. To prevent the evader’s team from intercepting sensitive information, the network must provide additional security features. Finally, the control algorithms should be aware of that a sensor node can fail.

2.1 Network Topologies used in WSN Applications. Networks differ as hierarchical and non-hierarchical ones. Hierarchical networks use robust backbones to increase efficiency. Since in hierarchical networks, inexpensive network nodes communicate with their backbones, creating a network by limiting number of expensive backbones will be cheaper. Therefore, simple nodes can be mobile. On the other hand, in non-hierarchical networks, all nodes are equal. By creating identical cells and keep one node active in the cell, connectivity can be managed with limited power [6]. It will be preferred a hierarchical network because it is wanted that backbones communicate with the base station in order to provide energy efficiency. By switching backbones according to an algorithm, energy efficiency is also considered since the energy consumption in the system is expected to be the main problem. Several network topologies which are commonly used in WSN applications are analyzed below.

2.1.1 Star Topology. Each member node in a star topology is connected to the sink or base station in one hop distance. Detection of faulty devices is very simple in that kind of hierarchy. Since all nodes are directly connected to sink, it can easily be determined which sensor node has a connection problem. An advantage of star topology is that setting up the network is simple. Management and error detection are simple and can be handled and recovered quickly. A disadvantage of star topology is that providing a survivable topology is difficult when nodes are mobile. It could not offer a reliable communication in case of a single point of failure since there is no any alternate path for nodes [7].

2.1.2 Clustered Topology. In a wireless sensor network that uses clustered topology, the sensor units are grouped into disjoint set clusters. The cluster head is responsible for coordination among the cluster nodes and gathering of their data and transmission of the aggregated data to the sink directly or via multi-hop transmission. To conserve energy, clustered WSNs offer three major advantages over non–clustered WSNs. Clustered WSNs are capable of reducing the volume of inter-node communication by localizing data transmission within the formed clusters and more importantly by decreasing the overall number of transmissions to the sink. Secondly, clustered WSNs are capable of extending the nodes’ sleep times by allowing cluster heads to coordinate and optimize the activities of other cluster members through some form of TDMA based scheduling [8]. One more advantage is that clustered systems localize the route set-up within the cluster and reduce the size of the routing table stored at the individual sensor node [9].

2.1.3 Clustered Tree Topology. Clustered tree topology model is one of the tree-based logical topologies of WSN, where nodes are organized randomly. It describes a cluster that means there is no order in node relations. Nodes at the lowest depth are reduced function devices such as sensors, controllers and actuators. These nodes are connected to powerful nodes, called full function devices. These full function devices are able to perform network routing functions and are connected to the personal area network (PAN) coordinator. A clustered tree network may include a different number of star networks connected with their central nodes.
which has direct access to single PAN coordinator [10]. In such a topology star networks can be seen as the clusters, where cluster leaders can be seen as the nodes on the backbone path of the spanning tree that can be constructed starting from a sink node.

2.2 Routing Protocols. Routing in wireless sensor networks is more different than fixed networks. Since there are more variables in wireless networks, sensor nodes may not work properly and routing must be changed based on dead/failed nodes. Routing mechanisms used in WSNs are made to adapt to such kind of situations. Routing protocols that are specified to be used in WSNs are listed in seven main categories in [11], namely location-based, hierarchical, data-centric, mobility-based, multipath-based, heterogeneity-based and quality of service (QoS) based protocols.

Location-based protocols [11] are used when sensor nodes are identified by their locations. Most protocols calculate the distance between two certain nodes in order to predict energy level so that the nodes can be managed to save their energy. Some location-aware routing protocols [11, 12] update the routes by using node coordinates, gathered from Global Positioning System (GPS) [13].

Data-centric protocols [11, 14] are different from other address-centric protocols. In data-centric protocols, node sensors transmit their data to the sink. In address-centric protocols, node sensors’ proper data is sent to the sink independently. In data-centric protocols when an initiator sensor transmits its raw data to the sink, some intermediate data can be added by other sensors which are between the initiator and the sink. That is not only a kind of gathering event but much more an aggregation mechanism. An advantage of using such information passing protocols is energy saving since less communication is needed between source sensors and the sink.

Hierarchical protocols [11, 15] are based on clustered topologies. Clustering is used to construct an energy preserving communication protocol by setting hierarchy in the communication. Every cluster has a unique node called as cluster head, and this node manages and coordinates its cluster. Then, inter-cluster and intra-cluster communication are done as two different hierarchical messaging.

Mobility-based protocols [11] have two main challenges due to the mobile nodes in the network. One is that there may not be an end-to-end data delivery guarantee as the network may be disconnected. The other issue is the overhead on energy consumption as the nodes move around. Mobility-based protocols intend to optimize the trade-off between providing a connected network and offering an energy efficient schema.

Regarding multipath-based protocols [11], the messages may use different paths between the source and target. Data transfer between sink and an ordinary node in the network, where the network is seen as a huge tree, has two ways of transmitting node's data to sink, namely single-path routing and multipath routing. When each sensor transmits its data to the sink by using only the shortest path, it can be referred as single-path routing. Multipath routing [11, 12] refers that each sensor calculates its n different paths to sink and balances its load evenly through these paths.

Heterogeneity sensor network [11, 16] structure involves mainly two different types of node devices regarding their resources. Resource powerful sensors have less or even no energy limitation, whereas the resource constrained battery-powered sensors have limited working life. To increase its lifetime, a sensor should use its remaining battery efficiently by reducing data transmission and computation.

QoS based protocols [11, 17] aims to optimize energy consumption in routing layer regarding the predetermined threshold quality values for the required services. Fault tolerance, energy consumption, delay, reliability and some other required services such as security may be taken care as the QoS metrics on routing in WSNs. All these QoS metrics need to be considered overall in a sort of trade-off comparison to prevent much energy consumption.

3. Challenges. There are several challenges for nodes that flow the data monitored from environment to sink, such as limited memory, computational capacities and battery power. In addition, our proposed system deals with fault tolerance, scalability, production cost, power consumption and security issues that are explained in details in [18].

Fault tolerance. Some sensor nodes may be damaged due to physical conditions and lack of power. The system should be designed considering those environmental circumstances so that overall network should still be working if any of its nodes dies. On the other hand, a part of the network may be disconnected due to
transmission range problems of the nodes or their mobile behaviors if supported. In such cases, the system should recover itself and keep on running with its available members for its common objective.

**Scalability.** The productivity of data flow may increase when the number of nodes in the network is raised. However, if the total number of sensor nodes increase dramatically, the system may be overloaded and disrupted. In order to specify a system as scalable, its operation should still run without concerning the number of nodes in the network.

**Production cost.** Number of sensor nodes in a general environmental monitoring scenario may reach to thousands or millions. On the other side, regarding the military applications, a less number of sensor nodes, i.e., 10 to 20, are used, especially for Special Forces. Therefore, node cost is usually not an issue for such special force applications.

**Power consumption.** Using battery power effectively is significant for system life-time. Self configuration and self organizing mechanisms are required in order to provide unattended operation. Nodes operate with limited power resources and limited ability to recharge [19]. Besides, when the sensor nodes which are disposed onto soldiers move away each other, the power consumption may be increased.

**Security.** Information needs to be secured to protect any private data used in network. The encryption, authentication and integrity mechanisms are necessary to reach a secure system.

4. **System Design.** Finite State Machine (FSM) usage is common in WSN applications. Therefore, we used FSM during the design process. The FSM diagram of the proposed system model is given in Figure 1.

![Figure 1. FSM Diagram of the Proposed System](image)

As shown in Figure 1, the nodes in our proposed model can be in any of the six states that are, INIT, ORDINARY, LOST, CLUSTERHEAD, MEMBER, HEADELECTION. To show all the states, messages and the relation between them, FSM table in Table I can also be examined. Nodes change their states according to the messages they receive and act according to those messages. On the other side, nodes have other four
attributions that are dead, healthy, injured, disabled. These results are decided by the algorithm running in base station according to cardiac rhythm and body temperature information sent by a node.

Nodes start initTimer when they pass to ORDINARY state. In ORDINARY state if a node do not become a MEMBER or CLUSTERHEAD during a predetermined period of time, that node will pass to LOST state and close initTimer. By such a timer use, we aim to prevent synchronizing problems. First in ORDINARY state, each node sends a situation message that includes the coordinate of the node and its distance to base station and each node updates its neighboring table based on the received messages. Initially, the node closest to base station in distance becomes CLUSTERHEAD and fires headTimer that works for choosing heads periodically. Other nodes which are not the closest become MEMBER. If a member of a cluster do not receive periodic situation message of cluster head, that member will no longer be considered as connected to the cluster and so it will pass to LOST state. It will remain in LOST state until it receives a periodic situation message from any of the cluster heads. Since the nodes are mobile and the topology always changes, the nodes not only switch between LOST and MEMBER but also switch between different clusters. So, the proposed approach provides a fault tolerant network as to offer to solve the connectivity problem by the nature of mobility of the nodes.

When headTimer is out, cluster head or members will pass to HEADELECTION state and cluster head starts head election timer. We considered implementing head election timer in order to prevent synchronization problems of nodes messaging. In HEADELECTION state, nodes will send their remaining battery level to their neighbors. If head election timer is not out, a node will decide to be the cluster head according to the following: first, the node should receive remaining battery level message, M1 in Figure 1, from all its neighbors, then the node should have the highest remaining battery level. Otherwise, the corresponding node will be a member. However, if head election is not completed during a predetermined period of time election, all nodes in that cluster will return to their previous states.

In addition, when a disconnected or lost node attempts to reenter to system, it is at the moment in LOST state. As a positive side-effect, this design can also be used same for the newcomer nodes of the system, if any. Any possible urgent newcomers are to be considered as in LOST state first, since they are not connected to any cluster. Consequently, when an unconnected node receives a situation message from a cluster head it becomes directly a member of that cluster. With the help of this FSM design, in overall, we expect to share out the responsibility of being cluster head. Cluster head node changes regarding the remaining battery levels of the nodes in the cluster, which will lead us to build a system in which energy consumption is equally distributed. So, the overall lifetime of the network will also be increased.

4.1. Extension Modules. There are extra modules that extend the system to be used for a military application

![Figure 2. FSM Table](image)

<table>
<thead>
<tr>
<th>STATE</th>
<th>start initTimer</th>
<th>initTimer expired</th>
<th>Received situation message &amp;&amp; closest</th>
<th>Received situation message &amp;&amp; (closest)</th>
<th>If receives situation message</th>
<th>If not receives situation message</th>
<th>receive (M1) from all its neighbours &amp;&amp; highest weight</th>
<th>receive (M1) from all its neighbours &amp;&amp; (highest weight)</th>
<th>HeadTimer out</th>
<th>Head election timer out &amp;&amp; (old state== CLUSTERHEAD)</th>
<th>Head election timer out &amp;&amp; (old state== CLUSTERHEAD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>INIT</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ORDINARY</td>
<td>-</td>
<td>LOST/ close initTimer</td>
<td>CLUSTER HEAD/ start HeadTimer, close initTimer</td>
<td>MEMBER/ close initTimer</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>CLUSTER HEAD</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>HEAD ELECTION/ new round begins</td>
<td>-</td>
</tr>
<tr>
<td>HEAD ELECTION</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>CLUSTER HEAD/ start HeadTimer</td>
<td>MEMBER/</td>
<td>-</td>
<td>CLUSTER HEAD/ MEMBER</td>
</tr>
<tr>
<td>MEMBER</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>LOST/-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>HEAD ELECTION/ new round begins</td>
<td>-</td>
</tr>
<tr>
<td>LOST</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Member/</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
tolerant and energy efficient properties of the model. On the other hand, we still work on mobility of system. Due to mobility, nodes may be disconnected from cluster so that the system is fault tolerant and energy consumption may be too high. Therefore, the algorithms running within the two main extension modules, module#1 and module#2 are considered based on the real case scenarios depicted in different schemes in Figure 3.a, Figure 3.b and Figure 3.c.

Module 1: The soldier cannot make any ability to communicate with team, but he can communicate with base station. The base station is going to send messages to team about direction of missing soldier, his location and soldier’s state. Therefore, a person who is from team may help to find the missing soldier as regards the messages that was sent from base station.

Module 1.a: If the soldier is injured or damaged due to physical conditions, the team will get the message of injured soldier who would need any help. Figure 3.a explains that the injured soldier’s state and his location will be sent to base station so that anyone who is a team member is going to reach the location of injured soldier. Therefore, the team can help the soldier within the shortest time.

Module 1.b: Figure 3.b illustrates that if a soldier is healthy, but he lost his team. In that case, the soldier is going to get a message of team’s location and he will try to find out his team and team mates by using given location and direction.

Figure 3.a. Module 1_a
Module 2: Figure 3.c shows the case that the soldier has communication capability with neither base station nor his team. Base station will send the predicted direction and last location of missing soldier to the nearest team. Thus, the nearest team tries to find missing soldier.
4.2. **Healthcare procedure.** Within the requirement analysis phase of the system, we have interviewed with specialists. Based on the recommendations of doctors for a person’s medical condition, the healthcare procedure, given in Figure 4, has been implemented for a soldier to decide on a result among four values: dead, healthy, injured, disabled. After obtaining the information about a soldier’s medical situation, the sink node runs this algorithm to give a decision on the corresponding soldier’s medical condition.

<table>
<thead>
<tr>
<th>Assume that all soldiers are healthy initially.</th>
</tr>
</thead>
<tbody>
<tr>
<td>They have not any hormonal and biological sickness</td>
</tr>
<tr>
<td>bodyTemp = body temperature of soldiers</td>
</tr>
<tr>
<td>heartRate = heart rate of soldiers</td>
</tr>
<tr>
<td>pri = priority of soldiers medical condition</td>
</tr>
<tr>
<td>if (bodyTemp&gt;=36.5 &amp;&amp; bodyTemp&lt;=37.5)</td>
</tr>
<tr>
<td>if(heartRate&gt;=60 &amp;&amp; heartRate&lt;=100)</td>
</tr>
<tr>
<td>state = healthy&amp;Alive</td>
</tr>
<tr>
<td>else if (bodyTemp&gt;=32.2 &amp;&amp; bodyTemp&lt;=35.5)</td>
</tr>
<tr>
<td>/heartRate increase dramatically.</td>
</tr>
<tr>
<td>state = may injured</td>
</tr>
<tr>
<td>priorityToSave = medium</td>
</tr>
<tr>
<td>else if(bodyTemp&gt;=28 &amp;&amp; bodyTemp&lt;=32)</td>
</tr>
<tr>
<td>state = exactly injured</td>
</tr>
<tr>
<td>priorityToSave = high</td>
</tr>
<tr>
<td>else if(bodyTemp&lt;28)</td>
</tr>
<tr>
<td>state = coma &amp; die</td>
</tr>
<tr>
<td>priorityToSave = low</td>
</tr>
</tbody>
</table>

**Figure 4. Pseudocode of Healthcare Procedure**

The algorithm in Figure 4 is mainly based on the conditional structures regarding the heart rate and the body temperature extracted from the medical data message. Initially, we assumed that each soldier has no any medical issues, all of them are healthy. Actually, there are two significant cases that are body temperature and heart rate. These cases analyze the critical points. Priority gives the soldier’s medical condition. When the body temperature is greater than or equal to 36.5 °C and less than or equal to 37.5 °C, the heart rate is going to be checked whether it is greater than 60 and less than 100. If this condition is satisfied, the soldier’s state is healthy and s/he is alive. Besides, when the body temperature is between 32.2 °C and 35.2 °C, the heart rate infers the soldier’s heart rate increases dramatically. The soldier may be injured and the priority may be supposed as medium.

On the other hand, if body temperature is between 28 °C and 32 °C, it could be inferred that this soldier is exactly injured and his priority seems high. Finally, if the soldier’s body temperature is less than 28 °C, it could be decided that the soldier is in coma and will die absolutely. The priority of such a soldier is low due to preserve the remaining resources of team for the rest of the soldiers.

4.3 **Simulation Results.** The proposed network is implemented using nesC programming language on TinyOS platform [20]. The considered topology of the proposed sensor network involving 15 sample nodes is designed in TinyOS as illustrated in Figure 5. In Figure 5, it is shown that the network is composed of four clusters named as A, B, C, and D. The nodes in Figure 5 are clustered according to the proposed FSM. Each cluster has a cluster head and a few cluster members. Members in a cluster will only communicate with their cluster head. On the other hand, a head of a cluster will also communicate with base station. We assume that base station is one hop distance away from the cluster heads. Therefore, cluster heads have ability to flow information that they sense and received. We aimed to flow information through other clusters, in case of having no communication with base station. Consequently, if a cluster head is disabled to a direct communication with base station due to mobility or any environmental circumstances, it will flow information to base station through other nodes that are able to communicate with base station in one hop distance.
Every node has a specific range for transmitting data. Green circles in Figure 5 show these ranges. Therefore, a node can only transmit data to other nodes that are in range. In addition, yellow circles in Figure 5 show unconnected region. The extension modules described in Section 4.1 are problematic real-case scenarios that may be occurred in any fault of the network. Either the case that a soldier move in a different direction than his/her neighbors or the case that a cluster as a whole team move in a different path than their neighbor clusters, there may exist a disconnection in any part of the network due to unconscious mobility. The extension modules are run to recover the regarding part of the graph and to reconnect the network. For that reason, the modules make the system much more fault-tolerant. So far, we have not implemented the extension modules in the system; main reason to give details about those modules is our intension to propose the model as a whole. The project implementation is still in progress.

A different scenario to demonstrate disconnection of a node where the system runs on the same topology given in Figure 5 is drawn in Figure 6. Figure 6 simply points out the basic connectivity problem in the system. The green circular territory around the alone node 3 represents its transmission range, whereas the yellow parts beyond its antenna range represent the area out of communication.
It is depicted in Figure 6 that node 3 is assumed to move away from its cluster due to its random mobility. At a convenient far away point, node 3 will get out of connection at any time. When a node goes out of range of its cluster, it is no longer a member of its cluster and it directly switches to a disconnected status (the state LOST in FSM table in Figure 2). When a node goes out of range of any cluster in the network, the node is disconnected from the network. Therefore, the network as a graph will not be connected fully after that moment.

As described with the extension modules proposed, there are two main different scenarios for a node to attempt to recover from its disconnected status. The first is that the disconnected node (soldier) itself will attempt to join the nearest different cluster if any is available in communication range. If not, the node will attempt to transmit its location to base station. The other alternative is the case that the corresponding node (soldier) cannot construct a communication with the base station. In such a case, when the periodic situation information is not received about the node, the base station will transmit to the nearest cluster head (team leader) the last stored location of the corresponding disconnected node together with a predicted direction based on the last movement history. Thus, the nearest team will move to that direction and try to find out the disconnected node to make it join the cluster.

The simulation results given in this paper do not involve any disconnection scenario. All nodes are assumed to be able to connect the base station in one hop and the network is assumed to be always connected. The aim of the simulations conducted so far is to show the energy efficiency of the proposed clustering approach together with the proposed FSM model. We have measured the energy consumption of a full-time connected scenario running on the topology given in Figure 5. The corresponding results are depicted in Figure 7.a and Figure 7.b. In the simulations, it is assumed that the nodes consume approximately 16 mA for transmitting or receiving single radio message [21].

Figure 7.a and Figure 7.b show the comparable results on energy consumptions for two different clustering scenarios. In Figure 7.a, the cluster head is elected once at the beginning and saves its state for all the simulation time. In other words, there is only one constant cluster head. The head does all the transmission to base station and consumes more energy than member nodes since the member nodes just send their data to their fixed head. Regarding this simulation scenario, the constant cluster head is node 2, seen as in Figure 7.a. However, in Figure 7.b, cluster head is decided according to our proposed FSM design. Namely, cluster head is decided regarding consumed energy; hence the head node is not fixed. The node which consumes less energy in total becomes cluster head. Therefore, the time period for all nodes to be the cluster head would be divided in a balanced manner, which leads to an almost equally energy consumption on each node. This also results an increase in overall network lifetime.

The simulations have been run for duration of 10 time periods for both scenarios of Figure 7.a and Figure 7.b. As shown in Figure 7.a, node 2 was always the fixed head in the first scenario and it consumed dramatically a
huge energy compared to the other nodes. In the second scenario, the number of total periods in which the same node is being elected as head was tried to be much more balanced among all nodes in the same cluster using the proposed FSM. In Figure 7.b, since node 2 and node 9 were elected as head in more periods than node 13 and node 14, node 2 and node 9 consumed more energy than node 13 and node 14; however there has not been observed a distinct difference on energy consumption per nodes in any different simulation. Figure 7 compares the measured energy consumptions of the nodes in cluster C for two different simulations. The energy consumption amounts of the other nodes in other clusters were also measured balanced when using the proposed FSM. On the other side, the total energy consumption view of each cluster is shown in Figure 8. Clusters A and B, which have same number of members, have same energy consumption amounts. Total energy consumption in cluster D is more than the other clusters indicated in Figure 8 and this result is consistent with that cluster D has more number of members than the others as shown in topology in Figure 5.

![Figure 8. Energy Consumption per Cluster](image)

The systematic behind the energy calculation in Figure 8 can be summarized as following: Each node in a cluster with a number of N nodes initially broadcasts 1 message to update their neighboring table during initTimer interval. Hence, each node receives N-1 different broadcasting messages. Therefore, number of corresponding messages either sent or received in initial duration is N for each of N nodes, that is N^2 in total. Then, in headTimer interval, each of N-1 member nodes sends 1 message to cluster head. Cluster head receives N-1 messages from members and transmits these data to base station in 1 aggregated message. Consequently, number of related messages sent/received in headTimer duration is N regarding cluster head, 1 regarding each of N-1 members, that is 2N-1 in total. Lastly, in head election timer duration, each node in cluster broadcasts 1 message and receives N-1 messages from neighbors. After being elected, the new cluster head broadcasts 1 additional message to inform all neighbors about its status. Those N-1 members receive this 1 message. Therefore, number of messages sent/received is N+1 regarding the new head, N+1 regarding each of N-1 members, that is N^2+N. When the simulation starts, initTimer interval expires once at the beginning, then headTimer and head election timer intervals expire periodically in each tour. Reminding that the simulation durations were chosen as 10 time periods/tours, the total number of messages sent/received in any cluster in Figure 8 with N nodes is N^2+10[(2N-1)+(N^2+N)], which can be simplified as [11N^2+30N-10]. Considering the cluster C with N=4 nodes as shown in Figure 5 and using 16 mA for each send/receive operation, the total consumed energy per cluster C is calculated as 4576 mA, which is the corresponding measured value shown in Figure 8.

5. Conclusion. We proposed and built a self-configured, unattended, low cost WSN based system that involves both military and healthcare features. The overall system is considered to be fault tolerant to solve the connectivity problem due to mobile nodes. The model is also designed to be energy efficient to increase the lifetime of the nodes using a clustering approach with changing cluster heads.
The project implementation has been going on. As the main future work, it is planned to focus on disconnection-enabled scenarios and to evaluate the recovery success of the proposed system. Furthermore, the extension modules proposed will be implemented to offer a much more fault-tolerant system.

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SHARI’ STATUS OF MOON SIGHTING IN THE PERSPECTIVE OF MODERN TECHNOLOGY: A CRITICAL REVIEW

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ABSTRACT: The main Reason in the difference of opinions about moon sighting is that some of the scientists think that they can realize the existence of the crescent in the sky through observatory and other mathematical assessments or calculations. This has been very categorically clarified by the modern sciences. So why not we may benefit from this technology so that we may not be in dire need of producing witnesses for sighting the moon. It has therefore become very essential to clarify the “Shari status” of the use of modern technology in this regard. The article beforehand is aimed to prove that the creation of the moon is not sufficient for establishing the sighting of the moon but as a matter of fact witnessing the same with the naked eyes is required.

Key Words: Moon Sighting; Observatory; Crescent; Witnessing; Naked Eyes

Introduction: Islam is the religion of nature. It has clearly stated that whether it is the old science or the new one, all of its technologies are considered as the gifts of Allah (S.W.T). Neither Islam nor reason avoids from utilizing the same. However, they emphasize on the utilization of all such gifts in the obedience of Allah (S.W.T) and not to use them in aimless activities.

Allah Almighty says:
"Don’t you know that Allah (S.W.T) has engaged all belongings of the Earth and the Boat in your service which sales in the river with his orders and He has sustained the Heavens to prevent them from falling on the Earth, unless it is ordained by Allah (S.W.T)" (Sura-Alhaj:65)

The Almighty Allah says in another place in the Holy Quran:
"Don’t you see that Allah (S.W.T) has ordained all the things which are in the skies and on the Earth to be in your service and He has completed all his exhibited and hidden Gifts on You’ (Sura-Al- luqma’an:20)

It is evident from the above mentioned verses of the Holy Quran that the whole Universe where mankind and million kinds of Hydrospheric and lithospheric animals live. In which the Sun, the Moon and other Planets etc are in circulation. [1]
There is a strong and steadfast system of astronomy and the strange variations of the elements and the plants as well as minerals found in the universe. These are the things, the control of which has been assigned to Human being. All of the Universe, Its astronomical bodies and elements and all energies of the elements have been dedicated for the Service of Man. [2]

Besides, all animals of the Sea and the Land, directly and indirectly are busy in his service so that this weak man who is ruling the universe may see this fact quite clearly, that he is not its creator and owner in the real sense. He will further realize that controlling all these things by the sake of his strength and power, He cannot compel them to extend their services to Him. He will see that there is no other possibility for him except that only Almighty Allah (S.W.T) has subjugated all these things for him. So it means that he also must have been created for certain objective.

Similarly all of the world’s inventions are just like a reflective mirror and a lesson for a discerning individual. Therefore Allah (S.W.T) did not create these things for him as a raw material, rather he gave him the quality to benefit from them and invent the things which are necessary for his existence. Whether it is the primitive or the modern sciences actually these are the 2nd name of a human behavior. None of the sciences can create a thing rather its duty is merely to utilize those thing properly. It shows that all inventions of science are the Gifts of Allah (S.W.T) and they can be used by Him. However, the religion and Islamic Shari’ah compels the man not to use them in his disobedience or in unlawful activities to injure the principles of Islam. [4]

That is why none of the person whether a lay man or a scholar have never thought of considering the use of Guns, Tanks and bombs in wars un-permissible. When the airplanes started flying in the air, not only the Muslims used it in their worldly affairs but also used them in their religious undertakings. Similarly the new instruments of information have been unanimously accepted and appreciated by the scholastic Muslim community to be used only for passing information and news. [5]

As for as the need of evidence and the presence of witnessing are concerned, this was neither considered sufficient by any of the courts in the world nor the religious scholar trusted such like assertion through information resources and technologies. It means if we take assistance from these inventions to the extent which may not violate the radical principle of Islam, so that cannot be denied by any individual. [6]

1. **Flying in the airplane for the purpose of moon sighting is unwanted in Islam:** It is not advisable to make arrangements for flying in an airplane for the moon sighting. Islam is a natural and a universal religion. Its injunctions are equal for all individuals including scholar, ignorant, literate, illiterate, male and female. All of its obligations are common for the intellectuals, scholars, Researchers and the Ruling class.

Similarly these are also for those human beings who are living in forests, in the mountain and in all those areas where no modern machineries are available.

On the other hand in the Islamic worships specific care has been taken of that at least in the worship and the worship places there must be equality in all aspects such as there should be no difference between rich and poor. In addition
to that while performing the pilgrimage there must be equality in respect of Dress performing its other formalities like going to the places of Mina, Muzdalifa, Arafat and standing in equal lines are the open evidences in this regard. That is why in Islam all bases of the rituals and all of the instructions are laid on simplicity which is to be easily accessible to all the Muslims in all of the areas, countries, regions etc. on equal basis. It should not happen that a wealthy person may achieve better facilities in their worships and the poor may remain deprived. Therefore, all the Islamic worships were neither dependent on the primitive philosophy nor on the modern science and its inventions. Similarly for offering the same worships we are not in need of any help of researcher, philosopher or mathematician and an astronomer. Though the beginning and ending of a month by the sighting of a crescent was possible to have been known by astronomy, but the prophet (PBUH) instead of confusing the Muslims in these complications, He ordered them that there was no need of involving themselves in these artistic delicacies rather sufficing by specific fixation based on cursory and superficial view. [7]

The prophet (PBUH) said, "Celebrate the Fasting and Eid with the sight of crescent. If there is cloud and dust, so complete thirty days fasting, but if two individuals present evidence of the moon sighting perform your Fasting and Eid accordingly" (Sunan Al Nasa`I ,Volume 4,p.132)

To sum up, it is meant that without involving himself in the mathematical complications and the calculations of astronomy each individual should simply try to see the crescent in his own place of living. If he does not see the moon he should complete thirty days. He should makes such arrangements for it to the extent that he may be able to sight the moon from such a place from where nothing is lying as a hindrance or handicap to see it. The prophet (PBUH) did not try to make more arrangements for moon sighting than this. So it means that provision of flying via an airplane for this purpose is an extremely exaggerated act, the example of which is untraceable in the Era of the Prophet in the primitive Islam. [8]

Though there were no airplanes in the Era of the Prophet (PBUH), but Makkah is surrounded by Safa, Marwa and the mountains like Abu Qubais. Similarly there are number of mountains around Madeena Tayyeba. If high flying for moon sighting was an Islamic act or shari necessity so the groups of the companions of the prophet (PBUH) would gone to the mountains and there would have been several Narrations of the holy prophet (PBUH) in the treasure of sayings of Muhammad (PBUH). But keeping in view the Era of the prophet (PBUH), the Era of caliphate and the early Muslim Era there is no such mention which may state that the prophet (PBUH) or his companions might have made arrangements for sending the people to the higher places to achieve this goal. [9]

The main essence of the practical training of the prophet and his companions was that, residence of each city would try in their own places to see the moon. If the moon is sighted compliance may be made accordingly, if not the month may be considered to be of thirty days. It is not essential that we may make arrangements for flying in the air for moon sighting. [10]

But it does not mean that if an individual accidentally happens to see the moon from an airplane in the air and he presents himself to give his evidence and his witness may be rejected, because there is no reason for rejection in this
regard, rather due to the presence of dust and vapors in the atmosphere it is possible that the moon sighting becomes impossible from a lower place and binge the air clear in the higher regions it may be sighted. [11]

2. **The Delima of using the computer soft wares for moon sighting:** To know whether the Moon is present at the Horizon or not with the help of a computer software is not so difficult, but to attain the surety of the moon sighting is not possible, because it depends on several other factors just like sharp vision, experience and weather conditions as well. In addition to that if all the essentials of moon sighting are available but the moon is kept behind the clouds then again it will not be sighted, while the computer can tell us about its direction, its height and its shape .(www.moonsighting.com)

Help in the following matters can be obtained from the computer software's:

- To help the man who is sighting the moon to divert his attention towards the direction that is identified by the technology. This help can even compensate the lack of experience of a man in moon sighting and enables him to fix his eyes on a right place.

- To identify the places where there is enough possibility of moon sighting so that the Government may know as to from where better evidences can be obtained.

- For each Moon sighting the variations of the atmosphere may be made on monthly basis so that it is clarified as to which places are unified and which are diversified in relation to their atmosphere. Because the ordinary and major difference in the variation of atmosphere lays great effect on the moon sighting.

- The picture of the moon of that day! With the help of this the Shari Qa’azi (Judge) can asked critical question from the person claiming to have sighted the moon. [12]

If the atmosphere is clear than there is no need of resorting to use the observatory. However, if the atmosphere is cloudy or there is a city where there are so many tall buildings, in this case if telescope or airplane is used for moon sighting it does not matter with the condition that an Islamic government or other dependable individuals make arrangements for this.

Because the terms and conditions of witnessing and evidence for a moon are so easy that anyone can claim to have sighted the same. It means that when a doubt is created regarding the evidence of a lay man so there is the possibility of the creeping of the same doubt in the minds of the people regarding that information or evidence which is received via these new technologies. But this is also essential that the degree of height on which usually moon is sighted the evidence should not mentioned higher degree than that. As the possibility of moon sighting from a higher places has been recommended by the Jurists in accordance with the sayings of Muhammad (PBUH), "Observe Fasting as you see it" [13]

Allama Ibni Abideen Writes:
"Indeed the moon is very often sighted from the higher places when it is impossible to sight it from the lower places. So this exception is not against the Zahir Al-Rivayah" [14]

This must be with the condition that the flight is not so high that it is not visible to those who are on the earth. Because according to Shari’ah “that Moon sighting is authentic which is to be seen from the land with naked eyes”. Therefore, if a person flying at the height of 20 to 30 thousand feet sights the Moon, so that evidence is not valuable for that village from where in spite of the clearance of atmosphere a man can see it. [15]

3. Is the evidence of two persons who sight the Moon on the 29th acceptable or not?

Replying this question a great scholar Ashraf Ali Thanawi (R.A) writes,” telescope is an instrument which only accelerates the eyesight. There is no separate Shari’ah verdict for this; rather the same is to be applied to this which is for viewing the moon without it. Therefore sighting the Moon with a telescope is right and authentic and if the atmosphere is cloudy and dusty the moon sighting without the condition of non-availability of any hindrance would also be enough for them. All should act upon it but if the atmosphere is not cloudy so compliance is not permissible for others and for them as well, but they should keep fasting. [16]

The author of Ahsan - Alfatawa narrates: “Using Telescopes, Airplane and other means for the moon sighting is permissible subject to observing the Shari’ah evidential procedures of moon Sighting. Whichever modality is adopted for this procedure this must be represented by several Experts of Islamic Jurisprudence failing which no verdict would be acceptable” [17]

Conclusion:

1. The Islamic Shari’ah recommends the following two ways for the commencement of Ramda’an and Eidain.
   a) The Sighting of the crescent on the 29th of the Month by the approved procedure of Islam.
   b) If there is cloud and dust, so may complete thirty days fasting.

2. The modern Technologies such as Observatory in the case of Crescent Sighting are permissible to be used for moon sighting unless it does not contravene the mentioned fundamental principle of Islamic Shari’a. Hence, on this basis seeking assistance from the computer software’s is an appropriate approach. With the help of computer and a vast area in those places can be identified where the possibilities of Moon sighting are very bright. And all such places can also be defined where those possibilities are equal to nothing, in this way with the help of these information the problems of the difference of atmosphere can also be solve to some extent.

3. The usage of Modern technology for moon sighting or sitting in the airplane and observing it is though, permissible yet not obligatory in Islamic Shari’ah, because these are not available to each person. So if the atmosphere is cloudy and the moon is existing but it is not visible due to cloud so we are not obliged that
we may go above the clouds and see the moon, rather it would be considered that the moon has not been witnessed.

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FINANCIAL WEALTH, ENVIRONMENT, AND FRAMING; A DECISION MAKING APPROACH

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ABSTRACT: The fundamental reason for this study was to explore the impact of the variable “financial wealth” which debilitates the framing effect and “environment” which has a frail acquaintanceship with framing effect. A self-created questionnaire was utilized with the end goal of information gathering. Population for this examination was the gurus and mutual fund managers from the ISE & LSE. The gathered information was dissected with the assistance of clear dissection, correlation analysis, and the straight forward regression strategy likewise. The conclusion of this study exhibits that the encircling influence in the identity of singular may influence the choice making capability of the speculator.

Keywords: Framing Effect; Financial Wealth; Investment Environment

JEL Classification: C5; E21; O16

1 Introduction Framing effect is essentially the conduct of individuals, in which they react in an alternate manner towards a specific alternative relying upon its presentation. One of the significant qualities of the confining inclination is to turn the observation, contention, and the choice of a singular with respect to the certain subject. It is a cognitive inclination which is fundamentally the leader propensity to various circumstances dependent upon the strategy for presenting/framed a particular decision. On the groundwork of an environment theory, individuals will dependably lean toward the most sound or coherent decision and additionally the most favorable decision as stated by the circumstances. “Frame dependence is the term which implies that conduct of the individuals relies on the surrounding of their choices issue” (Shefrin & Statman, 2000).

1.1 Encircling/Framing Effect and Threat Behavior There is a solid relationship exist between the encircling impact and the danger conduct of every person, if the person is risk taker and a general presentation of a particular thing might influence the single person in diverse path as contrast with the person who are risk divergent. People/investors by and large need to enhance their portfolio to minimize the likelihood of their risk and additionally to expand the likelihood of their return. The point when all the things have same level of risk, than the individuals will pick those things that show the most elevated likelihood of return, and when all the things have same level of return, than the individuals will pick those things that shows the least likelihood of risk. Each mogul will pick the security with most elevated return and least chance likelihood (Markowitz portfolio theory, 1952). Dorn & Huberman (2010) say that the more hazard unwilling speculators will pick the less unpredictable stock. Individuals
typically offer inclination to those decisions that are efficiently predictable with their discernments, mentality, choices, and believe.

1.2 Financial Wealth: There are such a variety of gurus in the general business of the world. Some are poor & some are sound, some are hopeful & some are negative, some are delicate and cognizant & some are extremely unwind, and some are certain & some are apprehensive too. At the same time the venture choice of every individual at some point dependent upon the business conduct (grouping conduct), however more often than not, their recognition and choice making quality is unique in relation to each other.

More often than not, gurus in the business are untried, and those moguls can undoubtedly surrounded actually when they are fiscally solid and have a business sector data in light of the fact that they don't have the knowledge to assign the speculation and investigate and also decipher the accessible information with a specific end goal to figure what's to come variances. Dellavigna (2009) refers to that individuals typically settle on choices on the premise of money related soundness and at some point fiscally sound individuals might additionally confined around the financing choice which could be hurtful for them and the business too.

1.3 Environment: Sometime the environment, in which the guru settles on choice, can influence their choice making capacity. Surrounding influence shift from circumstance to circumstance. At some stage, it could be valuable and at some other stage, it might be destructive. Surrounding impact can change the predictable conduct and observation of a single person. Goerg & Walkowitz (2010) show that distinctive kind of presentations at altogether different stages in diverse issues can impact the movements of the speculators to their ventures, and it might be more full of feeling when your presentation demonstrates the positive externalities in regards to the speculation.

1.4 Problem Statement: Throughout the surrounding impact, a person will lose their capability of settling on proficient choices at the time of assessing and looking at two changed elements. On account of perpetual presence of encircling in the business, it might be extremely challenging to enhance the victory rate of business. In the event that the encircling is not be reduced/eliminate, than the likelihood of irregularity in the business might build which could be the foundation for poor monetary dependability, expand in the rate of expansion and the many more most noticeably awful results.

1.5 Significance of the Study: This study lets us know about the limits of encircling and how the business to be destabilizes. It might likewise be exceptionally useful for further research with some different variables identifying with the encircling influence.

1.6 Purpose of the Study: To evade the unfavorable outcomes, there must be some benchmark gave by the administration to the motivation behind looking at the positive qualities and the qualities of a certain substance prior and then afterward the confining of a choice in light of the fact that the reappearance's of the share trading system likewise influences the economy in general. Nielsen & Holm (2007) diagnose that there must be some assessment structure under the control of government keeping in order to contrast the particular substance with another and for the promotion of a learning process of an individual.

2 Literature review: The greater part of the monetary executors in the world don't know about market variances, however they manage the speculators wrongly or outline their psyche as stated by their enthusiasm for the purpose of their own. As stated by the Zhao (2011) the issue of the moral hazard is one of the significant foundations for mogul's misfortune and business sector liquidation. There are such a large number of approaches to investigate any of the particular articles. The indistinguishable kind of numerous studies can give and a variety of assorted comes about on the groundwork of their presentation styles.

In Pakistan, the saving money segment made progression from the state possessed banks to the characterized banks inside 2 decades of their operations. In 1990's, banks diminish the majority of their stark arrangements and congregations that are made by the state, and on the support of such sympathy the greater part of the private banks and fiscal foundations made change and help their business sector worth by fulfilling their clients in a generally composed way. Throughout the time of 1990's-2010's, the banking structure administer their choice making powers in a large portion of the well performing areas/people in order to bring about a noticeable improvement relationship around the administration and the execution. Burki & Ahmad (2010) says that the private banks execute their
operational movements in an extremely proficient way as contrast with the state/government possessed banks, and the private banks are most cost effective than those.

Individuals are for the most part picked an element on the support of their reliability, future strength, and a monetary worth. Howarth & Monahan (1996) said that every benefit is most ideal when its future market value worth is more than its past business value. The decision of a casing that the leader chooses is halfway regulated on the foundation of a representation of a specific issue, and part of the way on the premise of a singular's identity characteristics, aspects, standards, and the propensities. As stated by the theory of framing, the impacts of confining happen when the singular discernment viewing something changes as there is a fluctuation/variation in the surrounding. The encircling predisposition includes the sub-ordered sensation which is referred to be as slender confining, in which the singular will keep tabs on the only one or two parts of the particular element and overlook all different measurements of that substance and finally trade off their choice.

2.1 Financial wealth: On the basis of the theory of ‘wealth consciousness” the money related fortune may influence the identity of the individuals. This theory of wealth consciousness is dependent upon the ideas of “law of fascination” which states that how we can influence by the finish of anything and how we respond towards the finish of anything also?

Commonly, the moguls in the business sector are barely confined. Hensher (2010) infers that at some point the gurus in the business settle on predisposition choices on the foundation of the perplexity of expense and time on the grounds that moguls are for the most part most cognizant about the expense of a security/entity, and they are additionally exceptionally delicate about their opportune returns and speculations. The conduct of the greater part of the gurus in the business sector is conflicting in view of their low level of duty. The conduct of both the purchaser and merchant assume an extremely vital part in the business sector.

At some point individuals in the business settle on proficient financing choices however at some point they can't. For the most part, the monetary efficiency/wealth prompts the productivity in the financing choices, the proficiency in the financing choices lead to the most fitting hazard and return parity, and the most suitable hazard and return offset will prompts the solid profit for the venture which is the fundamental target of the speculation. Hodgson, Brehan, Ford, Streatfield, & Urwin (2000) say that speculation proficiency determinedly connected with fiscal productivity. At some point, individuals are more cognizant about their stores so as to keep up them with the end goal of supporting against the misfortune. Individuals drop their choice making capacity in the condition when they feel extremely touchy about their stores and speculations (Bougherara, Denant-Boemont, & Masclet, 2011).

For some time, some individuals in the business sector need to spare their cash and some need to contribute their cash, which is based upon the venture conduct and money related abundance of the mogul. Glac (2009) notice the human disposition to venture which is dependent upon the budgetary riches may impact the speculation choices and the business sector also. In all the circumstances of conviction and lack of determination in the business, the fiscal soundness assumes an exceptionally essential part at the time of speculation choices. Guiso & Paiella (2008) raise that the mogul typically chance disinclined and they can't put unreservedly in the business sector when they are not monetarily sound. Moguls in the business for the most part settle on choices on the foundation of budgetary soundness, accessibility of flawless business sector data, and after that pick the most suitable one from the accessible options.

Likewise with the fiscal soundness, individuals feel good and unwind. The danger conduct of the guru might likewise change with the level of fortune. By expanding the level of money related soundness, the danger abhorrence conduct minimize and risk taker conduct expand in the gurus and need to gather the business sector data so as to examine what's to come variances for the speculation viewpoint (Peress, 2004). At some point in the business sector, individuals with monetary riches can't grow their portfolio effortlessly as a result of their recognition quality and dissection approach/ability. Nofsinger (2012) details the individuals with budgetary soundness that would prefer not to contribute their portfolio on account of their cynical methodology around the financing.

2.2 Environment/Surroundings: In the share trading system, the greater part of the mogul’s misfortune their gigantic measure of speculations with a specific end goal to safe their past ventures in light of their affectability relating to the sunk cost. Generally, in the event of the sunk cost, individuals are really certain and status cognizant about their financing. They feel that the speculation at the current circumstance in a stock can defeat their past
misfortune identified with that security, however at that stage surrounding can assume an exceptionally paramount part. Karevold & Teigen (2010) stipulate that there exist an extremely solid relationship between the surrounding and sunk cost, at some point at that circumstance, the presentations of other individuals can impact their choice making observation identifying with the venture.

Some individuals feel fear about their movements, so they need the assistance of operators to wipe out their shots of danger. Not just the crisp speculators in the business are fear about their activities however a large portion of the encountered moguls feel falter at the time of venture. Baron and Ritov (2004) refer to that the majority of the experience moguls feel fear at the time of speculation on the grounds that they are unreasonable, and don't think about the effective and auspicious utilization of heuristics. At some point, the particular event/action impacts the business, and such impact is relying upon; how a mogul considers the occasion? Furthermore how they settle on ruling against such occasion? More often than not in the business sector, an operator changes the states of the business through encircling the guru by concentrating on showing and one uncommon characteristic of the organization/security/entity, which is referred to be as property surrounding.

The mental potential and conduct of the distinct is positively influenced by their social order; the territory where they live, the individuals who meet with, nature's domain in which they work or making business transactions. The aggregating of a distinct assumes an extremely vital part in their choice making and the size setting of the gathering is additionally the primary issue in it (Zheng, Wang, & Zhu, 2010).

**Hypothesis**

- **H1:** Financial wealth increases the confidence level and ability to make rational investment decisions.
- **H2:** People rarely framed according to their environment/surroundings.

**3 Methodology:** The major purposes of this study and later appraise of literature allow us to outline the two (2) main hypotheses for this study. After that, we structured these hypotheses for diagrammatic consideration of the outline of research and for the hypothesis testing in equations from. Figure and the equation demonstrate our model of study.

**Figure: 1: Model for Investors**

\[ ID = \beta_0 + \beta_1 (FW) + \beta_2 (E) + \epsilon \]  

Where:

- ID = Investment Decisions
- FW = Financial Wealth
- E = Environment
3.1 Population, Sample, and Analysis Method: The major purpose of this study is to identify the factors that can be the cause of framing effect which influences the investment decisions in the market. The population of this research consists of investors and the mutual fund managers/brokers in the stock market of Pakistan. Thinking the classic character of the population, we used suitable sampling practice for the selection of sample. The total 490 feedback forms were floated in the Islamabad stock exchange (ISE) & Lahore stock exchange (LSE). We received 173, which means that approximately 170 feedback forms from the stock exchanges can be usable for the reason of data investigation. We examined our data all the way through correlation and simple regression procedures. Furthermore, items descriptive examination is accomplished in order to clarify the typical reaction of shareholders and investment managers to diverse features of framing effect.

3.2 Common Approach: We used the deductive technique in this research as this study is stand on the hypothetical structure of the behavioral finance. We then experienced our experimental decisions with the accessible theories.

3.3 Choice of Technique: To attain the main purposes of this study, we applied mutually qualitative technique and the quantitative technique as well. The quantitative technique is basically the survey that we executed in the shape of a feedback forms. With the help of the survey, we try hard to verify, how strong is the association among the practical imposition of decisions and the individual behavior and perception in veracity. A qualitative technique is executed all the way through our endeavor to illustrate the explanations and existence framing surrounded by investors with the help of accessible theories.

3.4 Principle Data: Our primary data for this study consists of feedback forms which we were collected from the individual investors & agents from stock markets of Pakistan on the basis of survey. We collected more or less 170 responses from stock markets.

3.5 Tools used for Data Gathering: For such type of study, the book “Behavioral Finance and Wealth Management” by “Micheal Pompain” is very much significant and very helpful for the purpose of developing a questionnaire. The concept of the feedback forms was initially introduced by “Sir Francis Galton”. For the purpose of pilot testing, approximately 30 questionnaires were floated in the market in order to check the validity and reliability of the data. There were 17 close-ended questions in the questionnaire on 5 point likert scale (Strongly Disagree – Strongly Agree) for the stock market.

4 Results: Initially, we are measuring the unwavering quality or reliability of this information so as to affirm that either this information is noteworthy for our effects or not. Basically, the reliability test shows that what amount of this information is predictable over the time period. The consequence of unwavering quality shows that the "alpha" of FE is 0.456, FW is 0.521, & E is 0.577, which indicates that all the variables are reasonably steady or solid over the period of time because for reliability purpose, the “alpha” of 0.6 is considered to be good.

4.1 Correlation Analysis: The table: 2 below represent the conclusions of relationship. The correlation coefficient around “framing effect & awareness level” is .250, the size of the acquaintanceship around both variables is low and they are additionally significant at low level (.157) at p<.2 at 84% confidence interval. The correlation coefficient around "framing effect & environment" is -.024, the size of the companionship around both variables is low and they are additionally irrelevant at level (.760) at p<.8 at 24% confidence interval. We can finish up from such examination that there exists a low significant and negative relationship between framing effect & financial wealth, and there exist an insignificant and negative relationship between framing effect & environment.

4.2 Regression Analysis: It is utilized to recognize the effect of environment & financial wealth which prompts framed/biased conduct on the speculator's choice making capacity. We connected a straightforward regression procedure to recognize the general effect of environment & financial wealth.

4.2.1 Simple regression: The table: 3 below shows the outcomes of regression details. The primary quality regarding importance of this model is F-statistics. The value of F-stats is 1.007 which is significant at low level (.368) at p<.4 at 63% confidence interval, so this model is very weakly significant or insignificant. The quality of R-square is 0.012 which delineates the expressive force of proposed variables. In this way 1.2% variety in the mogul's choice making capability is continuously elucidated by the confining.
The coefficient of regression for financial wealth is -0.092 and it is significant at low level (0.168) at \( p < 0.2 \) at 83% confidence interval. We can translate this worth as far as probability of the guru to settle on less framed/biased choices due to budgetary soundness/richness. By keeping all the proposed variables fixed, the moguls who are monetarily exceptionally solid are 9.2% more likely to settle on intelligent choice. Hence, the first hypothesis of this exploration that "financial wealth increases the confidence level and ability to make rational investment decisions" is administered by these outcomes.

The coefficient of regression for environment is 0.000 and it is insignificant at (0.995) level at \( p < 1 \) at .05% confidence interval. In this way, the effects of the worth of this variable show that such variable have an almost incredibly modest or no effect on the speculator's choice making capacity. Thus, the second hypothesis of this examination that "people rarely framed according to their environment/surroundings" are looked after by these outcomes, in light of the fact that this variable is inconsequential and shows an almost little or no effect on the speculator's choice making capability.

**Descriptive Analysis:** The outcomes of table: 5 show that all these variables are demonstrating the effects of acknowledgement towards biased choice making. Since, as stated by the likert scale of 5, we can translate that the value \(< 1\) show a decidedly differ conduct, the value \(> 1\) however \(< 2\) show a differ conduct, the value \(> 2\) but\(< 3\) show an impartial conduct, the value \(> 3\) but\(< 4\) show a concur conduct, and the value \(> 4\) but\(< 5\) show a firmly concur conduct.

**5 Conclusion:** The theory of behavior decisions conclude that the selection generating is actually dominated through the surrounding result, leading on the irrational/biased options. Almost all of the research workers show these parameters: “financial wealth” weakens the actual surrounding influence & “environment” includes a vulnerable affiliation having surrounding influence may possibly impact the actual investor’s selection generating capability. Hirshleifer (2001) mentions a normal trader in the market must targets the price tag on an advantage ahead of generating the actual investment decision.

**6 Regarding Questionnaire:** The initial variable “financial wealth” offers poor substantial relation with all the determination making power of an entrepreneur. The particular fiscal success weakens the particular framing result; we can easily translate the situation since the chance of an entrepreneur to generate far more logical/unbiased determination as a result of fiscal soundness. Retaining all the other parameters constant, the particular people, that enter the marketplace along with a huge amount of expense or maybe a fiscally sound entrepreneur would carefully review and translate the marketplace scenarios and specifics & figures likewise to make the most successful options to come up with earnings. Therefore, with the help of these kinds of effects results our 1\textsuperscript{st} hypothesis is approved.

The next variable “environment” possesses an unimportant relation with all the determination making power of an entrepreneur. Environmental surroundings rarely weakens the particular framing result and rarely results in the particular framing result; we can easily translate the situation since the chance of an entrepreneur to hardly ever create illogical/biased determination as a result of atmosphere. Simply by preserving all the other parameters constant, the particular people, that enter the marketplace with their group/community rarely concentrate on the particular movements and options of their party regarding determination making purpose, since tastes the particular entrepreneur available in the market would like to review information and figures to create best options. Therefore, with the help of these kinds of effects results our 2\textsuperscript{nd} hypothesis is approved.

**Drawbacks and Future Suggestions:** This specific study had been just bounded to be able to these suggested variables (financial wealth as well as environment) although you can find numerous different variables that could be the cause intended for surrounding have an effect on. Also, most of us looked at the particular manage regarding surrounding have an effect on just around the conclusion making power of the buyer within the wall street game as well as within the banks, different options, just like: property managing, collateral managing, dividend policy and other operational options from management and business viewpoint may also be made to be able to have an effect on regarding surrounding. This specific study can be augmented to be able to these types of crevices at the same time.
REFERENCES

## Tables

### Table 1

**Reliability Analysis**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Reliability</th>
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<tr>
<td>Framing Effect</td>
<td>0.456</td>
</tr>
<tr>
<td>Financial Wealth</td>
<td>0.521*</td>
</tr>
<tr>
<td>Environment</td>
<td>0.577*</td>
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</table>

*Note. *p>0.5, **p>0.7, ***p>0.9*

### Table 2

**Correlation Analysis**

<table>
<thead>
<tr>
<th></th>
<th>FE</th>
<th>FW</th>
<th>E</th>
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<tr>
<td>FE</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Pearson Correlation</td>
<td>Pearson Correlation</td>
<td>Pearson Correlation</td>
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<tr>
<td>Sig. (2-tailed)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
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<td>170</td>
<td>170</td>
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<td>0.221**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>-0.024</td>
<td>0.221**</td>
<td>1</td>
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<tr>
<td></td>
<td>-0.109</td>
<td>1</td>
<td>0.221**</td>
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<tr>
<td></td>
<td>0.157</td>
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<td>0.760</td>
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</table>

**. Correlation is significant at the 0.01 level (2-tailed).
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<tr>
<td>F</td>
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<th>t-stat</th>
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<td>0.288</td>
<td>13.276</td>
<td>0.000***</td>
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<td>Financial Wealth</td>
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<td>0.066</td>
<td>-1.385</td>
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<td>Environment</td>
<td>0.000</td>
<td>0.065</td>
<td>-0.006</td>
<td>0.995</td>
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</table>

Note. *p<0.09, **p<0.05, ***p<0.01

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<td>3.5392</td>
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<tr>
<td>Environment</td>
<td>3.3549</td>
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</table>
DE-OTSU METHOD TO ELIMINATE ICE LOAD EFFECT

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ABSTRACT. If the weather is too cold, moisture capacity of the weather is down and moisture turns to ice on conductors of electric transmission line (ETL). The ice causes additional burden on ETL conductor, and it is called as ice load. So, sag and tension of ETL can be increase extremely. If sag of ETL increases extremely, safety distance of line decreases. Thus electric faults or dead of the living can be made. If tension of ETL increases extremely, conductor breakage or bending of power pole can be shown and electric energy of some consumers may be cut several days. Therefore ice load must be urgently eliminated but primarily ice thickness of ice load must be determined. Monitoring of ETL can be made to prevent effect of ice load. When multilevel threshold image segmentation is used as ice monitor method, ice thickness of ETL can be determined accurately. In this study, Otsu method can be used as multilevel threshold method but finding of optimum threshold level with Otsu method is difficult. Therefore differential evolution algorithm (DE) was used to find optimum threshold level. Namely, Otsu method was used as objective function of DE. In literature, maximum threshold number was selected as 5 but it is not enough to determine iced conductor thickness of ETL. In this study maximum threshold number were selected as 8-level.

Keywords: Ice load, Electric Transmission Line, Image Segmentation, Multilevel Threshold, Otsu Method.

1. Introduction. Power quality is an important issue for electric transmission lines (ETL). Power outage affects adversely to power quality, and it can occur due to different reasons. Ice load which is one of these reasons harms extremely to ETL. Ice load occurs generally at between 2°C and -8°C temperature and at least 95% humidity. If amount of ice load increases excessively, transmission line pole may be bending or conductor may be breakage. Thus it can cause to power outage for days, and property damages on a large scale. Ice monitoring method is one of the effective methods to prevent effect of ice load. Image segmentation can be used as ice monitoring method. Threshold value is important to make good segmentation. Thus bi-level and multilevel image segmentation methods were developed in literature. It was indicated in literature that the result of multilevel image segmentation is better than the result of bi-level image segmentation. Multilevel threshold can be made Otsu method. But detecting of optimum threshold level is difficult with traditional Otsu method. Thus artificial intelligence methods have been used to detect optimum threshold level in literature. One of the these artificial intelligence methods is Particle Swarm Optimization (PSO). It was seen that when PSO-Otsu method was used, its algorithm speed is faster than traditional Otsu method [1].
Two-dimensional Otsu method can be used in segmentation of low-contrast iced conductor studies. Algorithm speed of two-dimensional Otsu method is low speed. This case is disadvantage for two-dimensional Otsu method [2]. Thus 2D Otsu was developed with genetic algorithm, and genetic algorithm was developed with simulated annealing. But in [2], threshold level is low. Convergence of traditional PSO can be developed with developed PSO (DPSO). In image segmentation studies with multilevel threshold method, the good results were obtained with DPSO [3]. But in [3], maximum threshold levels are 5. This threshold levels may be not enough for some application. Video processing can be used to monitor transmission line, but noise of image are important problem. When 2D Otsu method was used with PSO, noises which is on image were eliminated [4]. But single level thresholding was made in [4]. When hybrid PSO-GA method was made with Otsu method, noise of image was eliminated [5]. But in [5], the best threshold levels are not indicated. Slope-line search algorithm is another method to determine ice thickness of iced conductor [6]. In this method, ice thickness which is on aerial line conductor can be determined by using slope-line search algorithm. But in [6] study single level threshold was used with slope-line search algorithm. Image classification method can be used to determine ice thickness. In literature, determination of ice load was made using image classification methods. Support Vector Machine (SVM) and Artificial Neural Network (ANN) methods were used as classifier. It was seen, when the result of SVM was compared with the result of ANN, the result of SVM was better than the result of ANN [7]. But ice thicknesses of these methods were not indicated.

In this study, iced conductor thickness which belongs to ETL was determined by multilevel thresholding. Otsu method will be used as multilevel threshold method. Since computational time of traditional Otsu method is long, this method will be accelerated with differential evolution algorithm (DE). So, optimum threshold level can be determined by DE. Maximum threshold levels are defined as 5 levels in literature, but this levels are not enough to determine iced conductor thickness. Thus maximum threshold levels have been determined as 8 level in this study.

2. Problem Formulation. Otsu indicated between-class variance method for image segmentation. In this method, variance of different classes is maximum value. When an image is divided as two classes, these classes can be defined as $C_0$ and $C_1$, if threshold level of $C_0$ and $C_1$ is determined as $t$. $C_0$ includes the gray level from 0 to $t-1$, and $C_1$ includes the gray level from $t$ to $L$. Gray level probabilities are defined as $w_0$ and $w_1$, and distribution of gray level probability of classes as follows [8]:

$$C_0 = \frac{p_0}{w_0}, \ldots, \frac{p_{t-1}}{w_{t-1}} \text{ and } C_1 = \frac{p_t}{w_t}, \ldots, \frac{p_L}{w_L}$$

$$w_0 = \sum_{i=0}^{t-1} P_i \quad \text{and} \quad w_1 = \sum_{i=t}^{L} P_i$$

The mean levels of classes are defined as $\mu_i$, the mean levels of image are defined as $\mu_T$.

$$\mu_0 = \sum_{i=0}^{t-1} \frac{iP_i}{w_0} \quad \text{and} \quad \mu_1 = \sum_{i=t}^{L} \frac{iP_i}{w_1}$$

$$\mu_0.w_0 + \mu_1.w_1 = \mu_T \quad \text{and} \quad w_0 + w_1 = 1$$

Otsu's method which is based on between-class variance is defined as follows;

$$f(t) = \sigma_0 + \sigma_i$$

$$\sigma_0 = w_0.(\mu_0 - \mu_T)^2 \quad \text{and} \quad \sigma_1 = w_1.(\mu_1 - \mu_T)^2$$

In bi-level threshold studies, optimal threshold level ($t$) is determined by Otsu method as follows;

$$t = \arg \max \{ f(t) \}$$

Multilevel thresholding of an image can be extended between-class variance function.
The number of threshold is \( m \) \((t_0, t_1, t_2, ..., t_m)\), and the number of classes in original image is \( m \) \((C_0, C_1, C_2, ..., C_m)\).

Where 

\[
f(t) = \sigma_0 + \sigma_1 + \sigma_2 + ... + \sigma_m
\]

\[
\sigma_0 = w_0.(\mu_0 - \mu_T)^2
\]

\[
\sigma_1 = w_1.(\mu_1 - \mu_T)^2
\]

\[
\sigma_2 = w_2.(\mu_2 - \mu_T)^2...
\]

\[
\sigma_m = w_m.(\mu_m - \mu_T)^2
\]

The optimum threshold levels \((t_0, t_1, t_2, ..., t_m)\) are determined as follows [8]:

\[
(t_0, t_1, t_2, ..., t_m) = \arg\max \{ f(t) \}
\]

3. Definition of The Proposed Method. In Figure 1, iced conductor of ETL have been shown. This ETL is damaged by extreme ice load. In this study, iced conductor image which is shown Figure 1 will be used for ice thickness determination study. Determination of ice thickness of iced conductor will be made image segmentation method. Thus threshold level must be determined properly. Multilevel threshold method will be used to determined optimum threshold level but primarily gray level histogram of this image must be obtained. After this image was converted to gray level, average filter was used to eliminate unnecessary object images on image of iced conductor. After average filter was implemented to the gray level image, its histogram was obtained. Optimal threshold points can be determined by using the obtained data from histogram.

![Figure 1. Iced Conductor](image)

Multilevel threshold will be made Otsu method. But detecting of optimum threshold values are difficult. Thus DE algorithm will be used to detect optimum threshold values for image segmentation. DE objective function is Equation (11). So \(t_0, t_1, t_2, ..., t_m\) values which are on gray value histogram can be determined easily by using DE-Otsu Method. \(t_0, t_1, t_2, ..., t_m\) values are shown Figure 2.
After threshold levels and threshold values are determined, edge detection can be made. There are many edge detection methods in literature. These methods can be defined as two topics. These topics are first-order and second-order edge detection operators. First-order edge detection operators are Roberts Cross, Smoothing, Prewitt, Sobel, and Canny. Second-order edge detection operators are Laplacian, Zero-crossing and Laplacian of Gaussian. Marr–Hildreth algorithm was used for edge detection. Marr–Hildreth algorithm is based on the zero-crossings of the Laplacian of the Gaussian operator [9].

4. Differential Evolution Algorithm (DE). DE algorithm is one of the important optimization algorithms. working principle of DE is similar to working principle of Genetic Algorithm. Crossover, mutation and selection operators which used in Genetic Algorithm are used in DE. DE algorithm was used with Otsu method to find optimal threshold level in this study. After histogram of image was obtained, DE-Otsu Method was applied for multilevel threshold. DE algorithm steps are defined as follows [10];

Step 1: Initial population is occurred. Chromosome number of initial population must be at least 4. In this study, population number is 256.

Step 2: Target vector and base vector are selected, and different two vector which are different target vector and base vector. Namely different four vector are selected in population.

Step 3: Weighted difference vector is calculated with difference two vector.

Step 4: Addition of weighted difference vector with base vector is made to occur mutant vector. F value is between 0 and 2. After mutation operation is applied to each vector, mutant population is occurred.

$$\forall j \leq D: \eta_{j,G+1} = \gamma_{j,G} + F \left( \gamma_{j,G} - \gamma_{j,G+1} \right)$$

Step 5: Crossover operator is applied between initial population and mutant population. Crossover is made according to crossover rate (RC). RC value is determined randomly between 0 and 1, and the number is produced random between 0 and 1 for each gene of chromosome. If the number is small than RC, gene is taken from mutant population chromosome. Otherwise, gene is taken from initial population chromosome. But at least one gene must be taken from mutant population. So, new trial vector is occurred.

$$\forall j \leq D: x_{j,G+1}^{\text{new}} = \begin{cases} x_{j,G}^{\text{new}} & \text{if } \text{rand}[0,1] \leq RC \lor j=\text{rand} \\ x_{j,G} & \text{Otherwise} \end{cases}$$

Step 6: Objective function value of target vector and objective function value of new trial vector are compared to select the best vector for new population.
These processes which are between Step 2 and Step 6 are applied each chromosome. Namely primarily after 1th chromosome is selected as target vector, these processes which are between Step 2 and Step 6 are applied. Subsequently, 2th chromosome is selected as target vector and these processes are applied. Thus a new solution is produced for each chromosome. So, new population is occurred. This loop continue until the best solution is found or when iteration number is reached. In this study, iteration number is 100. Also schema of DE algorithm is shown in Figure 3.

Figure 3. DE Algorithm Schema

4. Experimental Results. DE-Otsu method was used to determine iced conductor thickness which is shown in Figure 1. DE-Otsu method is faster than traditional Otsu method. Multilevel threshold method has been used in image segmentation studies to determine the best threshold. In literature maximum threshold levels are determined as 5 levels, but this levels are not enough to determine iced conductor thickness which is shown in Figure 1. Thus in this study, maximum threshold levels were determined as 8 levels, and minimum threshold levels were determined as 3 levels. Iced conductor thickness was determined according to pixel number of image. The result of DE-Otsu Method is shown in Figure 4 and Table 1. Figure 4 belongs to 7-level threshold.
Table 1. The result of DE-Otsu Method

<table>
<thead>
<tr>
<th>Threshold Level</th>
<th>The Number of Pixels</th>
<th>Threshold Values</th>
<th>The Fitness Value of GA</th>
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<tr>
<td>3</td>
<td>52</td>
<td>82 121 177</td>
<td>1943</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>73 104 135 183</td>
<td>2002</td>
</tr>
<tr>
<td>5</td>
<td>48</td>
<td>63 89 113 142 190</td>
<td>2034</td>
</tr>
<tr>
<td>6</td>
<td>47</td>
<td>57 83 110 139 164 192</td>
<td>2048</td>
</tr>
<tr>
<td>7</td>
<td>44</td>
<td>58 84 105 136 158 175 203</td>
<td>2058</td>
</tr>
<tr>
<td>8</td>
<td>38</td>
<td>57 79 95 124 133 163 188 218</td>
<td>2067</td>
</tr>
</tbody>
</table>

Figure 4. The Result of DE-Otsu Method

4. Conclusion. Ice load is important issue for power quality studies. Primarily iced conductor thickness must be determined to prevent ice load effect. In this study, DE-Otsu Method was used to iced conductor thickness. The results of DE-Otsu Method are shown in Figure 4 and Table 1. In literature, maximum 5 levels was made but 5 level is not enough to determine ice thickness. The result of 7-level thresholding is closest to the real image size. It was shown in Figure 4. This result is enough to determine ice load on conductor. Thus DE-Otsu Method can be used with 7-level thresholding in application of ice thickness determination.

REFERENCES


ANALYZING NUTRITIONAL DEFICIENCIES THROUGH HAIR

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ABSTRACT. Nutritional deficiencies are highly prevalent in many developing countries. They exist when human body doesn’t absorb the adequate amount of a nutrient. These deficiencies can lead to a variety of health problems, such as problems of skin, digestion problems, defective bone growth, and even dementia. These deficiencies rarely occur in isolation; if someone is lacking of one deficiency then likely to have some other as well. Iron deficiency has strong relationship with hair loss, similarly many other deficiencies are also associated with hair texture, hair quality and hair loss. In this paper hair features has been used to diagnose several deficiencies in human body. The diagnosis is established by using Case based reasoning CBR. This automated nutritional deficient system reuse the existing cases and adapt if some new case arrives by using similarity measures.

Keywords: Case-Based Reasoning (CBR), Medical knowledge-base system, Nutritional deficiencies.

I. Introduction: “CBR is an analogical reasoning method providing both a methodology for problem solving and a cognitive model of people” [1]. Case-based Reasoning is an advanced instance based machine learning approach in artificial intelligence for problem solving. It is a methodology for solving problems by referring to the old cases, past experiences and prior knowledge. Case-Based Reasoning uses existing case and matches it to a similar old case in order to solve a particular problem. Over the past years this area of AI has gained a lot of attention and has become an area of interest for researchers. Implementation of CBR can be conducted using a number of techniques to record old cases and then search for the nearest case to solve the problem. Furthermore some techniques are used to modify prior cases to map effectively with new cases and other techniques to integrate new cases when they are required. People are comfortable with the idea of using CBR for making decisions and solving their problems in situations where they are uncertain about everything or in dynamically changing situations as this technique is quite similar to the human behavior.

We propose an approach to develop an automated knowledge-based decision support system based on CBR methodology. Our system exhibits nutritional deficiency in human body on the basis of hair analysis. Deficiency or surplus of any mineral or toxic substances first affects the hair and later these effects are visible in human body as to prolong optimum blood level in human body these heavy metals are transformed to hair therefore we use hair to identify these deficiencies. we extended the idea from hair mineral analysis tests (HTMA)

The working of the system is described in figure 1 as follows: A new case (the problem) comes in for analyzing the nutritional deficiency; this test case is then matched with the Case Base which acquires prior
knowledge, old cases and adaptation rules. If the test case match with the old case we reuse it otherwise we need to adapt using the adaptation rule. Hence we are either reusing or revising in this predicament. Subsequently we have a recommended result in form of the nutritional deficiencies. If in future facts urge that the recommendations made previously are not in accordance with the future factors or scenarios then the learning phase initiates in which we retain the case as a new case in the case base. The figure 1 below explains the process pictorially:

![CBR process diagram for proposed system](image)

### Figure 1. CBR process diagram for proposed system

This paper proposes a methodology to diagnose and analyze the nutritional deficiencies of different people belonging to different regions, different age groups and gender on the basis of hair factors. The foundation of making the indices are: Hair texture, Region, Age, Balanced Diet, Stress, and Amount of Hair loss. The deficiencies can be of Iron, Iodine, Copper, Manganese, Zinc, Cobalt, Molybdenum, Selenium, Chromium, Tin, Vanadium, Fluorine, Silicon, and Nickel.

This remaining paper is organized as follows: Section 2 narrates the related work in this particular field, Section 3 delineates the algorithm being used, Section 4 demarcates all the experimentation and analysis, Section 5 recounts the limitations and future recommendations and lastly the conclusion is given.

### II. Background And Related Work

Hair has strong relationship with most of the nutritional deficiencies in human body; Bertazzo A et al [2] showed in their paper that human hair color has an immense effect on Cu concentration in both males and females. Afridi et al [3] did research to analyze the presence of heavy metals (cadmium, copper, iron, nickel, chromium, lead, and zinc) in the scalp; certified reference material (CRM 397) hair was adopted to check the validity of this approach. Moeinvaziri et al. [4] found strong relationship between iron deficiency and hair loss in women of child bearing age. Bhat et al. [5] showed association of premature graying of hair due to few immune disorders in human body. Naieni et al. [6] presented a paper to show that premature canities of hair is strongly caused by different abnormal levels of serum iron, copper and zinc in human body.

After finding strong relationship between different hair factors like graying of hair, baldness, and gradual hair loss, we focused on finding some artificial intelligence algorithm to diagnose human nutritional deficiencies using hair. CBR has been widely used in different medical diagnosis. CBR yielded a very efficient cancer diagnostic system, initially diagnostic processes were carried out by firing of rules in the Rule-Based inference, Salem et al.[7] used nearest neighbor to map similar cases and frame is used for case indexing, retrieval and the storage in cancer diagnosis. Ahmed et al.[8] proposed a multi-model and multipurpose-oriented clinical decision support system for stress management, by introducing a fuzzy
rule-based classification scheme along with CBR technique performance of the system has been improved. A case base diabetes management web system was designed by Nguyen et al [9]; they presented the implementation of a Case-Based Diabetes Management Web System (CWDM), which is a website that integrates the DM lifecycle, CBR, and web technology.

Shahina Begum et al[10] conducted research by using artificial Intelligence techniques for diagnosing stress. Due to the large variations Case-Based Reasoning technique is applied coupled with fuzzy logic to incorporate uncertainties. Shahina Begum et al [11] presented a Cased-Bases Reasoning (CBR) system that classifies people into two categories healthy and stressed person based on sensor fusion. Sensor Signal Fusion is the technique which is used in this paper to combine different sensory data so the resulting information obtained from them is better than when these sources used individually. Multivariate Multi scale Entropy Analysis (MMSE) algorithm is used to combine these sensory signals and to extract features from these signals. Euclidean distance and Fuzzy Logic are used to match the nearest case.

III. Algorithm

3.1 Case base Reasoning Algorithm: CBR is a problem solving technique that learns from its past experience of related problems to solve and give the most accurate result for new problems. CBR solves a particular problem by predicting the future, based on the training examples also called the cases of the CBR. Cases are foundation of CBR. CBR algorithm maps the incoming problem on the cases it is trained on, in order to solve that problem. When cases are complex, such as complicated legal ruling and planning the method of classification or regression is used to find solution. However, for simpler cases, K-nearest neighbor is employed along with the CBR algorithm to find the distance between the cases and map the incoming problem with its nearest trained case efficiently and effectively. K-nearest algorithm is further explained in detail below.

For obtaining k-nearest neighbors, a distance metric is required to estimate the closeness of two cases. In our system the initial values of attributes are converted to a numerical scale that can be used to collate values as done in Figure 4. The distance between these attributes is calculated by using the formula below. The metric Euclidean distance - the square root of the total of the squares of the attribute differences-is used to differentiate the two cases. Given as:

$$d(p, q) = d(q, p) = \sqrt{(q_1 - p_1)^2 + (q_2 - p_2)^2 + \cdots + (q_n - p_n)^2} = \sqrt{\sum_{i=1}^{n} (q_i - p_i)^2}$$

3.2 Cases: CBR case is representation of an experience.

A case consists of three vital parts:

Problem: issue that needs to be solved (determine nutritional deficiencies in humans)

Solution: appropriate reaction for the problem (select among different cases if matched occurs otherwise adapt for new one)

Outcome: impact of that solution (proposed solution should be ratioted for future use or not)

A good representation of these three parts of problem makes it feasible to reuse, revise and retain cases.
3.3 Retrieve. For retrieval of a case user is required to enter their information. Including user’s region, stress level, hair problem user is having, user’s diet is it balanced or not, hair type, texture and user’s age. As shown in Figure 2.

System reads these cases and converts them to index numbers that are assigned to each case as given in Figure 3. These attribute indexes are stored in variable $a_1$…$a_8$ used in Algorithm 1. These attributes comprise a single case. This user case is compared to all cases in case-base and a set of nearest neighbors is retrieved from the case-base. To perform the task of retrieval following algorithm is generated

**Algorithm 1:**

Input: 
Input attributes $a_1$…$a_8$
File attributes $b_1$…$b_8$

Method:
1. while file has next line
   a. Read case from file and storing information;
   b. Store case deficiency;

   // Euclidean Distance of user case from case read from file
c. Difference =
Math.sqrt(1*(a1-b1)*(a1-b1)+1*(a2-b2)*(a2-b2)+1*(a3-b3)*(a3-b3)+1*(a4-b4)*(a4-b4)+1*(a5-b5)*(a5-b5)+
1*(a6-b6)*(a6-b6)+1*(a7-b7)*(a7-b7)+1*(a8-b8)*(a8-b8));
2. End while
This algorithm takes user related information, as input. Compares all the cases present in case-base with user case gradually, calculates their difference and deficiency specified with each case present in case-base.
In line ‘c’ of algorithm the concrete work of retrieval, Euclidean Distance is calculated. The while loop in line ‘1’ of the algorithm is executed until all the cases are read from case base file. Line ‘a’ reads a single case and stores all details temporarily. Likewise line ‘b’ is stores deficiency of current case of file. In line ‘c’ Euclidean Distance is implemented. It calculates the difference of all cases with the current case and stores that difference.

3.4 Reuse. Reuse method in CBR is responsible for lodging solution for new case from solution of cases retrieved. As there is no remarkable difference between the cases therefore solution of retrieved case is used as solution of new problem as it is. Adapting to retrieved case.
For devising accurate solution to the given problem difference and deficiencies of all cases are sorted in ascending order using following algorithm

Algorithm 2:
Input: Difference: case differences (calculated I above algorithm)
cs: case deficiency
Method:
1. For i=0 to end of file
   a. For j=0 to end of file
      i. If(difference[i]>difference[j])
         1. temp=difference [i];
         2. difference[i]=difference[j];
         3. difference[j]=temp;
         4. temp1=cs[i];
         5. cs[i]=cs[j];
         6. cs[j]=temp1;
   b. End For
2. End For
3. Return cs[0];
For sorting in ascending order this algorithm compares difference of each case- i with all other differences-j. In line ‘i’ the two differences are compared and swapped if condition is true. Swapping is done on both differences and deficiencies. Lines ‘1’ to ‘6’ are repeated until all the differences and deficiencies are sorted in ascending order.
In line ‘3’ the algorithm is returning the first deficiency in cs list which is the deficiency of case having least difference from the user case.

3.5 Revise. In situation where there is a significant variation between user case and retrieved case, the retrieved solution is adapted to account for those prime differences. Adaptation can be done through Substitution, Transformation, Genetic method or other methods depending on the complexity of case. However, in this system there is no noticeable contradiction between the two cases. Hence, solution of retrieved case is restated.

3.6 Retain. Retention is the final and key step of step of CBR cycle. The learning characteristic of CBR approach is what makes it more attractive in all other methods. There are certain issues when learning and recording new cases. When cases are complex or have a wide range of attributes additional information is stored with the case or solution. On contrary many system store solution of problem solved.
To retain this system all the attributes of user case and along with the proposed solution are stored in case base. Attributes are stored as indexes that were assigned by the system following to factors provided at time of retrieval.
Following algorithm is used which stores the present case along with the deficiency in case-base:

**Algorithm 3:**

Input:  
- sorted difference list: difference
- Sorted deficiency list: cs

Method:
1. If difference[0]!=0
   a. Store user details in file
   b. Store deficiency in file

In line ‘1’ the system probes the first difference of list whether it is zero or not. If it is zero then it means that the new case exists in file and does not needs to be appended in case-base, thus lines ‘a’ and ‘b’ are not executed. These lines are executed when the cases do not match and the system has to store the new case for future use.

**IV. Experiments And Analysis**

**4.1 Experiment.** This section of the paper focuses on the experiment that we did to find the nutritional deficiencies in hair. In the experiment we include some major attributes, they are: Region, stress, problem factor (any problem related to hair person having), proper diet, amount of hair loss, type of hair, texture of hair and age. We have given discrete values to the attributes which are mentioned in following tables: Fig. 1

![Table 1: Region](image1)

<table>
<thead>
<tr>
<th>Region</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>African</td>
<td>0</td>
</tr>
<tr>
<td>European</td>
<td>1</td>
</tr>
<tr>
<td>Asian</td>
<td>2</td>
</tr>
</tbody>
</table>

![Table 2: Hair Type](image2)

<table>
<thead>
<tr>
<th>Hair Type</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Straight</td>
<td>0</td>
</tr>
<tr>
<td>Wavy</td>
<td>1</td>
</tr>
<tr>
<td>Curly</td>
<td>2</td>
</tr>
<tr>
<td>Kinky</td>
<td>3</td>
</tr>
</tbody>
</table>

![Table 3: Balanced Diet](image3)

<table>
<thead>
<tr>
<th>Balanced Diet</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
</tbody>
</table>

![Table 4: Stress](image4)

<table>
<thead>
<tr>
<th>Stress</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>0</td>
</tr>
<tr>
<td>Yes</td>
<td>1</td>
</tr>
</tbody>
</table>

![Table 5: Hair Texture](image5)

<table>
<thead>
<tr>
<th>Hair Texture</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thready</td>
<td>0</td>
</tr>
<tr>
<td>Wavy</td>
<td>1</td>
</tr>
<tr>
<td>Curly</td>
<td>2</td>
</tr>
<tr>
<td>Spongy</td>
<td>3</td>
</tr>
<tr>
<td>Silky</td>
<td>4</td>
</tr>
</tbody>
</table>

![Table 6: Hair Loss](image6)

<table>
<thead>
<tr>
<th>Hair Loss</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>VeryLow</td>
<td>0</td>
</tr>
<tr>
<td>Low</td>
<td>1</td>
</tr>
<tr>
<td>Normal</td>
<td>2</td>
</tr>
<tr>
<td>High</td>
<td>3</td>
</tr>
<tr>
<td>VeryHigh</td>
<td>4</td>
</tr>
</tbody>
</table>

![Table 7: Problem Factor](image7)

<table>
<thead>
<tr>
<th>Problem Factor</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>0</td>
</tr>
<tr>
<td>Brittle or Dry Hair</td>
<td>1</td>
</tr>
<tr>
<td>Flaky Scalp and Dull hair</td>
<td>2</td>
</tr>
<tr>
<td>Dandruff</td>
<td>3</td>
</tr>
<tr>
<td>Red,Itchy Scalp</td>
<td>4</td>
</tr>
<tr>
<td>Brittle Top Layers</td>
<td>5</td>
</tr>
<tr>
<td>Brittle Top Layer</td>
<td>6</td>
</tr>
<tr>
<td>Hair Thinning</td>
<td>7</td>
</tr>
<tr>
<td>Split Ends</td>
<td>8</td>
</tr>
<tr>
<td>Poor Growth</td>
<td>9</td>
</tr>
</tbody>
</table>

![Table 8: Age](image8)

<table>
<thead>
<tr>
<th>Age</th>
<th>Index Assigned</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-10</td>
<td>0</td>
</tr>
<tr>
<td>11-15</td>
<td>1</td>
</tr>
<tr>
<td>16-20</td>
<td>2</td>
</tr>
<tr>
<td>21-25</td>
<td>3</td>
</tr>
<tr>
<td>26-30</td>
<td>4</td>
</tr>
<tr>
<td>31-35</td>
<td>5</td>
</tr>
<tr>
<td>36-40</td>
<td>6</td>
</tr>
<tr>
<td>41-45</td>
<td>7</td>
</tr>
<tr>
<td>46-50</td>
<td>8</td>
</tr>
<tr>
<td>50-above</td>
<td>9</td>
</tr>
</tbody>
</table>

**Figure 4: Deficiency Test Attributes**

As our hair comprises proteins, iron and minerals like electrolytes, sodium, potassium and calcium. Elements such as copper, manganese, iron, zinc and toxic metals like lead, mercury, cadmium, arsenic, aluminium can be traced in our hair also. Required minerals and nutrients are carried from body to hair in order to maintain optimum nutrition level and hair structure. But lack of these essential nutrients and minerals in body causes
undersupply to hair making it brittle and weak. Hair being one of the most intricate parts of human body delineates body deficiencies pertinently. This causes hair troubles. “21” mineral levels can be determined through hair mineral analysis test that assists in diagnosing body deficiencies.

In order to detect hair deficiencies we have conducted an experiment which takes health condition of the user as its attributes given in Figure 4. We conducted a survey over 400 people. Who were asked to fill a questionnaire entailing information about their region, stress, diet, other attributes in Figure d and deficiencies if they had or know about any. Out of these cases 300 were selected and studied. Deficiencies were identified properly following medical conditions. Data was entered in system’s case base in the form of indexes specified in Figure d along with deficiencies for system training.

From cases given in figure 5, we perceive that how much hair issues help you in identifying your body deficiencies. If these deficiencies are recuperated hair conditions can also be improved. Apart from hair issues your region age and diet has a great impact on your health and hair conditions. Sometimes it is nothing but the climatic conditions of your region that causes your hair to enfeeble. However, in certain situations it may be an apprehension of a serious hidden health issue which can always be sorted with physician.

Following are a few examples that illustrate the process of discerning deficiencies:

<table>
<thead>
<tr>
<th>Region</th>
<th>Taken Stress</th>
<th>Problem Factor</th>
<th>Balanced Diet</th>
<th>Hair Loss</th>
<th>Hair Type</th>
<th>Hair Textur</th>
<th>Age</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>African</td>
<td>No</td>
<td>None</td>
<td>Yes</td>
<td>Normal</td>
<td>Kinky</td>
<td>Spongy</td>
<td>11-15</td>
<td>No Deficiency</td>
</tr>
<tr>
<td>African</td>
<td>Yes</td>
<td>Red itchy Scalp</td>
<td>No</td>
<td>Very High</td>
<td>Kinky</td>
<td>Spongy</td>
<td>16-20</td>
<td>Stress</td>
</tr>
<tr>
<td>African</td>
<td>No</td>
<td>Itchy Scalp and Dull hair</td>
<td>No</td>
<td>High</td>
<td>Kinky</td>
<td>Spongy</td>
<td>16-20</td>
<td>Iion, Zinc and Vitamin C</td>
</tr>
<tr>
<td>European</td>
<td>Yes</td>
<td>Itchy Scalp and Dull hair</td>
<td>Yes</td>
<td>Normal</td>
<td>Kinky</td>
<td>Spongy</td>
<td>31-35</td>
<td>Protein and Iron</td>
</tr>
<tr>
<td>European</td>
<td>No</td>
<td>Bittler or Dry hair</td>
<td>Yes</td>
<td>Normal</td>
<td>Kinky</td>
<td>Spongy</td>
<td>31-35</td>
<td>No Deficiency</td>
</tr>
<tr>
<td>European</td>
<td>Yes</td>
<td>Bittler tip layer</td>
<td>No</td>
<td>Low</td>
<td>Wavy</td>
<td>Cottony</td>
<td>3-10</td>
<td>Low Carbohydrate</td>
</tr>
<tr>
<td>Asian</td>
<td>No</td>
<td>Dandruff</td>
<td>No</td>
<td>Very</td>
<td>Straight</td>
<td>Thread</td>
<td>16-20</td>
<td>Zinc and Vitamin</td>
</tr>
<tr>
<td>Asian</td>
<td>Yes</td>
<td>None</td>
<td>No</td>
<td>Very Low</td>
<td>Straight</td>
<td>Thread</td>
<td>21-25</td>
<td>Low Thyroid</td>
</tr>
<tr>
<td>Asian</td>
<td>No</td>
<td>Bittler and Dry hair</td>
<td>No</td>
<td>Normal</td>
<td>Straight</td>
<td>Silky</td>
<td>16-20</td>
<td>Iion, Zinc and Vitamin C</td>
</tr>
<tr>
<td>Asian</td>
<td>Yes</td>
<td>Poor Growth</td>
<td>Yes</td>
<td>Normal</td>
<td>Straight</td>
<td>Silky</td>
<td>31-35</td>
<td>Vitamin B d&amp;C, Zinc</td>
</tr>
</tbody>
</table>

**Figure 5:** Few cases from the training set

4.2 Analysis: Plotting collected data set we come to following interpretations:

4.2.1: Hair Loss due to Nutritional Deficiency: Hair is probably most important attribute of body. Thinning and loss of hair is the first signal of poor health, stress, hormonal imbalance and vitamin or mineral deficiency. Healthy and vibrant hair exhibits vibrant health. Graph below shows the rise in hair fall due to increased nutritional deficiency.
4.2.2: Baldness due to Nutritional Deficiency:
Baldness (alopecia) is partial or complete loss of hair from head and body. Hair cells are replenished more shortly than other cells in body. Hair acts like a barometer of your overall health. Imprudent or abrupt hair loss implies to hormonal imbalance, nutritional deficiency, stress or toxicity from environment. This excess of hair loss can result into complete baldness in men substantially. Following graph shows the tendency of baldness in men and women due to nutritional deficiency.

4.2.3: Diet and Deficiencies analysis
Nutritional diet is important imperative for health of body and hair. Balance diet maintains body’s nutritional level and helps in suppressing deficiencies. Following graph shows influence of diet on deficiencies.
4.2.4: Regional Deficiencies:
In past few years regional deficiencies have risen to a substantial degree because of unhealthy and improper diet. The graph below shows the comparisons of deficiencies in Africa, Europe and Asia.

![Regional Deficiencies Graph]

4.2.5: Analysis of Statistical and Deficiency Testing System Results:
The graph below shows the trend of Nutritional Deficiency due to improper diet, stress and other health issues in Asia, generated by the results obtained from Deficiency Testing System.

![Nutritional Deficiency in Asia Graph]

4.2.5: Mineral Deficiency in Human Body:
Minerals are vital source of health in human body but their excess and scantiness both can harm health. Specific amount of Minerals should be taken daily to avoid health problems. The chart below shows deficiency of minerals required for hair, in body on average.
V. LIMITATIONS AND FUTURE RECOMMENDATIONS

5.1 Limitations. Cased Based Reasoning has several probable virtues juxtapose to other conventional systems. However it has some boundaries and limitations which are explained below:

1) The number of cases used in case base:
Major foible of CBR is that the numbers of cases devised for hair analysis are restricted. Though the system is evaluated using different approaches, potential of our system can be aggrandized if the system is trained on colossal number of cases.

2) Difficulty in collection of data set:
Clustering of real time data of hair is arduous as we are catering three regions in our paper namely; Africa, Europe and Asia. Every individual belonging to some region has different type of hair embodying different deficiencies. It is not possible to cater all the real time scenarios of all the regions. Hence there are inexhaustible real time cases which are hard to be incorporated in the data set.

3) Vague information from people:
People are not explicit about the data. They are not aware of their hair type or texture. They don’t tell us about their proper age, or they are having balanced-diet or not, do they take stress or not? How much amount of hair loss they have on daily basis? For proper analysis these questions should be answered carefully so we can have consistent information.

5.2 Future Recommendations. Cased Based Reasoning as compared to Artificial Neural Network is not close to human behavior hence our system’s accuracy can be improved by using ANN approach instead of CBR.
Artificial Neural Networks (ANN) can also be used for implementation of nutritional deficiency using hair factor analysis system because this technique mimics natural selection and brain processing. Each neuron is linked to all neurons in next level and each level is assigned a weight. They travel through patterns and adjust imperfect data until they reach a state where they have no neurons to over fit data imperfections and converge to give a solution [9].
A major setback in our system is the sparse real time data. The accuracy level of the system rises if it is trained on every possible case of the hair deficiency. The regions taken into account to train our system are only three which are not adequate to maintain the data set. Hence if we further improve on our data set and incorporate other regions the accuracy of the system can possibly be elevated.
Moreover if we combine skin factors with hair for analyzing the nutritional deficiency the results would be more meticulous as the system would be trained on refined data than before hence the results would improve accordingly.
Vi. Conclusion: A machine learning technique which comes under the branch of instance based learning namely Cased-Based Reasoning is preferable for medical knowledge based systems. This paper ventures an idiosyncratic method to locate nutritional deficiency in human body with the help of analyzing different attributes of hair. Implementation is centered on Cased-Based reasoning technique. The cases are congregated from multiple surveys conducted on analysis of hair by different doctors and medical centers. Some cases lead to various diseases caused by deficiencies in body which had an immense effect on one’s hair. The result provided by the system indicates the nutritional deficiencies in human body which assist the users determine the problem area so they can improve their diet and take preventive measures accordingly to avoid further damage.

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INTEGRATING CASE-BASED REASONING APPROACH AND TABU SEARCH FOR UNIVERSITY MAKEUP CLASS SCHEDULING

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ABSTRACT. Makeup class scheduling is a very time-consuming and highly constrained scheduling problem. It is similar in nature to course time tabling with different nature of hard and soft constraints. We focused on scheduling make up classes by using case-based reasoning (CBR) and Tabu search. Different techniques have been proposed related to course time table scheduling, each having some limitations in terms of optimality and efficiency. This paper focuses on integrating CBR with Tabu search technique to find optimal solution efficiently. Tabu search handles finding optimal solution and CBR handles satisfaction of constraints. CBR solves a new problem case by considering the previously stored cases. Tabu search keeps internal memory and do not get stuck in local maxima.

Keywords: Makeup class scheduling; case-based reasoning; Tabu search; constraints

1. Introduction. Makeup class scheduling has to be performed for every department in the university. It is a highly constrained problem similar to timetable scheduling but having different nature of hard and soft constraints. The scheduling problem involves allocating rooms for various lectures in fixed timeslots. Various clashes with regular routine lectures also have to be considered. It requires a lot of time and effort and often results in erroneous schedule due to which university faculty and students face much inconvenience. There is a need to automate the makeup class scheduling procedure to efficiently schedule makeup class schedules in less time.

This paper introduces the technique that integrates case based reasoning (CBR) approach with Tabu search approach to obtain promising result. Strengths of Tabu search are combined with CBR and utilized for precisely handling makeup class scheduling.

Rest of the paper is organized as: Section II contains description of work done related to timetable scheduling. Section III contains university makeup class scheduling characteristics and constraints. Section IV and Section V contains description of weighted k-nearest neighbor approach and multiple retrieval approach using attribute graphs respectively. Section VI contains the description of proposed technique for makeup class scheduling. Section VII contains experiments and results. Section VIII concludes the paper. Section 8 contains future recommendations.

2. Related Work. Makeup class scheduling is similar in nature to time table scheduling. A lot of work has been done related to time table scheduling. First techniques that were proposed include linear and integer programming techniques, in which all variables are required to be integer and then the best solution is found.
under several constraints and relationships. Clustering and decomposition approaches were also proposed. In these approaches grouping is done for events, constraints are handled and quality of solution is improved. Graph coloring heuristics were proposed by Burke et al, sequentially allocate events to resources. Limitation involved in this approach is that it suits well for small scale problems but fail for large problems. Hence, graph coloring approaches cannot be applied to large scale problems like time table scheduling. For generating high quality results evolutionary algorithms (EAs) and their hybrid versions work much better than other approaches. EAs are categorized into two categories: local search (LS) algorithms and point based algorithms. LS improve the current solution. Main techniques involved includes simulated annealing (SA), hill climbing (HC), Tabu search (TS) and others. Genetic algorithms (GAs) and other global search evolutionary algorithms maintain a population based candidate solutions. Different EAs have been applied on time tabling problem. Burke et al. applied GA for time table scheduling. GA was implemented by Ergul. A lot of work has been done for solving time tabling problem using TS algorithm. Stochastic optimization timetabling tool is proposed by Pongcharoena et al. A survey of meta-heuristic techniques has been done by Lewis. CBR has been a major point of concern for research. It is a technique that is based on a notion which involves humans to use past experience and modify it for satisfying the requirements. CBR is being used in and for solving timetabling problems. Fuzzy based techniques for timetabling have been investigated by Asmuni et al. GAs and particle swarm optimization (PSO) and their hybrid technique has been applied to timetabling problem by Morteza Alinia Ahanda and Mohammad Taghi Vakil Baghmishesh. CBR and PSO are integrated for timetabling problem by Ho Sheau Fen, Siti Zaiton Mohd Hashim and Safaai Deris. All of the above mentioned approaches provides feasible solution but do not provide optimal solution efficiently. In this paper, CBR and TS are integrated and provide promising and optimal results.

3. University Makeup Class Scheduling Characteristics And Constraints. University makeup class scheduling problem involves scheduling of set of lectures on the basis of given timetable’s scheduled rooms, room specification (with multimedia/without multimedia) and timeslots as input. For scheduling makeup class, duration and room specification for makeup class is used as an input for finding the makeup class schedule.

3.1. Decomposition of problem and CBR: Case based reasoning is an efficient technique that is used for solving a new problem case by either reusing or adapting previously stored solutions that are similar to that problem case. Makeup class scheduling is a highly constrained problem. These constraints are categorized into two types: hard constraints and soft constraints. Hard constraints must not be violated in any case. Soft constraints, on the other hand are commendable and they are not important to be satisfied. There are many constraints related to makeup class scheduling problem, which can be seen as constraint satisfaction problems. Hard constraints are: two makeup class schedules must not be assigned simultaneously to same timeslot and room, timeslot and room for makeup class that is scheduled must not have a clash with scheduled timetable’s classes rooms and timeslots and makeup class that is scheduled matches the required room specification (room with multimedia/without multimedia). Soft constraints are: course xyz has been assigned with time slot no. S and two makeup class schedules are consecutive with each other or not. Makeup class scheduling is done through supervised learning technique. In this technique a data set commonly known as training data is given. There are different attributes for entries in data sets. Goal is to predict the target value or outcome for unseen example. Two methodologies for supervised learning are:

- k-nearest neighbor
- Decision trees

For investigation of data, input timetable attributes value is converted to discrete one. K-nearest neighbor will be used as classification algorithm for retrieving cases from case base in the upcoming section.

4. Weighted K-Nearest Neighbor Approach For Retrieval. In weighted K-nearest neighbor approach, if weighted sum of difference of features of a cases; which exists in the case base, with new query case; is greater than other cases then that case is retrieved. In other words, a case from case base that matches k number of features with new query case will be chosen and retrieved, where k<n and n is the total count of features. All of the attributes and features of case base are not important in finding makeup class schedule. All the important features are assigned weights. This means that only relevant and important features will be
considered [2]. For finding the neighbors of new query case, weighted Euclidean distance technique will be used that finds the distance between two points [3]. In makeup class scheduling, distance between new query case; that involves the duration, day and instructor name for makeup class that is to be scheduled; and all the cases that are in case base is calculated. That will help to indentify which cases exactly match the new query case, yielding a zero value. If $x_i$ is new query case features and $x_j$ is a previously recorded cases features. Then, weighted Euclidean distance will be calculated as below:

$$d(x_i, x_j) = \sqrt{\sum_{s=1}^{S} w_s(x_{is} - x_{js})^2}$$

$w_s$ is the weight that is assigned to features of cases in case base. Most important features are assigned greater value weights [4]. In Figure 1 the distance between query case attribute/feature $x$ and case from data set $y$ has to be calculated. According to Pythagoras theorem, hypotenuse$^2$ = Base$^2$ + Altitude$^2$. It can be seen that we have to find hypotenuse for calculating the distance between query case and stored case. Base will be found by $x_1$-$y_1$ and height/altitude will be found by $x_2$-$y_2$. This yields the formula as:

$$|PQ|^2 = (x_1 - y_1)^2 + (x_2 - y_2)^2$$

$|PQ|^2$ tells how much similar or different is the query case from the cases present in the data set (case base).

**Algorithm for weighted KNN:**

**Weighted K-nearest neighbor** (cb:Case-base, nq:new-query, n, d:distance)

1) Assign weights to features of cases.
2) Compute weighted Euclidean distance $d$ between new-query $nq$ and every case in case-base $cb$ (timetable).
3) Choose $n$ examples in case base $cb$ that are not nearest (exact match) to new query case $nq$.

The weighted kNN algorithm is very slow. Also it is sensitive to noisy data and there is a large computational overhead due to calculation and allocation of weights [5].

5. **Multiple Retrieval Through Attribute Graphs And Decision Trees.** Attribute graphs can be used to represent the constraints in makeup class scheduling. Edges of graph represent constraints and vertices represent courses. Notation $a: b$ is used, where $a$ depicts the label of attribute and $b$ denotes the value that is assigned to that attribute [6]. Hard constraints are 3, 4 and 5. Soft constraints are 0, 1 and 2. Figure 2 contains description of hard constraints and soft constraints related to makeup class scheduling.
**Figure 2. Hard and soft constraints of makeup class scheduling**

Figure 3 depicts the subset of graph that will be represented for makeup class scheduling.

<table>
<thead>
<tr>
<th>LABEL</th>
<th>VALUE</th>
<th>EXPLANATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>N (Slot No); course code</td>
<td>Course no has been assigned with time slot no. 5</td>
</tr>
<tr>
<td>1</td>
<td>N/A</td>
<td>Two makeup class schedules are consecutive with each other</td>
</tr>
<tr>
<td>2</td>
<td>N/A</td>
<td>Two makeup class schedules are not overlapping with each other</td>
</tr>
<tr>
<td>3</td>
<td>S (Slot No); room R</td>
<td>Two makeup class schedules should not be assigned simultaneously to same time slot S and room R</td>
</tr>
<tr>
<td>4</td>
<td>N (Slot No); room R; leaving no makeup class scheduled</td>
<td>Two makeup class schedules do not have a same time slot and scheduled time slot class</td>
</tr>
<tr>
<td>5</td>
<td>L (Room No); multimedia room</td>
<td>Room class is scheduled in a multimedia room</td>
</tr>
<tr>
<td>6</td>
<td>N (Room No); multimedia room</td>
<td>Room class is scheduled in a multimedia room</td>
</tr>
</tbody>
</table>

**Figure 3. Graph representation of makeup class**
All of the makeup classes of courses shown by vertices match the required room specification RSpec, indicated by 5. Similarly edge between operating system and operating system lab, indicated by 1, 5 show that these two schedules are consecutive with each other and match the required room specification RSpec. For the course named Management Information System, three notations are used. In 0: 1, 0 indicates the label 0 which means that course has been assigned a time slot no. S and 1 indicate the value of slot no. which is 1 (according to discrete values assigned). In 6: 1, 6 indicates the label 6 which depicts that makeup class has been scheduled in a room with specification of RS and 1 indicates the value of room specification i.e. 1. In 7: 1, 7 indicates the label 7 which means that room RS has been allocated and 1 indicates the value of room no. depicted by 1. Similarly other constraints on courses are shown.

For retrieval, case base is constructed as a decision tree and stores the cases which are illustrated by attribute graphs like shown in figure 3. Possible permutations of the courses are gathered in a tree structure. Clustering is done on structures or substructures that have similar or same attributes under a specific node in a tree. In retrieval procedure, attribute graphs will be found and retrieved that represents the cases that are much alike to new query case. In this way, retrieved cases turned out to be the one with same constraints as the new query case. Comparison is done on the bases of values that are assigned to each of the vertices [6].

Algorithm for constructing decision tree, given a data set is given below.

**Make-Decision-tree (DS: data set)**
1) Identify the classes out of data set. (e.g: C may be one class)
2) If (all elements of data set DS constitutes a class C)
3) Make a leaf node and labeled it as C
4) Else
5) Construct sub-trees out of DS
6) Repeat steps 1-5 until classification gets completed

Decision tree is easy to understand. Small details that may have been skipped are considered. However, minor change in input data can result in major change in tree structure. Also it will be highly time consuming for constructing decision tree for large data set [7].

6. **Proposed Solution: Integrating TS And CBR.** Tabu search is an efficient optimization technique that can be applied to makeup class scheduling for attaining satisfying results. During search operation in finding a time slot for makeup class scheduling, every visited case that violates the constraints is inserted in the Tabu list. Then, this list is managed by applying a FIFO strategy. There are two controlling mechanism in Tabu search. These are categorized as diversification and intensification. Intensification concentrates on appreciating areas of search, while diversification guides the search towards unvisited search areas [8]. Case based reasoning suits well for controlling and monitoring the learning factor in Tabu search. It works best for problems where domain knowledge is represented by experience [8]. A feasible and optimal solution with minimum number of violations of constraints is found. Two operations are associated, as given below:

**Case-base repair generation:** When an initial solution(s) is picked then that solution violates the constraints defined in makeup class scheduling. Then repairs are generated for these violations using the case base or data sets.

**Tabu list:** A list is maintained that contains record of repairs that need not to be repeated. This ensures that the proposed algorithm will not get stuck in same repairs of violations that are being repeating. Case base is assumed to be well trained. The experience stored in case base will be used for generating repairs for violation of constraints in makeup class scheduling. If the repair is generated and this repair is found to be already present in Tabu list and hence needs to be forbidden. Then, next repair is generated out of retrieved case from the case base. In this way optimal solution for makeup class scheduling problem can be achieved [29]. Tabu list contains all of the makeup classes’ record that is already scheduled. Thus, to avoid clashes, any newly generated schedule (case) should not match with or exists in Tabu list. Figure 4 depicts the flow chart of proposed algorithm. Following is the proposed algorithm.
Proposed Algorithm:

**CBR-Tabu (CB: case base, QC: query-case, TL: Tabu list)**

1) Assign weights to features of cases.
2) Compute weighted Euclidean distance d between new-query QC and every case in case-base CB.
3) For each retrieved case c1 from case base CB that does not yield a zero d.
   (c1 contains violation and repair)
4) If c1 belongs to TL
5) Drop c1 and go to step 3 to generate repair
6) Else
7) Suggest the makeup schedule and store it.
8) Add chosen repair(makeup schedule) to TL

Flowchart:

![Flowchart](image_url)

**Figure 4. Flow chart of Tabu search and CBR**
During searching process, Tabu search algorithm has to maintain depth and breadth in the process of searching. As Tabu search finds optimal solution during the search early, so depth will not be an issue in Tabu search. However breadth may be crucial [30].

7. Experiments And Results. The data used in investigation of makeup class scheduling problem is comprised of timetables that have been taken from five departments of Kinnaird College for Women University, Lahore, Pakistan; namely Statistics, Psychology, Business Administration, English Literature and Computer Science. Integrated CBR and Tabu search algorithm have been tested on the data obtained from these departments. A makeup class schedule takes timetable as input. Table 1 depicts the information related to the university’s timetable regarding only the five departments mentioned above. Implementation has been done in Java.

<table>
<thead>
<tr>
<th>Resources</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room</td>
<td>41</td>
</tr>
<tr>
<td>Courses</td>
<td>45</td>
</tr>
<tr>
<td>Scheduled makeup classes</td>
<td>15</td>
</tr>
<tr>
<td>Instructors</td>
<td>39</td>
</tr>
</tbody>
</table>

Table 1. Kinnaird College for Women University’s timetable and makeup schedule

Table 2 shows the result achieved through implementation. Constraint violations are the number of times the clashes are found with existing scheduled makeup classes. Before getting results, 15 makeup classes are scheduled. Algorithm is run 10 times. As implementation involves only five departments and only 15 makeup class schedules are taken, therefore constraints are much less as compared to suggestions for makeup class schedule given by the algorithm.

<table>
<thead>
<tr>
<th>No. of algorithm run (iteration)</th>
<th>Constraint Violations</th>
<th>Suggestions achieved for makeup class to be scheduled</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
<td>87</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>81</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>579</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>40</td>
</tr>
<tr>
<td>6</td>
<td>2</td>
<td>171</td>
</tr>
<tr>
<td>7</td>
<td>2</td>
<td>562</td>
</tr>
<tr>
<td>8</td>
<td>2</td>
<td>221</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>260</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>763</td>
</tr>
</tbody>
</table>

Table 2. Implementation results
In the figure 5 graph is shown with constraint violations and suggestions for makeup class scheduling.

![Graph depicting constraint violations and suggestions for makeup class scheduling.](image)

**Figure 5.** Graph depicting constraint violations and suggestions for makeup class scheduling.

8. **Conclusion.** In this paper, different classification techniques in supervised learning are presented. Limitations involved with simple CBR approach applied on makeup class scheduling are shown. Then a proposed technique involving an integration of CBR and Tabu search is demonstrated. Tabu search is a very powerful and practical approach. A case base is used for generating similar cases that have violation of constraints in them. Case base is utilized for generation of repairs. Two mechanisms were demonstrated that includes generation of case based repairs and Tabu list. Function of Tabu list is to hold a list of repairs in the memory that are generated to resist repetition of usage of those repairs again. All this helps to find an optimal solution that does not involve repeating same solutions to same occurring problem.

9. **Future Recommendations.** For future research, an efficient diversification technique related to Tabu search must be used to handle the limitation mentioned in this paper. Also there is a need to improve and handle the consistency of knowledge base and errors in data must be handles. The proposed technique is tested on very small data set. It can be tested on large data set to check its efficiency. Secondly, the proposed technique can also be applied on other university related scheduling problems like timetable scheduling to get optimal results.

**REFERENCES**


AUTOMATED CAREER COUNSELING SYSTEM FOR STUDENTS USING CBR AND J48

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ABSTRACT. Career-related confusions are a serious issue among students these days. A student needs an accessible, easy-to-relate-to and trustworthy career planning resource at their disposal. Mostly at age of 18, students are not mature enough to know precisely what career to follow; they are not sufficiently aware of what goes on in a particular area and which academic majors are associated with their areas of interests. This paper presents an automated system that mimics a one-to-one meeting with a professional career counselor. The system supports people in developing their own career opting competences. The paper focuses on collating different machine learning algorithms to guide students on the basis of their academic background, hobbies and location. This proposed system helps student in their University choice, career choice and the scope of their respective appropriate career for future.

Keywords—CBR; machine learning algorithms; career planning; student; A levels

1. Introduction. The selection of career paths for students after A-levels/intermediate is an attention requiring concern. A recent survey of 115,000 people from 33 different countries indicated that 50% of the people felt that they had chosen the wrong career (“Mail’s Globe Careers”, 2009). Notably in Pakistan, there is not enough guidance for students, either from their institutes or other sources, which can instruct them to adopt such majors in University that is best suited to their interests and skills. Present paper confronts the career-related confusions amongst students nowadays. This research intends to solve the career assortment problems by making use of the CBR (Case Based Reasoning) and Decision Tree J 48 algorithm. The system establishes an automated process similar to a one-to-one meeting with a career counselor and aids to ‘plan’ a career true to the student’s grade, IQ, hobbies and, predominantly, gender. Students can later determine a career from the proposed options and the illustration of related jobs. The system’s distinction is to nominate Universities offering education for the recommended careers.

Rest of the paper is organized as: Section 2 includes the related work done concerning student’s educational and career decision problems. Section 3 describes the methods involved in the building and programming of the system. Section 4 discusses the data collected, experiments done for the system and its results. Section 5 compares the techniques employed. Sections 6, 7 and 8 conclude the paper.

2. Related Work. Career counseling is based on a student’s previous academic performance, skills and potential and students are often unaware of what may suit these attributes perfectly. In that manner, career counseling is similar to defining students’ problems related to learning and application and their solutions. Many papers are written that propose solutions to students’ related problems by implementing data mining techniques along with certain machine learning algorithms. The overall goal of the data mining process is to extort information from a data
set and transform it into a rational structure for further use. Misinterpretation related to career counseling is the major problem faced by undergraduate students. For this purpose, intense examination of certain input is important for effective student development through effective career counseling (Hall, 2005). Multiple researches have been conducted to acquire student’s educational attributes to observe future career patterns. With the help of certain algorithms, career related decisions are deduced. The inference of these researches leads to career guidance based on their transitional period. Pal et al. (2014) propose data mining techniques for identifying patterns in vast databases of multiple universities to investigate alumni and students’ challenges regarding career and counseling. Kakavand et al. (2014) applied Decision Tree algorithm to process post-graduate students’ academic information and predict the attributes of those students who are inclined to pursue their studies on the basis of the pattern identified from a database of Post-Graduate students. Cao et al. 2012, elaborated college students’ complications regarding their present career choices. In order to aid these students in determining their professional problems they utilized basic career counseling, information and evaluation and management along with auxiliary decision-making. Thus, proposing solutions and recommendations by assessing effectively and employing agent technology to create a web based system. (Stebleton, 2006) discussed the theoretical approaches of counseling African students in the US Universities together with its practical implications. Yadav et al. (2012) applied ID3 algorithm, C 4.5 algorithm and CART algorithm on a student database to predict Engineering student’s performance in final exams. Baradwaj et al. (2011) resort to data mining techniques in order to improve quality of higher education. Conati et al. (1997) have worked on an online model for coached problem solving by operating Bayesian networks and incorporating ANDES, which is an intelligent Tutoring System for Newtonian physics. They used stochastic sampling algorithms to update the network and predict students’ actions during problem solving. Hasebrook et al. (1997) lodged an expert advisor that works on many platforms that gives vocational guidance by making use of expert advice for the same input. The limitations with the system are that it does not cater alien inputs and provides career suggestion for only renowned majors. (Miller, 2006) proposed a solution-focused counseling strategy for career counselors to better advice careers to clients who seek only a little direction rather than letting the counselor control their professional choices. It enables career counseling practitioners to induce self-helpfulness in such clients. The outcome from the application of such strategies is mostly helpful when clients come for counseling for only one session. Schedin (2007) sparsely investigated the interaction process between a client and career counselor to describe and analyze interpersonal behavior in career counseling sessions. This research was driven by interpersonal theory and the model of structural analysis of social behavior (SASB) developed by Benjamin S., Feduccia (2003) explained the influence of Career Discovery I, which is the first module in a computer-assisted program for making career decisions, on the firmness of choice of college majors. The research determined differences, if any, between students who entered a Research-extensive University without declaring a major to those who declared one. Crozier et al. (1985) focus on the role and function of post-secondary career counseling specialists and the issues that affect their practical implementation within post-secondary institutions. Brown et al. (2002) suggest how social cognitive career theory’s major hypotheses can be applied to counseling careers and to develop a broad array of career choices and analyzing its barriers as well as how to overcome those barriers. Betz et al. (2014) review the literature on Bandura’s (1997, 1982) self-efficacy theory to the career field and describe the usefulness of career self-efficacy in building such models that predict the occupational choice behavior of men and women along with understanding the disadvantaged status of women in labor force through elf-efficacy utility. Ye (2014] applied the same for Chinese Graduate students. [18] describes the demographic, economic and social effects on career preparations. (Suling, 2012) made use of multi-objective decision-making and combines it with BP artificial neural network appropriately to construct the general diathesis estimation model for university students. (Westbrook B, 1999) is the replication of past studies by using an improved design to determine the relationship between aptness of career choices and career maturity test scores.

However, the entire above papers proved that no work has yet provided with an optimized and accurate output in regards to students’ problems with career choices after A-levels/Intermediate. But in this paper, automated career planning and data mining techniques are integrated with CBR and Decision Tree J48 to distinguish the academic, personal and intellectual patterns of A levels/intermediate students for productive career guidance.

3. Methods. Automated Career Planning incorporates concepts of Artificial Intelligence and Machine Learning Algorithm which proposes a suggestion to students regarding majors most appropriate for them. It is a formulated technique for analyzing an individual’s abilities through his/her interests and hobbies. Thus constructing solutions for students related to career planning problems. The system’s fabrication involves more than one algorithm from Weka, a collection of Machine Learning algorithms for data mining tasks also the algorithm involved CBR of hamming distance with Manhattan distance to calculate the output as well as to refine the accuracy of the results.
System is designed in a way that it takes inputs from the user, matches it with the training data and yields an output. Following are the fields that the user fills as inputs:

1. Name(String)
2. Gender(Char--->F/M)
3. High School Grade(Char--->A-F)
4. Hobbies (Radio Buttons)
5. Skills (Radio Buttons)
6. IQ Grade(Char--->A-F)

3.1 Case Based Reasoning (CBR). In case-based reasoning (CBR), career counseling system’s capability is exemplified in an archive of past cases, instead of being encoded in traditional rules. Each case typically comprises an explanation of the problem, along with an answer and/or the output or result. The knowledge and reasoning process demonstrated by an expert to solve the case is not noted, but is contained in the solution.

To solve a unique case, it is matched against the cases in the case base or training set, and similar cases are regained. The regained cases are used to advocate a solution which is reused and tested for future queries. The solution is then revised. Finally the new problem and the final solution are remembered as part of a new case. Reusing the remembered case solution in the context of the new case is based on the idea of recognizing the variances between the remembered and the new case; and identifying the part of a remembered case which can be transported to the new case. Usually the solution of the remembered case is transported to the new case directly as a solution to this case.

Regaining the case solution generated by the reuse process is required when the solution verifies inappropriate. This offers an opening to acquire from failure. Remembering the case is the process of integrating whatever is beneficial from the new case into the case library. This comprises of determining what information to remember and in what form to remember it, how to direct the case for forthcoming recovery; and assimilating the new case into the case archive. The standard word for regaining is retrieving and for remembering is retaining. Reuse and Revise are used as it is in this paper.

![Diagrammatical representation of CBR's working and the output](image-url)
3.2 Steps in CBR Algorithm:
   a) Regain the most alike case (or cases) linking the case to the archive of past cases;
   b) Reuse the regained case to try to solve the new problem;
   c) Revise and acclimatize the suggested solution if required;
   d) Remember the ultimate solution as portion of a new case.

3.3 Regaining a case involves:
   a) Recognizing a set of related problem descriptors;
   b) Corresponding the case and repaying a set of satisfactorily alike cases (given a similarity count); and
   c) Choosing the finest case from the set of cases refunded.

3.4 Implementation. For implementation, the values of each field; Name, Gender, Grade in A levels/intermediate, Hobbies, Skills, IQ Grade and Current Major are utilized which shape the training set. The training set is in the form of a txt file for that matter. We have gathered around 200 cases which keeps increasing because of the revise logic of the algorithm CBR.

3.5 Unique Unit Case:
   a) A separate unit case is formed from the user’s entries in the system’s interface, which asks the user to provide input for the same fields as stated before excluding Major, and CBR is applied.
   b) Each row of training set is compared through CBR’s logic where every row of training set is compared with unit case.
   c) As each column is matched, a similarity number (3) decrements.
   d) Ultimately, the “Major” column of the row with the lowest similarity number is displayed.

3.6 Algorithm for CBR Hamming Distance:

   Hamming Distance (countMatches: No. of attributes, sim: Similarity number, a: Training set’s attributes, b: given case’s attributes)
   1) Check if sim=3, then, hamming distance is calculated.
   2) Assign a value to countMatches according to the distance and number of attributes.
   3) If the attribute of a matches with b countMatch is decremented. This is done till 3rd attribute of both a and b as sim is 3.
   4) If the first three attributes of a do not matches with b, then last three attributes are checked and countMatches is decremented each time it matches.
   5) The difference is then calculated by dividing countMatches with 7.
   6) And the major is allotted.

3.7 Algorithm for CBR Manhattan Distance:

   Manhattan Distance (sim: Similarity number, a: training set’s attributes, b: given case’s attributes)
   1) Else if sim=2, then, Mnahattan distance is calculated.
   2) Add up all the absolute differences of the attributes of a and b.
   3) Assign the value to difference[i].
   4) Update the value of difference[i] by difference[i]*6+firstAttDist/7.

Figure 2 depicts our system’s functional flow chart on CBR. This figure wraps up the fore-mentioned stages in one diagram.
4. Experiments and Results.

4.1 Data As Input. Data is selected with a keen realization of its effects on the precision of results. The data used in this paper was collected from Graduate students of 5 different Universities of Lahore, Pakistan (Table I) in the form of a questionnaire whence 20 majors' list was acquired to work on. The total count of questionnaires filled is 173. It included a set of questions that recognize the personal, educational and intelligence attributes of students of particular majors. 70% of those questions determined the IQ, and the rest were divided into questions that calculate the personality and professional concerns of the pupils. The variables attained from the questionnaire are shown in Table II.
The attributes, as shown in Table II, include general demographic information like Name and Gender. The target population was Graduate and Post Graduate students. For this questionnaire they were provided with a list of hobbies that generally interest that age group, including activities resembling outdoor sports, collecting items, playing musical instruments or listening to music, creativity based activities such as reading or writing. The students were expected to choose as many hobbies that appealed them, thus determining the attribute for Hobbies. The questionnaire also included a list of skills that are generally found in professionals working in the fields to better accommodate the user to a specific career. Grade in A levels/intermediate required the target population to fill in their academic grade in FSc./FA/ICS./I.Com to yet again better understand the academic improvements of the students studying a certain major. IQ Quiz Grade is the grade that these students attained in the quiz provided along with the questionnaire to aptly judge their intelligence and IQ tendencies to undertake a major. The quiz analyzed their command on language, mathematical knowledge, observation and problem solving techniques. In Current Major, the students provided their major which aids the system to classify the similar attributes of each major and advise careers to the users accordingly.

<table>
<thead>
<tr>
<th>Fields</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>A-Z</td>
</tr>
<tr>
<td>Gender</td>
<td>Male, Female</td>
</tr>
<tr>
<td>Skills</td>
<td>Technical, Persuasive, Entrepreneurial, etc.</td>
</tr>
<tr>
<td>Hobbies</td>
<td>Reading, Writing, Music, Contemplating, Relaxing, etc.</td>
</tr>
<tr>
<td>Grade in A levels/intermediate</td>
<td>A, B, C, D, F</td>
</tr>
<tr>
<td>IQ Quiz Grade</td>
<td>A, B, C, D</td>
</tr>
<tr>
<td>Currents Major</td>
<td>Computer Science, Physics, Psychology, Media Studies, Pharmacy, etc.</td>
</tr>
</tbody>
</table>

Table II. Variables Related To Students

4.2 Result As Output. Majors proposed may be more than one depending on the user’s input. The use case is then entered in the training set as a revised data point. After the majors are proposed, respected Universities are also proposed to the student as well as the jobs description and nature of field.

4.3 Decision Tree J 48. In this system, Decision Tree J-48 is employed through Weka, a software collection of machine learning algorithms. J48 classifier is a simple C4.5 decision tree for classification. It creates a binary tree. With this technique, a tree is constructed to model the classification process for proposed majors (Fig. 1). The 173 datasets collected were input in a .txt file and then converted to .arff file for Weka compatibility. Once the file is
loaded in Weka and J-48 is run on it, a tree is built. This tree is applied to each tuple in the data set and results in classification for that tuple.

4.4 **Algorithm for constructing Decision Tree J-48, given a data set:**

*Make-Decision-tree (DS: data set)*

1. Classify the classes out of data set. (e.g.: A may be one class)
2. If (all elements of data set DS creates a class A)
3. Make a leaf node and label it as A
4. Else
5. Construct sub-trees out of DS
6. Repeat steps 1-5 until classification gets completed

4.5 **Implementation in Weka.** Figure 3 contains the tree view generated after running the algorithm. The squared brackets show the splitting criteria. This is the attribute name on which the parent node was split and the value (numeric) and nominal value (set) that has led to this child. The class value (Major in this case) in single quotes states the majority class in this node. The value in round brackets states (x of y) where x is the quantity of the majority class and y is the total count of examples in this node.

The first node in the figure shows majors-taken percentage according to grade and then in this grade, according to gender.
Fig. 3 J48 decision tree representation from Weka. The figure is only one branch of the tree depicting that each level node proceeds with the different attributes.

4.6 **Comparison Of Results.** As CBR is an instance based algorithm, it generates different outputs by giving priority to the similarities between the test case and the collected data sets. In the light of the data sets, if the test case matches exactly 6 attributes similar to the Computer major’s case, matches 5 attributes similar to the Mathematics major’s case and 4 attributes with Physics major’s case, then the system gives different priority on the basis of outputs. For the above mentioned scenario, the output is Computer Science, Mathematics and then Physics. Moreover, the revised concept leads to the same result again and again showing the high accuracy of the system that
is approximately 80%. While comparatively using J48, the output is a definite positive decision (yes) or negative decision (no) for a student to whether go with the result or not. Only a single output is provided and accuracy of the algorithm is 50-60%, as shown in Fig 4.

![Comparison between Algorithms](image)

**Fig. 4 Graph representing the comparison between CBR and J48**

5. **Limitations.** The system is restricted for a certain geographical area. Culture impacts the career decisions of students widely. The system is trained over data acquired from the students of a restricted area and so it might give output that is more relatable and acceptable to students belonging to similar area and culture. The machine is trained through the datasets which are collected in the form of questionnaires from the people of only one country. Limited number of datasets is being used. The attributes in the datasets are specific.

6. **Conclusion.** Students nowadays face many problems when choosing a career path. They are often unsure of what may suit their interests and scope best. Many institutions are also incapable to provide students with proper guidance since they have no means to individually cater every students needs and suggest a career accordingly. Comparison based algorithms present a solution for this problem since they compare certain attributes of one case (student in this sense) with the previous cases collected (a student database). As this study indicated, CBR and Decision Tree J-48 can perfectly illuminate the way for students to select a career that exactly matches their skills and IQ tendency. The results indicate that the system is capable of correctly proposing majors with approximately 80% accuracy when presented with sufficient data and features. Out of the two algorithms tested, CBR gave the highest accuracy and Decision Tree J-48 gave the lowest accuracy.

7. **Future Recommendations.** Accuracy increases as the knowledge of the system increases. If the system is trained over a much larger library of cases, its accuracy will increase many folds. Gathering more types and aspects of usable data for building the library for the system will result in better accuracy, more reliability and will acquire the student’s trust. The system is open-ended can certainly be extended. If the judgment criteria has some entity in it which should be cognitive of a person’s psychological attribute, the system can be made more productive.

**REFERENCES**


PREDICTION OF BINDING MODE OF BISPHENOL-A (A CARCINOGEN) IN ESTROGEN AND TESTOSTERONE RECEPTORS BY APPLYING COMPUTATIONAL DOCKING APPROACH

ABSTRACT. Bisphenol A (BPA) displays weak estrogenic properties and could be a weak carcinogen. BPA exposure during the perinatal period has been reported to alter both prostate and mammary gland development in ways that may render these organs more susceptible to the development of neoplasia or preneoplastic conditions with subsequent exposures to strong tumour-initiating or tumour-promoting regimens.

Methods: Molecular Operating Environment (MOE-2012) software was used to perform docking calculations. This software returned affinity energy values for several ligand conformations. Subsequently, we used PyMole 1.4 and Ligand Scout 3.1 to check the stereochemistry of chiral carbons, substructure, superstructure, number of rotatable bonds, number of rings, number of donor groups, and hydrogen bond receptors.

Results: some compounds involved in cancer, here computationally we predict the distortion behavior of Bis-Phenol A in equilibration in estrogen and testosterone receptors, and then GROMACS was used to simulate the behavior of the Bis-Phenol A in complex (estrogen - testosterone receptors) after a set of 500 PS and up to 300 K in water. This calculation returned a graph of potential energy against simulation time and showed that the ligand (bis-phenol A) are might be involved in destroying the equilibration of both the receptors.

Conclusions: The results indicate that Bis-Phenol A could be a competitor for steroids which defect the equilibrium of estrogen – Androgen effect, but the binding with testosterone receptor was stronger than binding with estrogen receptor.

Keywords: bisphenol A (BPA), Docking, carcinogen

1. Introduction: Bisphenol A (BPA) is a chemical used to make a kind of plastic called polycarbonate. Also BPA is used to make the linings in almost all canned food and drinks, including cans of liquid infant formula (U.S. Environmental Protection Agency, 2010). The important note on BPA that it exhibits hormone-like properties that raise concern about its suitability in some consumer products and food containers (U.S. Food and Drug
A 2010 report from the US Food and Drug Administration (FDA) identified possible hazards to fetuses, infants, and young children. However, an FDA assessment released in March 2013 said that BPA is safe at the very low levels that occur in some foods (U.S. Food and Drug Administration, 2010).

Endocrine-disrupting chemicals (EDC), including phthalates, bisphenol A (BPA), and phytoestrogens such as genistein and daidzein, are associated with a variety of adverse health effects in organisms or progeny by altering the endocrine system (Yoon K, & Kwack SJ, 2014) which make focusing of researcher to characterize the whole effect of these compounds accurately considering the priorities of hormone system. The widespread exposure of individuals to BPA is suspected to affect a variety of physiological functions, including reproduction, development, and metabolism (Delfosse V, & Grimaldi M, 2014). Recently, Bisphenol A consider as one of the highest volume chemicals produced worldwide.

the previous studies showed that BPA has estrogen like effect and it has binding ability to estrogen receptor (Richard M., 2014). Basically, BPA binds to steroid receptors but it is unclear whether it binds to Estrogen receptor and take role like estrogen agonist or binds to androgen receptor to be antagonist which leading to disrupt the estrogen – androgen equilibrium in breast tissue. Consequently, in this study we try to explain the binding of BPA to the two types of receptor using Molecular docking and Docking calculation. Molecular docking is a computational method that can be used to explain the interactions of ligands with the receptor.

2. Methodology: In this study an effort was made to carry out the docking of the Bis-Phenol-A into the binding pocket of Estrogen [(PDB Code 1a52)] and Testosterone receptor [(PDB Code 2am9)] by means of MOE 2008.10 (Molecular Operating Environment) software package. LigPlot implemented in MOE software was used to envision the interactions between Estrogen and Testosterone receptor and compound Bis-Phenol-A.

2.1. Retrieval of ligands : The compound Bis-Phenol-A, which is a carcinogen and cause breast cancer, was collected from the previous literature (John Bucher, 2010). The structure of the compound was constructed using MOE-Builder tool. The 2D structure of the retrieved Ligand is shown in (Figure 1). The related 3D structures were also obtained and the energies of the identified molecules were minimized using the default parameters of MOE energy minimization algorithm [gradient: 0.05, Force Field: MMFF94X].

Figure 1 2-Dimensional and 3-Dimensional minimized Structure of compound Bis-Phenol-A

2.2. Preparation of Receptor Protein : The protein molecules included in our study, Estrogen and Testosterone receptors was downloaded from Protein Data Bank [PDB Codes 1a52 & 2am9]. Water molecules were removed and the 3D protonation of the receptor molecules was carried out. The energies of the retrieved receptors were minimized using the default parameters of MOE energy minimization algorithm [gradient: 0.05, Force Field: MMFF94X].
2.3. **Molecular Docking**: The default parameters of MOE-Dock program were used for the molecular docking of the compound Bis-Phenol-A. To find the correct conformations of the Ligand and to obtain minimum energy structure, ligands were allowed to be flexible. At the end of docking, the best conformations of the Ligand were analyzed for their binding interactions.

3. Results & Discussion

3.1. **Validation of the docking procedure**: In order to evaluate the accuracy of MOE-Dock program the co-crystallized Ligands were removed from the active sites of both of receptors and re-docked within the binding cavity of both receptors (Estrogen and Testosterone receptor). In this study, RMSD value was found as 1.809 Å for Estrogen receptor and 1.09 Å for Testosterone receptor, showing that our docking method is valid for the studied (Bostrom J et al. 2003) and MOE-Dock method, therefore, is reliable for docking of the compound Bis-Phenol-A in the cavity of both receptors.

3.2. **Docking Analysis**

**Binding interactions of ligands and Protein**: From the MOE-docking studies it was observed that the compound Bis-Phenol-A indicate good agreement of docking score to testosterone receptor (S= -11.7486), as compared to estrogen receptor which has -11.0623 docking score.

It was observed from the docking conformation of compound Bis-Phenol-A for Testosterone receptor with resolution of 1.64Å that the compound was bound into the binding cavity of Testosterone receptor making interactions with the residues Arg752 (basic, side chain donor), Asn705 and Thr877. Arg752 interacts with the oxygen (hydroxyl group) single bonded to the one side of Benzene ring while Asn705 and Thr877 were found in polar interaction with the H (of hydroxyl group) of the compound as shown in Figure 2B (2-D pose) and 3-D in Figure 3.

![Docked conformation of compound Bis-Phenol-A (A) Estrogen Receptor [PDB Code 1a52 and Docking Score (S) -11.0623] (B) Testosterone Receptor [PDB Code 2am9 and Docking Score (S) -11.7486]](image-url)
Similarly the same docking conformation of compound Bis-Phenol-A for Estrogen receptor with resolution of 2.80Å, it was observed that the compound established two interactions with the pocket residues, Gly521 and His524 of estrogen receptor (PDB Code 1a52), Gly521 established an interaction with the Hydrogen of OH group of benzene ring and to same Benzene ring His524 established interaction with the oxygen, as shown in Figure 2A (2-Dimensional) and 3-Dimensional in Figure 4.

Figure 4: 3-Dimensional pose of compound Bis-Phenol-A (magenta color) and Testosterone Receptor (sienna and navy blue color)

Figure 5: 3-Dimensional pose of compound Bis-Phenol-A (magenta color) and Estrogen Receptor (sienna and navy blue color)
It was observed that compound Bis-Phenol-A is an active again Testosterone receptor, because compound was bound side by side into the binding cavity of Testosterone receptor.

4. Conclusion: The docking analysis resulted in the detection of key Ligand interactions with respect to binding site of targeted receptors. As a result of this study we concluded that the compound (B-P-A) computationally studied here have shown good relationship among, docking score and binding interactions. The compound distinctly showed interactions with most important active site residues, Arg752, Asn705, Thr877 and His524 (according to the crystal structure of Estrogen and Testosterone receptors [PDB Codes 1a52 & 2am9]) of the target receptors. So this compound may be active ingredient again Testosterone receptor as compared to the receptor estrogen.

In summery, our findings demonstrate that BPA, which is one of the most prevalent chemicals for daily use materials, can bind to Testosterone receptor more tightly than Estrogen receptor. That means BPA probably behaves as testosterone antagonist and lead to interrupt the equilibrium and finally increase the activity of estrogen which is one of breast tumor cause.

REFERENCES

EFFECTS OF SUPPLEMENTARY EXAMS ON MOTIVATIONAL LEVEL OF OPEN DISTANCE LEARNER (ODL)

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ABSTRACT: Motivation plays a fundamental role in teaching learning process. Motivation boosts the learners’ behavior for active learning to attain specific study goals. It facilitates students obtain information, knowledge, develop interpersonal skills, increase creativity, and develop a sense of discipline. This study aimed to investigate the effects of supplementary exams on motivational level of learners in Open Distance Learning (ODL) at Allama Iqbal Open University (AIOU). It was also attempted to identify different remedies to upraise the motivational level of distance learners. The population comprised of post graduate level students (who appeared in supplementary exams in Autumn 2012) of Faculty of Education. A random sample of 100 students was taken. Questionnaire was developed and administered on the sample through survey. Questionnaire was validated through expert opinion (face validity). Data was analyzed in SPSS. Major findings of the study revealed that supplementary exams lower the motivational level of students for further learning. It was suggested that supplementary training/classes may be arranged for the learners who fail in exams in first attempt. Moreover, online tutorial support may also be arranged for such learners. To maximize the motivational level of learners, experts, psychologists, counselors, teachers, and parents may be consulted to lessen the effects of supplementary exams for the continuation and completion of learning process.

Key words: Motivational Level, Supplementary Exams, Open Distance Learning

Introduction: Exams measure the ability to deals examination pressure mugging understanding of complicated issues and solution with in limited time period, short term memory. There is no other way to evaluate the performance of learners then examination (AH, 2011). To test the intellectual knowledge of learner and feed back of learners’ examination is major important instrument (Zoughii & Armidale, n.d). Intrinsic Process basically motivates the person. Intrinsic, rewards, self concept based motivation, either external or internal, behaviors; attitudes towards the goals are the basic sources of motivation (Scholl, 2002). What causes an individual to react, act in specific way either unconsciously or consciously intentionally or unintentionally is motivation (Deckers, 2010). Process that initiates guides and maintains goals- oriented behaviors (Cherry, n.d). The arousal, selection, direction, and continuation of behavior abide by the force that is called motivation also define as desire and willingness to act. (Singh et al. 2011) Strategies to use of failures to make changes for sources are find out the reasons of failure, discover the way to learn best and change it in goals and commitment to attain it and self discipline(Denny & Triou, 2011). Learner of open distance learning environment has low extrinsic motivation level which would be increased through rewards, recognition of degree; enhance job opportunities, worth of degree for competitive exams (Singh et
al. 2012). Basic objective of evaluation is to assess and judge the quality or worth of educational program, performance and proficiency of learners’ attainments (Shahid, 2010). Open education system provides flexibility in courses and taking up examinations as compared to traditional system (Gautam, 1990; & Indradevi, 1985). The learners successfully complete the education in open distance learning is connected to the self management, (Atman, 1988), and familiarity to technology (Schifter & Monolescu, 2000) and personal concept (Gibson, 1996). When learners of formal education system and ODL are compared there is significant variation exist in motivation level towards learning. (Singh et al., 2011). To work and learn, motivation of learner affected by many factors (Bligh, 1971; & Sass, 1989).

**Problem Statement:** Motivation is a major factor in students’ learning process. Students’ success in exams is associated with their motivational level. Furthermore, if a student fails in exams, the supple may reduce his/her motivational level to proceed further for studies. In this perspective, the present study was based to identify the effects of supplementary exams on motivational level of Open Distance Learners.

**Objectives:** Following were the objectives of study:

- To investigate the effects of supplementary exams on motivational level of learners in Open Distance Learning (ODL) at Allama Iqbal Open University.
- To identify the remedies to upraise the motivational level of distance learners.

**The Questions Of The Present Research:** The focused questions of this research were:

- What are the effects of re-examination on ODL Learners Motivation to complete the enrolled program?
- What is the relationship between the supplementary exams and learners motivation level?

**Hypothesis:** There is a significant relationship between supplementary exams and motivational level of Open Distance Learners.

**Methodology:** The study was descriptive in its method and school survey study was conducted to solve the problem.

**Population:** The population comprised of post graduate level students (who appeared in supplementary exams in Autumn 2012) of Faculty of Education.

**Sample:** A random sample of 100 students (male and Female) was taken by using table of random numbers.

**Instrument:** Questionnaire was developed and administered on the sample through survey. Questionnaire was validated through expert opinion (face validity). It consisted of 17 items. The items were in the form of short sentences and employed “Yes” “No” response options. The instrument contained the questions regarding demographic information of the respondents. These included questions regarding age, gender and monthly income of the respondents.

**Validity of the Instrument:** Questionnaire was validated through expert opinion (face validity). Based upon their responses the suggested improvements were made in the research tool.

**Pilot Testing:** A matching sample of (60) post graduate level students was selected by random sampling and questionnaire was sent them through post with a self addressed envelope and 2 weeks were given to respondents to send filled questionnaire back. Out of 60 respondents 41 responded. All the responses were analyzed and scale reliability was evaluated in SPSS. Alpha-coefficient reliability of the instrument is given in the following table:
**Alpha-Coefficient Reliability of Questionnaire**

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of Items</th>
<th>Cronbach's Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>17</td>
<td>.87</td>
</tr>
</tbody>
</table>

**Results** To compute data, Pearson Correlation was used to see the effects of supplementary exams on motivational level of students. Percentages were computed regarding remedies to improve motivational level of students.

**Table 1**

*Pearson Correlation of Supplementary Exams and Motivational Level of Students (N=100)*

<table>
<thead>
<tr>
<th>Supplementary Exams</th>
<th>Motivational Level of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.89*</td>
</tr>
</tbody>
</table>

*N* = 100

*p ≤ 0.01

Above table highlights a relationship between supplementary exams and motivational level of students. The correlation coefficient (.89*) reveals that supplementary exams affects motivational level of students. The significance level (Sig) of .01 affirms that motivational level of students was correlated with supplementary exams with a possible error (p ≤ 0.01) to 1% of the cases.

**Table 2**

*Pearson Correlation of Supplementary Exams and Motivational Level of Female Students (N=65)*

<table>
<thead>
<tr>
<th>Supplementary Exams</th>
<th>Motivational Level of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.91*</td>
</tr>
</tbody>
</table>

*N* = 100

*p ≤ 0.01

Above table highlights the responses of female students regarding relationship between supplementary exams and motivational level of students. The correlation coefficient (.91*) reveals that supplementary exams affects motivational level of students. The significance level (Sig) of .01 insists that motivational level of students was correlated with supplementary exams with a possible error (p ≤ 0.01) to 1% of the cases.

**Table 3**

*Pearson Correlation of Supplementary Exams and Motivational Level of Male Students (N=35)*

<table>
<thead>
<tr>
<th>Supplementary Exams</th>
<th>Motivational Level of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.88*</td>
</tr>
</tbody>
</table>

*N* = 100

*p ≤ 0.01

Above table highlights the responses of male students regarding relationship between supplementary exams and motivational level of students. The correlation coefficient (.88*) reveals that supplementary exams affects motivational level of students. The significance level (Sig) of .01 asserts that motivational level of students was correlated with supplementary exams with a possible error (p ≤ 0.01) to 1% of the cases.
Table 4

<table>
<thead>
<tr>
<th>Remedies</th>
<th>(Frequency) Male</th>
<th>(Frequency) Female</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lessons according to Interests</td>
<td>58%</td>
<td>42%</td>
<td></td>
</tr>
<tr>
<td>Extra Support</td>
<td>70%</td>
<td>30%</td>
<td></td>
</tr>
<tr>
<td>Consultation with Psychologists</td>
<td>48%</td>
<td>52%</td>
<td></td>
</tr>
<tr>
<td>Extra effort from Teachers/Tutors</td>
<td>31%</td>
<td>59%</td>
<td>100</td>
</tr>
<tr>
<td>Training/Coaching Classes</td>
<td>50%</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Extra Effort from Learners</td>
<td>45%</td>
<td>55%</td>
<td></td>
</tr>
<tr>
<td>Peer Consultation</td>
<td>81%</td>
<td>19%</td>
<td></td>
</tr>
</tbody>
</table>

The above table indicates the remedies suggested by the learners to improve their motivational level to lessen the supplementary exams. The responses of male and female respondents indicate that there may be lessons according to the learners’ interest; extra support may be provided; psychologists may be consulted; teachers/tutors extra support may be provided; training/coaching may be arranged; learners may do extra effort; peer consultation may be done.

Discussion: In the present study, it was the objective of study to investigate the effects of supplementary exams on motivational level of students. The results revealed that supplementary exams do affect motivational level of students (Table 1, 2, and 3). The correlation coefficients (.89*, .91*, and .88*) indicate that there is relationship between supplementary exams and motivational level of students. The second objective of the study was to identify different remedies to upraise the motivational level of distance learners. The responses of male and female respondents indicate that there may be lessons according to the learners’ interest; extra support may be provided; psychologists may be consulted; teachers/tutors extra support may be provided; training/coaching may be arranged; learners may do extra effort; peer consultation may be done.

Conclusion: Results of study suggest that there were significant relationships between the effects of supplementary exams on motivational level of learners in open distance learning. It was suggested that supplementary training/classes may be arranged for the learners who fail in exams in first attempt. Moreover, online tutorial support may also be arranged for such learners. To maximize the motivational level of learners, experts, psychologists, counselors, teachers, and parents may be consulted to lessen the effects of supplementary exams for the continuation and completion of learning process. To increase the motivational level of learners particularly extrinsic motivation which was lessen in ODL learners generally and specially learners who appear in supplementary exams provide them job opportunities career prospects, more facilities at study centers, acceptability of degrees for competitive examination.

Recommendations: In the light of the conclusion drawn from the research following suggestions were recommended. Online guidelines for examination preparation may be provided to the ODL learners who appear in examination and supplementary examination. Online availability of subject experts, tutors, psychologists may be available to motivate the learners and lessen the dropout. Coaching classes at selected study centers may be arranged for extra effort to clear the supplementary exams.

REFERENCES


ARTICLE 25TH A: IMPLICATIONS OF FREE AND COMPULSORY SECONDARY EDUCATION

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ABSTRACT: The constitution of Islamic Republic of Pakistan 1973, after 18th amendment, under Article 25(A) provides free and compulsory secondary education as fundamental right for Pakistanis and responsibility of the state. On April 19th, 2010 the president of Pakistan signed this document. The government of Pakistan has therefore made constitutional efforts to synthesize the importance and need of free and compulsory secondary education. The implementation of this provision is on the part of provincial government after 18th amendment. The main objectives of this study were: 1. to understand the constitutional provisions about right to education as fundamental right and actual situation of schools for its implications. 2. to make recommendations to the government of the Punjab for the effective implication of article 25th A. The research was descriptive in its nature. The data was collected by using Survey method, from the 20 District education officers (EDOs) who were randomly selected from 36 districts of the Punjab. The tool for collection of data was self developed questionnaire on three-point scale. Major finding was: Lack of basic infrastructure, shortage of teacher, less physical and material facilities, burden on parents in the form of allied expensive for study, transportation expenditures, opportunity cost in case of earning hand of family are the major issues needed to be addressed on emergency bases for implication of free and compulsory secondary education. The study recommended that local community and non-government organizations may be involved to make education for all at secondary level.

Keywords: Article 25th A, Free secondary Education, Compulsory Secondary Education

Introduction: Education is a human right, a vital sector that play decisive role in human resource development, social-economic growth, holistic development, building human capabilities through knowledge based society, creativity, knowledge, and knowledge based learning organization. (Malik, 2011)

Education is not just preparation for life but a life in itself (Malik, 2006). Education is a right and shall be free and accessible for everyone which develops human personality, understanding, and tolerance among all nations, racial or religious groups. Every person shall be able to benefit from educational opportunities designed to meet their basic learning needs, these needs comprise both essential learning tools and the basic learning content (World Education Report, 2000)

According to PES, 2010-2011 the educational institutions in the Pakistan can be divided into following categories. Pre-Primary & Primary, Middle High, Higher Secondary & Inter-Colleges, Degree College Technical & Vocational Institutions, Teacher Training Institutions, Non-Formal basic Education, Deeni Madari and Universities.
Secondary education is one of the levels of education that plays pivotal role in the socio-economic development, produce middle level work force and feeding crop for higher education (Hussain, 2011). “Secondary education is a period of education which follows after elementary education and acts as foundation for tertiary education. The purpose of secondary education is to prepare the students for either higher education or vocational training” (Goel, 2005)

Secondary Education in Pakistan is comprises of class 9th and 10th and usually the age of the students in these classes is 13—15 years (UNESCO, 2009). The education system of Pakistan contains 25,209 secondary schools, which is 9% of total institutions of both public and private sector. Out of these 10, 555 schools are in the public sector, 42% the total where as 14, 654 are in private sector which is 58% of the total. The boys enrollment at secondary level is 1.491 million (58%), whereas, the girls enrollment is 1.079 million (42%). The total teachers at secondary level are 395,709, out of which 188,353 (48%) are in public and 207,356 (52%) are in Private sector. (PES, 2010-2011)

It is an obligation of the State to provide equal opportunity and make possible measures to access it to all citizens for improving their status in life. State is responsible to make sure compulsory and free education at secondary level. When we talk about the government, article 7 of the constitution of Pakistan 1973 define the status that the Federal Government Majlis-e-Shoor (parliament), a Provincial Government, a Provincial Assembly, and such local or other authorities in Pakistan as are by law empowered to impose any tax, are consider as government that implement laws and enforce the fundamental rights (Mehmood, 2011).

The Constitution of state is a very important and source of legislation document. A document which reflects the collective will of nation, major principles for national development, give direction to achieve national objectives (Isani, 2001). Right to compulsory and free secondary education is the constitutional right. Chapter 2, Principles of Policy, Article 7 of the constitution of Pakistan 1962 mentioned free and compulsory Primary Education (The constitution of Pakistan, 1962).

Secondary education was focused in chapter 2 Part II, Principles of the policy. Article 37(b) of the constitution of Islamic Republic of Pakistan 1973, the promotion of social justice and eradication of social evils has already given a provision that the state shall remove illiteracy provide free and compulsory secondary education within minimum possible time period. The provision of Article 37(b) is concerned it is a kind of directive and non-justice able, this is not cognizable by any court and shall not be enforceable (Butt, 2008).

The constitution fails to mention a deadline by which the government is expected to meet the targets. Secondary education never got the priority and adequate resources that it deserved. (Isani, 2001).

Education as fundamental right particularly free and compulsory secondary education is given in chapter 1, part 2, Article 25 A of, right to education the Constitution of Pakistan 1973, the state shall provide free and compulsory education to all children of the age of five to sixteen years in such manner as determine by law which is given in 18th amendment as fundamental right for the citizens of Pakistan (Mehmood, 2011).

The term ‘right’ in civil society is defined to mean which a person is entitled to have, to do, or to receive from others, within the limits prescribed by law. Fundamental rights are those natural rights which are personal to the individual as a citizen of a free and civilised country and belongs alike to every man, woman and child (Butt, 2008). To achieve the goal of Free and compulsory secondary education allocate funds, specific grand to district government to fulfill obligations, regular schools inspection for both qualitative and quantitative bases and training for teachers for quality education are necessary (Nirajanaradhya, 2013).

The fundamental rights are those rights that shall be enforceable either by judicial or any other prescribed process in law. Courts having jurisdiction are bound to declare void ab initio such action in the violation of fundamental rights taken by the legislatives or the executive and provide relief to the effete parties.

To implement the targets of free and compulsory secondary education as fundamental right in Pakistani perspective, is required realistic and continuing planning, inter sectoral coordination, viable strategies, and sufficient resources with social and cultural considerations. This study is planned to get an in depth insight into the implication/prospect of constitutional provisions for free and compulsory secondary education

**Problem Statement:** Right to education Article 25th A was established fundamental right in 18th Amendment of Constitution of Islamic Republic of Pakistan 1973. The government of Pakistan has therefore made constitutional
efforts to synthesize the importance and need of free and compulsory secondary education. The implementation of this provision is on the part of provincial government and their might be different levels of implications at provincial level. The present research has been designed to study the implications of the Constitutional Provision, article 25th A, regarding free and compulsory secondary Education.

Objectives: The main objectives of this study were:

1. To understand the constitutional provisions about right to education as fundamental right and actual situation of schools for its implications.
2. To make recommendations to the government of the Punjab for the effective implication of article 25th A.

The Questions Of The Present Research: Following were the main questions of the study

i. What was the existing situation of education in providing free and compulsory secondary education in Pakistan?
ii. What measures had been taken for free and compulsory secondary education at provincial and district level?
iii. What were the problems in implementing free and compulsory Secondary Education at provincial level?
iv. How it was possible to provide free and compulsory Secondary Education in Punjab?

Delimitations: The study was delimited to the followings:

1. Districts of Punjab Province
2. EDOs Education of respective districts

Methodology: The research was descriptive in its nature. Survey method was used to collect the data from respondents included in the study. Besides, following procedure was adopted to carry out the study:

a. Population: The population of the study was consisting of the following:
   1. All (36) districts of Punjab
   2. All (36) EDOs of the respective districts

b. Sample: A stratified sampling technique was applied for sampling.
   - Twenty districts (10 literacy wise high and 10 with low literacy) was taken as sample.
   - (Literacy rate was the indicator of sample of these districts. (Kiani, 2014)
   - Twenty EDOs education from twenty districts of Punjab.

c. Instrument: The tool for collection of data was the questionnaire. The questionnaire was designed Self-developed three-point scale for EDOs.

Application Of Statistical Techniques: The primary sources of data collection were questionnaires administered to EDOs of twenty districts of Punjab. The data were analyzed in the light of objectives of the study. Percentage of each item under each question was calculated for meaningful interpretation; the data were further presented and illustrated in the form of tables.

Data Analysis Of Questionnaire: Data collected through questionnaire consisted of 26 questions and six sub-scales which were as under:

<table>
<thead>
<tr>
<th>Table 8.1. Subscales of Research Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sub Scales of Implications of Implications of Free And Compulsory Secondary Education</td>
</tr>
<tr>
<td>1. Free and compulsory education</td>
</tr>
<tr>
<td>2. Current situations of schools</td>
</tr>
<tr>
<td>3. Availability of facilities</td>
</tr>
<tr>
<td>4. Parents Involvement</td>
</tr>
<tr>
<td>5. Situation about teachers</td>
</tr>
<tr>
<td>6. Financial and Administrative Issues</td>
</tr>
</tbody>
</table>
### 8.2. Results:

**Table 8.2.1**

<table>
<thead>
<tr>
<th>Q.No</th>
<th>Free and compulsory education</th>
<th>Result</th>
<th>A</th>
<th>UN</th>
<th>C</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Free education means education free of any cost.</td>
<td>f</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>2.</td>
<td>Students passing middle examinations are enrolled in secondary education.</td>
<td>f</td>
<td>10</td>
<td>-</td>
<td>10</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>50</td>
<td>-</td>
<td>50</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>3.</td>
<td>All students who apply for admission get admission in secondary education.</td>
<td>f</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4.</td>
<td>Dropout rate at secondary level education is comparatively higher in your district.</td>
<td>f</td>
<td>06</td>
<td>-</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>30</td>
<td>-</td>
<td>70</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5.</td>
<td>Free secondary education increases enrollment of the students.</td>
<td>f</td>
<td>20</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 8.2.1 indicates that 100% respondents are agreed the statements about the free and compulsory education, admission for all policy, and free education increases enrollment. 50% are agreed that students continue secondary education after passing middle exams, 70% agreed upon high drop our rate at secondary level.

**Table 8.2.2**

<table>
<thead>
<tr>
<th>Current situations of schools</th>
<th>Result</th>
<th>A</th>
<th>UN</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Numbers of secondary schools are sufficient to meet the existing need of your district.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>7. Numbers of rooms in your district school are sufficient for enrolled students.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Table 8.2.2 shows that 100% respondents are agreed in Q.No6, and 7 statements.

**Table 8.2.3**

<table>
<thead>
<tr>
<th>Availability of facilities</th>
<th>Result</th>
<th>A</th>
<th>UN</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>8. Library facility is available in all schools for secondary classes.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>9. Laboratory facility is available in all schools for secondary classes.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>10. Secondary Schools have basic infrastructure to provide compulsory education.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>11. Safe Drinking water is available in all secondary school in your district.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>12. All secondary Schools have sufficient play ground (s).</td>
<td>f</td>
<td>05</td>
<td>-</td>
<td>15</td>
</tr>
<tr>
<td>%</td>
<td>25</td>
<td>-</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>13. Secondary School provides uniforms to students.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>14. Free books are provided to students.</td>
<td>f</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>%</td>
<td>100</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>15. All School Provide free transportation facilities.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
The data tabulated in table 9.4 mentions that 100% respondent fully disagreed with the existing facilities and demand of secondary education in schools. 75% are agreed upon the statement that schools have sufficient play ground and 100% agreed that free books are provided to students.

**Table 8.2.4**

<table>
<thead>
<tr>
<th>Q.No</th>
<th>Parents Involvement</th>
<th>Result</th>
<th>A</th>
<th>UN</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>16.</td>
<td>Community /parents are aware of the free and compulsory secondary education is responsibility of the state.</td>
<td>f</td>
<td>18</td>
<td>-</td>
<td>02</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>90</td>
<td>-</td>
<td>10</td>
</tr>
<tr>
<td>17.</td>
<td>Parents are willing to send their children to school at secondary level in your school community.</td>
<td>f</td>
<td>15</td>
<td>-</td>
<td>05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>75</td>
<td>-</td>
<td>25</td>
</tr>
<tr>
<td>18.</td>
<td>Parents are willing to send their girls at schools for secondary education.</td>
<td>f</td>
<td>13</td>
<td>-</td>
<td>07</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>65</td>
<td>-</td>
<td>35</td>
</tr>
</tbody>
</table>

Table 8.2.4 reflects that 90% parents are aware of the concept of free and compulsory secondary education. 75% parents are willing to send their children and 65% are willing to send their girls to schools for secondary education.

**Table 8.2.5**

<table>
<thead>
<tr>
<th>Q.No</th>
<th>Situation about teachers</th>
<th>Result</th>
<th>A</th>
<th>UN</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>19.</td>
<td>Existing teachers are sufficient to cater the demand of education at secondary level education.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>20.</td>
<td>Teachers are burdened in non-teaching work (reports preparing, filling up forms and attending training programmes).</td>
<td>f</td>
<td>04</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>20</td>
<td>-</td>
<td>80</td>
</tr>
<tr>
<td>21.</td>
<td>Extra work load on teachers affect the quality of education.</td>
<td>f</td>
<td>06</td>
<td>-</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>30</td>
<td>-</td>
<td>70</td>
</tr>
</tbody>
</table>

Data placed and illustrated in Table No.8.2.5 indicates that 100% respondents agreed to the statements that insufficient teachers to cater the demand of secondary education. 20% to 30% are disagreed with the Q.No 20 and 21.

**Table 8.2.6**

<table>
<thead>
<tr>
<th>Q.No</th>
<th>Financial and Administrative Issues</th>
<th>Result</th>
<th>A</th>
<th>UN</th>
<th>DA</th>
</tr>
</thead>
<tbody>
<tr>
<td>22.</td>
<td>Adequate funding for secondary education has been provided by the government.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>23.</td>
<td>Access to the government funds is easy for your school.</td>
<td>f</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>-</td>
<td>-</td>
<td>100</td>
</tr>
<tr>
<td>24.</td>
<td>Allocated funds for free and compulsory secondary education are properly utilized.</td>
<td>f</td>
<td>04</td>
<td>-</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>20</td>
<td>-</td>
<td>80</td>
</tr>
<tr>
<td>25.</td>
<td>Accountability system is active to check proper use of resources.</td>
<td>f</td>
<td>08</td>
<td>04</td>
<td>08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>40</td>
<td>20</td>
<td>40</td>
</tr>
<tr>
<td>26.</td>
<td>Coordination amongst the departments is necessary for implication of free and compulsory secondary education.</td>
<td>f</td>
<td>20</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Data placed and illustrated in Table No.8.2.6 indicates that 100% respondents agreed to the statements that practices given in Q.No 22, 23 that adequate funds and easy access to school may be possible. Coordination among the department is necessary. 20 % are agreed with the statement Q.No 24. 40% agreed, 20 % are uncertain and 40 % disagreed with the statement Q.No.25
Conclusion: The study reported that Article 25th A is a milestone towards the prosperity of Nation, what is written in the constitution of Pakistan as fundamental right after eighteenth amendment is not yet being implemented at the grass root level. Many issues and barriers are in the form of shortage of physical facilities, monitoring and assessment mechanism, qualified personnel i.e. teachers, management and technical experts. Parents bear cost of stationary, transport fair, uniform etc which is a question on the concept of free education. On the other hand inadequate funds, slow procedure to access it also an issue. Population growth and development in schools sectors are inversely proportionate.

Recommendations:

i. Allocate funds to free and compulsory secondary education.
ii. Local community, Non-government organizations and donor agencies may invite as stakeholders for the implementation of Article 25th A.
iii. Non-formal and distance mode of education system may used as open school concept.
iv. Allocated funds for free and compulsory secondary education are properly utilized
v. Accountability system is active to check proper use of resources.
vi. Coordination amongst the departments is necessary for implication of free and compulsory secondary education.

Acronyms And Abbreviation: EDOs District Education Officer f Frequency

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EMOTIONAL INTELLIGENCE AS A PREDICTOR OF DECISION MAKING STYLES AMONG UNIVERSITY STUDENTS

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ABSTRACT. The present study was sought to examine the role of emotional intelligence in the perdition of rational, intuitive, dependent, avoidant, and spontaneous decision making styles. Hypotheses of the present study were included “emotional Intelligence will positively predict rational and intuitive decision making style among university students” and “emotional Intelligence will negatively predict dependent, avoidant and spontaneous decision making style among university students”. Emotional Intelligence Scale (Wong & Law, 2002) and General Decision Making Style Questionnaire (Scott & Bruce, 1995) were used to collect the information. Sample of the present study consisted of 300 university students. Purposive convenient sampling technique was used for data collection. Linear Regression analysis was applied to test the hypotheses. The results indicated that emotional intelligence has significant positive effect on rational and intuitive style whereas significant negative effect on avoidant decision making style. Emotional intelligence has non-significant effect on dependent and spontaneous decision making style. The present study has multiple practical implications is understanding the role of emotional intelligence in decision making of the students studying in higher education institutions.

Keywords: Emotional Intelligence, Decision Making Styles, Students

1. Introduction. Emotions play vital role in decision making. Emotions allocate worth to objects, assist in the understanding the ways to get those objects, and provide motivation in doing so (Gifford, 2002). The importance of emotions in decision making is apparent from the fact that most of the times decision making itself is an emotional process. A detailed analysis of all possible alternative courses of actions and their accompanying attributes often leads of negative emotional experiences (Beattie & Barlas, 2001; Luce et al., 2001). Likewise the importance of a decision or the extent to which we feel emotionally involved in it may influence our choice. Strong emotional involvement might make us more likely to go with ‘gut feelings’ intuition) whilst decisions involving significant financial expenditure are unlikely to take place without some rational analysis (it is hoped) (Spicer & Sadler-Smith, 2005). In order to understand the role of emotions in decision making it is important two concepts “the feeling-is-for-doing approach” proposed by Zeelenberg, Nelissen1, Breugelmans, and Pieters (2008) and “the Somatic Marker Hypothesis” proposed by Damasio et al., (2000) and Bechara, Tranel, and Damasio (2002) must be taken into consideration. The basic principle of feeling-is-for-doing approach is that emotions serve as motivational processes (Zeelenberg et al., 2007; Zeelenberg & Pieters, 2006).Decision is taken in uncertainty without any information about their positive or negative outcomes. The somatic marker hypothesis which is basically a neurological theory of decision
making indicates that emotions regulate bodily changes that facilitate in decision making. Especially in neural bodily connections and emotional bodily changes assists in the process of decision making (Naqvi, Shiv, & Bechara, 2006).

The feeling-is-for-doing approach stresses on looking ahead the motivational function of emotions (Nelissen & Zeelenberg, 2007; Zeelenberg, Nelissen, & Pieters, 2007). This approach illustrates the instrumental role of emotions in striving for goal achievement and eventually achieving it (Zeelenberg, Nelissen1, Breugelmans, & Pieters, 2008). It also makes a prediction of the various effects of different emotions like regret, disappointment, shame, and guilt (De Hooge, Zeelenberg, & Breugelmans, 2008). The “Somatic Marker Hypothesis” offers neural account of decision making defects of various kinds of patients. The core premise of the hypothesis is that emotions guide decision making. Patients suffering from bilateral lesions of the VM cortex develop severe impairments in personal and social decision-making, inspite of holding good intellectual abilities like intelligence and creativity. These patients even find difficulties in routine life decisions showing a connection between these abnormalities and impaired decision making resulting in poor quality decisions (Bechara, 2004; Damasio et al., 2000; Bechara, Tranel, & Damasio, 2002).

Emotions remain present after we have decided. After having made a choice and before the outcomes are known people often feel squeezed between the hope and fear. Sometimes people are wishful to know the outcomes, expecting the best. Other times they avoid seeking such information because they fear the worst (Shani & Zeelenberg, 2007; Shani, Tykocinski, & Zeelenberg, 2008). Finally, mental states play a critical role in how perceptual information is processed. Our hopes, fears, and expectations affect what we perceive. In a recent laboratory experiment, emotional states were shown to affect whether two visual patterns were perceived as the same or as being different (Dror, Charlton, & Peron, 2005). Affect and emotions are considered ‘hot topics’ in decision literature (Peters, Vastfjall, Garling, & Slovic, 2006) that were regarded ‘neglected topics’ in the past (Bohm & Brun, 2008). Intuition decision makers never involve in processing of the details of information in a systematic manner, rather they look for overall context and take an overview of details in the flow and make a decision. They are more inclined toward focusing on premonitions, hunches, feelings, insights, instincts, emotions, six sense, and impressions (Scott & Bruce, 1995). Emotional self-awareness is regarded as bases of decision making (Hablemitoglu & Yildirim, 2008). Rational approaches deal a task in an objective, unemotional, analytical, and logical manner whereas intuitive approaches handle tasks holistically, emotionally, personally, which depict feelings of the concerned individual (Scot & Bruce, 1995). Wolff, Pescosolido and Druskat (2002) studied the relationship between emotional intelligence and decision making styles. The results indicated that emotional intelligence had significant positive relationship with rational decision making style and significant negative relationship with avoidant decision making style. Findings were non-significant with reference to intuitive, dependent, and spontaneous decision making styles. It is for the first time that role of emotional intelligence in decision making styles among university students is being investigated.

2. Conceptual Frame Work.

2.1. Figure 1.
3. **Hypothesis.** On the basis of the prior literature, following hypotheses are formulated:

**H1.** Emotional Intelligence will positively predict rational and intuitive decision making style among university students.

**H2.** Emotional Intelligence will negatively predict dependent, avoidant and spontaneous decision making style among university students.

4. **Method.**

4.1. **Participants.** A total of 300 university students were included in the sample. Both male (n = 150) and female students (n = 150) were part of the sample. Purposive convenient sampling technique was used to collect the data from participants. Data was collected from Quaid-i-Azam University Islamabad, International Islamic University Islamabad, FAST National University Islamabad, and COMSATS Islamabad. Students were belonging to BS, MS, and PhD in various disciplines. Informed consent was obtained from all the participants before administering the questionnaires. Students were ensured to be confident as all the information will be kept highly confidential and will only be used for research purpose.

4.2. **Measures:** Emotional Intelligence Scale (EIS) developed by Wong and Law (2002) was used to measure emotional intelligence among students. The scale consisted of 16 items and it is a six point Likert-type scale. There is no cut off score and high scores on scale means high emotional intelligence and low scores mean low emotional intelligence. The possible score range is from 16-96 where 16 is lowest score and 96 is maximum score for whole scale. Past research in the indigenous context indicates that EIS is a reliable and construct valid instrument to measure emotional intelligence (Atta, 2008). General Decision Making Style Questionnaire (GDMSQ) devised by Scott and Bruce (1995) was used to measure the different decision making styles of students. It is based on five point Likert-type scale. It contains 25 items and five subscales including rational, intuitive, dependent, avoidant, and spontaneous decision making style. Each style is measured through five items. For each style, the possible score range is from 5-25 where 5 is lowest score and 25 is maximum score for whole scale. Past research in the indigenous context indicates that GDMSQ is a reliable and construct valid instrument to measure decision making styles among students (Bechara et al, 2002).

4.3. **Results:** The present study was carried out to examine the role of emotional intelligence in the prediction of decision making styles. Zero-order correlations, alpha reliability coefficients and descriptive statistics were computed for all study variables. Linear Regression analysis was applied to test the hypotheses.

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>α</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Emotional intelligence</td>
<td>58.92</td>
<td>9.04</td>
<td>.84</td>
<td>-.35**</td>
<td>.17**</td>
<td>.10</td>
<td>-.19**</td>
<td>.04</td>
<td></td>
</tr>
<tr>
<td>2. Rational</td>
<td>18.23</td>
<td>3.17</td>
<td>.75</td>
<td>-</td>
<td>.34**</td>
<td>.23**</td>
<td>-.06</td>
<td>-.08</td>
<td></td>
</tr>
<tr>
<td>3. Intuitive</td>
<td>18.26</td>
<td>2.83</td>
<td>.82</td>
<td>-</td>
<td>.16**</td>
<td>.22**</td>
<td>.25**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Dependent</td>
<td>18.98</td>
<td>2.93</td>
<td>.76</td>
<td>-</td>
<td>-</td>
<td>.36**</td>
<td>.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Avoidant</td>
<td>15.96</td>
<td>3.90</td>
<td>.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Spontaneous</td>
<td>15.47</td>
<td>4.09</td>
<td>.72</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* *p < .01

Table 1 shows Mean, Standard Deviation, Alpha Reliability Coefficients and Pearson correlation among all the variables used in the study. All the variables have satisfactory internal consistency as indicated by the reliability coefficients. The correlation matrix indicates that emotional intelligence has significant positive correlation with rational (r = .35, p < .01) and intuitive decision making style (r = .17, p < .01) whereas significant negative correlation with avoidant decision making style (r = .19, p < .01). Rational decision making style has significant positive correlation with intuitive (r = .34, p < .01) and dependent decision making style (r = .23, p < .01).
Intuitive decision making style has significant positive correlation with dependent ($r = .16$, $p < .01$), avoidant ($r = .22$, $p < .01$), and spontaneous decision making style ($r = .25$, $p < .01$). Dependent decision making style has significant positive correlation with avoidant decision making style ($r = .36$, $p < .01$).

Table 2: Regression analysis showing the effect of emotional intelligence on the prediction of (a) rational, (b) intuitive, (c) dependent, (d) avoidant, and (e) spontaneous decision making style ($N = 300$)

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Rational $\beta$ (a)</th>
<th>Intuitive $\beta$ (b)</th>
<th>Dependent $\beta$ (c)</th>
<th>Avoidant $\beta$ (d)</th>
<th>Spontaneous $\beta$ (e)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Intelligence</td>
<td>.352***</td>
<td>.173**</td>
<td>.103</td>
<td>-.187**</td>
<td>.035</td>
</tr>
<tr>
<td>$R^2$</td>
<td>.121</td>
<td>.027</td>
<td>.007</td>
<td>.032</td>
<td>.001</td>
</tr>
<tr>
<td>$F$ (1, 298)</td>
<td>42.030***</td>
<td>9.160**</td>
<td>3.209</td>
<td>10.832**</td>
<td>.375</td>
</tr>
</tbody>
</table>

**$p < .01$, ***$p < .001$ 

Regression analysis was conducted separately with emotional intelligence as a predictor variable and rational, intuitive, dependent, avoidant, and spontaneous decision making styles as outcome variables. The results of the Regression analysis shows that emotional intelligence has significant positive effect on rational decision making style ($\beta$ (a) = .352, $p < .001$). The $R^2$ value of .121 shows that EI explains 12.1% variance in rational style [$F$ (1, 298) = 42.030, $p < .001$]. Emotional intelligence has significant positive effect on intuitive decision making style ($\beta$ (a) = .173, $p < .01$). The $R^2$ value of .027 shows that EI explains 2.7% variance in intuitive style [$F$ (1, 298) = 9.160, $p < .01$]. Emotional intelligence has significant negative effect on avoidant decision making style ($\beta$ (a) = -.187, $p < .01$). The $R^2$ value of .032 shows that EI explains 3.2% variance in avoidant style [$F$ (1, 298) = 10.832, $p < .01$]. Results are non-significant for dependent and spontaneous decision making style.

5. Discussion: The results indicate that from 2.7% to 12.1% variance in the decision making styles can be accounted for, by the emotional intelligence. The traditional view of decision making was based on the assumption that decision should be made by keeping the emotions aside. But the empirical evidence proved that awareness regarding emotions and intelligence plays a vital role in effective decision making (Kalat & Shiota, 2007). The 1st hypothesis “Emotional Intelligence will positively predict rational and intuitive dependent decision making style among university students” was supported in the present study. Emotional intelligence displayed a significant positive effect on rational decision style. Rational decision making style is considered as an ideal style of decision making (Mau, 1995; Chartrand, Rose, Elliott, Marmarosh, & Caldwell, 1993; Harren, 1979; Scott & Bruce, 1985). Rational decision making is based on the deliberate analysis and evaluation of alternatives to reach an ideal goal through most effective means (Gross, Crandall, & Knoll, 1980). The rational approach to decision making stressed on establishing cause-effect connections while identifying solutions to problems, keen search and true consideration of all potential alternative solutions, maintaining the priority of primary objectives, optimizing choice, and maximizing the choice opportunities by searching for an ideal solution (Hendry, 2000).

Emotional intelligence displayed a significant positive effect on intuitive decision style. Now-a-days researchers rely on intuition which was explained by recently advanced neuroscience and psychology as an experimental phenomenon governed by tactic knowledge. Interplay of cognitive and affective processes results in intuition (Sinclair & Ashkanasy, 2005). Intuitive decision making style is the brainchild of emotional self and environmental awareness (Harren, 1979; Hablemitoglu & Yildirim, 2008; Singh & Greenhaus, 2004). Self and environmental awareness produced by intuitive decisions is based on the reliance on limited sources and relatively less quantity of information (Singh & Greenhaus, 2004). Thus, without involving in minute things, intuitive decision makers look for overall context. They focus on futuristics potentials; imagine, predict, anticipate, and hypothesize possibilities; see opportunities as a creative and innovative endeavor; prefer variation and change; and attempt to design overall plan (Miller & Ireland, 2005). Due to decision making in short time-spans (Harren, 1979), intuitive decision making is more appropriate under the conditions of uncertainty (Bergstrand, 2001; Callan & Proctor, 2000). Intuitive decision makers
accept the personal responsibility of their decisions just like rational decision makers (Harren, 1979). The 2nd hypothesis “Emotional Intelligence will negatively predict dependent, avoidant and spontaneous decision making style among university students” was partially supported in the current research. As hypothesized, emotional intelligence has significant negative effect on avoidant decision making style whereas the findings are non-significant with respect to dependent and spontaneous decision making style. Avoidant decision making style is defined as an attempt to avoid decision making whenever possible. It involves indecision, postponing, avoiding, and delaying decisions and keeping oneself away from decision scenarios (Scott & Bruce, 1995). Research sees avoidant decisional style negatively. Russ, McNeilly, and Comer (1996) found a negative correlations between avoidant decision making style and first level managers’ effectiveness. Loo (2000) discovered that positive correlation exits between the avoidant decision making style and avoidant conflict management style which shows that individuals with an avoidant decision making style are also inclined toward avoiding conflicts.

People opting avoidant decision making style face difficulties while taking decisional initiatives and they are unable when they have to act upon their intentions (Scott & Bruce, 1995). Avoidant decision making style is ineffective in nature and outcomes. It is ineffectiveness is attributed to the lack of self and environment awareness (Philips, Pazienza, & Farrin, 1984). Avoidant decision making style was positively correlated to external locus of control indicating that individuals with avoidant style are controlled by the external factors rather than their internal control orientation (Scott & Bruce, 1995). Blais, Thompson, and Baranski (2003) illustrates that individuals with high Personal Fear of Invalidity (PFI) are reluctant decision makers who feel frustrated when errors occur, are uncomfortable regarding the costs of errors, hesitant while evaluating alternatives, and mostly delay and postpone decisions. Thus, researchers demonstrate that such individuals with high PFI are avoidant decision makers.

In the present study, EI displayed non-significant effect on dependent and avoidant decision making style. The current findings are consistent with the Katyal and Awasthi, (2005) research on the relationship between EI and decision making styles, illustrating the EI is non-significantly related to dependent and spontaneous decision making style. Beside the importance of EI in decision making, one hypothesis advocates that emotions with mild and moderate intensity are appropriate for effective choices whereas severe intense emotions are problematic for effective decisions (Kalat & Shiota, 2007). Dependant decision making style is positively related to external locus of control (Scott & Bruce, 1995). In this way, dependant decision makers try to get rid of responsibility. But ultimately they are announced responsible for decisional outcomes (Argyropoulou & Sidiropoulou, 2003). Too much reliance on others’ information and guidance (i.e. increased use of others) leads to relatively less effective choices (Phillips, 1997; Phillips, Christopher-Sisk, & Gravino, 2001). Dependant decision making style results in decreased validity of the information, decline in accuracy of awareness, and downfall in decisional effectiveness (Singh & Greenhaus, 2004). Finally, the hasty and impulsive spontaneous decision makers (Scott & Bruce, 1995) are prone to miss some important information in haste. Consequently, a balanced approach in decision making can be more appropriate for effective decision making (Spicer & Sadler-Smith, 2005).

5.1. Limitations and Suggestions: First, the present study was limited to the role of just emotional intelligence in the prediction of decision making styles. In future research it would be more appropriate to study the effect of multiple intelligences especially the role of cognitive, social, and spiritual intelligence in the prediction of decision making styles. Secondly, the current research was based on studying the role of overall emotional intelligence in the styles of decision making, in future research, the role of various facets and dimensions of emotional intelligence in the prediction of decision making styles should also be investigated.

5.2. Conclusion: The present study was sought to examine the role of emotional intelligence in the prediction of decision making style. The current research is an initiative in the university setting. Out of two, one hypothesis was completely supported whereas the second hypothesis was partially supported in this research. Emotional intelligence has significant positive effect on rational and intuitive decision making style whereas significant negative effect on dependent and spontaneous decision making style. The findings were non-significant with respect to dependent and spontaneous decision making style. The recent study is pretty insightful in understanding the role of EI in decision making among the university students.
REFERENCES


OPTIMAL HOSPITAL LOCATION USING CASE BASED REASONING

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ABSTRACT. Global Positioning System (GPS) is used because of its tremendous functionality and now is one of the key enablers for Location Tracking. Global Positioning System also provides variety of services to commercial, military and consumer applications. In this paper, we have proposed to incorporate functionality of GPS in medical area; we’ve used Case Based Reasoning to determine the nearest location of relevant hospital for any patient. Our system handles two types of patients, the algorithm returns nearest hospital if the patient belongs to class A and best hospital of the city if the patient belongs to Class B. Class A and B are made on the basis of diseases.

Keywords: Global Positioning System; relevant hospital.

I. Introduction: In this fast global era, time is the most important factor in human life. People tend to search things on the basis of two priorities, either in less time or in a best way. Similarly when a person gets ill, the first problem is how to choose a hospital to visit. Today Global Positioning System (GPS) is playing an important role to find the location of the nearest hospital and best hospital without requiring any interference of doctor. The purpose of this paper is to develop a software application for patients to immediately show the nearest hospital. GPS will keep track of all hospitals that are for maternity as well as for children. The system will also give patients the details of nearest hospitals with address of the hospital and contact number. Most importantly, two classes of diseases have been defined, Class A is for non-critical diseases and class B is for critical diseases, in case patient belongs to class A then GPS will calculate the distance and accordingly return the nearest hospital otherwise the best hospital for the given disease in the area would be returned.

II. Related Work: It was claimed in a research paper about novel hybrid large scale medical diagnosis system LMDS that combines the advantages of human and agents in medical diagnostic elaboration (Lazlo et al., 2007). Emery, Watson, and Rose (1999) proposed in their paper about Genetic nurse Specialist outreach, Primary health care and General practitioner’s supporting role in the field and the demands of future and variety of health care systems. This shows how the General practitioners assess the genetic risks and explore doctors awareness for specific genetic diseases for their patients in countries such as UK. A Real Time System for Detecting and Tracking People (Haritaoglu, Harwood and Davis, 1998) shows the tracking, detecting and monitoring system for people outdoor. It’s about recognizing the actions of people, movements, and locations between two objects with the help of surveillance devices and matching algorithms for security purpose. A research (Parala et al., 2013) evaluated the existing tracking devices for elderly people and identified the difficulties and possible solutions in the performance analysis. There were two GPS (global positioning system) tracking devices examined and the first issue found was how to handle patients with memory loss.
The second was maintenance and recharge ability to handle devices. Vehicle Accident Alert and Locator (VAAL) by Mathews et al. (2011) did research work completed in accidents (car) state of alarm. The authors presented programmed module GPS/GSM trackers which combined accident report automatically by GSM communication platform which uses sms for sending message to the nearest agencies such as hospitals, police stations and fire institutes. Positioning System gives exact position of the point where accident has occurred. This will allow initial response and will rescue accident victims, save lives and property.

ii. Gps Investigator System: Choosing a proper and nearest hospital for any patient is the biggest problem these days. This even results in much time wastage in finding the right hospital and sometimes this happens because of wrong guidance. Sometimes the patient is having particular symptoms and might go to a hospital that does not have doctors who can treat that disease and help them to relieve. And sometimes patient might get confused which hospital to go to and which might be the best and right choice for him. Sometimes people aren’t aware of nearest hospital in their locality and even in case of having non-critical diseases they tend to travel far from home. Hence the proposed solution of this problem is outdoor positioning of hospitals through GPS INVESTIGATOR SYSTEM. It will provide the patient with the best hospital when he/she enters worst disease like AIDS, cancer etc. and nearest hospital when normal disease i.e. fever, malaria are entered. GPS will keep track of all hospitals that are for maternity as well as for children.

3.1. Case Base Reasoning (CBR): The term (CBR) is the process of solving new problems based on the solutions of similar past problems. Each case typically contains a description of the problem, a solution and/or the outcome. To solve a current problem: the problem is matched against the cases already stored and similar cases are retrieved. The retrieved cases are used to suggest a solution which is reused and tested for success. If necessary, the solution is then revised. Finally the current problem and the final solution are retained as part of a new case. As in CBR, there are cases stored and each case consists of a problem, its solution, and typically, annotations about how the solution was derived, so in our project, we have defined cases in the form of diseases and hospitals associated with it. Our system will refer the nearest or best hospital to user/patient according to his disease. It is also keeping the track of all hospitals that are for maternity as well as for children. The patient will enter his location and the disease name from which he/she is suffering. The system will match the disease with the cases stored and identify all hospitals associated with that disease from cases stored. Once it has been matched and hospitals are identified, it will find the nearest or best hospital depending on patient’s disease or location and will display that hospital on the map. It is also possible that the user might enter an area that is not known to our system or it might not in the data sets. To handle such cases, the system is trained to implement String matching technique which will search the records that are the nearest match for the area or the information that the user enters. The results will be null if string doesn’t match. Thus, the accuracy of our system is approximately 80 percent.

3.2. Accuracy of Algorithm

- Input disease, location area and category {disease: string type, area: string, category: string}
- Apply string matching by checking disease gender and area from record

If (matched)

    Return stored location of matched case
if category=="Others" or Gender=="Female" and disease!="maternity"
    num = category1(disease)
    if num==1
        area2 = worst(disease)
        return location for critical disease
    else
        num = category2(disease)
        if num ==2
            area2 = nearest(area)
            return nearest hospital
    else if Gender=="Female" and disease=="maternity"
        return nearest maternity home
    else
        if category== "Child"
            return children hospital

- category1(String disease)
  If disease is critical
  return 1
- category2(String disease)
  if disease is normal
    return 2
- nearest(String area)
  if area is in nearest record
    return nearest location
- worst(String disease)
  if area is in worst record
    return critical disease location
3.3 GPS Investigator Flow Chart

![Flow Chart Image]

**Figure 1. Flow chart of system**
Iv. Experiments And Results: The given flow chart (Figure 1) depicts the flow of our system. After performing many experiments, it has given 90.99% accurate results. The data sets are categorized in four different classes (male, female, children and others [i.e. others can include any person]. Diseases fall into two classes A and B: critical and non-critical.

<table>
<thead>
<tr>
<th>Experiments For Existing data sets</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Inputs</strong></td>
</tr>
<tr>
<td><strong>Class</strong></td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Children</td>
</tr>
<tr>
<td>Female</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NEW Cases Results and Experiments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class</strong></td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td>Children</td>
</tr>
</tbody>
</table>

Figure 2. few results generated by system

The Figure 2 shows the true and false cases i.e. (0 in case of inaccurate output and 1 in case of accurate output). If the disease is critical, it will show the best hospital for the disease in the city. For instance, if the disease entered is “cancer” then the output will be “Shaukat Khanum Hospital Lahore” rather than any nearest hospital to the patient’s location. If the user selects female maternity hospital, then system will show the nearest maternity hospital. For instance, if the user selects maternity hospital and enters location Krishanagar, then the system will show the “Family Welfare and Maternity Hospital Krishanagar”. It is also possible that the user might enter an area that is not known to our system or it might not in the data sets, to handle such cases, our system is trained to implement String matching technique which will search the records that are the nearest match for the area or the information that the user enters. The results will be null if string doesn’t match. Thus, the accuracy of our system is approximately 90.99 percent.

4.1 Results: Results are shown in the form of google maps and texts. It depends on the system. If the user enters input to search for the first time, then output or results will be shown by displaying the location on Google Maps. But if the same input is entered by user second time, then the system is trained to display it simply in the form of tex. It will not browse Google Map after first time.
Figure 3. Data showing calculation of accuracy of experiments

Figure 3 represents accuracy of experiments, seven different cases for every type (maternity, children, nearest
and best) from the case base are used for the accuracy calculation. n Number of runs are performed to check
the result of same case for a specific type. Means values are calculated that are showing very promising
results of the proposed algorithm.

4.2 Graphs

![Graph showing accuracy of algorithm on 55 runs for specific case](image)

Figure 4. Accuracy of Algorithm on 55 runs for specific case

x-axis: Proposed nearest hospital location and y-axis: Total numbers of correctly specified hospital location.
Accuracy of algorithm is shown by a graph in figure 4. Highest accuracy is for finding the nearest hospital,
for a case randomly chosen from the case base. After selecting the case, 55 runs of algorithm was performed
which gave n number of times accurate result.

![Accuracy of Algorithm](image)

**Figure 5. Calculation of accuracy for suggesting best hospital (55 runs for every testing case)**

In figure 5, graph shows the accuracy calculated through the proposed algorithm, it is highest for cancer.

![Graph for all categories](image)

**Figure 6. Accuracy rate for every category**

Figure 6. shows overall results of the three categories (Female, children and others). The accuracy rate of Maternity/Female hospitals is lowest as there are less number of maternity hospitals in Lahore.

- Percentage of accurate results of Maternity/Female Hospitals: **84.85%**
- Percentage of accurate results of Children Hospitals: **92.2%**
- Percentage of accurate results of “Others” category: -

Others category includes:

- Mean value for nearest hospitals= 49.2
Mean value for best hospitals = 46.7
Mean value for others category = (49.2+46.7) / 2 = 47.95
Percentage for others category = (47.95 / 50) * 100 = 95.9%

Accumulative Percentage for all cases = \( \frac{X_1 + X_2 + \ldots + X_n}{n} \times 100 = \frac{(47.95 + 42.4 + 46.14)}{150} \times 100 = 90.99\% \)

V. Limitations And Future Recommendations

- One major limitation is that our GPS Investigator is limited to a specific area of Pakistan (Lahore). More data can be trained.
- Another major limitation is that the User requires Internet availability so that the system can search right hospital for him and facilitate him.
- Disease analysis can also be provided. The system can be made intelligent enough to provide the patient with details of disease if he enters any symptoms and may provide him with location where that disease is being treated.
- More APIs of global positioning system can be used to make system more effective.

VI. Conclusion: The technology of the Global Positioning System is in use for huge changes in society. The applications using GPS are constantly growing. The system we have made will provide the patients with hospitals by just entering their disease. It will provides the patient with the best hospital in terms of entering worst disease like aids, cancer etc. and nearest hospital in case of entering normal disease like fever malaria etc. The cost of the patient is dropping while at the same time the accuracy of the system is improving, therefore the GPS investigator system for hospital location is beneficial for the patients.

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CASE ORIENTED DIGITAL EVIDENCE SIMILARITY FRAMEWORK

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ABSTRACT. In this paper a new framework is present, named case oriented digital evidence similarity framework (CODES). This framework is a top down approach, consists of tasks basically starting from the arrival of new crime case, mainly cyber crime, till the generation of final report regarding that case. This framework facilitates the investigation of a cyber crime case by matching the digital evidences collected from new cases to the digital evidences of previous case thus abstracting the crime pattern of the cases which makes it easy to reach the criminals or unscrupulous individuals. By using CODES framework investigators will be able to use already stored digital evidences to find the similarity in current and previous evidences thus making it easy to trap the criminals and saving time.

Keywords Digital Forensic; Forensic Computing; Digital Evidence; Similarity; Top down Approach; Cyber crime.

1. Introduction. To deal with digital forensic analysis is becoming difficult as the complexity of cases is increasing day by day, abundant of data, and advancement in the technology [1]. Investigators face large number of problems in making an obvious start point from where they can start their first step. If investigators start to collect digital evidences and match them with the concept of similarity which is a widely used concept in computer software engineering then it will be easy for investigator to solve same alike cyber crime cases. The concept of similarity emerged as a strong concept in computer science fields and is used in many different aspects [4]. The concept of Similarity is basically come from psychology, in which it is told that how different kind of data and information can be merged in form of group or classes [5, 6].

Computer forensics (CF) has transform as a strong concept in the past some years. Computer forensic play a very vital role in law enforcement especially cyber laws because it helps in collecting the digital evidences of cyber crime [2].

The work is organized in the following sections. Section 2 describes a small comparison between forensic science and computer forensic and some about Digital Forensic and its branches. Section 3 describes similarity and its use in various facets of the field. Section 4 introduces CODES framework and its description. Section 5 contains conclusion and future work.

2. Comparative Analysis of Forensic Science and Computer Forensic With the advancement of internet technology and use of computer in every aspect of life, misuse of it goes with it as well. Computer forensic has come into being in dealing with this situation, the growth and advancement in this field is not much fast as it is new. Forensic has evolved over the past millennium and computer forensic has evolved over the past years which is being active in much from the year 2005. The current research and study in computer forensics is focusing on how to derive a single case from two parts. Computer forensics has been facing a very similar
situation like forensic science in which it was difficult to expound scientific evidences in court. Well understanding of scientific evidence and digital evidence by the law enforcement organization is necessary to evolve and advance computer forensic and forensic science.

2.1. Digital Forensic:
Digital forensics or digital forensic science is come into being from forensic science and it is used to solve the cyber crime cases especially helpful to find the digital evidences and investigating them. In addition to find the digital evidences from the crime case itself it can also be used for specific purpose like, determining the intent of crime being done, identify sources (for example, in copyright cases), or authenticate documents. The scope of investigation has become broader as compared to other areas where investigation was just answering a series of simple question. [7].

Digital forensic can be divided into three broad categories [3]:
- Computer Forensic
- Network Forensic
- Cyber Forensic

A. Computer Forensic:
Computer can be used to commit crimes, and crimes can be recorded on computers. These crimes include company policy violations, embezzlement, e-mail harassment, murder, leak of proprietary information and even terrorism. Law enforcement agents, network administrators, and private investigators are now relying on the skills of professional computer forensic examiners to explore criminal and civil cases. In general, a digital forensic expert investigates data that can be retrieved from computer hard disk or other storage medium, just like an archaeologist excavating site. Computer forensic is evolving as a strong field and many researchers are working on it.

B. Network Forensic:
Network forensic can be divided into two different streams. First is related to security where we continuously monitoring inconsistent network traffic and identifying intrusions. People who done crime through network use different system to commit crime which cause a unusual network usage pattern which is traced to investigate the cases. Second is related to law enforcement in which we can analyze the capture or recorded information and try to produce digital evidence, which we can be used in legal proceedings. Digital evidences are the most important thing in digital crime investigation. As most digital type crime are done through networks so network forensic is becoming important in digital crime investigation.

C. Cyber Forensic:
Cyber crime investigation uses digital evidences to give a meaningful description of the unusual cyber activities. As there are many benefit of cyber technologies wich are helping human being in many aspects of life the negative use of it also exist there which shows the bad picture of cyber technology which actually is not true. That is why Cyber forensic is a widely use term now a days for the enforcement of laws [8]. The use of digital data for inclusion into a criminal investigation is also included in cyber forensics. As the involvement of computers in crimes is increasing day by day, many technologies related to cyber forensic are being developed to overcome this.

3. Similarity. Similarity is a vast concept which is used in many disciplines in different aspects to get benefit from it. In the field of computer sciences many researcher and authors have use this concept in different branches of computer science like in artificial intelligence it is used to see the similarity between different groups of data, in software engineering it is used to see similarity between requirements, in network security and so on. Similarity plays a helpful role when there is large amount of data and it is to be grouped together to make comparison [5, 6]. Many researchers have used the concept of similarity in fusion with other concept mostly in artificial intelligence like text base similarity, speech recognition and clustering. It has also been used in many concept of software engineering like requirement base similarity and many more [9].

4. CODES framework. The CODES Case Oriented Digital Evidence Similarity Framework is presented in fig given below. This framework is a top down approach. Different stages from start to end are mentioned which are grouped as, Case, Digital Evidences, Digital evidence repository and final report generation. This
framework will help the investigators in saving time by shorten the timeline of investigating the case by matching the digital evidences of the case.

4.1. **Top Down Approach.** The top down approach is used when the whole process goes in a smooth process from starting till end. In CODES framework top down approach is used because the investigation is started from the top from the arrival of the case and then the middle part; analysis of case for collecting digital evidences; checking the similarity of new evidences with previous till final report generation. In contrast to this bottom up approach use different strategy in which it start from the end and going to the up.

![Figure 1. CODES Case Oriented Digital Evidence Similarity Framework](image)

4.2. **Case Oriented Phases.** First CASE level includes two CASE-oriented phases; Case Understanding, Case analysis and Case examination. When the new case is arrived it will deeply examined by the investigator to understand the nature of crime and somehow the motivation of the criminal. It is very important to understand the nature of case because through this the investigation team will be able to collect the digital evidences.

- Public sector cases
- Corporate or private sector cases

Public sector cases are those in which government agencies are included as criminals in investigation. Public sector cases also demand the investigator to understand the place where the crime has been done. Other type which is corporate or private sector cases which include crimes related to private organization and companies. These type of cases demand the investigator to understand the business and also requires that the business do not get disturbed during this investigation. After fulfilling these requirements, the case is analyzed in the third phase. The dimension of the crime done through computer is some time same and some time different like there are many crime cases like fraud, bomb blast, kidnapping, hacking, embezzlement, smuggling of drugs, hijacking and other like that. So it is very necessary to deeply understand, analyze and examine the case.

4.3. **Collection of Digital Evidences.** Digital evidence is the most important thing when investigating for a crime which is committed using computers or other digital devices. This evidence is the only thing which is presented in the court by investigators. The nature of digital evidences varies between different operating system when it comes in term of computer and other digital devices such as mobile phone etc. It is very tricky job for investigators to collect the digital evidences as well as saving them for use in future in other similar cases decreasing the cost use per case and also the time. In the second phase of the framework which is the
collection of digital evidences the case is examined to collect the evidences with respect to the following facts **what**, **Why**, **Who**, **Where**, **When**, **How**. These facts will help in collecting the digital evidences of the crime case and will also be saved in the repository. The collected evidences will be examined to find out the pattern of crime. It is seen in many cases that most criminal groups, hackers and individual doing crime through network mostly use the same patterns.

In CODES framework the digital evidences will be collected category wise like with respect to the the nature of crime done and saved in the repository attribute wise so that it will be easy to apply similarity check on them. These attributes include digital evidences with respect to time, place, person and some more. Saving digital attributes like this will help in matching similarity of new and old digital evidences.

4.4. **Digital Evidence Repository**. Digital evidences are easily altered, duplicated and erased if not kept safely. In cyber crime case these are the only thing which is presented in front of court during the hearing of case. Keeping this in mind a digital evidence repository is presented in the framework. All the evidences new or old will be saving in it. The identified digital evidences of the crime are sending to the digital evidence repository where digital evidences of previous crime are saved. This will help in matching the current evidences with the previous ones to see that there any similarity between the evidences with respect to any fact which may be time, person, place, procedure etc. if there would be any similarity the investigator will try to find the connection with the previous crime cases, if not then the team of investigation would go for new strategy and generate a new final report.

4.5. **Digital Evidence Similarity Match**. As describe in the earlier section similarity is a vast concept and can be used in many ways. In the CODES framework the digital evidence similarity check will enable to match the evidences found in new case with the already stored digital evidences of different cyber crime cases. This is the most important phase in the CODES because in this phase it is decided to go with the new investigation or go with the old one. This similarity match will help the investigator in a way that if the current digital clues are matched or have some kind of similarity with the previous clues the investigator will get help from the previous reports to tackle the case. If there is no similarity then a new report with new clues will be generated.

4.6. **Report Generation**. Final report generation matters a lot at the end of whole process because it will tell the investigator that in what direction now the team has to proceed. There can be two types of report generated at the end one is totally new report and the other one will be the updated report. The report generation regarding whole investigation is based on the digital evidence match which is done with similarity match. New report with new facts and investigation will be generated if there is no similarity between current and previous digital evidences of crime cases. This report will contain all new facts, digital evidences, facts and figures regarding new crime case. If any similarity between attribute of current and previous digital evidence is found the report will be generated in accordance with that.

5. **Conclusion and Future work**. This work presented a case oriented digital evidence similarity framework CODES, whose purpose is to find out similarity between the digital evidences of different cyber crimes. The two main purpose of this framework are, one to match the digital evidences of current crime case with the digital evidences of already solved crime cases, to see that they have similarity in them and based on this fact second objective is to save time and effort by solving the case at hand.

In future this framework will be implemented practically in the form of tool or running application to get more benefit from it. That tool will be practiced on real time digital crime cases to make a beneficial use of it.

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ON MODEL BASED REGRESSION TESTING OF WEB SERVICES

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ABSTRACT. Regression testing is helpful in finding out if the quality of an evolved system has not regressed during maintenance. In case of web services, it becomes an issue since access to implementation is restricted to interface level information only. The problems gets further complicated if the testing is manual and the effect of maintenance is minimal. We can establish an idea about the depth of changes through the analysis of exposed interface and provide test oracle by storing test data and returned values in case of successful test cases.

This paper proposes an interface analysis approach where we analyze these interfaces written in web service description language (WSDL). We utilize data collected from interface analysis to invoke service operations and develop test oracles. We use these test oracles for regression testing to ensure there is no regression in the operations where the interface has not changed. In case, the interface has changed, we can detect by rerunning interface analysis to find out evolution in the signature.

Keywords: web services; regression testing; test oracles; web services description language (WSDL); reflections.

1. Introduction. Regression testing in web service is difficult since actual implementation of the web service is only accessible through exposed interfaces and many of the established testing methods cannot be applied owing to this limitation of access to code [1]. Software systems evolve over time or they go obsolete [2] and we need to continuously monitor if the preexisting system quality has not regressed in the evolution process. Testing in case of web services has an additional cost since it involves service invocation [3].

In case of web services exposing their operations by means of WSDL, we can find out details of operations such that both the input and return types can be found out. These may be simple data types or they may be complex data types composed of simple data types. From modeling perspective, complex data types are the objects passed as parameters or returned as return types. Test cases are, on the other hand, composed of inputs and expected return values. Once we know
input parameters and their types from WSDL analysis, we can develop test cases and write drivers to execute operations to receive execution output as a response object. If we maintain a record of the operation details, inputs and actual outputs in case of successful executions, we can prepare test oracles for future runs and we can find out interface level evolutions from interface analysis of consecutive versions. Together these are enough to lead us to know what operations are added, removed or evolved and if there is any regression in operations that have remained the same in two versions.

We propose, in this paper, an approach where we examine exposed interfaces of simple object access protocol (SOAP) based web services written using web service description language (WSDL) to extract operation signatures. Our analysis is capable of extracting simple data types and complex data types that are serializable and involve basic data types in their composition. After extracting operation signatures, we are ready to execute these operations. We use reflections to develop an adapter so that we are able to execute a web service considering extracted operations. We allow the users of our system to select data values so that concrete test cases could be formulated and provide the execution result back to the user for verifying if the returned value was correct. Once the user confirms that the execution response was in accordance with expected response, the input and the actual response are saved for providing a test suite and a test oracle. We call this training data for regression testing step. This way, the user completely tests web service under test (WSUT) and the user can rerun all of the test cases so achieved for regression testing. The activity diagram shown in Figure 1 presents the whole process discussed above.

![Figure 1. proposed system](image)

The paper is organized as follows. An overview of regression testing techniques is presented in Section 2 and our proposal is introduced in Section 3. We present evaluation of our proposal in Section 4 and discuss related work in Section 5 while the conclusion and outlook is presented in Section 6.

2. Regression Testing: An Overview. Regression testing is retesting of modified parts of system under test (SUT) to see if there is any regression in preexisting system quality [4]. Since regression testing is a process to verify quality of the evolved system, there is a test suite already available to select test cases. Following test case classification given in [5], a test case already available in the test suite can be classified as obsolete, re-testable or reusable. A test case can be regarded as “obsolete” if the evolved system has been updated such that a functionality previously existing is seized to exist or part of code has been merged, replaced or removed from the rest of the code.

Regression testing may be broadly classified into two types - one in which the specifications of the system do not change, termed as corrective regression testing, and other in which the specifications may change, called progression regression testing [5]. The requirement of the former may arise consequently to activities such as corrective maintenance or refactoring whereas the later may be
required in response to modifications in existing functionality, adaptation or evolution. Regression test selection techniques for progression regression testing can be classified into the following [6, 7]:

1. **Retest All Techniques**: We select all existing test cases for rerunning and it is useful in case of security critical or high risk systems.

2. **Ad-hoc/Random Techniques**: We rely on human judgement and test cases are selected randomly using expert judgement.

3. **Safe Techniques**: Certain test selection criterion is defined assuming that changes would be covered.

4. **Minimization Techniques**: Modification in the system is calculated e.g., in [8]. Test cases are selected such that they cover all modified parts of SUT.

5. **Data-Flow/Control-Flow Techniques**: Changes in data/control flow information before and after the change is identified to select test cases test modified/added flows.

Apart from the first of the identified techniques cited above, the rest may be termed as selective retesting techniques and may work on the basis of specifications or the code of the system and hence can be divided into two main groups - Code based or White-box or Specifications based or Black-box techniques. A typical selective retesting technique works on the basis of identifying changed part of the program code \( P' \) from \( P \), identifying changed part of the specifications \( S' \) from \( S \), and selecting subset of existing test cases \( T' \) from \( T \) such that running of \( T' \) on \( P' \) may cover complete changed part or a need to write some new cases \( T'' \) may be felt which may be eventually written and the program \( P' \) may be tested for regression using \( T' \cup T'' \) [5, 6, 7, 9, 10]. Model-based regression testing techniques consider system specifications or model of a system and try to find out the required test cases for regression testing on the basis of specifications analysis and are appropriate for web services regression testing. The following section introduces our proposed approach for regression testing of web services.

3. **Our Approach**. This section is devoted to explaining our proposed approach for arriving at test cases and development of test oracle which becomes a resource for development of test suite for regression testing. We access service interface, written using WSDL as discussed earlier, through its provided URL and parse it for extracting information. We gather required information such as operation name, operations input output parameters are gathered from analysis of exposed interface. This is implemented using reflection class in .Net [11]. After the information is extracted from the WSDL document, we have list of all operations with signatures mentioned in the interface.

**Algorithm 1** generation of test oracle

<table>
<thead>
<tr>
<th>Require:</th>
<th>URL of the web service to be tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>For (i=0; i&lt;num(operations); i++) do</td>
<td></td>
</tr>
<tr>
<td>if Operation is already invoked AND interface is unchanged then</td>
<td></td>
</tr>
<tr>
<td>Automatically rerun operation and report result</td>
<td></td>
</tr>
<tr>
<td>else</td>
<td></td>
</tr>
<tr>
<td>WSDL is parsed, web method is extracted and input/output parameters are extracted</td>
<td></td>
</tr>
<tr>
<td>if test executes successfully then</td>
<td></td>
</tr>
<tr>
<td>update oracle with input data, save actual output (verified by tester) as expected output for subsequent executions</td>
<td></td>
</tr>
<tr>
<td>else</td>
<td></td>
</tr>
<tr>
<td>discard test case</td>
<td></td>
</tr>
<tr>
<td>end if</td>
<td></td>
</tr>
<tr>
<td>end if</td>
<td></td>
</tr>
<tr>
<td>end for</td>
<td></td>
</tr>
</tbody>
</table>

We allow the user to select web method one by one and give the input data and expected output data which formulates a test case. The web service needs to be invoked to run the test case and we
need a mechanism for invocation of WSUT to dynamically access operations in web service. We use CodeDOM compiler [12] for client development purposes and automatic running of test cases first time around. The test case are run considering each operation separately and all the results are saved for developed test oracle.

Theses test cases and the the test oracle allow us to do regression testing for subsequent test runs. The system runs all available test cases for regression testing and provides and comparison of results of previously tested functionalities with the results of new results of the same functionalities. The test cases which were previously successful and have failed in the evolved version reported. This is shown in algorithm 1 involved in this process.

Once interface is analyzed and test oracle is prepared, the tester can analyze subsequent versions of the same web service. This process allows to find out if there is any evolution seen at the interface level. In order to see its impact on the rest of the operations that have not displayed any evolution at the interface level, test data and oracle from previous runs is used for regression testing. This is shown in algorithm 2.

Algorithm 2 regression analysis

Require: URL of the web service to be tested, test input data and oracle from previous run
for (i=0; i<num(operations); i++) do
  if test passed, result saved in database then
    if actual output from current run = expected output read from last run data then
      test passed, no regression
    else
      test failed
  end if
end if
end for

However, it is important to highlight that the proposed solution is limited in the sense that testing of simple types and first level complex types is possible. That means, we are only able to consider complex types (objects passed as parameters) that do not further involve complex types and therefore all non-serializable types cannot be tested. Our proposed system is also unable to do complete testing on the collection of complex types as a parameter as well.

4. Evaluation. We explains our approach on a relatively small application that we developed for test purposes. We develop two versions where an operation is added, one operation is deleted, signature of one operation evolves and one operation remains unchanged. We report operations deleted, added and evolved from signature standpoint and we provide testing output of the forth operation for regression testing result.

For detailed analysis, We present a case study which we have developed from an open-source\footnote{available at http://btsys.sourceforge.net/} bug tracking desktop application. We have converted this desktop application into a service-oriented application which, we call bug tracking service (BTS) and, is useful to automate the process of fault reporting. We have also provided an interface for administrative issues e.g., add/update/delete a project and user. The status of the bug i.e., if it is fixed etc can be updated subsequently by the development team so that the test team could test and the end user may get notified. The administrative and user interfaces after evolution as shown in Figure 2. The evolved version of the same system has additional operations to add status if the bug is fixed, updating signatures for project and user to contain more information and the rest of the operations are kept unchanged intentionally. The first run allows us to maintain test oracle where the second run automatically runs tests from previous run to report any regression due to addition and update of operations.

For the first run, we retrieve all operations in the provided interface and we provide tester with list of all input parameters and provide them an interface for entering possible input values. This
step could be automated by providing values from a possible range for simple data types. Since we are allowing the user to provide values for complex data types used in the WSUT, we provide an interface for inputs and allow them to investigate return types of operations. The user inputs data required to invoke the operation, the operation is invoked automatically and results are displayed back so that the user can confirm if they were correct. In case the actual result returned is inline with expected output, the test case is recorded and the test oracle is updated. This is shown in Figure 3 where parameter “person” is passed to operation “Save Person” which has name, id and age and the response object contains system response which is of type boolean and contains “true” as value in it.

Once a test case execution is successful for a WSUT, an XML file is updated where the information about operation, inputs and actual output is saved. This provides information about operations in a particular release of a WSUT, provision of test oracle and becomes basis for rerunning test cases for regression testing. The subsequent executions use this saved test cases data and test WSUT for regression testing. These executions show which of the test cases were successful,
which new operations were added for which new data is required and which of them have seized to exist. This is shown in Figure 4 where the execution reports that no new operations are added, one operation has seized to exist and all previously existing show no regression.

![Figure 4. result panel](image)

We evaluated our proposed application on the case study discussed earlier in this section. We found out that the approach was useful in the sense that all the test cases and the resulting test oracle was saved in an XML file. However, the approach was taking more time to provide results as the number of operations were growing. A closer analysis of underlying algorithm revealed that the complexity is however not growing exponentially. Another important issue faced was that the system was only able to interpret faults related to system functionality and cases where system should not report a fault, as discussed in [13], were reporting false positives. Therefore, the system was not able to differentiate cases where there were issues such as temporary non-availability of service, timeouts, etc. The approach, however, worked well for web services with average number of the operations and where there were no technical faults such as timeouts, communication failure etc., as discussed in [13]. The output of first run considering application before evolution is shown in figure 5.

![Figure 5. BTS service execution before evolution](image)

Figure 5a shows how operations visible in service are viewed in our developed tool and figure 5b shows the fact that all operations were executed for the first time and hence they are visible in
the new test cases section of graphical user interface of our application. The execution before evolution results in creation of an xml file and a snapshot of resulting xml file is shown in Figure 6 where an operation “GetAllBugsForProject” is highlighted with a red rectangle showing the input is “projectId” and the output is object set “Bug[]”. The operation execution result is saved in the shape of actual output and the testers response is also recorded.

![Figure 6. test oracle](image)

We evolved BTS service such that new operations were added and some of the operation signature were modified. We tested the application for regression and found out that the developed tool was reporting failure in some operations that had not evolved. A closer look at operations revealed that the system tried to create duplicate database entries as evident in Figure 7b and hence some of the test cases, shown in Figure 7a, related to operations such as “Add User” reported failure. This is shown in Figure 7.

![Figure 7. BTS service execution after evolution](image)

(A) after evolution execution report  
(B) reason for false positive

5. **Related work.** Regression testing consuming model level information is considered in previously e.g., in [14], where regression test suite is developed considering modifications in the finite state machine (FSM) representation of the system under scrutiny before and after evolution. The authors identify changes in transitions between states and additionally use evolution in data and control dependence while selecting test cases for rerunning. The same concept is extended in [15] where a state dependence graph is annotated with additional transitions to represent control and data dependence and it is tested if a du-pair is affected consequence to a change in recorded transition.
Regression test selection analyzing UML artifacts is proposed in [16] where evolution in artifacts is identified from analysis of associated object constraint language (OCL) expressions. The authors have also developed a tool to present changes in models before and after evolution through analysis of XML representation (XMI) of these artifacts. Web services regression testing considering call graph analysis is proposed in [17] where operation name are used to construct flow graph (CFG) and an analysis is conducted whenever evolution in operations is observed.

Analysis of WSDL for purpose of testing is done, e.g. in [18], where mutation testing approach is introduced and the authors introduce faults and develop mutant versions for testing of web services. A mutant is killed in case output of the mutant version of the operation differs from the original operation. Test case generation from WSDL is also proposed in [19] where WSDL is analyzed not only for generation of test cases but proposing suitable test data. The authors also propose a coverage criteria based on operation coverage, operation flow coverage and message coverage.

Our approach is novel in the sense that we use WSDL analysis to identify evolution in operations presented in two successive versions of a service. We further identify those operations that have been newly added, deleted or evolved considering interface level information. We select those operations that have remained same and we keep track of inputs and actual outputs for last executions of tests on WSUT. This allows us to propose test oracles and a means for automation of test execution as we not only have the input data for test cases but expected output as well. We use reflections to automatically invoke operations while testing.

6. Conclusion. Service oriented systems are only accessible through their exposed interface written using WSDL for SOAP-based services. We can develop test cases from the analysis of information available in the interface and maintain invocation history to provide test oracles. These test cases and test oracles are helpful in regression testing of web services since we can find out which of the operations are returning the same output as before. We can also find out from the analysis of WSDL which of the operations have been added or deleted in the newer versions of a service. We plan to investigate how can this approach be merged with coverage analysis proposals discussed in [20]. Another line of investigation could be to find out how test oracles could be developed from algebraic specifications, as discussed in [13] to automate development of test oracles which is manual in the current proposal.

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EMPIRICALLY INVESTIGATING THE IMPACT OF CSR ON FINANCIAL PERFORMANCE OF SUGAR INDUSTRIES OF PAKISTAN

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ABSTRACT. Objective of economic growth and development is to bring about well-being in the society. Income distribution devoid of redistribution creates inequalities in the economy. Realization of social responsibility (CSR) on the part of corporations may accrue them good fame and name among the competing economies in the current era of dominating nontariff barriers and globalization. This study empirically investigates CSR activities and its impact on the financial and marketing performance of sugar industries of Pakistan using the secondary data sources. The study empirically determines the impact of CSR activities in terms of donation, workers profit participation fund (WPPF), and research and development (R&D) on performance of sugar industries such as sales, return on assets (ROA) and return on equity (ROE). Panel data models employed on the 30 cross-section production units for the period of 2004-2013 reveal significance of social aspects of economic development of Pakistan in the vision 2025. Qualitative analysis of the interviews of the top management of the sugar industries would have been the option to provide further strength to the study. On account of certain constraints the analysis is confined to the empirical investigation of the research topic.  

Keywords: Corporate Social Responsibility; Sugar Industries; KSE-Pakistan.

1. Introduction. Creative capitalism is the mode of capturing any business market. This concept emanates the idea where government, nonprofit businesses and companies are supposed to work together in order to capture the market with a balanced objective of profit maximization and the social well-being. If businesses and companies are not engaged in the activities of social responsibility, the economy will have to pay cost in terms of sustainable development and retention of its good image among the stakeholders. Social well-being directly refers to corporate social responsibility which is the obligation of business that includes legal, economic, social and philanthropic responsibilities towards the society [1]. There are different approaches to practice CSR such as reactive, defensive, proactive, responsive, strategic and accommodative. The last two are acceptable for all stakeholders. CSR is used as brand insurance by companies for its sustainable development which is likely to diminish if organizations ignore CSR practices in the long run.

Strategic corporate social responsibility (CSR) is related to the integrated management system (IMS) of a business. When a company introduces CSR in its basic objectives, it shares vision which inculcates the culture of organization and beliefs of the employees transmitted to outside community and customers through word of mouth and legal compliance of CSR activities. Such socially desirable practices result in positive performance of the firm. Strategic CSR is embedded with core business objectives and its competencies to create positive business value through its engagement in day to day business culture and operations. Responsive CSR concerns mitigating the adverse effects from the business and acting as good corporate citizen. As compared to strategic CSR, responsiveness is good in the beginning but actually less responsive as it becomes a barrier for the innovations of business. Strategic CSR is helpful for both production and processing [2].

Findings from the previous studies reveal differential effects of CSR practices on the performance of firms in terms of sales, return on assets (ROA) and return on equity (ROE). Different findings may be attributed to the descriptive methodologies employed by these studies. Nevertheless, relationship of CSR practices and performance indicators of the businesses can be better explained using appropriate econometric techniques on the qualitative and quantitative variables. This study evaluates CSR practices and empirically determines their impact.
on performance of sugar industries in terms of sales, return on assets (ROA), and return on equity (ROE). Donations, workers profit participation fund (WPPF), and research and development (R &D) are some of the dimensions of CSR discussed in the previous studies. The implication of proposed study is to improve practices of social responsibility in relation with performance by adjusting additional costs in the sugar industries of Pakistan. The present study employs data set of 30 sugar industries for the period of 2004-2013. Panel data models are employed. The data have been collected from the financial statements of sugar industries and the annual reports of joint stock companies published by the State Bank of Pakistan.

2. Background of the Research Problems. “The Vision 2025 is the country’s long–term development blueprint which aims to create a globally competitive and prosperous country providing a high quality of life for all its citizens. It aspires to transform Pakistan into an industrialized, technology intensive, globalized and knowledge based inclusive upper middle income country by 2025”, (Planning Commission of Pakistan, 2014). The issue regarding occupational health services of the employees arouse during the 19th century. CSR practices started to ensure dependable workforce for the organization. Globalization of trade and increasing pressure of market forces has affected the work environment and work related health of labor. CSR is the activity ensuring that occupational health of labor which is necessary part of the well-being of the society and workforce of the organization. This commitment and social activity of organization lead their employees towards the organizational commitment. The scope of CSR has been extended to include hotels, restaurants, casinos, and airlines [3].

A network was born out of the need to improve the sustainability of value chains in South Asian countries named as South Asian Network of Sustainability and Responsibility (SANSAR). Under this network Sustainable Development Policy Institute (SDPI) is working for the implementation of CSR in Pakistan. This institute has highlighted the factors which if improved can be beneficial for the sugar industries to flourish more than its existing level. For its sustainable development these factors include, no exploitation of farmers; increasing involvement in social activities that can be beneficial for society, community or stakeholders of the production unit. The CSR practices can improve living conditions, health, workforce, environment, education, security at the workplace, healthy democracy, and relations with union and management.

The employees may get due share in the profit for the better performance on the job. Taxes paid to government are also part of CSR because government employs these funds for the welfare of the society. CSR code of conduct and ISO 26000 are the recognized international standards that guide all the companies as to their involvement in corporate social responsibility. The corporate citizenship along with maximum profits and better financial position, CSR promotes the public interest as it eliminates the harmful practices from the environment for sustainable development and progress of economy. Despite financial, technical and infrastructural constraints, the industries have to manage all healthy activities in terms of CSR [4]. CSR practices may also help decrease poverty from the economy [5]. From the last eight years (2005-2013), earthquakes and floods have opened the way for companies to engage in CSR and promote it [6]. In order to ensure protection of rights of all stakeholders, CSR activities can play a significant role. Stakeholders not only include the investors and consumers but also include the employees, society and community. Performance of a corporation can be increased in terms of their return on sales, return on assets and return on equity by ensuring the practices of corporate social responsibility. There is positive relationship between CSR and financial performance of the firm. The long term sustainability of the business depends upon CSR activities due to its direct correlation with social responsibility and ranking [7].

In order to determine the effect of CSR on the financials of the firm, some studies have generated positive results while the others reveal negative effects. There are studies which reveal neutral role of CSR in the determination of profitability. All these studies are descriptive in nature in spite of the quantifiable variables [8]. CSR is implemented by the companies not only because it has to be followed strictly as per regulations of company but also for the pursuit of International CSR code of conduct. It is also necessary to adopt CSR code of conduct in the self-interest of the corporations in the event of market competitiveness and market fluctuations. If a company practices CSR successfully, it expects to receive more consumers. By engaging itself in the CSR activities, the business corporations can increase the trust level of consumers who evaluate their products with positive attitude. Therefore, CSR activities can easily affect assessment and behavior of consumers [9]. Many businesses consider this activity as beyond CSR. The government may frame different policies and strategies to enhance this pro-poor scheme that ultimately is beneficial for the whole economy [5].

Many business organizations consider corporate social responsibility as barrier in growth on account of costs incurred in terms of donations, charities and social responsibilities. However, significant number of business organizations consider CSR activities as an exposure of the companies to explore more purchasing intent of consumers. This purchasing intent can be increased, if CSR activities are adopted by the companies and are well reported to their stakeholders and public community whose attitude towards the purchasing ultimately changes in favor of business.
Increasing trend and implementation of corporate social responsibility have developed awareness among the organizations which relate sustainability with CSR practices. Strong CSR practices of corporations are not only in favor of strong sustainability but also for the whole economy [10]. It increases the trust for the organizations which can generate more business and revenue for their growth and development. The positive effect of CSR practices on the financial performance of services sector can be observed if only the practicing businesses report their activities to the society [11]. There are certain other factors which have been identified in the previous studies in terms of law, culture, economic and political conditions.

3. Research Methodology The conceptual framework is developed in the context of previous studies.

3.1. Unit of Analysis Sugar industries of Pakistan make the unit of analysis for this study, and all the thirty sugar industries listed on the KSE are considered for unit of analysis. The issue of corporate social responsibility arises in sugar industry more than any other industries.

3.2. Sources of Data Secondary data of the 30 cross-sections for the period of 2004-2013 are extracted from the financial statements and annual reports of the 30 listed sugar firms of Pakistan. Annual reports of the sugar industries and the reports of joint stock companies of the State Bank of Pakistan have been accessed in order to arrange the data set.

3.3. Econometric Methodology In order to empirically estimate relationship of independent and dependent variables, generalized least square (EGLS) in the framework of panel data models are employed. Additionally, descriptive and nonparametric analysis have also been conducted to find the significance of CSR related factors but have not been reported for space saving. Testing the robustness of the results is inevitable part of the methodology.

3.4. Fixed Effect Regression Model

\[
\begin{align*}
\text{ROA}_it &= \beta_1 + \beta_2 \text{R&D}_it + \beta_3 \text{WPPF}_it + \beta_4 \text{DONATION}_it + \mu_i \\
\text{ROE}_it &= \beta_1 + \beta_2 \text{R&D}_it + \beta_3 \text{WPPF}_it + \beta_4 \text{DONATION}_it + \mu_i \\
\text{ROS}_it &= \beta_1 + \beta_2 \text{R&D}_it + \beta_3 \text{WPPF}_it + \beta_4 \text{DONATION}_it + \mu_i \\
\text{Perf}_it &= \beta_1 + \beta_2 \text{WPPF}_it + \beta_3 \text{DONATION}_it + \beta_4 \text{WPPF}_it \times \text{R&D}_it + \beta_5 \text{DONATION}_it \times \text{R&D}_it + \mu_i
\end{align*}
\]

Where

CSR = Corporate social responsibility

ROA = Return on asset (net income to total assets)

ROE = Return on equity (net profit to shareholder funds)

ROS = Sales as percentage of total assets

R & D = Research and development and Perf$_it$ shows performance indicator (ROA, ROE, ROS).

WPPF = Workers profit participation fund

\[
\begin{align*}
\text{Independent Variables} \\
\text{Corporate Social Responsibility} \\
\bullet \text{Donations} \\
\bullet \text{Workers Profit Participation Fund} \\
\bullet \text{Research and Development (As Control Variable)} \\
\end{align*} \quad \begin{align*}
\text{Dependent Variable and Its Dimensions} \\
\text{Performance} \\
\bullet \text{ROA} \\
\bullet \text{ROE} \\
\bullet \text{Sales Growth}
\end{align*}
\]
The last equation has incorporated R&D as the control variable. The coefficients of interactive terms reveal significance of the control variable in the determination of performance of sugar industries of Pakistan.

3.5. Independent Variables This study employs three variables as proxy for the corporate social responsibility. These variables include donations, workers profit participation fund (WPPF) and research and development (R & D).

Studies such as [12], [5], [13] and [14] have favorably considered donations as the representative variable of CSR. Many studies such as [15], [12], [16], [17] and [3] reveal that an organization is the most important entity to create ownership among the workers by introducing workers profit participation fund in their financial system. Research and development have also been employed as proxy for the CSR [18] or playing its role as a control variable between the CSR and performance of the organization [8]. R &D can also be considered as alternative to the CSR by saving workers from the bad incidents or period of crises through innovations and research [19].

3.6. Dependent Variable(s) Performance of the sugar industries is the dependent variable with three dimensions such as return on assets, return on equity and sales growth [20].

3.7. Relationship between Independent and Dependent Variables There is positive relationship between CSR and financial performance of the firm [7]. Performance of any business is measured through its spectrum of sustainable development. Proactive movement of the businesses towards the social responsibilities directly lead them to better performance [21], [22], [15], [23] and [24]. Workers profit participation fund is also component of CSR practices which creates commitment among the employees with organization and their retention for the organization is reiterated by the studies such as [12], [15], [16], [17] and [3]. Commitment of the workers improves performance of the business organization. Donations as a practice of CSR also contribute towards the performance of CSR by creating commitment and loyalty of the employees with organization [12], [5], [19], [14] and [5]. R & D is the important factor of CSR practices which makes a source of long term investment. A supportive attitude of the firm towards long term growth helps in reducing and ultimately controlling possible crises or bad incidents of the company [19]. There are studies which also reveal weak or no correlation among CSR practices and their financial performance [8]. CSR practices can do nothing in the bad days of company and it is only tantamount meeting the government obligations towards social responsibility [18]. Results of the panel data models are shown in the tables 1 through 6 appended at the end of this paper.

4. Findings of the Study Findings of the study have been examined, compared and contrasted with the previous studies in this section. Discussion has also led to the significance of the study in terms of practical and academic implications. In the end a few limitations and recommendations for future research have been deliberated. Findings reveal positive role of CSR practices towards the performance of sugar firms of Pakistan. Donations have shown positive effect on the purchasing power of the recipients and help in the building of good image of the organization. The employees are encouraged to play their role in the performance of the business organization. These findings are in accordance with the previous studies [5].

Workers profit participation fund raises the level of commitment of employees of sugar firms with their employers and their increasing level of satisfaction is the source of increasing performance of the businesses [3]. Retention of workers is also possible and their commitment with the business is enhanced [16]. Findings also reveal positive effect of R & D on the performance of firm in terms of their sales. Operationally R & D increase the cost burden of the businesses. That iswhy R & D do not show significant effect on the performance in terms of ROA, and ROE. Nevertheless, it has revealed significant impact on marketing performance such as sales [8]. The businesses cannot increase ROA, and ROE in the short run by adopting R & D policy but in the long run this policy is beneficial for the firm [18]. These findings are different from [19].

Overall results of study are consistent with the previous studies such as [12], [5], [8], [14], [16], [3], [24], [19], [15], [20], and [18].

4.1. Impact Commitment of employees, performance of the sugar industries, community services and economic development are complementary to each other [3]. Findings of the study have shown some practical implications. Some of them are stated in following lines.

- The sugar industry of Pakistan can increase their performance by practicing the CSR activities of donation, workers profit participation fund, and R &D.
- CSR is the requirement of code of business conduct. Sustainable economic growth and development of industries require businesses and industries to observe CSR practices.
Observing CSR is the source of repute for the industries in the eyes of all stakeholders who should be part of the economic development of Pakistan.

4.2. Academic Contribution Academic contribution of the study is briefly discussed in the points given below:

- Findings of the study determine the direction of research in the area of CSR through country vide survey of the business organizations. The analysis may be extended to other industries and the services sectors of Pakistan.
- It also highlights the need for inculcating CSR practices in organization culture as some practices of CSR can increase performance in the long run and help in the sustainability of their economic activities.
- Furthermore, this study is an empirical contribution and source of knowledge for the stakeholders of sugar industries, their employees, customers, and investors.

4.3. Aligning with Vision 2025 Based on the vision of 2025 of the government of Pakistan, this study has shown valid contribution towards the inclusive and indigenous growth of sugar industries as a sample. This study specifically deals with the equitable distribution of income and development of human capital. In this connection the businesses have to take all the stakeholders along in the pursuit of their long term objective of profit maximization and sustained development. These stakeholders, if satisfied and happy, will be contributing towards better performance of the business corporation. Ultimately sustained businesses enhance the development and economic growth of the country. Sugar sectors where CSR has significant importance due to the exploitation of farmers and employees whose job is seasonal in nature. This study is also contribution to the inclusive growth policy of vision 2025 especially the vision related to investment in education. Overall this study explores a step forward towards achieving the vision of 2025 by implementing CSR in sugar sector of Pakistan that contributes towards the performance of Pakistan Economy.

APPENDIX

FIXED EFFECT MODEL

Panel EGLS (Cross-section Weights)

Table 1: Dependent Variable: ROA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-2.129618</td>
<td>0.847277</td>
<td>-2.513485</td>
<td>0.0125</td>
</tr>
<tr>
<td>DON_D</td>
<td>-2.152382</td>
<td>1.094991</td>
<td>-1.965661</td>
<td>0.0504</td>
</tr>
<tr>
<td>RD</td>
<td>0.172919</td>
<td>1.613894</td>
<td>0.107144</td>
<td>0.9148</td>
</tr>
<tr>
<td>WPPF_D</td>
<td>4.173884</td>
<td>0.879328</td>
<td>4.746674</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.319518</td>
<td>Mean dependent var</td>
<td>18.91578</td>
<td></td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.237656</td>
<td>S.D. dependent var</td>
<td>78.00988</td>
<td></td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>67.40168</td>
<td>Sum squared resid</td>
<td>1208434.</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>3.903112</td>
<td>Durbin-Watson stat</td>
<td>2.061459</td>
<td></td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

DON-D = Dummy of Donations [assigned value 1 if donated, 0 otherwise]
RD = Research and Development

WPPF-D=Dummy of workers profit participation fund [1 if WPPF exists, 0 otherwise]

To fix the problems of heteroscedasticity the study also applies generalized least square method which statically determines the significance of relationship among dependent and independent variables.

Table 2: Panel EGLS (Cross-section weights)

<table>
<thead>
<tr>
<th>Dependent Variable: ROE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>DON_D</td>
</tr>
<tr>
<td>RD</td>
</tr>
<tr>
<td>WPPF_D</td>
</tr>
</tbody>
</table>

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

| R-squared | Mean dependent var | 57.39460   |
| Adjusted R-squared | S.D. dependent var | 225.0606   |
| S.E. of regression  | Sum squared resid  | 10001187   |
| F-statistic         | Durbin-Watson stat | 1.930256   |
| Prob(F-statistic)   |                    | 0.000000   |

Unweighted Statistics

| R-squared | Mean dependent var | 6.337114   |
| Sum squared resid | Durbin-Watson stat | 2.258577   |

Table 3: Method: Panel EGLS

<table>
<thead>
<tr>
<th>Dependent Variable: SALES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
</tr>
<tr>
<td>----------</td>
</tr>
<tr>
<td>C</td>
</tr>
<tr>
<td>DON_D</td>
</tr>
<tr>
<td>RD</td>
</tr>
<tr>
<td>WPPF_D</td>
</tr>
</tbody>
</table>

Effects Specification

Cross-section fixed (dummy variables)

Weighted Statistics

| R-squared | Mean dependent var | 410.5054   |
| Adjusted R-squared | S.D. dependent var | 344.6392   |
| S.E. of regression  | Sum squared resid  | 16419239   |
| F-statistic         | Durbin-Watson stat | 1.682045   |
| Prob(F-statistic)   |                    | 0.000000   |
### Table 4: Panel EGLS (Cross-section weights)

#### Dependent Variable: ROA

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-1.924903</td>
<td>0.721513</td>
<td>-2.667872</td>
<td>0.0081</td>
</tr>
<tr>
<td>DON_D</td>
<td>-0.509839</td>
<td>1.467506</td>
<td>-0.347419</td>
<td>0.7286</td>
</tr>
<tr>
<td>WPPF_D</td>
<td>3.433006</td>
<td>0.910390</td>
<td>3.770918</td>
<td>0.0002</td>
</tr>
<tr>
<td>DON_D*RD</td>
<td>-4.570373</td>
<td>2.307086</td>
<td>-1.981015</td>
<td>0.0486</td>
</tr>
<tr>
<td>WPPF_D*RD</td>
<td>2.816071</td>
<td>1.885276</td>
<td>1.493718</td>
<td>0.1364</td>
</tr>
</tbody>
</table>

#### Effects Specification

**Cross-section fixed (dummy variables)**

### Table 5: Panel EGLS

#### Dependent Variable: ROE

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>6.445429</td>
<td>1.092573</td>
<td>5.899315</td>
<td>0.0000</td>
</tr>
<tr>
<td>DON_D</td>
<td>1.122967</td>
<td>5.110361</td>
<td>0.219743</td>
<td>0.8262</td>
</tr>
<tr>
<td>WPPF_D</td>
<td>-1.798810</td>
<td>3.933145</td>
<td>-0.457346</td>
<td>0.6478</td>
</tr>
<tr>
<td>DON_D*RD</td>
<td>-22.29915</td>
<td>7.367936</td>
<td>-3.026512</td>
<td>0.0027</td>
</tr>
<tr>
<td>WPPF_D*RD</td>
<td>22.58117</td>
<td>6.566907</td>
<td>3.438630</td>
<td>0.0007</td>
</tr>
</tbody>
</table>

#### Effects Specification

**Cross-section fixed (dummy variables)**

### Weighted Statistics

<p>| R-squared     | 0.370159 | Mean dependent var | 47.85696 | 0.000000 |</p>
<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>0.291726</td>
<td>S.D. dependent var</td>
<td>199.8665</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>171.9244</td>
<td>Sum squared resid</td>
<td>783287.</td>
</tr>
<tr>
<td>F-statistic</td>
<td>4.719429</td>
<td>Durbin-Watson stat</td>
<td>1.930960</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unweighted Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.133806</td>
<td>Mean dependent var</td>
<td>6.337114</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>10183253</td>
<td>Durbin-Watson stat</td>
<td>2.259709</td>
</tr>
</tbody>
</table>

**Table 6: Panel EGLS**

**Dependent Variable: Sales**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>132.4474</td>
<td>7.948361</td>
<td>16.66349</td>
<td>0.0000</td>
</tr>
<tr>
<td>DON_D</td>
<td>-5.629496</td>
<td>17.56754</td>
<td>-0.320449</td>
<td>0.7489</td>
</tr>
<tr>
<td>WPPF_D</td>
<td>2.959596</td>
<td>10.47798</td>
<td>0.282459</td>
<td>0.7778</td>
</tr>
<tr>
<td>DON_D*RD</td>
<td>49.84188</td>
<td>23.73952</td>
<td>2.099531</td>
<td>0.0367</td>
</tr>
<tr>
<td>WPPF_D*RD</td>
<td>32.43498</td>
<td>16.72598</td>
<td>1.939197</td>
<td>0.0535</td>
</tr>
</tbody>
</table>

**Effects Specification**

Cross-section fixed (dummy variables)

**Weighted Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.482616</td>
<td>Mean dependent var</td>
<td>389.4899</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.417943</td>
<td>S.D. dependent var</td>
<td>327.0632</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>241.5568</td>
<td>Sum squared resid</td>
<td>15404316</td>
</tr>
<tr>
<td>F-statistic</td>
<td>7.462390</td>
<td>Durbin-Watson stat</td>
<td>1.740541</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Unweighted Statistics**

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>R-squared</td>
<td>0.190354</td>
<td>Mean dependent var</td>
<td>159.0302</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>18621511</td>
<td>Durbin-Watson stat</td>
<td>2.021695</td>
</tr>
</tbody>
</table>
REFERENCES


THE ECONOMIC POSITION OF FAMILY AND ITS RELATION WITH CHILD TRAFFICKING: A STUDY FROM THE PERSPECTIVE OF POLICY ANALYST AND EXPERTS

SYED RASHID ALI¹, NIAZ MUHAMMAD²
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ABSTRACT The prevalence of child trafficking reflects the omnipresent poverty, deterioration of institutional norms, lack of relevant laws and deficient implementation in both the sending communities and receiving communities (ILO, 2002). However, most of the countries respond to the problem of child trafficking from legal perspective alone. They declare it an act of violence and focus on prosecuting the offenders. Such approach is limited in its scope as it ignores to probe into the underlying factors of the problem and hence, lacks the appropriate and long term effective strategy of its resolution. The issue of child trafficking is rooted in the multidimensional factors associated with the socio-economic, political, cultural, and educational aspects (Broderick, 2005; Limanowska, 2005). It is inevitable to explore and analyze these factors for comprehensive and everlasting solution of the problem. In this context, the present study is designed to investigate the economic factors associated with child trafficking. The study is based on survey carried out in Peshawar, the provincial capital of Khyber Pakhtunkhwa. A sample of 392 respondents is selected through a stratified random sampling technique from the list of lawyers, crime reporters, and academicians.

Key words: Child trafficking, Economic factors, Family, Opinion Leaders, Peshawar.

Introduction: The factors associated with the vulnerability of child to trafficking are probed by researchers in different regions and cultures of the world. The demographic information of the victims, mostly represents their belonging to a family of low socio-economic status, larger population, lack of employment opportunities, and alternate income source. Families with low socio-economic position often lack the resources and will to socialize their children and protect them from the evils of society like trafficking (Mirza, 2010; Bales, 2007; Demarest et al., 1993; Kielland and Ouensavi, 2001). The abolition of child trafficking is unlikely to be realized through law making and advocacy alone but by raising the socio-economic status of the people (Skeldon, 2000). Similarly, intensifying rural poverty forces poor families to give up their children to traffickers, under the pretext of providing them the opportunity to secure good jobs and better lives (Bales, 2001; Dottridge, 2002; Lloyd, 2005). Being a member of certain socio-economic status or ethnic group cannot determine the likelihood to be subject to trafficking, however, poverty, lack of access to education, unemployment, and member of minority group turn young person vulnerable to traffickers (ILO, 2003; Moore, 1994; Clawson, 2009; Estes and Weiner, 2001, 2005; Flowers, 2001). Children from
such homes are neglected and abused and the parent’s socio-economic status is hurdle in the development of children (Albanese, 2007; Anderson and Michaelson, 2007; Royal, 1998; Williams and Frederick, 2009; Williamson and Cluse-Tolar, 2002; Wilson and Dalton, 2008).

Poverty alone is not responsible for child trafficking; however, it is supported by other factors like ignorance of parents as reported by UNICEF (1998, 2000) in Sudan and Mauritania. Broderick (2005) while conducting research on transnational human trafficking under the title “Identifying factors in human trafficking” set a hypothesis that there is a significant difference between victims’ countries of origin and receiving countries on economic factors of poverty, unemployment, income, and literacy. The research findings reveal some significant differences in economic factors exist between the origin and destination countries.

Beyond poverty, other major community conditions that inflate minors’ risk for entrapment into prostitution include residing in an urban environment characterized by high crime and elevated levels of police corruption (Clawson, 2009). Situational conditions such as low socio-economic status of family, existence of prostitution market in the nearby area, the irregular and frequent movement of people like tourists, truckers, or military personnel are the risk factors associated with child trafficking (Estes and Wiener, 2001, 2005). There are many risk factors which is called ‘poverty plus’, a situation in which poverty does not by itself lead to a person being trafficked, but where a ‘plus’ factor such as gender based violence, illness, domestic violence, lack of educational opportunities, combines with poverty to increase vulnerability (ILO and UNICEF, 2009; Tumlin, 2000; and Mirza, 2010). Parents’ ignorance, lack of general awareness, lack of education, absence, and lack of implementation of existing laws, internal conflicts, lust for money, and involvement of influential are the associated factors with child trafficking (NET, 2008; Gunatilleke, 1994; Demleitner, 2001; Goździak and Bump, 2008).

Child trafficking in Sub Saharan Africa is a demand-driven phenomenon (ILO, 2002). The existence of an international market for children in the labour and sex trade, coupled with an abundant supply of children from poor families with limited or no means for education in a cultural context that favors child fostering, with restrictions on legal migration possibilities, have clearly opened a niche for traffickers. Fifty percent of the trafficking victims are children below the age of 18 (ILO, 2002; Broderick, 2005; Van, 2006). Studies analyzed the labor market and conclude that excess of labor in origin countries and shortage in the destination propels the business of child trafficking as in the Europe (Skeldon, 2000; ILO, 2003). Similarly, from a broader perspective, the practice of child trafficking is associated with demand and supply. The demand in international sex and labor market and the abundance of vulnerable population which is supported by the trafficker as a profitable and low risk trade (Joffres et al., 2008; Schauer and Wheaton, 2006). In most cases, trafficking results from the interface of multiple risk factors (ADB, 2003; Sinha, 2005; ILO, 2006; EPCAT, 2001). Vulnerability results from a range of inter-related economic, social, political, and familial factors (e.g., poverty, lack of sustainable livelihoods, inter and intra familial conflicts, structural inequities and discrimination).

Becker (1995) introduced the dialogue on economic approach to crime. Like rational choice theory, a person evaluates the cost and benefit of a crime. The benefit according to Becker may include money, property, and psychic prices (“getting away with something”). Costs could be money, “the opportunity cost of not working in legitimate work”, and the likelihood of conviction and punishment. Becker perceives offenders as risk takers as profit to illegitimate actions are vague. As the benefit from child trafficking is more than its cost, it will continue. Similar arguments are made by Schloenhardt (1999), Hughes (2003), O’ Neil (2000), and Makisaka and Marc (2009) that traffickers are making money from the business of trafficking of children and women being the easy target, hence, the crime prevails. Miko (2000), Yinusa and Basil (2008), Olateru (2004), ILO (2006), and Kapstein (2006) claims that next to arm and drugs, trafficking of women and children is the 3rd principal income source for the criminal syndicate worldwide and the key players and contractors spread over the world. However, feminist approach look into the crime and analysed it as stated by Jeffreys (2009) that prostitution and sex business is globalized industry where from girls’ bodies enormous profit is secured. Child trafficking known as modern day slavery prevails due to its profitable nature. Child trafficking is reported to be the third largest profitable trade after drugs and arms (Miko, 2000; Olateru, 2004).

Human trafficking is high profit and relatively low risk trade with availability of supply and increasing demand (Joffres et al., 2008; Bales, 1999, 2007; Naim, 2005; Hughes, 2000; Kapstein, 2006). Similarly, camel racing in the Gulf countries attracts poor people from Pakistan through the manipulation of parents by agents to surrender their children. The law enforcement agents and the immigration personnel perceived that high profit and low risk and fear of prosecution and penalties encourage the traffickers’ gangs to work in the country (Mirza, 2010).
Studies show that trafficked children are exploited in diverse ways. They are trafficked for abusing in sex and/or in labour market and sometimes in both. They are coerced into prostitution (Albanese, 2007; Priebe and Suhr, 2005; Williams and Frederick, 2009). They are detained, locked up to starvation, along with severe physical and verbal abuse (Anderson, 2003; Makisaka and Marc, 2009). Variety of tactics, the traffickers use for controlling the victims as reported by Makisaka and Marc (2009) the victims are tight in the web of debt-bondage. They are deprived of their identification and travelling documents like passport with the aim that they may not be able to escape. They are psychologically tortured. Victims, due to their illegal status afraid of the authorities, cannot ask for help. In Europe and Central Asia children are mostly trafficked for forced begging, marriages, and prostitution. Their forced services are utilized in bricks kilns, agriculture, rice mills and other factories. Both girls and boys are used in domestic work (UNDOC, 2009).

Afghan boys and children in Colombia are trafficked for exploiting in militancy and paramilitary operations and even suicide bombing. In Nepal and Pakistan, one of the major forms of human trafficking is bonded labor. In East Asia in the Pacific children are often trafficked for the purpose of sexual exploitation, domestic servitude, and forced begging. In Latin America and Caribbean poor families often push their young daughters to provide sexual favors to wealthy older men in exchange for school fees, money and gifts (Trafficking in Person Report, 2003). Noor Education Trust (NET, 2008) draws the findings that the purpose of sale through marriage (bride price in Pakistan) was quoted as sex trade by 32 (16.4%) respondents, exploitation as cheap labour was quoted by 27 respondents, while 73 (34.4%) said they were used for both. However, Mirza (2010) reports that even children are trafficked for removal of organs. Literature reveals that children are trafficked for the purpose of performing forced labour of all types, including agriculture, domestic services, construction work, and sweatshops in addition to commercial sexual exploitation (Brodrick, 2005; Trafficking in Person Report, 2003; Bales, 1999). Trafficking clearly violates the fundamental right to a life with dignity. It also violates right to health and health care, right to liberty and security of person, right to freedom from torture, violence, cruelty or degrading treatment. It violates for children who have been trafficked, or victims of child marriages their right to education, it violates the right to employment and the right of self determination (Mirza, 2010; NET, 2008).

According to the Trafficking in Persons Report (TIP, 2003), Pakistan is reported to be labeled as a source, transitory and destination country. Men, women, girls and children are trafficked for exploiting in forced labour and sex markets. It further reports that the big problem faced in Pakistan is bonded labour which is concentrated in Sindh and Punjab provinces, particularly in brick kilns, carpet making, agriculture, fishing, mining, leather tanning and production of glass bangles, estimates of Pakistan victims of bonded labour, including men, women and children, vary widely but are likely over one million. Other practices include selling of daughters into domestic servitude, prostitution, or forced marriages, and tribal or family disputes are settled through girl traded (known as swara in Pashto) or as payment for debts.

Research Methodology: The present section explains methodology adopted for carrying out the under discussion study as follows;

Study Area: The present study is conducted in Peshawar, cradle of Pakhtun culture. The incidents of various issues related to child trafficking are likely to be high in this city. The city houses a large population of Afghan refugees who are prone to the child trafficking (Azam, 2009). Moreover, it has also provided shelter to the internally displaced peoples (IDPs) due to military operation in Federally Administered Tribal Areas (FATA) as a result of war against terrorism. Both of the mentioned groups are prone to child trafficking and other socio-cultural evils. Further, the city hosts the old established academic institutions like Islamia College, University of Peshawar, and University of Agriculture. It also abodes Peshawar press club where journalists are covering every aspect of life in their reporting including crimes. A Bench of Supreme court, a full-fledged High court, Special courts, and Peshawar District courts are running its affairs in both its civil and criminal jurisdictions. Due to the mentioned features, District Peshawar has been selected to investigate the issue.

Sampling Procedure: We tried to approach the victims of trafficking which are handled by Federal Investigation Agency (FIA) at Peshawar. However, we were not given access to the victims due to law prohibiting interaction with the victims. In the absence of information from victims, we approached the social scientists, legal experts, and crime reporters who are the eyes and ears of the society, for their perception of the issue. Moreover, the strata we have used in our sampling is opinion leaders in the particular society and is able to influence the general society,
local administration, regional and national legislature, therefore, it is worth to know about their perception of the issue.

For data collection, proportionate stratified random sampling technique is used while membership list of Peshawar Bar Council, Peshawar Press Club, and Teachers’ Association is utilized as sample frame. For gathering consistent and reliable data, this technique seems to be more appropriate. As mentioned, the population is trifurcated into strata of social scientists, crime reporters, and lawyers working in district Peshawar. A sample size of 392 is drawn from the total population of 453 by using formula n = KV^2 / d^2 of Casley and Kumar (1989). The calculated sample size is divided into the mentioned strata on the basis of proportional allocation method where NI = Ni/N*n formula is used (Chaudhry and Kamal, 1996).

Data Collection: A comprehensive questionnaire, based on Likert Scale, is developed for data collection. The questionnaire is first discussed with experts and amendments are made accordingly. Thereafter, the questionnaire is pre-tested for its relevance to objectives of the study. Again, the inconsistencies and ambiguities are addressed before starting the final phase of data collection.

Data Analysis: Data is analyzed through SPSS 2010 computer software. Bi- variate analysis is carried out to measure the level of significance of hypothetical association and direction of relationship between dependent variable (Child trafficking) and independent variables (Economic Position of Family) by using Chi square (χ²) and Gamma (γ).

Results and Discussion: In this section major results are discussed and presented in table No. 2, which shows association and direction of relationship between child trafficking and economic position of the family. A positive (γ=0.460) and highly significant (p<0.05) relationship is observed between low socio-economic status and child trafficking (Table 2). Findings of the present study suggest parents with low socio-economic status may not be able guardians. In other words, families with middle and high socio-economic status may be more capable of guardianship than families with low socio-economic status. These findings are consistent with ILO (2003); Moore (1994); Clawson (2009); Estes and Weiner (2001, 2005); Flowers (2001); Dottridge (2002); and Lloyd (2005).

Similarly, a positive (γ=0.485) and significant (p<0.05) relationship is found between growing unemployment and child trafficking (Table 2). Large number of young population in Pakhtun society remains illiterate and unskilled due to which, mostly they may be unemployed. This situation of unemployment has deteriorated the psycho-social make up of individual personality and they remain unable to cope with the challenges like inflation, thus becoming easy prey to trafficking. These findings are in consonance with Kielland and Ouensavi (2001); ILO and UNICEF (2009); Tumlin (2000); and Demleitner (2001).

However, a non significant but positive (γ=0.324) relationship exists between increasing number of children at poor household and child trafficking. The positive value of Gamma shows more vulnerability of poor’s and the concept of trafficking increase in population would ultimately lead to the occurrence of incidences. The probable reasons to this increase could be the prevalent psyche that sons are guns. These findings are in line with Bales (2001).

Contrary to the above, a positive (γ=0.403) and significant (p<0.05) relationship is observed between non-cooperative behavior of economically sound people and child trafficking. The significance and positive result of this study reveals the non cooperative behavior of well off people with poor people in Pakhtun society. This practice of non cooperation can best be understood in terms of Karl Marx ideology of dialectical materialism where there is a gap between two classes i.e., bourgeoisie and proletariat which he explained in his concept of historical materialism. The ideal of Pakhtunwali focuses on the help of needy and deserving people, however, this ideal is not in practice which brought massive problems for the poor and ultimately they may get deceived by the traffickers for employment, education, better career etc. Lack of social capital, social solidarity and homogeneity in existing strata of haves and have not could be the main contributing factors. For bringing harmony and equilibrium between two classes it is the need of the hour to implant social capital on sound footings in Pakhtun society (study area).

Moreover, a positive (γ=0.189) and significant (p<0.05) relationship is observed between cheap labor for business activities and child trafficking. Similarly, a positive (γ=0.314) and significant (p<0.05) relationship is found between demand in international market for cheap labor and child trafficking (Table 2). The findings of the present study suggest that the traffickers may get motivated when observing high demand in the national and international labor and or sex market along with the increase in vulnerable population. The findings of the present study are in line with
Joffres et al. (2008); Broderick (2005); Van Impe (2006); ILO (2002); Schauer and Wheaton (2006); Skeldon (2000); and ILO (2003).

Similar results (γ=0.469; p<0.05) are observed between profitability of the business and child trafficking. The findings suggest that continuity of the business may be subject to the return it warrants for the investors. Higher the profit more would be the frequency of the crime and vice versa. The findings are in much corroboration to that of the Miko (2000); Olateru (2002); UNODC (2008); Joffres et al. (2008); Bales (1999 and 2007); Naim (2005); Hughes (2001); King (2004); Kapstein (2006); Schloenhardt (1999); and Hughes (2003).

A highly positive (γ=0.464) and significant (p<0.05) relationship is found between exploitation of victims in diverse form and child trafficking (Table 2). The findings suggest that it may be very difficult for the law enforcement agencies to trace the victims as they may be engaged in various fields like, bricks kilns, factories, sex industry and militancy, forced begging, marriages, domestic work, debt bondage. These findings are in high degree of consonance with Albanese (2007); Priebe and Suhr (2005); Williams and Frederick (2009); Anderson (2003); Makisaka and Marc (2009); UNDOC (2009); and TIP (2009).

Table No.2 Relationship between Economic Aspect and Perception on Child Trafficking

<table>
<thead>
<tr>
<th>Statements</th>
<th>Attitude</th>
<th>Perception on child trafficking</th>
<th>Total</th>
<th>Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree</td>
<td>Disagree</td>
<td>Not sure</td>
<td></td>
</tr>
<tr>
<td>Children from low socio-economic status are more susceptible to trafficking.</td>
<td>Agree</td>
<td>281(71.7)</td>
<td>40(10.2)</td>
<td>1(0.3)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>47(12.0)</td>
<td>9(2.3)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>4(1.0)</td>
<td>10(2.6)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Growing unemployment provides room for traffickers to groom around.</td>
<td>Agree</td>
<td>290(74.0)</td>
<td>40(10.2)</td>
<td>1(0.3)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>19(4.8)</td>
<td>10(2.6)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>23(5.9)</td>
<td>9(2.3)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Non-cooperative behavior of economically sound people is proportional to child trafficking.</td>
<td>Agree</td>
<td>235(59.9)</td>
<td>27(6.9)</td>
<td>1(0.3)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>42(10.7)</td>
<td>14(3.6)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>55(14.0)</td>
<td>18(4.6)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Increasing number of children at poor household breeds the chances of trafficking.</td>
<td>Agree</td>
<td>252(64.3)</td>
<td>35(8.9)</td>
<td>1(0.3)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>52(13.3)</td>
<td>15(3.8)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>28(7.1)</td>
<td>9(2.3)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Trafficking is a profitable business that’s why it is increasing day by day.</td>
<td>Agree</td>
<td>253(64.5)</td>
<td>29(7.4)</td>
<td>1(0.3)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>26(6.6)</td>
<td>10(2.6)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td></td>
<td>Not sure</td>
<td>53(13.5)</td>
<td>20(5.1)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>Protection is being given to traffickers by the high ups of the</td>
<td>Agree</td>
<td>248(63.3)</td>
<td>38(9.7)</td>
<td>1(0.3)</td>
</tr>
<tr>
<td></td>
<td>Disagree</td>
<td>31(7.9)</td>
<td>7(1.8)</td>
<td>0(0.0)</td>
</tr>
</tbody>
</table>
conclusions: It is concluded that children from low socio-economic status are more susceptible to trafficking. Growing unemployment, increase in population, especially in the poor families, along with non-cooperative behavior of the economically sound people, is positively associated with child trafficking. Demand for cheap labor in national and international markets is a major motivating factor for the traffickers. Trafficking was a profitable business and protection to traffickers was given by the high-ups of society which results in exploitation of victims in diverse forms.

The findings of the present study confirm the theory of Routine Activities introduced by Cohen and Felson (1979) which states that interaction of the three variables at same time and place i.e., suitable targets, absence of capable guardian, and motivated offender results into the commission of crime. Applying this theory to the present study approves that low socio-economic families, unemployment, lack of social solidarity and homogeneity, decreases the capability of guardians to safeguard their wards. Further, over population at poor household turn them into an easy and suitable target for trafficking. Furthermore, demand in the national and international market for cheap labor, availability of vulnerable population, the low risk and high profitability of the business motivates the offender to carry out their illegal enterprise of child trafficking.

Policy Recommendations: Following recommendations are made in the light of the findings of this study:

1. Poverty and gender inequality is perceived to be the causes of child trafficking. In this regard serious and sustained efforts should be made from right based perspective for promoting gender equality and alleviating poverty in all segments of society.
2. Government and other agencies should encourage and support academicians to conduct research and to highlight the issue.
3. The government should increase the salaries of the immigration, human trafficking unit and police officials who are particularly working on human trafficking cases, however, along with this government should issue a policy of zero-tolerance for corruption. If any official is convicted severe punishment is needed to be inflicted. Another strategy to adopt is the naming and shaming policy. Government should publish and public the names of all the involved people in the trafficking chain whether government officials, private citizens, politicians, or other powerful people. Media should give proper time and place for publishing and disseminating the name and cases. After all reputation matters.
4. Rehabilitative measures by the government in collaboration with the national and international organizations should be initiated which include programs for psychological support and therapy for the vulnerable communities and particularly for the survivors of trafficking.
REFERENCES


A NOVEL CLOUD BASED DATA MANAGEMENT FRAMEWORK FOR TEAM AND PROJECT ACTIVITIES IN GLOBAL SOFTWARE DEVELOPMENT (GSD)

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ABSTRACT. Today global software development is used to a great extent by software development teams because of its benefits like availability of expertise, twenty four hour development and cost etc. Along with its numerous benefits, GSD also has some challenges. Overcoming those challenges can significantly increase paybacks of GSD. Cloud computing is one of the latest patterns in computing that has various benefits and advantages. It provides many benefits to the customer. We argue that both GSD and cloud computing if combined can best serve to the users. Global teams can resolve most of the issues and achieve best from cloud practices. GSD challenges include most importantly data management as well as communication, coordination, security, project planning and management. Managing the data for such teams is one of the major issues. We surveyed the issues involved in detail from literature and answered two research questions regarding GSD challenges. We suggested to use Cloud Computing services and proposed a framework based on SAAS (Software-As-A-Service) cloud that will help to mitigate the problems.

Keywords: Cloud Computing, Global Software Development (GSD), Data Management, Coordination; Communication; Project Planning; Project Scheduling, SAAS (Software-As-A-Service).

1. Introduction. From the literature it is shown that GSD is becoming more and more popular among software development teams and organizations due to its extreme benefits. Resources from different locations can be utilized. These may include human resources, infrastructure and other resources. Speed of project development can be increased as work continuous twenty four hours and cost can be decreased by hiring labor from where it costs less. There is a high possibility of projects developed globally to have more success rate as experienced and trained personnel are hired from different locations. Software development is a process where a lot of collaboration is required among the development teams or members of the teams. Team members need to communicate at each level of software development lifecycle like requirements engineering, system designing, development and testing for quality work. When we talk about Global Software Development, the necessity for this collaboration is very much intensified.
1.1 Research Question. Besides many advantages GSD has some disadvantages as well [1][6]. Now the question is how can these shortcomings be minimized to achieve best performance through GSD benefits?

RQ1: How can be the challenges of GSD minimized?

When we talk about global development of software, there is a massive amount of project data that needs to be maintained in order to coordinate effectively throughout the project development lifecycle. The question here is that what are the best data management practices for managing GSD project data?

RQ2: What could be the best data management practices for GSD data on cloud?

1.2 Objective of research. Objective of this research is to answer two important questions that could help GSD teams in better development of the projects and to best utilize the GSD benefits and paybacks.

In a research on setting a research agenda for GSD [3], researchers concentrated on key research areas in the field of GSD and knowledge acquisition and management is one of them. In [3], authors have shown that there is a great potential in distributed software development as far as research is concerned. They extracted that tool support for GSD teams is a vibrant area for research.

So we worked on the areas of difficulties for GSD and available tools for those problem areas. Instead of using different tools for each type of problem we propose that using a cloud will help in better way. Tool support for GSD teams can be provided as SAAS cloud to mitigate the major challenges faced by the teams. Large scale data sharing and reuse definitely needs some good practices for management.

1.3 Research methodology. We followed a survey based research methodology. From the literature, challenges that GSD teams face are identified and then the solutions are studied. We then suggested a cloud data framework to answer RQ1.

For RQ2 different data management strategies have been studied and a survey table has been extracted.

1.4 GSD and its challenges. GSD is best practice for software development companies to develop quality software at small budget. Development teams containing skilled persons from all over the world to increase the market value and reduced costs are main goals of GSD [2].

1.4.1 Problems that GSD teams face. The problems are mostly because of the following reasons:

- Language
- Cultural
- Time-zone differences
- Geographically dispersed locations.

Due to the geographical distance among GSD teams, team members cannot see each other and as a result while communication they cannot understand each other’s body language as well as mood. They cannot easily clarify their points. So due to lack of face-to-face communication decisions are not taken in a short time and misunderstandings can be developed which can lead to high rework later. Another very significant problem that GSD teams face is the difference in their languages. Due to language difference workers are not able to communicate effectively. From our day to day experience we observe that the meaning of the same word varies from language to language. The words that are used in a good way in one language may be used in the opposite way in another language. Workers also face problems in conveying their messages and feel difficult to remove misunderstandings. Due to language differences, conflicts are more likely to occur among the members and it is hard to remove those conflicts. Medium language also affects the way of thinking.

When members of the team belong to different geographical areas they have different norms, values, believes and languages. Their communication styles and ways of thinking are also different. This may create problems in knowledge sharing and cause lack of trust among the team members. Team members can get frustrated if they feel trouble in communicating. Teams at geographically distinct locations also have different time zones and working hours of such teams are different which creates great trouble in informal and direct communication through telephone, IM (Instant Messaging) and video conferencing. Arranging collective meetings for such teams is a difficult task. Lack of spontaneous informal communication can increase the manager’s workload because misunderstandings can go longer and result into increased rework. Members hesitate to describe their problems if they do not know each other informally.

Team members of working at same place can easily have informal communication among them during breaks
and other events but globally distributed teams have no such opportunities to communicate informally. So it is more difficult to build trust and good relationships among global teams. Experienced employees can’t share their knowledge due to the distance among teams. When we talk about teams in the same location they can easily communicate and discuss any issues related to their work, but distributed teams hardly communicate. In distributed teams, due to the distance among teams it may take longer in getting response of a question. If the response delays occur, the project will not be completed on time. Delays in response can also become a reason of frustration among the team members.

Unavailability of project management tools can lead a project to a failure state. If team members are unaware of project updates, task assignments, status, latest information, documentation and information of people online, the project can never be successful. Project management tools are more necessary when the developing teams are globally dispersed. Selection of experts from a wide domain of global village is also a challenging job for the project managers of GSD teams. Teams are difficult to initiate due to organization invisibility.

1.4.2 Available Solutions to the problems: There are different tools available for each problem faced by the teams such as communication problems are solved by providing the teams with appropriate communication tools like e-mail, telephone, discussion forums. Summary of these tools that are being used now a day is given in figure 1 below:

<table>
<thead>
<tr>
<th>Problems with GSD Teams</th>
<th>Solutions available for those problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of face to face communication</td>
<td>Video conferencing</td>
</tr>
<tr>
<td>Response delays</td>
<td>Email notifications</td>
</tr>
<tr>
<td>Spontaneous informal communication</td>
<td>Instant Messaging</td>
</tr>
<tr>
<td>Knowledge sharing</td>
<td>Discussion Board</td>
</tr>
<tr>
<td>Cultural difference</td>
<td>Theme based Interfaces</td>
</tr>
<tr>
<td>Language difference</td>
<td>Language choices or language translator</td>
</tr>
<tr>
<td>Unavailability of project management tool</td>
<td>Web Based Project Management Systems</td>
</tr>
<tr>
<td>Data management</td>
<td>Databases</td>
</tr>
<tr>
<td>Managing documentation</td>
<td>Wikis and Google doc etc</td>
</tr>
<tr>
<td>Replicating code</td>
<td>Content Versioning Systems</td>
</tr>
<tr>
<td>Security of network</td>
<td>Encryption Techniques</td>
</tr>
<tr>
<td>Avoiding unauthorized access</td>
<td>Giving Privileges</td>
</tr>
</tbody>
</table>

Figure1: Problems for GSD teams with tools used for those problems

File sharing is a necessary activity for software development teams and a problem for global teams because of the distance. Emails can solve this problem through attachments. Problems due to language difference can be solved and collaboration among team members can be increased. Specific user interfaces for members can solve the cultural problem in using the system.

Project management also includes managing the projects in a way that keep them in a consistent state. The problem of expertise identification and selection can be minimized by giving willing people a facility so that they can upload their CV. Experts can be selected through their CVs. The point of suggestion here is that many tools are available now a day that discourse one or more than one problematic issue identified above but there is no centralized solution for every issue.

1.5 Cloud computing and its benefits. Cloud computing is one of the hot topics in research now a day in the field of computing. A lot of researchers are working on it due to its benefits and demands in the industry. Cloud computing is basically putting all services on an internet resource and access those services on demand.
The services may be provided by different cloud vendors. These services may include software applications, hardware equipment and different platforms to run businesses and also for software development. The major aim of the cloud computing paradigm is to develop low cost system with high proficiency. If anyone needs a high cost infrastructure or any other service that is not affordable then one can take those services from any cloud vendor on Pay-as-u-go basis. Customers only have to pay for the services they use and do not need to buy on their own. This can be cost effective policy for the organizations and also they don’t need to have installation overhead. Computing professionals are not required by the company as they have set up the services in their own organization.

Cloud can be implemented in different ways such as SaaS (Software-as-a-Service), IaaS (Infrastructure-as-a-Service) and PaaS (Platform-as-a-Service). Platform-as-a-Service means to give development tools and platforms to the customers on demand basis. In this way developers don’t have to buy expensive programming tools on their own. They just hire the platform from any cloud provider and use it for their business. They also don’t need to bother about the installations and maintenance details of those platforms. Infrastructure-as-a-Service clouds provide hardware and storage services, again making it very cost effective. Another major advantage of hiring storage services is increased availability and decreased probability of data loss. Software-as-a-Service clouds means to provide different services in the form of software applications. SaaS is becoming more famous as the organizations or teams availing SaaS do not have to look into the limitations of software installation and configuration.

There are some exceptional characteristics of cloud computing that are a motivation for us in an attempt to use cloud computing concepts for GSD. These characteristics are also motivating researchers to work in cloud computing and cloud computing is becoming very fertile for research. The major characteristics include:

• Easy scalability: infrastructure can be enhanced easily on demand.
• Reduced cost: server side infrastructure and equipment cost is not included.
• Better performance: response time is reduced and availability of data or services is increased.
• Easy to use: cloud does not need any software downloads and installations.

1.6 Cloud data management. Cloud is basically a central hub containing all the data so there should be some mechanism to manage this huge amount of data, reduce the access time and also to consider security and privacy of that data. In a research [21], authors presented features that a DBMS should contain which is designed for huge data. They discussed some of the available database options and concluded that none of the available database systems are as much effective for cloud environments. So they proposed a newly architected database for cloud deployments. The issues they identified in deploying database for cloud based environments include:

• Data stored at untrusted host i.e. cloud computing vendors
• Data duplication frequently across physical locations for accessibility and robustness

Data stored at untrusted host can make the customer nervous in concern with privacy and security of their data. This is one of the shortcomings of cloud computing. For increasing availability and durability of data it has to be replicated at different sites which increase data access overhead on network.

1.7 GSD data management. Global means the data related to the development of projects is dispersed at different locations. Development teams need to communicate this data with each other at different stages of software project development. Sometimes more than one person is working on a single module or deliverable. So the data must be maintained in a way that each team member of all the teams can access the data efficiently and with consistency. Data needs to be updated regularly and managed in a useful way. All the actions that are performed on data must be recorded and stored at a safe place. Data and the database must be protected from unauthorized access. Skilled, trained and qualified workers are required for data management. When we talk about global software development more resources are required for data management, either human resources or hardware resources. Improperly stored data can create problems. Managing data obtained through email and other communication medium in GSD teams is very difficult. Data management also includes keeping the projects in consistent state when teams are working on a same piece of code or data. Team members may face the problem when they complete their assigned task and want to send it to the Manager and other members for further processing. Sometimes the same code is needed for development of another component of the same system. In that case replicating large amounts of code globally is surely a difficult task. And data and information consistency is difficult to manage.
2. Research idea. The research idea is based on seeking answers to the two basic research questions.

2.1 Answer to RQ1. Our assumption is that cloud computing concepts and services can help GSD teams overcome the challenges and develop better products. All the software tools used now a day to meet GSD challenges should make a SaaS cloud together. This type of cloud can increase the usefulness for Global Software Development to a great extent. Other types of clouds like IaaS and PaS can also help mitigate challenges posed by global development of software. It can help in data management of the teams and projects. Global software development teams should develop a cloud of their own so that all the members of team can access the services through cloud. Each team member in all the teams does not have to install many tools like communication tools and project management tools that support them in software development. Rather they can use any service required on demand basis when and where required. Each member of the teams whether he is on one location or other can avail the services provided by the company cloud on as needed base. The services include:

- Coordination services
- Communication services
- Project management services
- Project planning services
- Data management services

There are a lot more services that come under these broad categories, which any member of Global Software Development teams can avail. The whole cloud is considered as a platform for software development, hence providing Platform-as-a-Service cloud. Software tools providing IM, SMS, Telephone, Video Conferencing, emailing, Discussion Board, language translation, Content Versioning, progress, document and resource management, report generation, querying, task scheduling and updating, bug and activity monitoring, and effort, time and cost estimation all of these services act as Software-as-a-Service cloud. Heavy computation servers and data storage hardware acts as Infrastructure-as-a-service.

Every phase of software development lifecycle can put forth to the new level of understanding, management and quality by using these cloud services.

Figure 2: A Novel Cloud based Data Management Framework for Team and Project Activities in Global Software Development (GSD)
2.2 Answer to RQ2. All these services that the proposed framework performs in turn help in managing project and team data. For efficient data management there should be proper methodologies and techniques. A survey performed by authors [25] concluded best nominee of type of applications that can be deployed in cloud. This survey was performed on big scale data managing methodologies in cloud settings [25]. We identified three areas where a lot of work is needed for efficient data management. These regions include:

- Reduce access time
- Data security
- Maintain data consistancy

2.2.1. Reduce access time. Performance could be enhanced by reducing the access time. Following points could be taken into account for having better access time.

- Query optimization techniques
- Smart object placement [22]
- Reduce query processing time [26]

Logically related data should be placed at one place to reduce access time and manage the data efficiently. As cloud is all time available resource available globally on the internet so there could be numerous of requests asking for some sort of services. To handle these requests there must be an efficient data management algorithm in place. Authors [22] presented a technique of using “Smart Object Placement” in their work. They concluded that related objects if placed together smartly cloud data access performance can be enhanced even with of frequent data access demands. Based on the two parameters, storage architecture and storage model, authors [24] has proposed a benchmark for cloud based data management systems. Efficient data mining technique can also help reduce access time. In [27] authors presented a data mining model based on genetic algorithm. Their work shows that this model is very scalable and it do not increase access time proportional to the increase in amount of data.

2.2.2. Data security. Security is definitely an important issue which should be addressed. Following issues should be catered for secure data management:

- Conformance to data availability
- Guarantee to data privacy

Data availability and security from data loss can be achieved through backup. Unauthorized access should be avoided and important information is on internet, so there are more chances of unauthorized access to the data. For this appropriate encryption mechanism for data should be used.

2.2.3. Maintain data consistency. data consistency is also an important issue. If one user is updating some data and at the same time other user is accessing it the data may be in an inconsistent state. Inconsistent data can result in great problems. So there must be a mechanism like locking for the cloud data. There are some tools proposed [28] for GSD that manage the data consistency by using Content Versioning. These tools are called Content Versioning Systems (CVS). A CVS ensures that a user requesting for a piece of data must get the latest copy of that data. CVS acquires a lock on the data being used by a user so that other members may not access it when the data is in changeable state. Hence CVS on cloud can solve the issues related to consistency of code, documents and other data obtained from communication mediums.

3. Survey. From literature survey we extracted the issues faced by GSD teams and their negative impact on the projects developed through GSD. We then find out how cloud can help to reduce those negative impacts. The geographic issues created by GSD can be mitigated through runtime enrichment and availability of services required by the team members. SaaS architecture provided by cloud computing environment can overcome the application installation and configuration overheads for each GSD location.
<table>
<thead>
<tr>
<th>Challenges</th>
<th>Issues</th>
<th>Negative impact</th>
<th>Cloud services for GSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coordination</td>
<td>Problem in knowledge sharing</td>
<td>Lack of trust</td>
<td>SaaS paradigm of cloud can overcome coordination issues by providing Language translator, Discussion board and CVS software as services to the dispersed teams.</td>
</tr>
<tr>
<td></td>
<td>Cultural differences</td>
<td>Problems in conveying messages</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Language difference</td>
<td>Difficult to remove misunderstandings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Conflicts are more likely to occur</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medium language also affects the way of thinking</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No sharing of ideas and transfer of expertise.</td>
<td></td>
</tr>
<tr>
<td>Planning</td>
<td>Problems in effort, cost and time estimation</td>
<td>Poor estimate of effort, cost and time required for completing the project.</td>
<td>For planning software estimation tools available on cloud can be used and the estimates are available whenever required throughout the project development.</td>
</tr>
<tr>
<td>Management</td>
<td>Unavailability of project management tool</td>
<td>Can lead a project to a failure state</td>
<td>A proper project management tool containing modules that maintain tasks, human resources, documents, project status etc. must be useful for the teams in order to develop quality products.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Poor quality of projects</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Response delays</td>
<td>Communication gap</td>
<td>One communication tool is not enough for the teams. For quality project development team members must have informal, formal, audio, video and text based communication as required.</td>
</tr>
<tr>
<td></td>
<td>Lack of informal communication</td>
<td>Difficult to complete a project on time</td>
<td>All the communication tools are available to the teams on demand on cloud hence do not require individual installations of each tool.</td>
</tr>
<tr>
<td></td>
<td>Lack of face to face communication</td>
<td>Reason of frustration among the team members</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Less number of collective meetings</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Can increase rework due to misunderstandings as members cannot easily clarify their points</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Decisions take longer time to be made and executed</td>
<td></td>
</tr>
<tr>
<td>Management</td>
<td>Difficulty in managing data obtained through email and other communication medium</td>
<td>Increase cost.</td>
<td>A type of software that is maintaining the versions of data must be centralized for the teams. Hence CVS on cloud will solve the issue consistency of code, documents and other data obtained from communication mediums.</td>
</tr>
<tr>
<td></td>
<td>Problem in updating data regularly</td>
<td>Increasing data access time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Difficulty in maintaining the consistency of data.</td>
<td>Increase in ambiguities and errors in the project.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problem in managing documentation</td>
<td>Increase project completion time.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Problem in code replication</td>
<td>Unavailability of history projects data can cause rework.</td>
<td></td>
</tr>
<tr>
<td>Security</td>
<td>Lack of security of network</td>
<td>Important data could be lost</td>
<td>Security services can also be provided on cloud including the authentication services.</td>
</tr>
<tr>
<td></td>
<td>Avoiding unauthorized access</td>
<td>Data could be miss used</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Survey
5. Related work. There is a lot of work done on the problem identification of GSD teams. Different areas identified include: [4][2][5][6][7]

- Cultural issues
- Knowledge managing
- Strategy development issues
- Poor communication
- Technical issues
- Project and process supervision
- Time difference
- Work distribution

Many people also worked on the solutions against these issues [12][13][14][15][16]. The solutions are either for one type of issue or not satisfactory for the GSD teams. One of the authors of this paper worked on the challenges faced by GSD teams and projects and proposed a framework that can help in mitigating the issues [28]. The study contains detailed survey of tools available for communication, coordination and project management. Data management issues are not discussed and not any proper discussion related to the data management was made. This paper proposed that there should be a centralized tool for GSD teams based on that framework.

In a research [23], authors proposed the idea of using GSD as SAAS cloud but there is no exact detail of problems that GSD face and how exactly these problems can be solved through cloud. Moreover they only worked on the collaboration challenges of GSD and not the communication, project planning and management and security issues. Their study amplified the motivation of using cloud to support GSD.

3.1. Conclusion and future work. This work is extension to the author’s previous study that clearly identified the importance of GSD, challenges posed by GSD and a complete survey of available tools for GSD. As cloud computing is a hot topic in research these days because of its various benefits to the industry. Hence we proposed to take advantage from those benefits and take GSD to the next level of performance so that quality products with low failure rate can be developed with low budget.

We proposed a data management framework that is based on cloud and argue that this cloud based framework of software application services can overcome all the issue of GSD by using every tool required for communication, coordination and project management as SaaS cloud.

The framework resolves many issues that come in communication, collaboration, security of data and data management. It is based on the very preeminent characteristic of cloud computing that is SAAS (Software-As-A-Service). Also we have extracted and worked on data management policies for cloud setups and proposed three areas of research where a lot of work can be done.

In future we will try to evaluate and validate our judgments. We will have more focus on technological aspects and we will keep digging in data management area.

REFERENCES


ARCHITECTURAL KNOWLEDGE MANAGEMENT (AKM) PRACTICES AND TOOLS FOR GLOBAL SOFTWARE DEVELOPMENT (GSD); A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT. Context: The basic ground for any software system is its architecture. Those systems degenerate earlier which do not incorporate an adjustable architecture. We found an increasing interest within software research community about architectural knowledge management. The need to manage architectural knowledge becomes more crucial when it comes to globally dispersed teams and organizations. Architectural knowledge management effectiveness can help in reducing challenges imposed by GSD.

Objective: This study is a systematic literature review of Architectural Knowledge Management practices and tools for GSD. The objective of this review is to explore the AKM practices and tools being used and propose the most effective practices or tool that can overcome most of the AKM challenges faced by GSD teams.

Method: We identified the primary studies involved in this work through a selection processes and a clearly stated inclusion exclusion criteria.

Results: As the research topic indicates the study is divided into two major themes: first theme is Architectural Knowledge Management (AKM) practices and the second theme is Architectural Knowledge Management (AKM) tools.

Conclusion: As a result of this study we concluded some suggestions for further research in this topic.

Keywords: Global Software Development (GSD), Architectural Knowledge Management (AKM), Software Evolveability and reuse.

1. Introduction. Software architecture explains how software system components can be arranged and how can these components work together. Usually architecture can be useful for other systems that have similar features and requirements. Architecture can promote reuse [1]. Software evolvability is to develop software that can easily evolve with time. Software evolvability is a strong quality constraint as the world is rapidly changing. Organizations lose business opportunities if they fail to evolve the software system effectively. For this there could be many areas which can be focused such as analyzing release histories, source code. One of these areas is the architecture of the software being developed. Authors have chosen software architecture level analysis for evolvability because the basis for any software is its architecture. For example, Those systems degenerate earlier which do not incorporate an adjustable architecture. So the study mainly focuses on architectural evolvability of software systems.

The main objective of managing knowledge is to improve software development process and utilize all the available knowledge resources such as individual resources and organizational resources of knowledge.
Architectural Knowledge Management support software evolve ability, sharing and reuse of architectural knowledge. Architectural knowledge management can help in improving the software systems architecture on which the organization or team is working currently as well as it can help in increasing software architecture reuse. Reusing architectural knowledge can improve the project quality with the passage of time as the architectural knowledge gets mature with the time. The second most important objective of managing architectural knowledge is to support sharing of architectural knowledge among development teams so that they can have equivalent understanding of the project on which they are working and no ambiguities occur which can increase rework on later stages of project development. Management of architectural knowledge can also support software evolveability. If any change in the requirement is received the organization should be able to extract knowledge from the managed architectural knowledge accommodate the changes and update their knowledge repository. Therefore, within the software architecture community, an increasing interest in architectural knowledge management is recognized [2][3][4][5].

In the last decade, we have seen dramatic transformation of software development processes. The transformation from single-site, into a multi-site, multilingual, multicultural, and globally distributed effort has marked the birth of Global Software Development (GSD) [4]. GSD has extreme benefits such as, resources from different locations can be utilized, speed of project development can be increased as work continuous twenty four hours and cost can be decreased by hiring labor from where it costs less. Software development is a complicated process and GSD has made it more complicated. But bright side of GSD has increased its importance. [6][7][8]

Architectural knowledge can be used and managed effectively to help the software development teams dispersed geographically in overcoming the challenges and issues come across a GSD environment. Whereas we have no summarized guideline to which practices can be applied to GSD setting effectively [9]. So we are interested in doing a systematic survey of all the practices and tools of architectural knowledge management. Members of a Distributed Team can work on many different parts of the system development or develop many Components but they need to coordinate with each other in order to manage architectural and time dependencies. For allowing Distributed Teams to communicate and share knowledge some Coordination Strategies are essential. Therefore, the point of concern is what are those strategies and practices. [10][11]

In a research on setting a research agenda for GSD [12], researchers concentrated on key research areas in the field of GSD and knowledge acquisition and management is one of them. In [12], authors have shown that there is a great potential in distributed software development as far as research is concerned. They also extracted that tool support for GSD teams is a vibrant area for research. So we worked on the area of AKM for GSD as large scale data sharing and reuse definitely needs some good practices for management. Objective of this research is to answer two important questions that could help GSD teams in development of the projects that have high evolve ability factor in order to increase sharing and reusability of existing architectures for future projects.

1.2 Research Question. From the literature it is shown that AKM is a hot topic of research these days but our focus is how it can help benefit GSD teams and enhancing the quality of projects developed under GSD environment. For this we have formulated two research questions that will help us to explore the AKM tools and practices present.

RQ1: What practices have been reported in GSD environment for Architectural Knowledge Management?  
RQ2: Which tools have been developed for Architectural Knowledge Management?

2. Research Methodology. This research work has been done by means of a Systematic Literature Review (SLR). An SLR is a literature review that focuses on predefined research question(s) that tries to recognize, select and analyze all the research evidences relevant to that question or questions. The research process includes the following different stages. These steps have been explained in the subsequent sections.

i. Developing review protocol
ii. Defining exclusion and inclusion criteria
iii. Defining what search process will be followed to find relevant studies
iv. Quality evaluation
v. Data accumulating and analysis.

2.1. Review protocol. Following the SLR guidelines and procedures[13], we framed a review protocol. The protocol identifies the context for SLR and research questions based on that context or field of study. Basically
research questions act as problem statement for the research. Review protocol also defines the search strategy, criteria for selecting studies, getting out data from the selected studies and analysis of that data. In this study section 1 describes the context of our research as well as the research questions that we are addressing in our research. Other parts of the review protocol are discussed in sections below.

2.2. Exclusion and Inclusion criteria. Basic reason of planning these criteria for selection of studies is finding all the relevant work/studies in this research. Papers from IEEE journals, workshops and conferences available within the range of 2006 and 2013 are considered. We set the lower search borderline on the publication year to 2006 as we wanted to consider the latest studies relevant to our topic stored in the database. We ignored studies that were not related to AKM practices used both in general and for GSD teams and organizations, and tools available for AKM. Table 1 shows the exclusion and inclusion criteria for our systematic review. The selected study must satisfy one of the inclusion criteria and studies that fulfill any condition from exclusion criteria must be excluded from the list of primary studies.

**Inclusion and Exclusion Criteria**

<table>
<thead>
<tr>
<th>Inclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies that are published from year 2006 to 2012</td>
</tr>
<tr>
<td>Studies that focus on AKM practices</td>
</tr>
<tr>
<td>Studies that focus on tool support for AKM</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Exclusion Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Studies that are not in English</td>
</tr>
<tr>
<td>Studies that are not related to research questions</td>
</tr>
<tr>
<td>Duplicated studies</td>
</tr>
</tbody>
</table>

Table 1: Inclusion and exclusion criteria

2.3. The search process. We restricted our search in scientific database as most of the material in books is referenced or discussed in publications stored in electronic databases. The searched electronic database is IEEE Xplore (see http://www.ieee.org/web/publications/xplore/). There are various other electronic databases as well but due to lack of time defined for this study we only considered studies present in IEEE Xplore database. This limits the research but still it’s a valid argument as IEEE Xplore is a huge data base with high impact publications covering the fields of Architectural Knowledge Management practices used in general, Architectural Knowledge Management practices for GSD teams and organizations, and tools available for Architectural Knowledge Management. Search terms used in our research to find related studies include:

i. S1: Architectural Knowledge Management Practices,

ii. S2: Architectural Knowledge Management Practices AND Global Software Development,

iii. S3: Tool support for Architectural Knowledge Management.

The selection process used for studies was based on multiple steps and these steps are shown in table 2.

**Steps in search process**

- Search in database to identify relevant studies by using each search term individually.
- Exclude studies based on the inclusion exclusion criteria.
- Exclude irrelevant studies based on analysis of their titles and abstracts.
- Obtain primary studies based on full text read.

Table 2: Steps in search process

At the first stage of search with first search term S1, a total of 35 publications were identified (see figure 2). Then after checking these publications against inclusion and exclusion criteria and removing irrelevant publications 29 publications were selected. Next 15 publications were selected after reading titles and abstracts. On the completion of first search process 7 studies were identified as primary studies where the contents relate to the research topic of Architectural Knowledge Management Practices.
In the search process for second search term S2, 4 publications have been identified in total (see figure 3). Then after checking these publications against inclusion and exclusion criteria no irrelevant publication was identified. After further filtering by using next steps in the search process again no publication was excluded as all 4 studies were related to the topic of Architectural Knowledge Management Practices for Global Software Development. Therefore in the end of second search process, 4 primary studies were identified.

In the last search process for the third search term S3, 34 publications have been identified in total (see figure 4). Then after checking these publications against inclusion and exclusion criteria 13 irrelevant publications were identified and excluded from the studies. After further filtering by using next two steps in the search process 3 publications were excluded as all the 13 remaining studies were related to the topic of tool support for Architectural Knowledge Management. Therefore in the end of second search process, 13 studies were identified as primary studies.

A total of the 24 studies were selected from all three search terms. Duplicate publications were removed. And at the end after removing repeating studies 20 studies were selected as primary studies for our review. Fig. 5 shows the number of publications identified at each stage of the research process.

2.4. Quality assessment. To summarize the findings of the included studies we defined a quality assessment criteria on the basis of this criteria each study has been compared. The studies have been devided into two basic themes on the basis of the area of AKM covered. Themes are AKM practices and AKM tools. The quality assessment attributes include:

i. The study includes theoretical framework/reasoning/survey results/implementation statistics instead of just studying the existing literature and writing non-justified statements.

ii. The study gives background of the topic of research clearly.

iii. The study clearly states the research methodology used for data collection and as well as for validation of results.

To assure the credibility and quality of selected studies all the studies must fulfill the above quality attributes.
2.5. Data extraction and synthesis. By reading all of the selected papers we extracted relevant material from each study. To summarize the extracted information we performed a comparison of these studies on the base of some data extraction parameters. These parameters along with the description of values for each attribute are shown in table 3. The results of our analysis will be described in the succeeding sections.

<table>
<thead>
<tr>
<th>Data Extraction Parameters</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bibliographic Reference</td>
<td>Author, Title, Source and Year of publication</td>
</tr>
<tr>
<td>Type of work/study</td>
<td>Book, journal paper, conference paper, workshop paper</td>
</tr>
<tr>
<td>Context of work/study</td>
<td>Main topic area and objective of the study</td>
</tr>
<tr>
<td>Research methodology used</td>
<td>Included technique for the design of the study, e.g. case study, survey, experiment, interview.</td>
</tr>
<tr>
<td>Constraints and Limitations</td>
<td>Identified constraints and limitations in the approach as well as the identified areas for future research.</td>
</tr>
</tbody>
</table>

Table 3: data extraction and synthesis

3. Overview of selected studies. All included studies are enlisted in appendix. In this section these papers are described regarding the publication sources of the studies. A temporal view of the selected studies in the field of AKM is also presented.

3.1 Data sources. Most of work published; out of these 20 were conference papers and workshop papers. A few journal papers are also included in the list. Table 4 shows the summary of distribution of sources for all the publications. All papers satisfy quality assessment criteria mentioned earlier. The distribution is also mapped on a graph (figure 6) to show the results graphically. Each source of studies is mapped against number of
publications under it. The graph shows the contribution of each source in the field of Architectural Knowledge Management. IEEEICSE can be seen as the most active community in this field.

### Study Distribution per publication source

<table>
<thead>
<tr>
<th>Source</th>
<th>Studies</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEEE Workshop on SHARING and Reusing architectural Knowledge Architecture, Rationale, and Design Intent (SHARK-ADI)</td>
<td>[1], [2], [9], [14]</td>
<td>4</td>
</tr>
<tr>
<td>IEEE International Conference on Global Software Engineering (ICSE)</td>
<td>[3], [4], [5], [6], [8]</td>
<td>5</td>
</tr>
<tr>
<td>IEEE International Conference and Workshop on the Engineering of Computer Based Systems</td>
<td>[11], [16]</td>
<td>2</td>
</tr>
<tr>
<td>ICSE Workshop on Wikis for Software Engineering (WIKIS4SE)</td>
<td>[15]</td>
<td>1</td>
</tr>
<tr>
<td>European Conference on Software Maintenance and Reengineering</td>
<td>[17]</td>
<td>1</td>
</tr>
<tr>
<td>International Conference on Communications and Signal Processing (ICCSSP)</td>
<td>[20]</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4: study distribution per publication source

Figure 6: study distribution graph

3.2 **Temporal view.** We mapped the number of studies by publication year onto a graph and the graph shows an increase of interest in the field (see figure 7). During year 2006 to 2013, the number of publications on the topic of AKM practices and tools did not vary uniformly. During 2008 and 2009 more research has been done in this area then the graph goes down but in 2012 it again shows that importance of AKM has been realized. Researchers than try to minimize challenges and problems in the field they consider important.

![Temporal View Graph](image)

Figure 7: temporal view

4. **Results.**

4.1 **AKM practices, Summary of Approaches.** The studies included in the first theme category, that is Architectural Knowledge Management Practices are compared on some predefined quality attributes. This comparison is summarized in table 5. The comparison shows that most of the studies have been done by using
different case studies. Different organizations have been considered and practices being used are identified. In some of the studies the newly proposed practices have been validated on a case study organization.

### Summary of AKM practices

<table>
<thead>
<tr>
<th>Bibliographic Reference</th>
<th>Type of work/study</th>
<th>Context of work/study</th>
<th>Research methodology used</th>
<th>Constraints and Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>[51]</td>
<td>Workshop paper</td>
<td>A preliminary review and comparison on current approaches to AKM have been presented and concluded that there appears a preference to use the codification strategy, however, the observations of the software architecture industry show that organizations tend to use a personalization strategy intentionally. Effort has been made for awareness of this gap between intention and reality and suggest to close this gap through focusing on hybrid approaches.</td>
<td>Literature Review</td>
<td>have not conducted an extensive literature search to identify all contributions in this area, but used the authors’ knowledge of the field and experience gained in software architecture practice in three different countries.</td>
</tr>
<tr>
<td>[52]</td>
<td>Workshop paper</td>
<td>To built up understanding on how to effectively support software architects in sharing knowledge and concluded a theoretical framework of what architects do and what they need.</td>
<td>Case Studies</td>
<td>It is based on practical findings of just one software development organization.</td>
</tr>
<tr>
<td>[53]</td>
<td>Conference paper</td>
<td>AKM practices supporting a personalization strategy towards knowledge management are perceived to be more useful than practices that support a codification strategy.</td>
<td>Case Study</td>
<td>Conducted survey questionnaire at one organization only.</td>
</tr>
<tr>
<td>[54]</td>
<td>Conference paper</td>
<td>Presented a summary of the Global Teaming Model (GTM) – a model that represents the key practices that software organizations should consider when operating in a geographically distributed environment.</td>
<td>Theoretical framework based on literature</td>
<td>Tried to keep the practices generic, but it is possible that they don’t all apply.</td>
</tr>
<tr>
<td>[55]</td>
<td>Conference paper</td>
<td>Performed a literature review that looks at AKM concepts, practices, tools and challenges; important in GSD and attempted to synthesize these; a metamodel have been created based on literature review.</td>
<td>Literature Review</td>
<td>No validation of metamodel have been done in industry as well as no work has been done on how current tools will support it.</td>
</tr>
<tr>
<td>[56]</td>
<td>Workshop paper</td>
<td>Presented the major AKM practices being followed in an agile environment. Authors have argued that AKM practices that encourage centralization don’t get much attention than those encouraging decentralization. Also they have introduced a new AKM practice, “peered sites”.</td>
<td>Case Study and survey based on interviews</td>
<td>Results can be biased as the survey is based on only one organization.</td>
</tr>
<tr>
<td>[57]</td>
<td>Conference paper</td>
<td>Described an approach for enhancing finding, capturing, and maintaining architectural knowledge based on context information.</td>
<td>Experiment</td>
<td>Experience with the approach is limited to its application during the development of the toolkit.</td>
</tr>
</tbody>
</table>

Table 5: summary of AKM practices

4.2 AKM tools, Summary of Approaches. In the first theme category, that is Architectural Knowledge Management Tools, the included studies are compared on the same predefined quality attributes. The comparison is shown in table 6. The comparison shows that most of the studies have been done by properly implementing the tools they proposed. Some studies have limitations on the lake of description to their implemented tools. A few papers have been validated by using different case studies.

5. Conclusion. Software architecture is one of the basic building blocks of a software system and provides basis for the system. If the architecture of a system is not flexible enough to accommodate changes easily the software will reduce its importance and life as well. Considering this importance of architecture research community focused on managing the architectural knowledge in order to support software evolvability, sharing of architectural knowledge and reuse of architectural knowledge. The need to manage architectural knowledge intensified when it comes to GSD because of various challenges posed due to geographically distant teams. Using architectural knowledge effectively may help in overcoming the challenges and issues encountered in GSD. For this a number of researchers have worked on the practices being followed and proposed better solutions. Need for tool support has also been identified in various papers. A number of tools have also been developed previously. We have performed a systematic literature review and divided our study into two categories of themes. First one is AKM practices and the second one is AKM tools.
### Summary of Tools for AKM

<table>
<thead>
<tr>
<th>Bibliographic Reference</th>
<th>Type of work/study</th>
<th>Context of work/study</th>
<th>Research methodology used</th>
<th>Constraints and Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td>[S8]</td>
<td>conference paper</td>
<td>Highlighted the benefits and challenges in managing architecture knowledge and discussed various approaches to characterize architecture knowledge based on the requirements of a particular domain. Also included case study covering the use of AKM techniques and tools in an industrial project.</td>
<td>Case Study</td>
<td>The paper is too short. Much of the details are not discussed in the paper.</td>
</tr>
<tr>
<td>[S9]</td>
<td>workshop paper</td>
<td>A tool has been described, that is developed to support a framework for capturing and using architectural knowledge to improve the architecture process.</td>
<td>Tool implementation</td>
<td>The tool described does not support diagrammatic modelling of design decisions rather its focus is on providing a handbook of architecture knowledge.</td>
</tr>
<tr>
<td>[S10]</td>
<td>conference paper</td>
<td>An architectural knowledge sharing portal has been designed and implemented. Portal’s integrated functionality supports architects in decision making, by providing easy access to right architectural knowledge at any given time.</td>
<td>Tool implementation</td>
<td>No integration with features like Wikis and Blogs allowing architects to easily produce architectural knowledge have been done.</td>
</tr>
<tr>
<td>[S11]</td>
<td>workshop paper</td>
<td>A conceptual framework for managing architecture design knowledge have been Developed and a web-based knowledge management tool “PAIME” has been developed to support that framework.</td>
<td>Tool implementation with experiment</td>
<td>No integration with tools commonly used for managing requirements for large-scale systems.</td>
</tr>
<tr>
<td>[S12]</td>
<td>conference paper</td>
<td>How architecture design decisions can be captured and documented with specific tool support is described and provided the effort estimation in capturing such knowledge.</td>
<td>Tool implementation</td>
<td>Lack of longer experiments to estimate more accurately.</td>
</tr>
<tr>
<td>[S13]</td>
<td>conference paper</td>
<td>ADSS tool has been described which enables capturing and documenting architectural design decisions in order to avoid knowledge vaporization.</td>
<td>Tool implementation</td>
<td>Should scale-up ADSS to industrial applications and extend the multi-user management features.</td>
</tr>
<tr>
<td>[S14]</td>
<td>workshop paper</td>
<td>In this paper, we present a tool that captures architectural knowledge from documents and emails and stores it in a more structured manner in knowledge repositories with minimum user intervention, thus minimizing the required amount of effort.</td>
<td>Tool implementation</td>
<td>Support for only MS-Word and MS-Outlook has been provided while some decisions are communicated in MS-Excel format and informally through chatting software.</td>
</tr>
<tr>
<td>[S15]</td>
<td>workshop paper</td>
<td>Describes the use of ShyWiki, a tool for Architectural Knowledge Management (AKM) and also describes how distributed stakeholders involved in software architecting can share knowledge and manage their tasks by using ShyWiki.</td>
<td>Tool implementation</td>
<td>The usability of the current version of ShyWiki has not been evaluated.</td>
</tr>
<tr>
<td>[S16]</td>
<td>workshop paper</td>
<td>A highly customizable ADSS tool has been developed which can enable practitioners to define ADSS models according to their preferences and working situations.</td>
<td>Case studies, semi structured interviews</td>
<td>Industrial case studies has not been conducted.</td>
</tr>
<tr>
<td>[S17]</td>
<td>conference paper</td>
<td>Supports the development of appropriate tools for automatic architecture reconstruction and reverse engineering of software systems.</td>
<td>Tool implementation with knowledge from case studies</td>
<td>Architecture visualization with change tracking is not clear.</td>
</tr>
<tr>
<td>[S18]</td>
<td>workshop paper</td>
<td>Built a prototype tool (KaitoriCap) that captures users’ Architectural Documents (AD) exploration paths and saves them with contextual metadata.</td>
<td>Prototyping and user evaluation</td>
<td>Information based on perceived usage in considered instead of actual AD usage.</td>
</tr>
<tr>
<td>[S19]</td>
<td>conference paper</td>
<td>Presents a reference architecture and a decision process-oriented knowledge metamodel that is synthesized from the domain specific functional requirements and quality attributes. A tool for these decision modeling concepts have also been described.</td>
<td>Tool implementation</td>
<td>Presented approach has not been applied to business domains outside IT.</td>
</tr>
<tr>
<td>[S20]</td>
<td>conference paper</td>
<td>A Web based Architectural Knowledge tool (ADUK) has been developed and highlighted the contribution through a suitable case study.</td>
<td>Tool implementation and experiment with case study</td>
<td>Tool features has not been discussed in detail.</td>
</tr>
</tbody>
</table>

*Table 6: summary of tools for AKM*
6. Future work. As mentioned earlier we have selected studies from only one electronic database that is IEEE Xplore. This limits the range of our research and the work can be extended by exploring research studies published in various other databases. We plan to explore those and refine the systematic review in a time of next one month.

APPENDIX

Appendix includes references to all the primary studies selected for this review.


[S2]. Rik Farenhorst, Hans van Vliet,”Understanding How to Support Architects in Sharing Knowledge”, IEEE ICSE’09 Workshop SHARK’09, May 16, 2009, Vancouver, Canada


[S17]. Lajos Schrettner, Péter Heged˝us, Tibor Bakota, “Development of a methodology, software-suite and service for supporting software architecture reconstruction” 14th European Conference on Software Maintenance and Reengineering,2010


[S20]. C. Dhaya, Dr.G. Zayaraz, “Development of Multiple Architectural Designs using ADUAK”, International Conference on Communications and Signal Processing (ICCSP), 2012

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Conference Proceedings


Journal Article


GAP ANALYSIS IN SOFTWARE ENGINEERING PROCESS ADOPTION IN IMPLEMENTING HIGH END EMBEDDED SYSTEM DESIGN

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³myjaved@ce.nust.edu.pk

ABSTRACT. Software engineering practices are customarily imposed on pure software projects. Embedded systems, where quality and performance are more important factors, practices imposed on software engineering are becoming more important. The embedded system software has to meet very critical reliability requirements and hard real time constraints. To meet these requirements and constraints it is essential to enforce software engineering practices in embedded systems. In this research work it is discussed how process of requirement engineering impact on the whole system development process in context of embedded systems. A framework for requirements specification of embedded systems is developed.

Keywords: Embedded system, Requirement engineering, RSD (Requirements specification document).

Introduction: Software engineering techniques are customarily applied on software projects. Embedded systems where the quality and performance are more important factors, software engineering practices are becoming more important. Embedded system is combination of both hardware and software components, which must be specified, design and implemented as well as it has to meet critical reliability requirements and hard real time constraints. These critical requirements make software engineering practices even more important for embedded systems. To ensure timely completion of project within specified budget with desire quality and performance it is important that software engineering practices should be followed. There is a need for new and improved development methods in embedded system industry to address these important factors. All the development process of the embedded system is depends on how the requirements engineering process is carried out. More than 50% of the problems occur in embedded system after system is delivered to the customer [1, 2]. A good requirement engineering process is considered as a prerequisite for successful project. Apart from implementing these requirements in every phase of development is also important. Correct implementation of requirements in embedded system is especially critical where both hardware and software are affected by them. However, there is a no systematic approach to address the requirement engineering process for embedded system. This research is carried out by the means of embedded system development. Though, requirements are specified, testing and evaluation is performed but there is no set format that can ensure correct specification of requirements. Testing of embedded system is another challenging task which should ensure full coverage of requirement specification. Testing and validation of these requirements are also performed but there is no set format and not any assurance that each test case covered each requirement.

In this research paper, discussed how the process of requirement engineering impact on whole system
development process is discussed. In section two, problem statement is stated. In section three literature review of existing requirement engineering processes and requirement engineering related to embedded systems is discussed. In section four research methodology is defined and in section five conclusion and future work is pointed.

2. Problem statement: There are many requirement engineering processes which are customarily applied on software project but there is no standard process for embedded system. Many research studies have been carried out in past regarding requirement engineering for embedded systems. They focused on different aspects of requirement engineering. This research specifically addresses embedded system development and production division. Requirement specification, testing and evaluation is performed but there is no set format. There is no any framework which can ensure that each test case cover each requirement specification. There is gap in software engineering process adoption in implementing defense embedded systems. Different problems are identified in requirement specification for embedded system. Requirement for embedded are hard to specify because of the absence of software engineering practices. When any change in requirement occurs it create inconsistencies among the requirements and system and make it difficult to trace the requirement through out the development process.

There are a lot of requirement specification tools are available in market but these tools can only help you in requirement management. Tool is not a process itself, these tools can’t help you in defining requirement engineering process for embedded system.

3. Literature Review: Embedded systems where the reliability requirements and hard real-time contraints are important factors the software engineering practices are becoming more essential to meet these requirements. The existing practices and some new methods are adopted by software engineers to effectively support the particularities of embedded systems [2, 3, 4].

On the basis of the literature review, it is shown that only few requirement engineering practices and tools are available to address the embedded system particularities [5, 6, 7]. As embedded system development is taken, where security and hard real-time constraints come together, which is a great challenge for software engineers. In embedded system development where the security is the main concern, to ensure security it is necessary for embedded software works correctly according to specified requirements [8].

With the help of software engineering practices we can solve problems by systematically convert the problem into software solution and after conversion maintenance of the solution can also be carried out using software engineering principals. Project which is developed through using software engineering processes, has to pass through different phase. These are cycle models of project. Phases of software engineering were first introduced by Royc [9] in waterfall model.

There are many other models like spiral model, iterative model, V-shaped model and component-based software engineering. In embedded system development hybrid of these model is mostly used. All the models share some generic software engineering activities. Requirements should be captured completely before moving to the design phase. Mostly 3-V model is used for embedded system development. In 3-V model, in initial step the simulation of system is developed and once the simulation is accepted, using COTS plateau design is mapped on prototype. After the acceptance of prototype the product development phase starts. In embedded system hardware and software are developed concurrently. The development process of embedded systems can be broken down into many parallel activities. These complex development activities influence the software engineering practices. If at any point re-designing of hardware is required it would effect budgets and timelines of project so the requirement should be specified completely as the rework will require and how it would impact on project.

There is another challenge in embedded system development, is to produce a system with high quality and before the system turn out to be obsolete supply it to the market. To improve the efficiency of the developers and to assure the quality of the software, as discussed in [10], software engineering techniques must be adopted by development team. Stakeholders can define their requirements with the help of requirement engineering processes [11, 12]. It also provides a clear understanding to the supplies, of what is being
implemented in embedded system. In requirement engineering process different users with different skills interact, they may include end user, customers, project managers, system engineers, software engineers etc. With the help of RE process, all kind of stakeholders can be facilitated to define baseline requirements, estimate the cost and schedule of project, provide a basis for agreement and a basis for system testing. whole process of RE results in trustworthy artifacts to drive the embedded system development process. Requirement definition process is shown in Table 1:

<table>
<thead>
<tr>
<th>Phase</th>
<th>Activities</th>
<th>Sub-activity</th>
<th>Artifacts Generated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Feasibility study</td>
<td></td>
<td></td>
<td>Feasibility Report</td>
</tr>
<tr>
<td>2. Requirement Elicitation</td>
<td>2.1 Define requirement Development process</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.2 Define vision and scope</td>
<td></td>
<td>Vision and scope Document</td>
</tr>
<tr>
<td></td>
<td>2.3 Identify user classes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.4 Select product champions</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.5 Establish focus group</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.6 Identify use cases</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.7 Identify system events and responses</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.8 Hold facilitated elicitation work shop</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.9 observe user performing their jobs</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.10 Examine problem reports</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2.11 Reuse requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Requirement Analysis</td>
<td>3.1 Draw context Diagram</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.2 Create prototypes</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.3 Analyze feasibility</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.4 Prioritize requirements</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.5 Model the requirements</td>
<td>3.5.1 Visually modeling the requirements</td>
<td>DFD, ERD, STD, Dialog maps, use-case diagrams, class diagrams and activity diagrams</td>
</tr>
<tr>
<td></td>
<td>3.6 Create data dictionary</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 1. Requirement definition Process activities and artifacts

In Figure 1, the whole process of requirement engineering is elaborated. This Figure elaborate how to switch between phases of while definig requirements. The oval shape represents the process and the artifacts generated from that process is represented by rectangle.

Figure 1. Requirement Engineering process flow from one phase to next
These requirement engineering processes are customarily imposed on pure software engineering projects, and do not address the particularities required by embedded systems [2, 8]. The traditional requirement engineering process needs adjustment in order to apply to embedded systems. The main output of the RE process is the requirement specification document. In this research work, the main focus is on requirements specification processes for embedded systems. For this purpose, literature review of current requirement engineering practices in embedded systems is carried out. Which reveals that difficulty occurs at initial stages of embedded system development [13, 14, 15, 16]. But there is any not particular process for specifying requirements for embedded systems.

Besides this, further investigation of the relationship between requirement specification and testing of whole system is performed and a relationship between RSD (requirement specification document) and system testing document is defined.

4. Methodology: Conceptual-theoretical research method is used which is further sub-divided into two phases:
1. Analysis phase
2. Synthesis phase

Analysis phase is based on literature review and study how the previous research on the embedded system requirements specification is carried out. Analysis phase is followed by synthesis phase in which new framework is constructed.

Developing a framework for requirement specification which is suitable for all kinds of embedded systems is a challenging task. Requirement specification is necessary to test the system against what is required and what is developed. Requirement specification is mainly related to the system testing. Requirements should be specified in such a manner that it should be easy to trace them and enables the system tester to generate correct test cases. Requirement specification document must have a validation criteria definition to check whether the system is running as expected. Literature review of IEEE Std. 830-1998 recommendation [17] and CMMI version 1.1 [18] is carried out.

Proposed framework has been divided into two phase first one is initial phase and second is main phase. In the first phase, overall system description is elaborated with the list of stakeholders. As depicted in Table 2. And in the second phase which is main phase of Requirement specification document we categorized requirements on the base of logical architecture of embedded system shown in Figure 2.

![Figure 2. Logical Architecture of Embedded System](image-url)
According to the logical architecture of the embedded system shown in figure 2 requirements for embedded system can be categorized as follows:

1. Hardware Requirements
2. Software Requirements
3. Interface Requirements
   a. User interface
   b. Hardware interface
   c. Software interface
4. User Requirements
5. Environment Requirements
6. Security Requirements
7. Performance Requirements

During the initial phase of the framework stakeholders will be able to get the overall idea of the system. It will help them to understand overall functionalities of the system. Business rules will be established during this phase, legal requirements and standard will be stated, all the system stakeholders will be identified and finally version of the document will be documented. In Table 2 activities of initial phase are listed and their descriptions are also provided. The artifacts generated after initial phase will help in the main phase where the requirements will be specified.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>Overview of the Document</td>
</tr>
</tbody>
</table>
| 2. Introduction to project | a. Project scope  
                             | b. Project purpose  
                             | c. Reference                                                        |
| 3. Business requirements   | Include all the business needs which should be addressed by the system. Definition of business rules include. |
| 4. Legal requirements      | Establish legal requirement check list.                                      |
| 5. Stakeholders            | List all the stakeholders which are directly or indirectly interact with the system. |
| 6. Version History         | List the previous version and current version of the document.                |

Table 2. Initial phase of RSD

Once the initial phase is completed it is necessary to transform these high-level requirements into a detailed requirement document. In main phase, a framework for documentation of requirements along with the test-case for each requirement is proposed. This will help both development team and testing team to check either each requirement is traceable or not. All the information about a particular requirement will be managed. Table 3a and 3b illustrate how the requirements will be managed along with integration testing document.
Tables 3a and 3b: Requirement specification

In Table 3a all the description about requirement is specified and in Table 3b all the description about test-case will be recorded. If test cases are traceable to the requirement specification document than tester can ensure that all requirements are covered in testing. With the help of this framework requirement engineers can specify the requirement for embedded system and also validate those requirements. Embedded system also include hardware requirements which are different from other requirements. The way they are specified and the information which is required to record for hardware is different. So Table 3a cannot be use to record hardware requirement. To record hardware requirements table 3a will be replaced by Table 4 n Table 3b will remain same.

Table 4: Hardware Requirement specification
Testing consist of sequence of step in which module testing, integration testing and system testing are include. Requirement specification activity is strongly related to the testing of a system. RSD and testing document relation is shown in Figure 3. For this requirements must be written in unambiguously and should be traceable. Requirement document must have validation criteria to which test result must conform. Requirement document must be manageable if any change occurs it should be recorded. With the help of this framework testers would be able to plan test cases while requirements are recorded. This will help in reaviling flaws at early stages which is inexpensive as compare to reaviling flaws after implementation. Module and integration testing is use to verify the architectural requirements. Module testing and integration are performed with development activities to ensure the accuracy of each module and interface requirements. However purpose of system testing is to validate the overall system functionality. Checking consistency between requirements and test-case will also help in to ensure that correct system functionality is being tested. Tracing test-cases back to requirements will ensure that no requirement has been left. This will also help testers to arrange test-case which required extra resources.

**Figure 3. Framework for identifying relationship between RSD and system testing document**

5. **Conclusion and Future work:** In this research work, a framework for Requirement specification for embedded system along with test-cases has been proposed. Further analysis of the relationship between requirement specification document and system testing document is done. This framework is for embedded systems where the correct requirement specification in critical to ensure quality, performance, reliability, security and other critical requirements. However this framework can be use for software projects by ignoring the hardware related requirements. In future work, implementation of this framework on embedded system project will be done and tool by using this framework to manage the requirements will be developed.
REFERENCES


PRE-COMPETITIVE ANXIETY LINKED WITH GENDER DIFFERENCE IN COLLAGIATE ATHLETES OF KHYBER PAK

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midrees@awkum.edu.pk

ABSTRACT: This study aimed to investigate difference in levels of pre-competitive anxiety in athletes of both sexes, in team & Individual Sports. The components of pre competitive anxiety was assessed by using the instrument of competitive state anxiety inventory -2 (CSAI-2) Martens, Vealey & Burton, (1990) was a set of questionnaire consisting of 27 items equally divided into 3-sub scales of cognitive anxiety, somatic anxiety & self-confidence. The subjects (N=720), included male (360) & female (360) athletes of team sports, Volley ball, Basket Ball, Hand Ball and individual sports, Table Tennis (single), Badminton (single) & Athletics between the ages of 16-27 years. The CSAI-2 administered one hour before the competition. The results were analyzed by t-test. The finding showed there was no significant difference in cognitive anxiety & self-confidences and significant difference in somatic anxiety levels among male and female collegiate athletes. While the three sub-scale (cognitive anxiety, somatic anxiety and self-confidence) were not significant in athletes of team and individual games.

Introduction: Generally speaking anxiety is a state of apprehension, uneasiness and stress, as some sort of emotional tension. Freud (1926) stated that anxiety stems from unconscious conflict that serves as a signal that unconscious impulses may erupt into consciousness and thus the individual fears punishment from his or her conscience for thinking about something that the superego considers bad. In the face of these dangers the person's ego unconsciously attempts to regain control by activating defensive processes that disturb the reality.

Anxiety occurs when a person feels threatened or when he is unprepared to respond adequately to a situation. It may occur when there is disruption or breakdown in effective coping and problem solving. According to Spielberger (1966), any situation which interrupts or threatens the interruption of organized responses, and which does not offer alternate responses to the organism will be anxiety producing situations.

According to the clinical psychologists there is always a process of information in anxiety based on attentional resources. They mentioned that individuals with high level of anxiety allocate attentional resources preferably to threatening stimuli. When threatening stimuli exist in the environment, they are more likely to detect them sooner than non-anxious subjects when threat is detected they focus more of their attentional resources on the threat than non-anxious subjects. Individuals high in anxiety experience higher level of general arousal in threatening situations than do non anxious individuals (Fridlund,et al: 1986).
**Competitive state anxiety** that occurs prior to a competitive situation is referred to as **pre-competitive state anxiety**. According to Endler (1978, 1983) as cited in Richard Cox (2007), there are five specific predictors that lead to an increase in anxiety in anticipation of an achievement situation. These five predictors are as follows:

1. **Fear of performance failure** Fear of getting defeated by a weaker opponent could pose a threat to an athlete’s ego.
2. **Fear of negative social evaluation** Fear of being evaluated negatively by thousands of spectators could pose a threat to self-esteem.
3. **Fear of physical harm** Fear of being hit in the head by a 90 mph fast ball could pose a serious threat.
4. **Situation ambiguity** Not knowing if she is going to start a match is sometimes stressful to an athlete.
5. **Disruption of well-learned routine** Being asked to change the way he does things without practice and warning could be threatening to an athlete.

Like all other emotions, anxiety has both a trait component and a state component. The trait component is like a personality disposition, whereas the state component is a situation-specific response.

It is believed that there are both cognitive and somatic components to anxiety. **Cognitive anxiety** is the mental component of anxiety caused by such things as fear of negative social evaluation, fear of failure, and loss of self-esteem. **Somatic anxiety** is the physical component of anxiety and reflects the perception of such physiological responses as increased heart rate, respiration, and muscular tension. Both state and trait anxiety are believed to have cognitive and somatic components. In the sport psychology literature, the notion that anxiety has both cognitive and somatic components is referred as **multidimensional anxiety theory** (Martens et al., 1990).

Anxiety in different forms permeates the lives of many, whether they are emotionally balanced or maladjusted and for the college going players who take part in sports competitive activates, they are to be expected to experience anxiety before or during competitions. Hence pre-competitive sports anxiety is an area of major interest to the Trainers, coaches, athletes and sports persons.

In my work as physical Education lecturer, many of the college level athletes approached me for help and advice because they are unable to cope with the pressure of competition and experiencing high anxiety symptoms before or during competition.

The above observations are also common phenomenon among female athletes. Throughout the Pakistan thousands of college level athletes of both sexes participate in sports activates. For many athletes these competitive activities can be filled with anxiety i.e Fair of failure, Societal fear and worry of not up to the expectations of coach, seniors, spectators and family members.

The effects of anxiety level on sports performance is a major concern for coaches and athletes of both sexes, taking part in various games. Therefore, anxiety is the most important field of study in sports psychology. A clear understanding of how athletes of both sexes differ with regard to anxiety would provide coaches and athletes valuable information to help to improve the performance.

The role of anxiety in sports has been a subject of great debate for decades. Numerous studies have been conducted abroad in this regard, but in Pakistan no such study has been available so far. keeping in view the social, cultural, religious, economic, environmental, geographical and political aspects of Pakistan which were different from that of the other parts of the world. The researcher considered that there was an urgent need of arousing awareness of sport pre-competitive anxiety and its impact on sports performance of athletes (players) in Pakistan. This study give awareness to athletes and coaches of both sexes about sports pre-competitive anxiety levels and its impact on sport performance. In Pakistan and especially in Khyber Pakhtunkhwa, usually male coaches were appointed/hired for training/coaching of female athletes, at college level. So the results of this study would also be helpful for those coaches, working in colleges and perform duties of coaching of athletes of both sexes.

This study would bring awareness in the coaches that anxiety is enemy of sports performance and its control thorough various psychological techniques should be the part of coaching.

Coaches can through this study, find out the coping strategies for reducing the debilitating effects of
pre-competitive sports anxiety. This study will open a gate for further researches in Pakistan.

**Statement Of The Problem:** Anxiety has a gross impact on sports performance of athletes. This study measured the pre-competitive anxiety differences at college level athletes of both sexes in terms of individual sports and team sports.

**Literature Review:** Sports are essential element for every nation and, everyone is directly or indirectly involved in sports either by playing or by watching. People play usually for two reasons one for money and other for fun. Sports can make people come close to each other because of their fans and this likeness has been transferred from one generation to another. After tough and tiring routine student need some recreation in the evening and outdoor games are best for them. Games are not only refresh them but it’s also teaches them how to discipline in life.

It has been found that sports participation is important for the development of children and young people, because sports characterize and builds mental and physical health. Without sports or lack of physical activity one may not be able to cope with stressors in life. Proper sports and physical activity also provides psychological well-being and helps to strengthen self-esteem especially in children, adolescents and adults.

Sports psychology is the study of psychological and mental factors that affect and are affected by participation, performance in sports, exercise and physical activity. Research suggests that the sports environment can provide socialization opportunities and place adaptive demands that are similar to those of other important life setting (Smith & Small, 1991).

It is true that sports contribute to psychological wellbeing but sportsman’s physical and mental condition is affected by competition anxiety, which may negatively affect their performance during competition. Competition anxiety can interfere performance because it may cause problem in coordination of movements during stressful condition. Intense anxiety situation also harm performance. If these problems left untreated it may lead to the development of acute stress disorder.

There has been a large amount of research concerning multidimensional aspect of anxiety (Jones, Swain, & Cale, 1991; Martens, Burton, Vealey, Bump & Smith, 1990). Anxiety consists of two subcomponents: cognitive and somatic anxiety. Cognitive anxiety is characterized by negative concerns and worries about performances, inability to concentrate and disrupted attention (Davidson and Schwartz, 1976).

Somatic anxiety consists of an individual’s perceptions of physical sensations of arousal, which are characterized by feeling, such as sweaty palms, butterflies and shakiness (Martens et al, 1990). Caruso, Dzewaltowski, Gill and Mc Elroy (1990) However research results have been challenged the assumption that anxiety is always detrimental to athletic performance (Raglin & Hanin, 2000).

Researchers got contradicting conclusions towards anxious and non-anxious subjects in competitions (Singer 1980). Anxiety has been reported as detrimental to performance in some studies such as Burton, 1998; Wiggins & Brustad, 1997 and Martens et al; 1990. Where in others such as Jones, 1995, anxiety appears facilitative to performance. A part from that the level of anxiety has been found to be significantly different at different times before competition (Ussher & Hardy 1996 in Edwards and Hardy, 1996). At the Same time, it has also been found to be not significantly different at different times before competition (Wiggins & Brustad, 1997). In short the findings of above studies are very varied. The inability to cope with the pressure in competitive sports can lead not only to decreased performance but also to physical illness and mental distress (Weinberg & Gould 1995). No research has reported that anxiety is conceptualized differently by males & females (Perry & Williams 1998). Research has demonstrated difference between the sexes in the intensity of anxiety responses (e.g. Martens et al, 1990). Research has also been done on the Gender differences concerning state anxiety levels. Male athletes typically display lower level of anxiety and higher self-confidence than female athletes (Krone & Williams, 1994; Wark & Wittig, 1979; Scanlan & Passer, 1977). Krane & Williams, 1994, found no gender differences for cognitive anxiety. They also demonstrated that the more experienced college player would show lower levels of cognitive and somatic anxiety then the less experienced player. However they found no difference in the levels of self-confidence. Eric Thomas, Jason P. Kring 1996, found difference in anxiety levels of both sexes which are congruent with previous research in which men scored higher on self-confidence and lower in somatic and cognitive
anxiety (Martens et al; 1990, Krane and Walliams 1994).

Anxiety in female will be higher both the cognitive and somatic components and lower in self-confidence than their male counter parts as indicated by several previous studies (Martens et al; 1990, Krane and Walliams, 1994; Madden and Kirby, 1995; Swell and Endmondson, 1996).

Females tend to report higher anxiety levels than males and rate this anxiety as more debilitating for performance (Jones & Cale, 1989; Jones, Swains, and Cale 1991; Krane and Williams 1994; Thatcher & Dorling 2004).

Extreme level of mental and physical anxiety can have a debilitating effect on those competing in individual sports such as diving, single Tennis, Track and Field, where a great deal of pressure is focused on one athlete. It is therefore necessary that coaches, trainers and athletes understand how sports context specifically influences anxiety and confidence.

Martens, Vealey and Burton (1990) theorized that athletes in individual sports would report more cognitive anxiety and lower levels of self-confidence. Martens et al. Reasoned that for athletes who performed solo, “……the threat of evaluation is maximized; that is, the diffusion of responsibility for performance errors is minimized……” (P-142). In other words, individuals would be more anxious mentally and have less confidence in their ability because they alone are responsible for their own success or failure. In contrast, somatic anxiety was not expected to be differ between individual and team sports’ participants. In their study, Martens and his colleagues defined Basketball and Volleyball as team sports and Gymnastic, Swimming and Track as individual sports. Results of their study indicated that individual sports athletes reported higher levels of cognitive anxiety and lower levels of self confidence. However contrary to their predictions levels of somatic anxiety were also higher for the athletes of individual sports Wong et al. (1993).

Eric Thomas, Jason P. Kring (1996) also conducted a study on anxiety and self confidence relation to individual and team sports and their results also supported that of the previous studies of Martens and his colleagues.

Research Objectives:

1. To analyze sports pre-competitive anxiety levels in male and female athletes.
2. To investigate the sports pre-competitive anxiety levels in athletes of both sexes in both team and individual sports.
3. To promote research contributing to advancement of knowledge in the field of sports psychology in Pakistan.

Research Hypothesis:

1. Female athletes have high sports pre competitive anxiety (SPCA) levels than male athletes.
2. Athletes of both sexes participating in individual sports have high SPCA levels than athletes participating in team sport.

Limitation Of The Study: This study was limited to selected (Boys & Girls) colleges particularly Degree & Post Graduate. The age of the athletes was 16-27 years. The colleges belong to five selected Districts of Khyber Pakhtunkhwa and were actively involved in sports activities. The Districts affected from terrorism were excluded in this study because the data collection was not possible in those Districts.

Sample Of The Study: Sample of the study was (N = 720). Athletes of various colleges of five Districts of Khyber Paktunkhwa i.e., Peshawar, Charasadda, Mardan, Swabi and Nowshera were selected randomly during male and female sports competitions of Educational Institutions.

In this study N = 720
Male athletes = 360
Female athletes = 360
Individual sports (games) male athletes = 180 (Table Tennis Single, Badminton Single and athletics)
Individual sports (games) female athletes = 180 (Table Tennis Single, Badminton Single and athletics)

Team sports (games) male athletes = 180 (volleyball, Basketball and Handball)

Team sports (games) female athletes = 180 (volleyball, Basketball and Handball)

**Instruments:** Personal information questionnaires (PIQ) contained information regarding the (student) athlete name, gender, age, class, game, numbers of years playing the game, numbers of tournaments/ championships participated, name and level of highest standard championship / tournament participated, doing practice/training regularly or occasionally etc, and competitive state anxiety inventory –2 (CSAI-2) Martens et. al, 1990. (CSAI –2, Martens, et al., 1990) is the measure of choice for most researchers of competitive anxiety. The CSAI-2 has 27 items over all, with 09 items each of three subscales, cognitive anxiety, somatic anxiety and self-confidence. The CSAI-2 was scored by computing a separate total for each of 3 sub scales, with score raging from a low of 9 to a high of 36 for each sub scale, the higher the score, the higher the level of anxiety-state and self confidence. A high degree of internal consistency for the sub-scales has been reported in several studies with alpha coefficient ranging from 0.79 to 0.90 (Edward & Hardy, 1996)

**Procedure:** The PIQ and CSAI-2 were administered to the participants approximately one hour before the competition or practice. Before completing the questionnaire Martens statement was read aloud, using the response set, “how are you feeling right now”? The CSAI-2 has shown adequate reliability and validity across different studies and samples see Martens et al., 1990, Edward and Hardy, 1996.

**Data Analysis:** The study data was analyzed carefully by using t-test. SPSS (version 11.5) was used for data analysis.

Table 1.1

Independent Sample t-test of cognitive component of Pre – Competitive anxiety between Male & Female Inter collegiate athletes (N= 720)

Table 1.1 depicts that mean of cognitive component of anxiety in male athletes is greater than female athletes i.e. 19.8 > 19.2.Similarly standard deviation in first case is 5.1 while in second case is 4.2.1-value is1.63 while P- value is 0.10 as the level of significance was set at 0.05. Therefore, finding revealed that there was no significant difference existed between male & female collegiate athletes on sub variable of Pre-competitive Anxiety (Cognitive Anxiety).

Figure. 1.1
Figure 1.1 is showing Mean Scores of Cognitive Anxiety between Male Athletes & Female Athletes. Cognitive component of anxiety in male athletes is greater than female athletes i.e. 19.8 > 19.2.

Table 1.2
Independent Sample t-test of Somatic Anxiety between Male & Female Inter collegiate Athletes (N=720)
Table 1.2 shows that mean of Somatic Anxiety in Male & Female Inter collegiate athletes are 18.2 & 19.9 respectively. While Standard Deviation in case of male is 4.7 & in female is 4.4. The value is 4.97 & P-value is 0.00. The level of significance was set at 0.05. The result indicates a significant difference between the obtained scores of male & female Intercollegiate Athletes.

Figure. 1.2

<table>
<thead>
<tr>
<th>Sub Variable of Pre-Competitive Anxiety</th>
<th>Gender</th>
<th>Numbers</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Degree of Freedom</th>
<th>t-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatic Anxiety</td>
<td>Male</td>
<td>360</td>
<td>18.2</td>
<td>4.7</td>
<td>359</td>
<td>4.97</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>360</td>
<td>19.9</td>
<td>4.4</td>
<td>359</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sub Variable of Pre-Competitive Anxiety</th>
<th>Gender</th>
<th>Numbers</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Degree of Freedom</th>
<th>t-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Confidence</td>
<td>Male</td>
<td>360</td>
<td>28.0</td>
<td>6.6</td>
<td>359</td>
<td>1.40</td>
<td>0.15</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>360</td>
<td>28.6</td>
<td>5.2</td>
<td>359</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 1.2 reveals that Female Athletes rating on the Somatic Anxiety of SCAI-2 is higher than Intercollegiate Male athletes of KhyberPaktunkhwa.

Table 1.3
Independent Sample t-test of self confidence between Male & Female Inter Collegiate athletes (N=720).
Level of significance is set at 0.05. Mean of Male athletes is 28.0 & Mean of Female Inter Collegiate athletes is 28.6. Where 28 < 28.6. Similarly Standard Deviation is 6.6 & 5.2 where 6.6 > 5.2. P- Value >0.05. Hence self confidence levels of Male & Female Inter Collegiate athletes are not significant.

Figure. 1.3
Figure 1.3 is presenting mean Scores of Self Confidence between Male Athletes & Female Athletes. Self Confidence level in Male athletes is lower than Female athletes i.e. $28 < 28.6$.

Fig. 1

Table 2.1
Independent Sample t-test of cognitive anxiety between athletes of team games & individual games (N=720).

<table>
<thead>
<tr>
<th>Sub Variable of Pre- Competitive Anxiety</th>
<th>Games</th>
<th>Numbers</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Degree of Freedom</th>
<th>t-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cognitive Anxiety</td>
<td>Team</td>
<td>360</td>
<td>19.6</td>
<td>4.6</td>
<td>359</td>
<td>0.57</td>
<td>0.566</td>
</tr>
<tr>
<td>Individual</td>
<td>360</td>
<td>19.4</td>
<td>4.8</td>
<td>359</td>
<td>0.57</td>
<td>0.566</td>
<td></td>
</tr>
</tbody>
</table>

The above table shows that means of Cognitive Anxiety of athletes in team & individual games are 19.6 & 19.4 respectively where $19.6 > 19.4$ & Standard Deviations are 4.6 & 4.8. Level of significant was set at 0.05. P-Value > 0.05. Hence Cognitive Anxiety levels of athletes in team & individual games are not significant. Figure. 2.1
Figure 2.1 shows that Cognitive Anxiety level of athletes in team games is higher than athletes of individual games.

Table 2.2 Independent Sample t-test of Somatic Anxiety between athletes of team games & individual games (N=720).

Table 2.2 indicates that mean of athletes of team games is less than mean of athletes of individual games i.e., 18.8 < 19.3. Standard Deviations are 4.2 & 5.0 respectively. Calculated t-Value is – 1.39 while P-Value is 0.16 as P-Value > 0.05. therefore, the result is non significant.

Figure. 2.2

<table>
<thead>
<tr>
<th>Sub Variable of Pre-Competitive Anxiety</th>
<th>Games</th>
<th>Numbers</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Degree of Freedom</th>
<th>t-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatic Anxiety</td>
<td>Team</td>
<td>360</td>
<td>18.7</td>
<td>4.2</td>
<td>359</td>
<td>-1.39</td>
<td>0.16</td>
</tr>
<tr>
<td>Individual</td>
<td>360</td>
<td>19.3</td>
<td>5.0</td>
<td></td>
<td>359</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 2.2 is showing that level of Somatic Anxiety of athletes in team games is less than athletes of individual games i.e. 18.8< 19.3.

Table 2.3 Independent Sample t-test of Self Confidence between athletes of team games & individual games (N=720).

Table 2.3 reveals that mean 28.5 > 28 & P-Value > 0.05.therefore, the result is not significant.

Figure 2.3

<table>
<thead>
<tr>
<th>Sub Variable of Pre-Competitive Anxiety</th>
<th>Games</th>
<th>Numbers</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Degree of Freedom</th>
<th>t-Value</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Confidence</td>
<td>Team</td>
<td>360</td>
<td>28.5</td>
<td>5.5</td>
<td>359</td>
<td>1.26</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>Individual</td>
<td>360</td>
<td>28</td>
<td>6.3</td>
<td>359</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 2.3 tells that Self Confidence in team games is higher than individual games i.e. 28.5 > 28.

Research findings and conclusion: The aim of this study was to investigate that was there any difference in levels of pre competitive anxiety in both sexes, in team and individual sports. The pre-competitive anxiety was measured by CSAI-2. Female athletes have high sports pre competitive
anxiety levels than male athletes, was found valid up to some extent because mean of cognitive component of anxiety in female athletes was greater than male athletes \( i.e., 19.8 > 19.2 \) similarly means of somatic component of anxiety in female and male athletes were 19.9 and 18.2 where \( 19.9 > 18.2 \). Male athletes has shown high self-confidence level in the female athletes. The result of the study showed that although there was no significant difference found in the cognitive component of the pre-competitive anxiety and self confidence among male and female collegiate athletes but mean of cognitive component of pre-competitive anxiety of female collegiate athletes was higher than their male counterparts contrary to this the self confidence level of male athletes was higher than female athletes. In this study the somatic component of precompetitive anxiety among male and female athletes was significantly different.

The above results are supported by findings of many others researchers such as Hammer Miester, Burton(2004), Remella and Deluca (2003) and Amponge(2001), Martens at al;(1990), Krane and Williams(1994), Swell and Edmondson(1996), Perry and Williams(1998), Maddin and Kirby (1995), Eric, Thomas, Jason and P. kring (1996). Athletes of both sexes participating in individual sports have high SPCA levels than athletes participating in team sports. Although result was non-significant in all three sub variables of pre-competitive anxiety of athletes of team and individuals but mean of cognitive component of pre-competitive anxiety of athletes of team and individual games were 19.4 and 19.6 respectively where \( 19.6 > 19.4 \) i.e., mean of cognitive anxiety is higher in athletes of individual games than team games. Similarly mean of somatic component of anxiety in athletes of individual games was higher than the athletes of team games i.e., \( 19.3 > 18.7 \).

In case of self-confidence the result depicted that mean of self-confidence of athletes of team games was higher than the athletes of individual games i.e. \( 28.5 > 28 \). It was hypothesized that individual sports athletes would report more cognitive and somatic anxiety and lower levels of self-confidence than their team sports counterparts.

The result supported this although the result showing non-significant levels. The results were consistent with the findings of Martens.et.al,(1990), Wong et.al (1993) and Eric Thomas, Jason, P. kring(1996). This study fulfill the goal that collegiate athletes show different reaction to the stressor involved in the competition when performing solo or part of larger team. In different events, this and future studies will facilitate the development of coping skills to be used by coaches, trainers and athletes at all levels of competitions.

**Recommendations:** The present study is the ever first try to give awareness to athletes, coaches, trainers and DPE’s about the impact of pre-competitive anxiety levels on sports performances particularly in KPK and Pakistan.

The result of this study will helpful for those coaches working in colleges and perform duties of coaching of athletes of both sexes in Pakistan and particularly in KPK. Coaches can through this study find out coping strategies for reducing the debilitating effects of pre-competitive anxiety. In future further research with truly high standard performers is needed to enhance our understanding of effects of anxiety on sports performance. Similar studies with larger Sample and Population keeping in view, Trait anxiety, other personality traits and directional approaches of pre-competitive anxiety in any sports can be carried out in depth to solve the problem.

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AN EFFICIENT SYSTEM FOR GENERATING
REPORTS OF COTS USED IN COMPONENT
BASED SOFTWARE ENGINEERING

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ABSTRACT. The world is advancing towards 4th generation techniques of software
engineering (SE) and new paradigms are being introduced in every area of SE to
outfit new demands of the progressive world. The primary focus of Project
Management is time and cost. We are trying our level best to make processes fast
and more responsive in order to overcome the time and budget constraints. In the
area of software engineering, development of a new system is a comparatively slow
process due to which most software projects lag behind the schedule and infringe
the deadlines which in return have direct impact on expenditure. To overcome this
problem Component Based Software Engineering (CBSE) was introduced which
opened up into a new dimension in software development process. Using
commercially off the shelf components (COTS) have proved to be an immense
assistance to developers reducing a great amount of development time and cost. But
their lies a problem in using COTS or a prewritten module or code i.e. we have to
customize it as per our requirements. This customization requires complete
understanding of the module as a part or the component as whole. To understand a
prewritten code is never an easy task. We propose an efficient and effective system
for report generation of input software components that will be a great assistance
for programmers who frequently need to customize codes or COTS according to
organization’s need.
Keywords: SE, COTS, 4th GENERATION SOFTWARE ENGINEERING, CBSE.

1. Introduction. World is making progress by leaps and bounds and the evolution of technology is paving
new paths in every field of knowledge. Like all other branches of Knowledge, Software Engineering is also
making its contribution in world’s advancement. It will be in no way wrong to say that Software Engineering
is providing a mandatory support to world’s progress.
Software engineering is a process that starts from an idea and ends up into a grand system. Like all other
sciences, Software Engineering has some paradigms and heuristics which makes the foundation of Software
development process. With the passage of time more efforts are being used in finding ways to make software
development process faster and easier. At the same time the production of more supple, manageable and less
error prone software systems are also serving as primary milestone to be achieved and focused in every
software development life cycle.
Ever since the birth of Software Engineering, there have always been many approaches for software
development and they all evolved with time and became more generic and applicable. They cover waterfall, evolutionary and many other software development methodologies. Many eras have passed and now world has entered in 4th generation techniques of Software Engineering. This opened up a new way of development i.e. component based development which includes using COTS, DLLs, Services and many more.

The question arises that why custom development has evolved into component based development of new system and when to make the decision between make and buy? What were the issues with custom development which are being addressed in component based development and what are the issues and complexities in component based development? Does the constraints on component based development strong enough to compliment the custom development?

Not only these but also other queries will be addressed in this paper and we also propose a system that will discourse one most concrete issue in component based development process. The propositions start with the fact that when the decision has been made to use any component then the obstacle arises to customize that component which require a thorough understanding of the plugins and internal architecture of the system. To understand someone else’s program means to be in that state when he was coding and also to understand the approach with which he was coding. This is impossible at least without supernatural powers that we lack in this fragile world.

The solution is that there must be a tool that can generate a report about the component by doing a thorough examination of the component. The report will not only be a source of understanding about the component but will also help engineer who wants to customize that component.

2. Comparison Between Custom Development And Component Driven Development.

2.1. Cost and Budget Comparison:

A software development process starts with the requirements gathering and elicitation then after the design and implementation, exhaustive testing is done and then the product is deployed and maintenance phase starts and this cycle continues for every new requirement and fault. This is the paradigm of the most custom software development and the most generic one too. While discussing the cost and budgetary of a software life cycle we can use a simple Bar chart as in Fig.1

These results were obtained after careful analysis of different Projects at Islamabad. The results show a clear distinction between the costs of custom development and component based development, this is due to the fact that, using a well-managed and trustworthy component can reduce the cost of maintenance. As long term maintenance cost can be reduced by using COTS (Commercial off-the-shelf, 2012), but integration cost is the one, most affected by the software system architecture.

![Figure 1. Cost Comparison between CBSE and Custom Development.](image)

Integration and testing cost of component based development is high because component must be tested properly for maximum scenarios. Requirement and coding cost in component based development is also high than custom, because requirements also involve the cost of choosing the best and suitable component and coding involves the cost of customization. As far as the customization is concerned we must know the internal
details of the component which we are generating by our proposed system. This will further reduce the cost of
coding in component based development by reducing the learning time of the component.

2.2. Schedule and Time Comparison: Reduced Cycle time and improved productivity with fewer people
means lower cost (Bhattachariya). The foremost objective of today’s progressive world is time. In software
development time management is a primary concern that prevails from requirements gathering till
deployment. Time and schedule are catered by using milestones strategy and also by strict time
management. When Component based SE was introduced the major pledge that it had over custom
development was regarding time. By using COTS, time of coding and maintenance was highly reduced and
left more time for requirements gathering, risk analysis and testing which in return has direct impact on
Quality. A component selected based on requirements, will accelerate the SDLC to testing phase eliminating
the time for designing and coding from scratch.

2.3. Complexity Comparison: The discussion to use COTS or reuse a legacy Component cannot be made
simply because the item “Fits In” the architecture (Galorath). Though architecture is a key to reuse
(Reifer, 1997), yet we must not overlook the result of above discussion that COTS products often require
significant effort for their integration in a system. The complexity comparison supports Custom SDLC as
inventing from the scratch is a simplest approach to be followed but there are chances that a person can take
over a project in middle which can be troublesome. In all these scenarios our proposed system will be a great
help because by that new comer can generate the report of the under construction module and can have a
quick go through of what has been done and what is due to be done.

2.4. Issues with COTS: Component based SDLC starts with requirements gathering which is extended to the
selection of Components or COTS, then these components are learned and customized and then integrated to
give the intended software which is then tested and deployed. It seems to be a quite straight forward process
but this has some major issues which certainly want urgent attention because without addressing these issues
progress in Component based will not be proceed further. Some of the issues are:

- Component must support the style of interactions of the system architecture in order to work together
  with other components.
- Choosing a wrong component may be more expensive than fixing problems in custom Software.
- There may be no source code available and no way to see the internal details of the component to
  customize it (Morisio).
- Unavailable, Incomplete or unreliable documentation of the component (Morisio) can add to
  complexities as well.
- An unpredictable Learning curve associated with the component (Morisio).

Among all these issues our proposed system will address one concrete issue that is concerned with the
understanding of the component in order to customize it. A tool that can take component as input and generate
report based on that component will be a great assistance for developers.

3. Practical Considerations. This section describes the software System Design that will develop to achieve
the above mentioned goals. This Design inputs a component and will generate a detailed report which will contain

- Index page for showing all modules in the component.
- Detailed report about every module in the component in separate chapters.
- Diagrammatical Data Flow between different modules of the component.

3.1 System Architecture. Proposed system will take a component as input and will generate a report
regarding its internal working. The report will be generated by using the parsed code of the component. We
need a parser to parse and tokenize the source code. Then index page and the detailed report per module will
be generated. In the end all these reports and the index page is consolidated into a single report of the whole
component in Figure 2.
3.2. Index Page Generation. For index page generation we will traverse the tokenized list which contains all the tokens of the parsed code and check for module names and keep them in a separate list. This list will be used to generate index page. We will count the page per module in detailed report section and also store them in a list containing module name and pages of its report. Then we will merge both list and generate index page which will show the starting page and the module name like a standard book index. Working is shown Figure 3.

![Figure 2: Complete System Flow](image)

We are using three counters for this purpose. C_Page is a counter for current page. S_Page is a counter for the starting page of any module and E_Page is the end page counter of that module. The results of these counters are being stored in “n*3” size list where ‘n’ being the number of modules and ‘3’ are the columns each for the respective counters.

3.3. Detailed Report Generation. For detailed report per module we are using the approach of expected tokens. Tokenized and parsed code that is in the form of a list of tokens is used for this purpose. We will get a token; first decide whether it is a key word, variable, functions’ name, class name or a number. Then we will get all tokens of one statement from the first got word till the next line is starting. We will locate the end of one statement by inspecting some end of line operators like”; “in C++. Then we will use the tokens of each statement and concatenate them with some pre-defined phrases and form a sentence. This is how all statements of a module will be converted into English sentences.

For example:
Input Line: int abc =10;
Output Sentence: Variable abc is being initialized as Integer by a value 10.
It is a very simplest example but can give a clear idea of Report Generation Schemas. The blend of phrases and keywords will give good structured sentences. The choice of phrase is done on the basis of tokens. As “abc” indicates that it is variable name as it is not a Keyword. It can be referred as a Function name but a function name has “(“followed by the name. Likewise “=” indicated an assignment and “10” is its value. One more thing we will do, we will maintain a list of all modules and pages required in its report. This list will be used in Index page generation as shown in Figure 3.

![Diagram](image)

**Figure 3: Index Page Generation**

3.4. **Diagrammatical Dataflow Generation.** This data flow diagram is just a simple block diagram which will show the modules in the form of blocks. Input and output parameters of each module will be taken from the parsed list of code. These input and output parameters will be used to make a link list so that we can locate which module is taking input from which module. This diagrammatic flow will give a summarized idea of the whole report.

4. **Analytical Results.** In order to check the usefulness of the provided paradigm a survey was conducted at 5 software houses at Islamabad among 30 Developers. The survey contained queries regarding the learning time of a component that is to be used in component driven development. Survey contained a checklist with learning time against KLOC (Kilo line of codes) of the component. Learning time is compared when no report is present across the component and when a report or documentation is present. The results showed that developers felt easy in understanding the component when the report of component was available. The results of the survey can be explained as in table 1.
Results show drastic decrease of learning time when the report of the component was available and the decrement can be considered upto 50%.

5. **Future Work.** This report generation system can be used for making generalized report of every programming language. System can be designed using Artificial Intelligence and Neural networks to make more generalized and intellectual reports. This system can be evolved to a much higher spectrum and can be used as a helping component in CBSE.

6. **Conclusion.** In CBSE the learning time of the component is critical and can be effective enough to halt the development process and violate deadlines. This learning time can be reduced by using a report generation system that will give an idea about the inner details of the component in human equitable language that is easy to perceive and comprehend.

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DOMESTIC VIOLENCE LAWS AND PRACTICES IN PAKISTAN

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ABSTRACT: The fundamental values of a country are reflected in its legal system that is encompassing the normative and social structure. The comprehensive legal structure in Pakistan treats domestic violence by taking into consideration two most important components, i.e. the constitutional law and the legal framework designed in the light of implementation of Shariah principles. In this Article, the legal treatment of domestic violence in Pakistan is examined to conjecture about the attitudes of variant mind-set to gender issues under the law in Muslim societies. The response to domestic violence is articulated in the values infused in constitution or law making or while devising fundamental values promulgated in the implementation of shariah. The legislation must be based on the foundations of Shariah’s philosophy in Pakistan to demonstrate that implementing shariah Laws as per social change will promote awareness of women rights in the country.

Key Words: Domestic violence, Pakistani Women, Legislation and Shariah Principles, Gender based violence

1. Introduction: Domestic violence against women is a complicated issue having different rationalizations to comprehend it. Researches all over the globe have shown that violence against women is a major social problem that demand special focus on account of severe physical, psychological, social and emotional consequences attached to it. Violence against women by intimate partners has serious implications for women’s physical, mental and social well-being. Domestic violence in Pakistani culture, recognized in the last two decades is receiving the attention primarily by the sustained efforts of women rights groups. The present research on domestic violence examines the prevailing knowledge, attitudes and perceptions that influence this practice. Through descriptive analytical investigation, specific societal behaviors are identified that reinforce violence. The aim of the study is to address the deficiency of not receiving adequate profiling by the society and to define it in Pakistani context by studying the prevalence, types, dimensions, factors and consequences of domestic violence and its impact on women.

2. Violence against Women in Historical Context: Women are considered the property of men since ancient times she had no rights on her children, inheritance, wages or belongings at all. The authority of a man over her allows him to use violence that was considered a legal right and social acceptance. In Indo-pak Subcontinent, customs and traditions were given preference over religious laws that actually had a negative impact on Muslim society. Hindu traditions had gradually been adopted as a necessary element and inseparable tradition. Thus basic rights of women were twisted and the notion of women being sub-ordinate become so infused in societal norms that protection of religion was dominated by customary traditions denying the same. The patriarchal gender system is the root of inequalities and gender discrimination against women in Muslim societies. Different factors play their part in variable status of women in different parts of the world; like, cultural value patterns in a specific community or variance in economic patterns and strategies of nations. When a culture legalizes the occurrence of violence in its direct or structural form; such acts of direct violence become part of institutional structural frameworks. Thus violence can be categorized as direct violence is an event, structural violence is a process and cultural violence is an invariant permanence.
3. Violence against Women in Pakistan: Being an ideological Muslim state, Pakistani laws are within the Islamic principles of Quran and Sunnah. However, Pakistani culture is influenced by other religions and cultures thus the culture of Pakistan is not pre-dominantly Islamic. On a broader scale the basic ideology stems from Islamic thought. But this does not connote that issues faced in familial affairs are due to Islam. In actual social and legal attitudes towards women manifest the pre-Islamic tribal cultural trends. For instance, honor killing is a pre-Islamic tribal custom that is not sanctioned by Islam. [8] Pakistani culture and norms support male dominance in matters relating to family, religion, law, politics and socio-cultural practices.[9] Domestic violence is usually taken as a personal affair that does not need to be measured, intervened or properly documented for policy strategy. [10] Thus such unfair treatment is being faced by women regularly due to deeply imbedded social and cultural norms in Pakistani society. There had been an immense increase in the reporting the violence against women in Pakistan, a major factor being the continued suppression of the rights of women that resulted in their degraded social status. [11] The high frequency of this habit of women abuse takes different forms and has drastic negative effect on the positive development of communities, especially in rural parts of the country. The forms of violence against women range from social, cultural to institutional level including various forms like physical abuse, honor killing, wani and watta-satta. [12] The influences from other religions has been so significant that the ideology of Islam that was supposed to be the dominating factor in determining the relations and rights of women was overshadowed under the social and legal attitude towards women due to pre-Islamic and tribal customs and cultural influence of other religions. The function of existing law procedures, use of media, religious verses interpretations, and customary norms work collectively to promote and penetrate the male dominance on institutional and cultural levels in Pakistan.

4. Distinguishing between Violence and Disciplinary Act: The violence against women is mostly misquoted as a permission given in the Holy Quran in verse 34 of Surah Nisa. The verse must not be read out of context and it has to be bear in mind that the fine-line between beating and admonishment for disciplining the action of wife. The Quranic verse states certain steps to be followed if the wife is found disloyal and misconduct shown on her part. The verse under discussion cannot be given as an example to support masculine domination or authority it would be complete misinterpretation of the Holy Quran [13] The word specifically used for beating “daraba” in Arabic is used in the meaning of departing and separating in 9 places out of 16 times as it comes in the Holy Quran. [14] Apart from the word’s proposed meaning, several verses in the Holy Quran [15] oblige believers to show love and respect to their spouses and treat them equally without showing violence. [16] Despite asserting on treating nicely to women, the husband has to recognize his authority, it is recommended that the husband must try to resolve the situation and in extreme cases, if any disciplinary action has to be taken, it is allowed, but only in extreme cases, to correct the moral infractions. [17] The Holy Quran has given a very clear standing on this topic. Men are given the charge to protect and provide maintenance to their wives. In lieu of that, a righteous wife is under obligation to protect her chastity, and be obedient to her husband in his absence. In non-compliance of the said duties, the husband may resort to beat them lightly as a last measure. The Holy Prophet (S.A.W) has expressed his extreme repulsion to the exercise of the option of beating women and always discouraged such behavior. [18] An important thing to note here is the steps mentioned in the verse are to be followed only in case of serious misconduct or immoral behavior. If admonishment does the work, one must not resort to beating, as this permission must not be taken out of given context. [19]

5. The Shariah’s Philosophy as the Basis for Future Legislation: Since shariah has limited the maximum measure to be exercised against women and even extreme refraction of husband’s requests are to be addressed firstly by nushuc. This has been ratified by Hadith as well where husband is permitted to strike but with the conditions, not to strike on face, or anything that may leave mark on her body. Thus such symbolic expression does not imply its desirability. There are many traditions of the Holy Prophet (S.A.W) emphasizing and focusing the face that women are not to be beaten, and how can anyone beat her and then sleep with her. Thus there is no example in Sunnah that the Holy Prophet (S.A.W) opted for this measure regardless of circumstances. [20] Islamic teachings are never limited as per geographical locations or people; they are universally applicable, pragmatic and flexible to be apt in variant circumstances effectively. In case of an act being permissible, it is never implied that it is totally unqualified without any restrictions; rather determining the extent of permissibility is to be spelled out, else it may lead to excessive use or abuse. Any act of violence or abuse cannot be attributed as part of religion as they are based on misinterpretation of Quranic words. Thus a person is himself responsible for his acts of abuse and violence ignoring the real essence of the teachings of Islam.
6. Legislation for Domestic Violence in Pakistan: Numerous proposals and theories are presented for resolving the occurrence of domestic violence against women; though none have sufficed to put in plain words and explicate the issue due to multifaceted factors involved in it. [21] There are clear provisions in the constitution of Pakistan regarding provision of equal rights to all the citizens and providing them equal opportunities before the law. But this ideal is yet to be achieved due to many hindering factors like to reach for justice or raising voice for their rights including lack of awareness, costly law procedures and gender insensitive attitude towards women. [22] A significant increase in the issue of domestic violence has been noted in the last few years. Majority of the states have ratified Convention on Elimination of All forms of Discrimination against Women (CEDAW) that oblige them to treat domestic violence against women as a violation of human rights and to incorporate international standards into national legislation. Pakistan had ratified CEDAW in 1996 and trying to fulfill the international commitment by in the area of domestic violence against women. [23] Domestic violence issues are not specifically covered in Pakistan Penal Code, however there are several sections covering issues regarding miscarriage, abandonment of under-12 child, causing hurt, wrongful confinement and restraint [24]. Laws on sexual violence come under the umbrella of the Hudood Ordinances 1979. In spite of this, women are more victimized than been provided relief due to these laws. In December 2006, the Protection of Women (Criminal Laws Amendment) Act was passed containing several clauses in the Pakistan Penal Code (PPC) and Criminal Procedure Code (CrPC) in connection with sexual assaults on women and some modifications were made to Zina Offense as well. Section 174-A was added to the CrPC in 2001 in an attempt to curb dowry related violence. Nevertheless, even though many laws were formulated to protect women and the amendments made to present laws, serious violations continue in Pakistan. Furthermore, a lack of implementation of existing laws further exacerbates their plight. In August 2009, the National Assembly passed the Domestic Violence Bill that lays down provisions for the protection of and monetary compensation for victims, punishment in the form of fines or jail time for those who violate protection orders. Establishment of National Commission on the Status of Women (NCSW) in 2000 was a chain to the policy of establishing framework of women development and gender equality and reviews the proposed recommendations to be effectively put into implementation. [25]

7. Conclusion and Recommendations: Combating domestic violence demands systematic, coordinated and sustained efforts. With the given law situation, there is a dire need to take steps that protect and promote human rights and women in Pakistan. A strict implementation of International protocols and treaties; along with allocating a substantive amount for helping out the victimized women is an urgent need. The constitution of Pakistan states that each person has the right to liberty and safety in accordance to law; and taking legal aid is a fundamental right for the protection of life. This clause must be properly implemented in the perspective of women victims of violence. A free legal aid should also be provided at the district level. Women Protection centers should be established and awareness campaigns for the rights of women much be launched. Since domestic violence against women has deep cultural and historical roots, it is asserted that broad scale social overhauling is required and appropriate interventions may be initiated.

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INFORMATION NEEDS AND SEEKING BEHAVIOR OF DISTANCE LEARNING UNIVERSITY STUDENTS OF PAKISTAN

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ABSTRACT: Information is a major element for development of human society. Human being is able to get power with the help of thinking and decision making and ultimately ruling the universe, but it is possible only if he is empowered with information. Information also provides center for growth of knowledge and a basic key for improvement of society.

The present era is called the “information era”. Information has become the most important resource for improvement of the society. To thrive in this modern era, one needs a variety of information, no matter how well versed one is in a field or profession (Tahir, Mahmood, & Shafique, 2008).

The Pakistan National Education Policy document recognized the significance of information and noted:
The future belongs to countries whose people make the most productive use of information, knowledge and technology. Knowledge has become the most important economic resource. Knowledge and information will be the engines to drive the country in the 21st century. (National Education Policy, 1998-2010).

Acknowledging the significance of information in national development, it is pointed out that “it is not an accident that the developed nations are those in which information products and services have been brought into being and are widely exploited, first in conventional forms and late through computer intervention” (Wasserman, 1991).

**Information seeking behavior and distance education:** Many universities are offering distance learning education programs for students over the world. Distance education and open learning is not a very old system of education as compared with conventional on-campus education system. It came in practice since 19th century. However, a number of improvements have been come forth with distance education system in last 2 centuries and still improvement efforts are going on with this system. The most significant and robust improvements have come in last few decades with the development of information and communication technologies.

On-Campus students filling their information needs from their own institution but there is need attention for distance learning student because their institute provides them print and electronic materials for readings, writing assignment and preparation for final examination, that what is their actual or real information need, from where they fill their information need and what is their seeking behavior and which channel they use for their searching information need. Adequate information about information need and seeking behavior of distance learning students is helpful and essential for their administration in development the resources, course content, services and facilities to students especially in developing countries like Pakistan.

(Josiah, 2007) stated that information seeking behavior is the way of individual’s for meeting and selecting the sources of information for personal use, knowledge growth and development. Information seeking behaviors consider an important research area. The aim of this study is to explore information needs of distance learning students of Allama Iqbal Open University (AIOU) students enrolled in management science department at different levels.

**Literature Review:** There have been a series of studies conducted regarding open education system, and information seeking behavior of distance learning students. (Ahmad, 2004) stated that distance education getting fame day-by-day and spreading over the world. That’s mode of study usually without direct face-to-face interactions and for making this education system more beneficial and qualitative it is important that quality library services should provide. In 2003 a study found that distance students were following the same trends that had been experiential in the traditional student population; namely, that “part-time students’ usage patterns have changed and now favor the use of electronic resources (the Internet, in particular) and also mirror trends observed in traditional student behavior toward libraries and library resources in many important respects.” In this study of distance education student search behavior, (Kelley & Orr, 2003) also noted that, “the technologies may change but, at the same time, students overwhelmingly prefer to have instruction delivered in a format that is accessible off-campus and offers them flexibility in when they receive instruction.”

(Bremner, 2001) conduct a research on “Meeting the information needs of distance learners-The open university’s response” survey determined more than half of the students who had used other information were obtaining it using public libraries and a third of the students in the survey overall had used the public library to obtain materials, or as a silence place to study. Only 15% of OU students had used academic libraries, partly because they were unaware that the majority of UK academic libraries can used for reference purposes for free by students at other institutions. Many students facing difficulties in finding a library that had a good collection of relevant materials, and better access to other academic libraries would help in this regard, but the OU Library realizes that arranging borrowing rights for OU students at other institutions is problematic.

**Rationale of the Study:** Pakistan is a highly populated lower income country struggling with huge poverty, which creates lots of confusion in the social, political and economic environment. To survive with the present economic backwardness and to avoid prospective fears of severe socio-economic crisis, it needs a big push toward better socio-economic performance of the country, which is not possible without improving the human capital position of the country.
Distance learning system of education has become an important method of teaching and learning around the globe. Open learning can play a vital role in improving education of working peoples and female who are having problems in getting formal educational degrees. However, it is very important to study their information needs and their ways to fulfill such needs. This study will help to explore information needs and seeking behavior of management science students of AIOU.

**Objectives of the Study** The focus of this study is distance learning students of AIOU enrolled in management science department. The main objectives of the study are:

1. To find out the information needs and seeking behavior of the masters class students of AIOU.
2. To analyze the information sources preferred and information channels used by the distance learning students in finding out their required information.
3. To examine the methods employed by the distance learning students in finding their required information.
4. To find out the major constraints and challenges being faced by distance learning students.

**Research Design:** The study is based on qualitative approach. In this study a survey method will be used. A focus group was arranged in this regard. There were nine members in a focus group. There were three tutors currently teaching, one representative of university and four students enrolled in post graduate programme at different levels. The duration of the session was 120 minutes. The author and coauthors of the study conducted the focus group themselves. This method is more feasible to complete the study as it is less time consuming and economical for a scattered population.

**Delimitations:** The study will be limited to masters and research students enrolled in Allama Iqbal Open University, Lahore campus. Undergraduate students have not been included in the study.

**Findings:**

**Kind of Information:** The participants agreed that the main kinds of information required to the students for their educational and information needs were lectures and other face to face discussion. Therefore it is clear to judge that lectures are the main source of information continuously required to the students. Course books, other books, previous lectures notes and other kinds of information are also other information sources required by them.

**Main information needs:** The discussion also concluded that the main information needs of both always were “Information on course of study”. Distance students ubiquitously require information about their concerned course, followed by information on career development, job opportunities, scholarships of further education and opportunities of further education.

**Purpose of seeking information:** A question was put to the students to find out the purpose of seeking information. The majority shared that they seek information for “Preparation of exams”, followed by “Completing assignment”, for “Updating knowledge”, “Solving problem at hand” and only some students for “Entertainment” respectively.

**Preferred language:** In the questionnaire a question was presented to find out the preferred language of both types of students to acquire the needed information. It was found that majority of the students preferred information in English language. Some students also mentioned Urdu for getting the required information.

**Preferred information channel:** Respondents were asked to indicate the information channel that they mostly consult while confronting an information need. Results showed that the majority of students consult “internet” as the primary information channel, followed by “library”, and “Book store”. They also consult their tutors and knowledgeable persons in the field.

**Methods of getting information:** It was found from the discussion that the majority of students showed that “Visit to Library Personally”, followed by “Calling the Library”, and “Other” methods such as asking their friend or family members.

**Problems and Barriers of regular and distance students:** The study result showed that most of distance students did not opt for material not being available, library staff is not competent, lack of digital resource in the institution
library, lack of internet facility in the library, lack of library guidance and orientation. It was observed that distance students face problems regarding their own institute library.

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ARCHITECTURE FOR RANGE, DOPPLER AND DIRECTION FINDING RADAR

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ABSTRACT. Radar signal processing is a well-established field. Accurate and efficient information extraction related to target is main goal of a radar designer. As it has applications in many areas, different architectures have been proposed for its signal processor. Radar capable of localizing a target can be used with missile launcher to hit the target. A radar signal processor with range, Doppler and direction of arrival estimation is presented with its architecture on FPGA.

Keywords: Radar; Target; FPGA; Correlation; Doppler; Direction of arrival.

Introduction. Radars can be used for ground and air surveillance. History of Radar lies back to world-war II [1]. A pulse Doppler radar is capable of finding range, Doppler and direction of a target. Architectures of Radar signal processors are given in [2] specifically for Automotive applications is given in [3]. Pulse Doppler radar transmits pulses and the reflected Echoes are processed to target’s information. The reflected pulses return to the Radar antenna, which are processed using FPGA, DSP etc. to obtain required parameters. In this paper, we have discussed Radar signal processor of a Pulse Doppler radar capable of finding range, Doppler and direction. Method for finding direction of arrival using 2x2 Array is discussed with its embedded architecture. Design methods and FPGA block diagram discussed are helpful for a Radar designer.

The organization of this paper is now presented. Section II in this paper discusses the algorithm used for finding range and Doppler of target. Section III gives the design methodology of the Radar signal processor and details of FPGA are shown in that section. Estimation of direction of arrival using array is presented in section VII. Finally section VII concludes the paper.

Algorithm for Range/Doppler Processing. Radar Antenna transmits pulses with a PRF of 600 Hz, each PRI is 3ms long with 20% duty cycle. The received pulses after reflection are stacked in a matrix. There are 2\(^{14}\) samples in one PRI (3 ms) after A/D. Fig. 1 shows the stacked pulses for 2 targets.

![Figure 1. Stacked pulses](image_url)
The Matrix is then passed through column wise FFT which gives Doppler axis[4]. After which correlation is performed row wise which results in range axis. Correlation is performed by using the fast correlation procedure [5]. After correlation of the rows, peaks are obtained corresponding to targets. The primary axis represents range and secondary axis represents Doppler. Thresholding gives much smoother peaks. The summary of algorithm[4] is shown below in Fig. 2

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**Figure 2. Algorithm Flow Diagram**

**Hardware/Software Partition.** For Hardware implementation there are some control blocks and some processing blocks, so the whole system has to be divided into 2 parts i.e. software and hardware partitions [6]. Design partitioning and verification methodology are crucial steps for the designer for hardware/software co-design. Verification of software based design is easy but verification of VLSI based designs is challenging. The proposed hardware/software partition is shown in Fig. 3. The coprocessor functions and the memory read/write are all performed in hardware part. Decisions such as to check if the required number of samples is available at the FFT/IFFT stage are performed in the software partition. Similarly checks of data available at output of FFT, which next stage is to be applied, all are performed in software partition. The received pulses are stored in DDR with (256x214) locations.
The FPGA block diagram and coprocessor details are shown in Fig. 4. The control unit has finite state machines (FSM) which ensures that flow of different signals is correct between different blocks.

We have used Digilent Spartan-6 FPGA[7] kit to verify our algorithm on hardware which is shown in Fig. 5.

For column FFT, IP core[8] is used which has many control signals. Some are input signals while some are output signals. The FFT core has to check whether the sequence is available at the input. Correlation is carried out after FFT of the columns. FFT core is used with multiple channels. Buffer RAMS (each has capability to store 512 words) are also used for data storage. The data just after row FFT is sent to complex multiplier. The multiplicand is stored in another Buffer RAM which is offline calculated. Then IFFT core is used so that finally correlation can be obtained. The FFT/IFFT core has an output signal of data valid which indicates that result is now available after processing. The detected targets after processing on FPGA are shown in Fig. 6.
Algorithm for Direction Finding alongwith Architecture. Estimating the direction of arrival of a target is also an important part of Radar signal processing [9]. Multiple antennas are helpful when using phase difference for estimation of direction of a target. For direction finding, an array of 2x2 antennas is used. The array is shown in Fig. 7.

The phase difference between 2 antennas can be used to find the direction of a target [10]. Fig. 8 shows phase difference between 2 antennas.

The path difference $\Delta l$ is given by $\Delta l = d \sin \theta$. The path difference results in a phase difference $\Delta \phi$ between the signals from the two antennas. The relation is given below in Eq. 1

$$\Delta \phi = \frac{2\pi \Delta l}{\lambda}$$

$$\Delta \phi = \frac{2\pi d \sin \theta}{\lambda} \quad (1)$$
Where lambda is the wavelength of transmitted signal. Angle of arrival is found from the phase difference given in Eq. 2

\[ \theta = \sin^{-1}(\Delta \phi / (2\pi d)) \]  

We can combine the signals from 2 antennas at same axis. Combining the sensor output as

\[ \text{phase diff} = \Delta x = 2\pi d \sin \theta \cos \phi / \lambda \]  

From Eq. (1)

\[ \text{phase diff} = \Delta y = 2\pi d \sin \theta \sin \phi / \lambda \]  

Similarly

\[ \text{phase diff} = \Delta y = 2\pi d \sin \theta \sin \phi / \lambda \]  

Now we can solve Eq. (3) and (4) to find \( \theta \) and \( \phi \). Rearranging both equations as

\[ \sin \theta \cos \phi = \Delta y \lambda / 2\pi dx \]  

\[ \sin \theta \sin \phi = \Delta x \lambda / 2\pi dy \]  

Now from Eq. 5 \( \sin \theta = \Delta y \lambda / 2\pi dx \cos \phi \)

Putting above relation in Eq. (6)

\[ \sin \phi / \cos \phi = \Delta dx / \Delta dy \]

\[ \Rightarrow \text{Azim} = \phi = \tan^{-1}(\Delta dx / \Delta dy) \]  

Now put \( \phi \) in Eq. (5) to find elevation \( \theta \). According to Eq. (6) and (7), if we know the phase differences \( \Delta x \) and \( \Delta y \), we can find the azimuth and elevation angles and thus can localize the target. Let the data from antennas in Fig. 16 is 1 \( \Rightarrow x_1 \), 2 \( \Rightarrow x_2 \), 3 \( \Rightarrow x_3 \), 4 \( \Rightarrow x_4 \). Combining the data from 1,3 and 2,4

\[ D1=x_1+x_3 \quad , \quad D2=x_2+x_4 \]

The phase of D1 and D2 is found by taking the FFT and then finding phase. The phase difference becomes
\[ \Delta x = \text{phase}(\text{fft}(D1)) - \text{phase}(\text{fft}(D2)) \]

Now, combining data from 1,2 and 3,4

\[ D3 = x1 + x2, \quad D4 = x3 + x4 \]

Similarly

\[ \Delta y = \text{phase}(\text{fft}(D3)) - \text{phase}(\text{fft}(D4)) \]

Finally \( \Delta x \) and \( \Delta y \) are used to find azimuth and elevation.

Proposed architecture for direction finding system using phase difference method discussed above is shown in Fig. 9

**Figure 9. Architecture for Direction finding**

**Conclusions.** Pulse Doppler Radar signal processor for air surveillance is simulated using MATLAB and then FPGA is used for testing the algorithm on processor. The design approach is explained with hardware/software partition and system block diagram. Antenna array system for direction finding was presented with its architecture. The results for simulation and hardware show that our system is working fine in presence of noisy signals.

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COLOUR SPACE USING PRINCIPAL COMPONENT ANALYSIS TECHNIQUE FOR SKIN DETECTION

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ABSTRACT. Colour is one of the most important features used in skin and face detection. Colour space transformation is widely used by researchers to find better representation of human skin tone. Despite the research efforts in this area, choosing a proper colour space for skin and face detection remained an unsolved issue. Illumination variation, various camera characteristics, different skin colour tones and skin-like colours in background are among major challenges in skin detection. This paper proposes a new colour space based on projection of YCbCr colour space to principal component of three different skin colour clusters corresponding to three human ethnics including Asian, Black and Caucasian by means of a variation of principal component analysis (PCA) technique. Two classifiers including Random Forest and Support Vector Machine (SVM) have been employed to construct the skin colour model. Meanwhile, a dataset of 450 images consist of skin locus of different ethnics (Asian, Black and Caucasian) under various lighting condition was used. The proposed colour space was compared to ten state of the art colour spaces and gave superior results in term of pixel-wised skin classification performance. The experimental results show that using the proposed colour space, pixel wised skin detection yields F-score rate of 0.9273 and ROC curve area of 0.9563 outperforms some of existing skin detection techniques.

Keywords: Colour Space; Transformation Matrix; Principal Component Analysis; Skin Detection; Classification.

1. Introduction. Detecting human skin is an essential technique in numerous computer vision applications such as face detection, human detection, body-part detection, gesture recognition and etc. colours are the most prominent feature of every digital image. Since colour features are invariant against spatial changes like skew, scaling and rotating, they have been used widely for skin detection applications[1]. A colour space is a mathematical representation of colours, describes colours as sets of numbers. RGB colour space is the default colour space for most available digital images. High amount of correlation among its components (Red, Green and Blue) and incorporation of the luminance and chrominance are the main drawbacks of the RGB colour space[2]. These drawbacks lead to vulnerability against illumination variation and poor classification which make RGB an undesirable colour space for image segmentation and retrieval especially in uncontrolled illumination environments[3].
Researchers are trying to find a proper representation of the human skin colour by means of transforming the colours into new spaces. Colour space transformations have applied to the skin detection for the following reasons: first, to increase the separability between skin and non-skin colours [4]. Second, to reduce the average correlation among different components of colour space [5]. Third, to separate the intensity and chrominance components [4]. Fourth, to increase the likeness and unity of the skin tones of different human ethnics (Black, Caucasian and Asian) [6]. Colour space transformation is usually employed as a preprocessing technique in preliminary stage of skin detection [7]. Many different models and techniques have been proposed for skin detection but typical skin detection usually fits in the scheme showed in figure 1.

![Figure 1. Typical skin detection scheme](image)

Despite the research efforts in this area, choosing a proper colour space for skin and face detection remained an open issue. Illumination variation, various camera characteristics, different skin colour tones and skin-like colours in background are the main challenges in skin detection. During the last decade several colour spaces such as RGB, nRGB, YCbCr, HSI, HSV, CIEXYZ, YUV, YCgCr, TSL and CIELAB have been applied to skin classification. Each of them has its own advantages and drawbacks. Studies shows colour spaces which separate the luminance and chrominance components such as HSV, TSL and YCbCr are likely to be more appropriate for skin detection [1][8][9][10][6][11][12] for this purpose. The following shows the transformation matrix maps the RGB colour space to YCbCr [13]:

\[
\begin{bmatrix}
Y \\
C_b \\
C_r
\end{bmatrix} = \begin{bmatrix} 16 & 65.48 & 128.55 & 24.96 \\ 128 & -37.79 & -74.20 & 112 \\ 128 & 112 & -93.78 & -18.21 \end{bmatrix} \begin{bmatrix} R \\ G \\ B \end{bmatrix}
\]

\[ (1) \]

This research proposes a new colour space named ABC (Stands for Asian, Black and Caucasian) based on projection of YCbCr colour space to principal component of three different skin colour clusters correspond to three human ethnics which are Asian, Black and Caucasian using a variant of PCA (principal component analysis) technique. This study performs a comparison analysis in term of pixel wise skin detection performance between the proposed colour space and ten other frequently used colour space. We employed Random forest and Support Vector Machine (SVM) as classifiers to construct the skin colour model for each colour space. Quantitative results obtained using ROC curve and F-score show that the proposed colour space outperformed other colour spaces in this study in term of pixel-wise skin detection. Qualitative comparison also acknowledges the dominance of the proposed colour space. The remaining of this paper is organized as follow: section 2 discusses the related works, section 3 presents the dataset and ground truth setup, section 4 presents the methodology, section 5 describes the results and analysis and finally section 6 concludes the paper.

**2. Related Works.** In the past, colour space transformation was thought not to make any significant enhancement in skin detection [4][14] but recent researches reveal the importance of the colour space for skin detection applications. Numerous studies have focused on colour space transformation to improve pixel wise skin detection performance. For example, De dios in [15][16] proposed YCgCr colour space, to enhance face detection performance. This colour space is based on YCbCr except it uses the smallest colour difference (G-Y) instead of (B-Y). They have claimed this technique enhances the face detection performance. In another study, Queisser [17] proposed a new colour space named βεγ which is optimized for uniformly coloured object segmentation. β is the primary axis, reflects the principal component of the object colours while δ and ε are distance and angle that each colour makes with the primary axis respectively. Their proposed colour space
claimed to have lesser cross-correlation compared to RGB colour space. Hosseini [18] used a convex constraint quadratic optimization technique to find the linear transformation matrix which yields a skin detection optimized colour space. They claimed that their proposed colour space gave superior results compared to traditional colour spaces.

Jones and Abbott [19] presents an optimized colour space transformation for face recognition using three approaches including Karhunen-Loeve (PCA) transformation, linear regression of skin colour distribution and Genetic algorithms. It is claimed that these approaches deliver overall improved performance. Meanwhile, Yihuashi [20] proposed a space transformation by using an adaptive gamma correction method. They used a non-linear conformal mapping technique to establish a relationship between gamma and pixel value. It is claimed that this approach enhanced skin colour detection performance. Khan [1], Schmugge [9], Terrillon [21] and Zarit [6] conducted comparative analysis between existing colour spaces to explore the effects of colour space transformation on pixel-wised skin detection performance. Issues like diversity of skin colour in different ethnics (Asian, African and Caucasian), illumination variation and camera sensor characteristics can also have significant negative effects on pixel wise skin detection performance [22]. Despite the efforts by researchers to initiate and adopt a domain specific colour space for skin detection, lack of a comprehensive solution to respond to these issues is obvious.

3. Dataset and Ground Truth. This study used dataset consists of 450 colour images obtained from Internet image resources. It contains 54 million pixels where around 15 million of them represent human skin colour which denote positive instances (skin class) while the rest of the pixels which occupy the background represent negative instances (non-skin class). In term of contents, images are either pornographic or they are exposing substantial amount of human skin patches from different ethnics, gender and lighting condition (indoor and outdoor). Our dataset is divided into of 3 sub-dataset including Asians, Blacks and Caucasians. Each sub-dataset contains 150 images in which 100 of them are used for training and 50 are used for testing purposes. In order to increase the reliability of our experiments, the ground truth has been constructed manually at pixel level using image editor tools. The ground truth is formed as a mask of skin patches in black background. Any pixel in images which does not represent the skin patch including hair, eyes, lips, spectacles, clothing, tattoo and any background object have been blacked out in ground truth. Figure 2 illustrates some examples of our dataset images and their corresponding ground truth.

![Sample images and corresponding ground truth in dataset](image)

4. Methodology. Since RGB is a fundamental and commonly used colour space for most of available digital images and other colour spaces are also expressed through RGB colour space either by a linear or nonlinear transformations. Non-linear colour spaces transformations usually denote by polynomial or simultaneous equations while linear colour space transformation is usually expressed using an associated transformation 3*3 matrix. A typical linear colour space transformation matrix is as follows:

\[
\begin{bmatrix}
R \\
G \\
B
\end{bmatrix} = \begin{bmatrix}
x_1 & x_2 & x_3 \\
x_2 & x_2 & x_2 \\
x_3 & x_3 & x_3
\end{bmatrix} \begin{bmatrix}
A \\
B \\
C
\end{bmatrix}
\]
Linear colour space transformations are considerably faster than non-linear ones. Therefore, the colour space proposed in this paper used linear transformation. Meanwhile, YCbCr is chosen as the base of our colour space transformation for two main reasons. First it separates the luminance and chrominance components and second, many literatures agree on its dominance over other many existing colour spaces in pixel wised skin detection. Figure 3 shows the block diagram of the proposed colour space.

**Figure 3. Block diagram of the proposed colour space for skin detection**

The following phases are employed to construct the ABC colour space associated transformation matrix. In the first phases, RGB images in our three sub datasets (Asian, Black and Caucasian) are transformed into the YCbCr colour space. YCbCr colour space dedicates an independent component “Y” to luminance. YCbCr images passing through a luminance withdrawal phases, leaving us with a CbCr chrominance plane. CbCr plane features less fluctuation against illumination variation. This may enhance the skin detection performance under uncontrolled illumination environments. The next phase centralizes CbCr plane through mean subtraction technique. Data centering is commonly practiced as a preliminary process for performing PCA. It ensures that the 1st principal component represents the direction of maximum variance. Mean subtraction process applies to both Cb and Cr components as shown in the following formula. Where $\bar{C}_b$ and $\bar{C}_r$ are the mean of Cb and Cr components respectively. $n$ denotes the total number of instances in each components and $c_b$ and $c_r$ are the mean centered components.

$$c_b = \frac{1}{n} \sum_{i=1}^{n} (C_{b_i} - \bar{C}_b) \quad c_r = \frac{1}{n} \sum_{i=1}^{n} (C_{r_i} - \bar{C}_r)$$ (3)

In the next phase, PCA technique is applied into the centered data. PCA is a statistical technique in which mainly used for data dimension reduction. This phase returns the eigenvectors of covariance matrix which denotes principal components of our data in form of a 3*3 matrix. The first principal component is a 3-vector which has the largest possible variance of data in CbCr plane. The last phase concatenates the first principal components of each sub datasets constructs a 3*3 matrix which is the associated transformation matrix of the ABC colour space as follow:

$$
\begin{bmatrix}
0.999 & 0.0107 & -0.0438 \\
0.0391 & -0.690 & 0.7224 \\
0.0225 & 0.7234 & 0.690 \\
\end{bmatrix}
$$ (4)

YCbCr colour space transformation can be bypassed through multiplication of our ABC and YCbCr transformation matrix. The following equations show the transformation matrix that maps RGB to ABC colour space.
reefold cross validation and colour deliver space of the trees performance in term of pixel wise skin detection. Figure 4 shows the score rate of 0.915 on Random Forest and 0.8923 on SVM shows good performance as well. RGB colour space yields relatively poor performance compare to other colour spaces in this study. High amount of correlation among its components and integration of chrominance and luminance might be the main reasons of RGB poor performance. Figure 4 shows the ROC (receiver operating characteristic) curve of the proposed ABC colour space alongside RGB, YCbCr.

Table 1 reveals that the proposed ABC colour space with F-score rate of 0.9273 on Random Forest and 0.8923 on SVM outperformed other colour spaces in term of pixel wise skin detection. Also, it can be inferred that Random Forest delivers averaging better results than SVM in term of pixel wise skin detection and shows consistent performance over different colour spaces. Meanwhile, YCbCr colour space with F-score rate of 0.915 on Random Forest and 0.855 on SVM shows good performance as well. RGB colour space yields relatively poor performance compare to other colour spaces in this study. High amount of correlation among its components and integration of chrominance and luminance might be the main reasons of RGB poor performance. Figure 4 shows the ROC (receiver operating characteristic) curve of the proposed ABC colour space alongside RGB, YCbCr.
using Random Forest classifier. ROC curve plots the true positive rate on vertical axis and false positive rate on horizontal axis, visualizes the performance of the colour spaces used in this study. As the curve gets closer to the top left corner of the graph means the classification performance increases. The proposed ABC colour space holds 0.9563 under its ROC curve which is considerably greater than 0.9123 and 0.8244 hit by YCbCr and RGB respectively.

![ROC Curve](image)

**Figure 4.** ROC curves of the proposed ABC colour space alongside the RGB and YCbCr under Random Forest classifier.

Qualitative comparison is another perspective of conveying the results. Figure 5 presents a qualitative comparison of the proposed ABC alongside the YCbCr and RGB colour spaces. Three images are used and each represents one sub dataset (Asian, Black and Caucasian). The blue patches resemble the pixels that have been detected as skin. Comparing the results with the ground truth infers that the proposed ABC colour space outperforms YCbCr as well as RGB colour space in term of pixel wised skin detection.

<table>
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</tr>
</tbody>
</table>

**Figure 5.** Qualitative comparison of pixel wised skin detection among RGB, YCbCr and the proposed ABC colour space. The blue colour patches resembles the positive results (FP+TP). Ground truth and original image provided as the reference.
6. Conclusion. In this paper we have proposed a colour space that improves skin detection performance. It addresses the problem of skin tone variance in different ethnics. The proposed colour space termed as ABC (stands for Asian, Black and Caucasian) creates through projection of YCbCr colour space to principal component of skin colour in three ethnics including Asian, Black and Caucasian. Experimental results show that using our proposed colour space, we are able to achieve better skin detection rates.

REFERENCES

COMPARISON OF PERCEPTION EMPLOYEES AND SUPERVISORS ABOUT THE OUTCOMES OF COUNSELING ON EMPLOYEE’S PERFORMANCE

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ABSTRACT. Employees face a multiplicity of life and career transitions especially at early adulthood. This research paper explores these transitions that shape personal, job related and career identity and its impact on the output and productivity of workers in an organization. A manager/supervisor can play an essential role in facilitating employee progress during these times. In this research paper not only the perception of employees and supervisors regarding outcomes of counseling on the employee’s performance have been compared, but the impact of psychosocial support, career development support and job related issues support from the supervisor on the employee performance has also been explored. Personal survey technique has been applied here as a method of data collection and Questionnaire has used as an instrument to collect the data. Sample size used for this study was 150 respondents (30 managers/supervisors, 120 employees). From the findings and hypothesis results, conclusion can be made over here that employee counseling is very important element in order to motivate an employee towards his/her job, so he/she can achieve the goals and objectives of an organization very effectively and efficiently.

Keywords: Employee counseling (Psychosocial support, Career Development, Job Related Issues) and Employee performance.

1. Introduction. Counselling can be define as the performance of a human being when he or she is directing and supervising the actions of a group toward a combined and defined goal [6]. Two management behavior dimensions that have recognized in organizational behavior vis-à-vis employee attitudes and performance are supervisor initiating structure and consideration for an employee. Initiating structure is the level or intensity to which a leader/supervisor guides and direct subordinates, clarifies his role, in the complete task and plans, coordinates, solves problem, criticizes, and forces them to give an exceptional and extraordinary performance. On the other side consideration is the extent to which a leader/supervisor is being friendly, supportive, consults with their employees before making any decisions, represents thier interests, has open communications with them, and recognizes their contributions, which can done though when supervisor counsel and interact on one to one basis with his/her employees.

Counselling is a very important element of enhancing job performance and work output of an employee. Many researchers have worked a lot in order to see the impact of on the job and off the job counselling on the performance of an employee. Counselling is a systematic approach in order to analyze problem area where an employee is not performing well. This means with help of counselling, managers could be able to solve the problems due to which an employee is not being able to perform efficiently and effectively at workplace[17]. Counselling is a very important technique in order to motivate an employee towards his job. Communication between the supervisor and employee should have to take place at both sides; so that the supervisor can easily highlight the actual problem and the possible solution for that problem that hinders the employee desired
Different counselling methods are accessible for supervisors in order to encourage their employees. The methods comprise individual assessment meetings, direct observation with feedback, and facilitation with work group support. Sometimes a supervisor also used the mixture of all three methods of counseling. Nowadays, it’s important to get the most production from each employee efficiently and effectively. Organizations must make sure that every worker performs to the best of their ability and delivers substantial worth to the business. One leading matter that almost every company deals with is the challenge of dealing with worker performance reviews. Employee performance reviews were once seen as a compulsory part of managing employees, but on the other hand it also observed that managers and employees feeling fear from going through evaluations. The time it takes to write, administer, analyze and then package them up for release is enough to decrease anyone’s output by a huge quantity. This attempt toward employee performance management just wasn’t as winning as it should have to be. Then the concept of counselling in order to increase the employee efficiency has been introduced. Research shows that association of an employee with the supervisor is an important factor in order to retain and make them satisfy in an organization. Supervisor is a person with whom employees can interact most repeatedly and with the help of interaction and supervision they can resolve their any kind of problems at workplace and can give the best output to an organization.

1.2. Problem Statement. A comparative study between the perception of manager and employee about the impact of counselling on the employee performance.

1.3. Hypothesis.

- H1: There is no difference between the perception of manager and employee on the impact of psychosocial counselling on the employee performance.
- H2: There is no difference between the perception of manager and employee on the impact of career development counselling on the employee performance.
- H3: There is no difference between the perception of manager and employee on the impact of job related issues counselling on the employee performance.
- H4: There is a positive impact of psychosocial support from the supervisor on the employee performance.
- H5: There is a positive impact of career development guidance provided by supervisor on the employee performance.
- H6: There is a positive impact of sharing job related issues with supervisor on the employee performance.

1.4. Outline of the Study. This study has examined the impact of counselling and comparing the perception of the manager and employee about the outcome of counselling on the job performance of an employee: the perception which is representation of what is perceived and considered as a basic component in the formation of a concept. As counselling has played a very fundamental role in improving the employee performance for the success of an organization since a very long time ago and always perceived positively as a key factor, at the both ends, by supervisor and employee as well. There is always a positive impact of psychosocial support, career development guidance and sharing job related issues with the supervisor on the employee performance. This research is based on comparative study in order to analyze the differences in the perception of manager and the perception of employee about the impact of counselling on the job performance of an employee. For example, in order to improve the performance of an employee if a counselling session has been conducted, now the perception regarding the outcome of counselling on the employee performance would be same on the end of employee and manager as well or would be perceived differently by both of them.

1.5. Definitions.

(1) Employee Counseling. Employee counselling can be explained as providing assistance and support to the workers to face through the complex period in life. At many points of occasion in life or career people get nearer to some troubles either in their job or private life, when it starts influencing and upsetting their performance or rising the pressure levels of an individual. Counselling is guiding, calming, advising and sharing and helping to resolve their troubles whenever the requirement arises. Counselling can be done on different areas, like as follow:
Psychosocial support: Psychosocial support is the procedure of meeting a person's emotional, social, mental and religious desires. All of these are necessary fundamentals of positive human development.

Career development support: It is a complex managerial course which involves employees, deals with their aspirations, handover such kinds of responsibility & assignments which are matching with their potential and eventually create such job positions that can accommodate growth ambitions of those workers and give them satisfaction at workplace.

Job related issues support: Job related issues support is the process of providing guidance to the employees if they are facing any kind of issues on their jobs.

(2) Employee Performance. Effective and efficient performance of an employee is an important element for the success of an organization. Organizations always want to retain those employees who are performing really good at work because performance of an employee is very important in order to achieve goals of an organization. So management of an employee performance on the routine basis is the key to an effective performance management system in order to compete in the market effectively.

2. Literature Review. Globalization is making world more dynamic and competitive as well, business arena is undergoing evolutionary phenomenon to respond to changing customer demands. This rapidly changing business environment is forcing organizations to embrace competitive strategies which can lead to innovation in process, even more technological changes and new products. The implications of this dynamism are noteworthy. For businesses it means greater opportunity combined with risks where as for workforce it emphasizes the importance of learning new skills which can give them edge in the market [14]. In 2007, 134.9 billion dollars were invested by U.S organizations in the area of learning and development, out of which two-third was spent on internal developmental activities [1]. With increased realization of worthwhile workplace learning, organizations are further focusing on decentralizing HR-related responsibilities to first-line managers or supervisors so that employee morals and hence performance can be boosted [8], [10]. This task devolution might widen the core responsibilities that first-line managers have. While traditionally first-line managers were only into supervision and administration, the new decentralized strategy would enable them to administer performance-oriented tasks in addition with assessing, developing and identifying the core-competencies of the subordinates and channel these competencies in accordance with organization’s goals, missions and values [7], [11].

Because the changes in business environment are so recurrent and vital, there is no fixed norm that supervisors can clinch on to. They have to use complex methods like combining individualized counseling with several different strategies to boost performance of employees. Even though, first-line managers have little or no control over Human Resource policies such as selection, recruitment or compensation, they have substantial and noteworthy responsibility when it comes to counseling and administrating the interpersonal and work-related relationships of their subordinates. On their shoulders, lie a huge conscientiousness of creating ideal working environment which can heighten and reinforce communication within groups; encourage cooperation and learning; and help keeping things focused towards goal attainment process [2]. Furthermore, individualized interaction with the subordinates is equally importance for creating peaceful working environment for subordinates.

The CIPD defines counseling as: “Counseling targets high performance and improvement at work and usually focuses on specific skills and goals, although it may have an impact on an individual’s personal attributes (such as social interaction or confidence.). The process typically lasts for a relatively short period”. There exist two primary objectives when employing counseling strategy: First to develop and nurture employee engagement and second to enhance performance [3]. The importance of employee engagement is highlighted by the fact that it is imperative for customer satisfaction - a crucial determinant of an organization’s financial performance.

2.1. Enhanced performance. As mentioned before, counseling is the key aspect of employee performance. It has influence on performance to a very greater extent, has been researched and measured. It has been illustrates in a research that sales agents who were given more than three hours of counseling per month yielded enhanced performance by achieving 107 percent of their total benchmark [15]. On the other hand, the sales representatives who received less than two hours of counseling per month showed poor performance by achieving less than 10% of their benchmarks. Prosell initiative to work with the clients in order to improve
working environment resulted in 47% increased customer retention, 50% increase in sales improvement and 39% reduction in employee attrition rates. By integrating counseling strategies within the team structure of sales representatives and customer service agents, the managers were able to achieve these remarkable results.

2.2. Increased Customer Satisfaction. There exist direct link between satisfaction of workforce and customer satisfaction. A satisfied workforce can lead to increased performance and hence higher number of satisfied customer [12]. This is confirmed and acknowledged by research that Prosell conducted where an apparent and lucid relationship was seen between actions taken by managers and the overall team performance. Around 61% of the employees who were surveyed responded that the way their managers treats and behaves with them had a direct affect on their performance as well as on the level of engagement and commitment they have when it comes to their tasks and services.

2.3. Increased employee engagement. Surprisingly merely 33% of employees in UK feel committed to their jobs and employer. This staggering figure shows the importance that employee engagement holds in impacting the overall performance of employees and hence of an organization [13]. Counseling must be customized to individual needs of employees - such initiatives can lead to enhanced performance at individual level which in turn can have premium and lasting effect on overall performance of team [5].

2.4. Reduced employee turnover. Retention of good employees makes good business sense; hence organizations tend to treat their valuable employees as assets. Therefore their retention is an important aspect which contributes to the growth of business. Employees who are motivated, loyal and consistent have tendency to deliver better-quality, customer value and consequently enhanced customer satisfaction and loyalty. Counseling has great aptitude to enhance employee engagement that can lead to reduced turnover rates and greater retention of worthwhile employees. Engaged workers are seven times less prone to leave the workplace within a year and almost ½ times more likely to continue working with the same employer for further four to five years [13].

3. Research Methods. This study is the comparative study about the Perception of employees and supervisors that encounters the outcomes of counselling on an employee’s performance. In the organization if counselling is provided by supervisor to his subordinates, this study, on the one side focused on the outcome of counselling on the employee performance and on the other side this study has compared the perception of employee and supervisor about the results of counselling on the performance of the an employee which can be either increased, decreased or can remain same as well.

3.1. Method of Data Collection. Personal survey technique has been applied and Questionnaire has used as an instrument to collect the data and data has been collected by taking an appointment with the respondents for having a personal meeting, in order to filled those questionnaires.

3.2. Sampling Technique. Quota sampling technique has been used.

3.3. Sample Size. Sample size used for this study was, 150 respondents (30 managers/supervisors, 120 employees).

3.4. Instrument of Data Collection. Questionnaires were used as an instrument for data collection. These measures were developed by Scandura and Ragins (1993). Questionnaire consists of two parts.
   i) In first part, responses have been received from supervisor and employee about the counseling, related to different issues.
   ii) In second part information have been gathered about the impact of counselling on the employee performance.
   The instrument is in the form of closed ended questionnaire. Answers were recorded in the Likert five point scales.
   Strongly agreed = 5   Agree= 4   Neutral= 3   Disagree= 2 strongly disagree= 1 (for first part)
   Increase = 3 Remain same= 2   Decrease =1 (for second part)
3.5 Research Model Developed

Dimensions in this questionnaire are as follows:
- Psychosocial support
- Career Development
- Job Related Issues

4.1. Findings and Interpretation of the Results
H1: There is no difference between the perception of manager and employee on the impact of psychosocial counselling on the employee performance.
H2: There is no difference between the perception of manager and employee on the impact of career development counselling on the employee performance.
H3: There is no difference between the perception of manager and employee on the impact of job related issues counselling on the employee performance.

Figure 3.1 (Source: Scandura and Ragins, 1993)
Table 4.1

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<th>Employee</th>
<th>t</th>
<th>df</th>
<th>t (2-tailed)</th>
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Group Statistics

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Table 4.2

Result: H1, H2 and H3 have been accepted.

Interpretation. In order to make the comparison in the perception of managers and employees regarding the impact of psychosocial, career development and job related issues counselling on the output of employee, independent sample t-test has been applied. After applying Independent sample t-test, it has been statically proved that there is no difference between the perception of manager and employee on the impact of psychosocial, career development and job related issues counselling on the employee performance, as the significant value is greater than 0.05 (psychosocial support=.219, career development supports=.873 and job related issues support=.983). As the significant value is greater than 0.05, it proves that the difference in the perception of the managers and employees regarding the impact of psychosocial, career development and job related issues counselling on the employee performance is nonsignificant, which means H1, H2 and H3 have been accepted.

H4: There is a positive impact of psychosocial support from the supervisor on the employee performance.
Table 4.3. Variables Entered/Removed

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Psychosocial_Support_E*</td>
<td>.</td>
<td>Enter</td>
</tr>
</tbody>
</table>

a. All requested variables entered.
b. Dependent Variable: Im_Psychosocial_support_M

Table 4.4. Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.660*</td>
<td>.436</td>
<td>.415</td>
<td>.37050</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Psychosocial_Support_E

Table 4.5. ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>2.967</td>
<td>1</td>
<td>2.967</td>
<td>21.612</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>3.844</td>
<td>28</td>
<td>.137</td>
<td>.725</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>6.810</td>
<td>29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Psychosocial_Support_E
b. Dependent Variable: Im_Psychosocial_support_M

c. Sample size for independent t-test: 29

d. Significance level: .05

Table 4.6. Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.183</td>
</tr>
<tr>
<td></td>
<td>Psychosocial_Support_E</td>
<td>.366</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Im_Psychosocial_support_M

Result: H4 has been accepted.

Interpretation. In H4 Psychosocial Support has been taken as an independent variable and employee performance as a dependent variable. As significant values of ANOVA and Coefficients are less than 0.05, it stated that the value of coefficient is also significant along with model. On the other hand as the value of beta is also positive (0.366), it means there is a positive impact of psychosocial support from the supervisor on the employee performance.

H5: There is a positive impact of career development guidance provided by supervisor on the employee performance.
Table 4.7

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Career_Development_Ea</td>
<td></td>
<td>Enter</td>
</tr>
</tbody>
</table>

a. All requested variables entered.
b. Dependent Variable: Im_Career_Development_M

Table 4.8

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.883a</td>
<td>.780</td>
<td>.772</td>
<td>.25014</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Career_Development_E

Table 4.9

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>6.207</td>
<td>1</td>
<td>6.207</td>
<td>99.193</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>1.752</td>
<td>28</td>
<td>.063</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7.959</td>
<td>29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Career_Development_E
b. Dependent Variable: Im_Career_Development_M

Table 4.10

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.513</td>
<td>.202</td>
<td>2.539</td>
</tr>
<tr>
<td></td>
<td>Career_Development_E</td>
<td>.550</td>
<td>.055</td>
<td>.883</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Im_Career_Development_M

Result: H5 has been accepted.

**Interpretation.** In H5 career development support has been taken as an independent variable and employee performance as a dependent variable. As significant values of ANOVA and Coefficients are less than 0.05, it stated that the value of coefficient is also significant along with model. On the other hand as the value of beta is also positive (0.550), which means there is a positive impact of career development support from the supervisor on the employee performance.
H6: There is a positive impact of sharing job related issues with the supervisor on the employee performance.

Table 4.11
Variables Entered/Removed\(^b\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables Entered</th>
<th>Variables Removed</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Job_Related_Issues_E(^a)</td>
<td>.</td>
<td>Enter</td>
</tr>
</tbody>
</table>

a. All requested variables entered.
b. Dependent Variable: Im_Job_Related_Issues_M

Table 4.12
Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.654(^a)</td>
<td>.428</td>
<td>.407</td>
<td>.39077</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Job_Related_Issues_E

Table 4.13
ANOVA\(^b\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>3.196</td>
<td>1</td>
<td>3.196</td>
<td>20.931</td>
</tr>
<tr>
<td>1</td>
<td>Residual</td>
<td>4.276</td>
<td>28</td>
<td>.153</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Total</td>
<td>7.472</td>
<td>29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Job_Related_Issues_E
b. Dependent Variable: Im_Job_Related_Issues_M

Table 4.14
Coefficients\(^a\)

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.819</td>
<td>.344</td>
<td>2.379</td>
</tr>
<tr>
<td>1</td>
<td>Job_Related_Issues_E</td>
<td>.418</td>
<td>.091</td>
<td>.654</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Im_Job_Related_Issues_M

Result: H6 has been accepted.

Interpretation. In H6 job related issues support has been taken as an independent variable and employee performance as a dependent variable. As significant values of ANOVA and Coefficients are less than 0.05, it stated that the value of coefficient is also significant along with model. On the other hand as the value of beta is also positive (0.418), which means there is a positive impact of job related issues support from the supervisor on the employee performance.
4.2. Hypothesis Assessment Summary.
H1: There is no difference between the perception of manager and employee on the impact of psychosocial counselling on the employee performance: H1 has been accepted, as the significant value is greater than 0.05. It means that there is no significant difference between the perception of manager and employee on the impact of psychosocial counselling on the employee performance.
H2: There is no difference between the perception of manager and employee on the impact of career development counselling on the employee performance: H2 has been accepted because the significant value is greater than 0.05. It means that there is no significant difference between the perception of manager and employee on the impact of career development counselling on the employee performance.
H3: There is no difference between the perception of manager and employee on the impact of job related issues counselling on the employee performance: H3 has been accepted as the significant value is greater than 0.05, It means that there is no significant difference between the perception of manager and employee on the impact of job related issues counselling on the employee performance.
H4: There is a positive impact of psychosocial support from the supervisor on the employee performance: H4 has been accepted and has proved that there is a positive impact of psychosocial support from the supervisor on the employee performance.
H5: There is a positive impact of career development guidance provided by supervisor on the employee performance: H5 has been accepted and has proved that there is a positive impact of career development support from the supervisor on the employee performance.
H6: There is a positive impact of sharing job related issues with the supervisor on the employee performance: H6 has been accepted and has proved there is a positive impact of job related issues support from the supervisor on the employee performance.

5. Conclusion. One of the most fundamental issues facing organization is preserving employee assurance in order to achieve business goals and objectives. Many organizations are facing a time of uncertainty and great managerial change led by oversees downsizing, outsourcing, global reform, and retracting career progression paths. Because of changes in these trends it became very difficult for every organization to compete successfully in the market.
With performance being an elementary foundation stone to financial achievement, employers will need to put into operation constant new and advanced learning programs and have to facilitate workers to achieve new knowledge and skills to prosper in the market. So in order to keep those employees motivated all the time counselling can play a really bigger role. There are many situations in the office when counselling can be implemented. At any time, employees who are major source of organizational success, may experience problems related to personal, professional or might be their career development, which may acutely influence overall financial performance and strategic goals of an organization.
If these hurdles and issues go unsettled and unresolved for a longer period of time, there are possibilities that these hurdles will crash and destroy the employee’s talent and caliber to perform effectively and efficiently on the job. So based on the results it can be concluded over here that counselling can be a strategic resource and tool that supervisors can use and have dependency on it when work performance, career transition, and personal behavior at the workplace becomes a question for them. It’s also a method to help key workers to get rid of professional and personal issues and reach higher career related aspirations, so that they can continue to add important value to the business of an organization.
So when companies give serious consideration to the happiness of their employees, employees start feel satisfaction and secure when they know that organization cares about their problems and challengers. Therefore, employees are free to think and to get better their performance while helping to complete the organization's purpose and mission.
The most important reason why counselling is considerable in an organization because through it employees are well motivated to achieve their own and organizational goals more efficiently and effectively. Supervisors are paying attention to the output and performance of their staff. On the other hand, if employees are dissatisfied, worried, or stressed out regarding personal, job related or career development issues, they will not be able to execute and perform well on their jobs. So it become very significant for that organization to give a better supervision, support and coach their employees, so they can perform better at the workplace and can achieve organizational goals more efficiently and effectively.
5.2. Future Research and Recommendations.

There can be so many recommendations that can be implemented and done for future research:

1. Sample collection should be dispersed more evenly rather than focused on one specific and focused area. The consequences will be more compelling, representative and credible.
2. Other factors need be looked upon in order to bring more accurate and appropriate results. For instance, coming researches can be done to know the impact of following diverse areas of counselling on the productivity and performance of an employee:
   - Marriage and family counselling
   - Rehabilitation counselling
   - Mental health counselling
   - Substance abuse counselling
   - Educational Counselling
   - Organization Cultural Counselling

REFERENCES

ANALYSIS OF THE PIM-1 KINASE INHIBITORY ACTIVITY OF 3H-BENZO (4, 5) THIENO (3, 2-D) PRIMIDIN-4-ONE DERIVATIVES BASED ON THEIR MOLECULAR FEATURES: A COMPUTATIONAL STUDY

ABDUL WADOOD1, SYED BABAR JAMAL1, MUHAMMAD RIAZ1, ZAHID HUSSAIN2 SULAIMAN SHAMS1, KHAIR ZAMAN2, MUHAMMAD NAEEM1 AND ASIF MIR3

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Email Address
3Department of Bioinformatics and Biotechnology, International Islamic University, Islamabad, Pakistan.

ABSTRACT. Pim kinases are predominantly interesting molecular targets for antitumor compounds because of its central role in cell proliferation and regulation of the cell survival. Quantitative structure activity relationship (QSAR) is an in silico approach widely used to predict structural features of a set of compounds required for the biological activity quantitatively. On the basis of QSAR models more potent inhibitors for a specific target could be designed. Using QSAR descriptors of Molecular Operating Environment (MOE) statistically reliable QSAR models for a series of 3H-Benzo (4, 5) thieno (3, 2-d) pyrimidin-4-ones as Pim kinases inhibitors were developed. The results showed that polarizability of these compounds might play significant role in the binding affinities of these compounds. Molecular descriptors (SlogP_VSA and SMR_VSA) involved with the Van der Waal surface area and molecular refractivity were observed to be the common fundamental features for defining the binding specificity of these compounds to Pim kinases. The descriptors (SlogP_VSA and SMR_VSA) predicted this in silico study could be exploited in the design of more potent Pim kinases inhibitors.

Keywords: Anti-cancer; In silico; MOE; PIM proteins; Polarizability.

1. Introduction. Pim kinases of serine/threonine family regulate cell survival and this family has three members, i.e. Pim-1, Pim-2 and Pim-3 (Amaravadi, et al. 2005). All three Pim kinases isoforms are highly homologous at the amino acid level, but differ moderately in their tissue distribution (Eichmann, et al. 2000; Allen, et al. 1997). The Pim-1 proto-oncogene was first identified as locus often activated by integration of provirus in Moloney murine leukemia virus induced mouse T-cell lymphoma. The Pim-1 gene is localized on chromosome 6p21.2 in a location involved in several leukemia translocations (Nagarajan, et al. 1986). Pim-2 was recognized as a gene commonly activated in secondary transplant of virus induced lymphomas. The identification of Pim-3 kinase is based on the relationship with Pim-1 and Pim-2. It was confirmed by observing transgenic mice over expressed Pim-1 and Pim-2 kinase in lymphoid system and developed
lymphomas that these kinases are oncogenic in nature (Nawijn, et al. 2011) and their involvement in the development of tumor is also well studied. Pim-1 and Pim-2 are found responsible for prostate cancer development in some cases (Cibull, et al. 2006; Dai, et al. 2005). The over expression of Pim-1 in head and neck squamous cell carcinoma and bladder cancer is also one of its evidence for causing cancer. In colorectal, pancreatic and hepatocellular carcinoma Pim-3 is over expressed (Li, et al. 2006; Popivanova, et al. 2007; Wu, et al. 2010). The mechanism by which Pim kinase control the proliferation of tumor cells may include phosphorylation, activation of molecules that positively regulates cell cycle progression or inactivation of cell cycle inhibitors P27kips or p21cipi (Morishita, et al. 2008; Geromichalos, et al. 2007; Bohm, et al. 1999). Pim kinase may control cell capability by phosphorylating apoptotic protein BAD and ASK (Morishita, et al. 2011) and are concerned with the capability of drug resistance. The expression of Pim-1 is highly observed in progenitors of liver, bone marrow and spleen, but also in such tissues that are non-hematological i.e. oral epithelia and prostate, during normal development of the embryo (Eichmann, et al. 2000; Amson, et al. 1089). In the human body, amplification of Pim-2 was described in different hematological malignancies. For example, in Chronic Lymphocytic Leukemia (CLL) and in Non-Hodgkin Lymphoma (NHL), substantial up-regulation of PIM-2 was perceived (Cohen, et al. 2004). Furthermore, PIM-2 stages in Chronic Lymphocytic Leukemia correlate with the clinical stage of the disease and to the doubling time of lymphocyte, and it was suggested that PIM-2 contributes to the lymphomagenesis by functioning as a survival factor (Cohen, et al. 2004). The activation of Pim-2 may block apoptosis, thus providing a promising mechanism for development of Myconogeny.Pim-3 that expresses serine/threonine kinase activity is a member of the proto-oncogene, many independent groups have reported its potential role in neuronal cell functions, as well as association with long term potentiation (Konietzko, et al. 1999; Giza, et al. 2002). The involvement of Pim kinases in prostatic cancer has been reported (6). Recent studies revealed that prostate cancer is increasing rapidly (Aho, et al. 2004). As, this cancer is less sensitive to chemotherapy, there is an urgent need to develop a new and potent drug for its treatment (Siù, et al. 2011). A number of Pim kinases inhibitors have been reported for the development of anti-cancer drug candidates (Akue-Gedu, et al. 2010; Tao, et al. 2009).

A quantitative structure activity relationship (QSAR) study hunted to explain and predict the activities of a series of congeners by utilizing empirical descriptors. Further, QSAR enables the investigators to establish in-silico quantitative models to predict the activity of novel molecules prior to their synthesis and simultaneously provide deeper insight into the mechanism of drug–receptor interaction (Kumar, et al. 2006; Ul-Haq, et al. 2009). The intention to use QSAR Descriptor was to calculate those properties of molecules which serve as characterizations or numerical descriptions of molecules in other calculations such as QSAR, combinatorial library design or diversity analysis. In principle, since any property of the molecule may be used as a molecular descriptor, there is no particular procedure for calculation of the QSAR-Descriptor. Relatively, QSAR-Descriptor is an environment to calculate various descriptors. The information provided by the developed QSAR models from 3H-Benz [4, 5] thieno (3, 2-d) pyrimidin-4-one derivatives might be used for the design and development of potential Pim kinases inhibitors.

2.1. Data sets and molecular structures. The inhibitors for Pim kinases of “3H-Benz (4, 5) thieno (3, 2-d) pyrimidin-4-ones” class was selected for the present QSAR study. All the structures were collected from the published literature (Tao, et al. 2009). The three dimensional (3D) structures of these inhibitors were constructed using MOE-Builder tool. The energies of the selected molecules were minimized using the energy minimization algorithm implemented in MOE. The following parameters were used for energy minimization; gradient: 0.05, Force Field: MMFF94X, Chiral Constraint: Current Geometry. All the minimized molecules were saved in the (.mdb) file format in two different databases. Nine out of sixty two compounds were randomly selected to form the test set for validation while the remaining were used as a training set for the development of QSAR models.

2.2. Molecular Descriptor. The molecular modeling software MOE (http://www.chemcomp.com.2010) was used to calculate molecular descriptors via QuaSAR module for the lowest energy conformers of the compounds in the series (Table. 1).
Table 1. Molecular Descriptors used in QSAR studies.

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SlogP_VSA0</td>
<td>Sum of ( v_i ) such that ( L_i \leq -0.4 ).</td>
</tr>
<tr>
<td>SlogP_VSA1</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (-0.4,-0.2).</td>
</tr>
<tr>
<td>SlogP_VSA2</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (-0.2, 0).</td>
</tr>
<tr>
<td>SlogP_VSA3</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (0, 0.1).</td>
</tr>
<tr>
<td>SlogP_VSA4</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (0.1, 0.15).</td>
</tr>
<tr>
<td>SlogP_VSA5</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (0.15, 0.20).</td>
</tr>
<tr>
<td>SlogP_VSA6</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (0.20, 0.25).</td>
</tr>
<tr>
<td>SlogP_VSA7</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (0.25, 0.30).</td>
</tr>
<tr>
<td>SlogP_VSA8</td>
<td>Sum of ( v_i ) such that ( L_i ) is in (0.30, 0.40).</td>
</tr>
<tr>
<td>SlogP_VSA9</td>
<td>Sum of ( v_i ) such that ( L_i &gt; 0.40 ).</td>
</tr>
<tr>
<td>SMR_VSA0</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0, 0.11).</td>
</tr>
<tr>
<td>SMR_VSA1</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0.11, 0.26).</td>
</tr>
<tr>
<td>SMR_VSA2</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0.26, 0.35).</td>
</tr>
<tr>
<td>SMR_VSA3</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0.35, 0.39).</td>
</tr>
<tr>
<td>SMR_VSA4</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0.39, 0.44).</td>
</tr>
<tr>
<td>SMR_VSA5</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0.44, 0.485).</td>
</tr>
<tr>
<td>SMR_VSA6</td>
<td>Sum of ( v_i ) such that ( R_i ) is in (0.485, 0.56).</td>
</tr>
<tr>
<td>SMR_VSA7</td>
<td>Sum of ( v_i ) such that ( R_i &gt; 0.56 ).</td>
</tr>
</tbody>
</table>

### 2.3. Fitting the experimental data.

The next step in the QSAR model was to fit the experimental data, the dependent variable pKi values against the selected descriptors. MOE commands were used to fit the data and the generated model was used to validate the results. Cross validation was also performed using LOO (Leave
2.4. **Pruning the descriptors.** To select the optimum set of the molecules under consideration, it is necessary to prune a set of descriptors. QSAR-Contingency application of MOE was used to find out which of the descriptor is best for the selected compounds. It is statistical analysis for the best selection of molecular descriptors. The results were analyzed by Principal Component Analysis (PCA) (Kumar, et al. 2006). PCA is proficient of manipulating a new, often smaller table of descriptors that are uncorrelated and normalized.

3. **Results.** The results obtained from QSAR revealed that there is an acceptable correlation between the pKi values of the 3H-Benzo (4, 5) thieno (3, 2-d) pyrimidin-4-ones class of compounds and the predicted values ($PRED$) from the model (Table 2).

<table>
<thead>
<tr>
<th>S.No</th>
<th>Compound</th>
<th>Activity (pKᵢ)</th>
<th>Model Prediction $PRED$</th>
<th>Model Residual $RES$</th>
<th>Model Z-Score $Z$-SCORE</th>
<th>Cross Prediction $X$ PRED</th>
<th>Cross Residual $X$ RES</th>
<th>Cross Z-Score $X$ Z-SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>6a</td>
<td>-1.15</td>
<td>-1.1176</td>
<td>-0.0324</td>
<td>0.1082</td>
<td>-0.6161</td>
<td>-0.5339</td>
<td>1.7701</td>
</tr>
<tr>
<td>2.</td>
<td>6b</td>
<td>-1.08</td>
<td>-0.9305</td>
<td>-0.1495</td>
<td>0.4995</td>
<td>-0.8853</td>
<td>-0.2947</td>
<td>0.6464</td>
</tr>
<tr>
<td>3.</td>
<td>6c</td>
<td>-1.04</td>
<td>-1.3583</td>
<td>0.3183</td>
<td>1.0636</td>
<td>-1.6977</td>
<td>0.6577</td>
<td>2.2262</td>
</tr>
<tr>
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</table>
Column 6 represents the Z-score; this method was implemented for the finding of outliers in the training set of QSAR. The compounds which show Z-score value greater than 2.5 were defined as an outlier while generating a QSAR model (Kumar, et al. 2006). In the present set of compounds in case of the Pim-1 kinase, compound 19a (Tao, et al. 2009) was reported as outlier as it produces the Z-score 2.8811, compound 19a was the only compound with Z-score greater than 2.5 so we can assume the selected descriptors adequate for developing good QSAR models (Bohm, et al. 1999).

3.1. **Graphical analysis for Pim-1.** The graphical analysis was carried out between the pKi values for Pim-1 kinase and the predicted values. A linear relationship exists between the predicted and actual activities ([Figure. 1A](#)). On the top of the plot the correlation coefficient $r^2$ is displayed as 0.67. The unconventionality of 1 or more pKi unit from the investigated value was a measured as poor fit. For the test molecules, analysis of the residuals indicates that the molecules with index 3, 5 and 9 in the test set, fit are inadequate ([Table. 3](#)).
Figure 1. (A) Correlation graph between the pKi values of the selected compounds and the predicted values of the model ($PRED$). (B) Correlation graph between the pKi values (Pim-2) of the selected compounds and the predicted values of the model ($PRED$).

Table 3. Actual and predicted biological activities of compounds for Pim-1 kinase.

<table>
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<th>Residual</th>
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The similar QSAR model was generated for pKi values of Pim-2 kinase as for Pim-1. The Z-score for all the compounds in case of Pim-2 kinase were under 2.5 which make the descriptors adequate for QSAR study. The predicted results are given in Table 4.
Table 4. QSAR results of selected 53 H-Benzo[4,5]thieno[3,2-d]pyrimidin-4-ones class for Pim-2 Kinase.

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<th>Model Residual $\text{RES}$</th>
<th>Model Z-Score $\text{SZ-SCOR E}$</th>
<th>Cross Prediction $\text{X PRED}$</th>
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</table>
3.2. **Graphical Analysis for Pim-2.** An acceptable correlation was observed between the pKi values for Pim-2 kinase and predicted values. The correlation coefficient r² is displayed on the top as 0.64 as shown in Figure. 1B. In case of the Pim-2 kinase, analysis of the residuals indicates that the molecules with index 2 and 9 in the test set, fit are inadequate (Table 5).

<p>| | | | | | | | | |</p>
<table>
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Table 5. Experimental and predicted biological activities Pim-2 kinase.

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<th>Predicted pKi</th>
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<td>6n</td>
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<td>6q</td>
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QSAR study of 3H-Benzo (4, 5) thieno (3, 2-d) pyrimidin-4-ones class inhibitors helped us to identify important properties of the compounds. Interestingly, the selected compounds for QSAR study also include 10 compounds which are reported as equipotent for all the three Pim kinases (Tao, et al. 2009). We generated QSAR model against the pKi values of these triple Pim kinases inhibitors separately. The results of our study were highly acceptable with this class of descriptors. Correlation between the experimental and predicted biological activities is shown in Figure 3.

4. Discussion. The properties of many molecules in most cases are dependent on the microscopic properties from which they are generated. QSAR methods are usually applied to correlate the molecular structures with some kind of in vivo or in vitro biological activities. QSAR was carried out for all the selected compounds. Over 100 programmed MOE descriptors were calculated for all the compounds in the series. QSAR Contingency module of MOE was initially used to identify the valid descriptors for the proposed study as it is a statistical application which helps in the selection of QSAR descriptors (Kumar, et al. 2006). To minimize the number of descriptors used, interrelation among the descriptors was also studied. Finally, 18 molecular descriptors, SlogP_VSA0 to SlogP_VSA9 and SMR_VSA0 to SMR_VSA7 were identified by the above mentioned approach to find out the best results. LogP accounts for molecular hydrophobicity in rational drug design and QSAR studies as well as it is also an important parameter in studying the environmental outcome of chemicals. SlogPis an atomic contribution model that calculates logP from the given structure. SMR is the model for atomic contribution, used to calculate Molecular refractivity (Wildman, et al. 1999). VSA (van der waal surface area) is the imaginary surface area of the molecule formed by the union of the spherical surface of the atom. Hence, SMR_VSA is the polarized union out of total union. The results of the predicted model from the selected 18 descriptors of SlogP_VSA and SMR_VSA class are given in Table 2 and Table 4 for Pim-1 and Pim-2 kinases respectively.
Comparing the QSAR results of Pim-1 and Pim-2 kinases, we can assume our models acceptable for both Kinases activities. There was only one outlier observed in the generated models. Furthermore, the results of the test sets indicate that compounds 6n, 9, 17b in case of Pim-1 kinase and 6d, 17b in the case of Pim-2 kinase are inconclusive with the applied descriptors and need other descriptors. In case of triple inhibitors no outlier was observed; Z-Scores produced by these compounds were less than 2.5 hence making the descriptors suitable. The predicted and actual values were very close to each other. Furthermore, graphical analysis gives the best correlation between the pKi values and the predicted values. The correlation coefficient $r^2$ produced were 0.98, 0.99 and 0.99 for Pim-1, Pim-2 and Pim-3 kinases respectively (Figure 2).
When we consider biomolecular properties it seems true, sometimes, a single peptide change in the biologically active molecule or a small atomic change in organic molecule can intense change the activity of these species. Even the complex relationship between properties and molecules not only occur in bio-molecular system, but also found in physiochemical, materials and many other systems. While studying a large number of molecules with different structures and properties it is difficult to find the empirical relationship between the properties and the structures. The used molecular descriptor of SlogP_VSA and SMR_VSA class produce good results for selected compounds and highlights that polarizability might be the principal factor for Pim kinases inhibitory potency. Additionally, the results of the study also directed that the nature of affinity between the active site of Pim kinases and Benzothienopyrimidin is shape specific. The results of the present study might be help in the design and development of more potent inhibitor for Pim kinases.

5. Conclusions. In recent years there has been substantial progress in understanding the role of Pim kinases in developing tumor, the various stages of which represent potential targets for the development of novel and potent drugs. Molecular descriptors highlight important features of the compound to enhance the reliability of its composition. The used molecular descriptor of SlogP_VSA and SMR_VSA class produce highly satisfactory results for a small group of compounds. Statistically reliable QSAR models the dataset of 62 compounds (3H-Benzo (4, 5) thieno (3, 2-d) pyrimidin-4-ones) as Pim kinases inhibitors were developed. The results showed that polarizability of these compounds might be the principal factor for Pim kinases inhibitory potency. Thus, we hope that predicted descriptors (SlogP_VSA and SMR_VSA) might be helpful in the design of more potent Pim kinase inhibitors.

REFERENCES


IMPACT OF POLITICAL AND CATASTROPHIC EVENTS ON STOCK RETURNS

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ABSTRACT This study intends to find the impact of political and catastrophic events on stock returns of Karachi Stock Exchange (KSE-100 Index). A total of forty three political and four catastrophic events have been considered from May 1998 to September 2013. Political events are further divided into two groups i.e., favorable political events and unfavorable political events. The impact is checked for political, catastrophic, favorable political and unfavorable political events for 1 day, 5 days, 10 days and 15 days event windows. The results suggest that mean returns before and after political events were different on 5 days window. Thus, political events do have an impact on stock returns, however, it does not last longer and returns are normalized afterwards. Similarly, favorable political events also have impact on stock returns only on 5 days window. Unfavorable political events show abrupt (one day) impact and 5 days impact. Catastrophic events show no impact on stock returns using 1 day, 5 days and 10 days event windows. However, the impact was observed on 15 days event window. These results indicate that Karachi Stock Exchange is inefficient in semi strong form.

Key Words: Political Events, Catastrophic Events, Stock Returns

1 Introduction The stock market movements have been keenly studied by many researchers (e.g., Schwert, 1989; Cutler, Poterba & Summers, 1989; Fair, 2002; Kim, 2003). The purpose is to find out factors that have an impact on stock returns. This strand of research is thought to be connected with the Efficient Market Hypothesis1. The factors identified by researchers are economic factors (announcements about interest rates, foreign exchange rate, dividend policy etc.), political events and catastrophic events along with many others (Suleman, 2012).

Studies on catastrophic and political news suggest that these events affect stock markets. It is considered that news about political decisions, which could potentially influence domestic and foreign policy are responded by stock markets. According to Tan and Gannon (2002), news that increases investors’ expectations should increase the prices and vice versa.

Over the years, Pakistan has experienced active political issues and involvements and has witnessed many catastrophes (Chari, 2010). The control of government has oscillated between democratic parties and military dictatorship and the real concept of democracy still remains a paradox. It is the urge for power that drives military to be actively participating in politics (Taha, 2012).

In sixty six years there have been three constitutions and the latter one of 1973 yet facing amendments. However, in the last fifteen years i.e., 1998-2013, the country has gone through some major political and

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1 This hypothesis assumes all news and announcements are fully accommodated in stock prices and that excessive earnings and abnormal returns are not possible.
catastrophic events (e.g., Musharraf government’s demise, earthquake and floods). After the nuclear tests in May 1998, Pakistan has faced excessive international pressure in the form of economic sanctions (Taha, 2012). The democratic government was dismissed and the military government of Musharraf took over on October 12, 1999. Even though in 2002, civilian government was restored yet Musharraf remained president for next five years. Further, he suspended the Chief Justice and announced emergency. However, after his resignation democratic government was formed, which for the first time in history completed its tenure. Unfortunately, Pakistan is also facing the menace of terrorism that creates anarchy (Kronstadt, 2008).

Pakistan was also badly hit by natural catastrophes including earthquakes in 2005 and floods in 2007 and 2010 (NDMA, 2010). The role of stability is of immense importance to economic development and growth (Memon, Memon, Shaikh, & Memon, 2011).

It is important to understand how the political and catastrophic events have affected the returns of Karachi Stock Exchange (KSE), which is the largest stock exchange of the country. The study contributes to the literature as it uses a more expanded time frame considering all the major political and catastrophic events. It observes the impact using four different event windows to get better results. It even observes the impact of favorable and unfavorable events separately.

We observe that political events do have an impact on stock returns in the short run, i.e., 5 days window and are normalized afterwards. The impact of catastrophic events is observed only on 15 days window. Thus, we conclude that KSE is inefficient in semi strong form.

The remaining paper is organized as follows. Section 2 discusses the literature review and hypothesis development. Section 3 describes the methodology. Section 4 contains data analysis and interpretation while section 5 concludes the paper.

2 Literature Review and Hypotheses

2.1 Literature Review Efficient Market Hypothesis states that stock prices contain the effect of all available information which restricts investors from earning extra than normal returns (Fama, 1970). Further Fama (1970) introduced the distribution of Efficient Market Hypothesis into three sub divisions, i.e. Weak form, Semi Strong form and strong form.

The view that historical information about stock prices and returns are entirely reflected in current prices is Weak form of Market Efficiency. It includes information about company announcements, dividend announcements, interest rates etc. (Fama, 1991). Semi strong form of efficiency is considered to exist when stock prices wholly adjust all publicly available information and do not allow investors to earn over than normal returns. While when stock prices fully accommodate insider’s information the market is said to be efficient in strong form.

Many studies suggest that markets may not be efficient allowing investors to earn abnormally. Researchers worked on market anomaly which is that exceptional condition of stock returns when they deviate from their normal or regular pattern (George & Elton 2001). Silver (2011) further elaborated financial market anomalies as the condition in which stock price behavior violates the concept of efficient market hypothesis. Many studies confirm the existence of market anomalies by comparing stock returns before and after an event (see also Ariel, 1987; Jaffe & Westerfield, 1989; Boudreaux, 1995). However some studies have reported non-occurrence of this abnormal behavior as well (Cadsby & Ratner, 1992).

Publically available information includes political, economic and catastrophic news along with other news which may end up violating semi strong form of market efficiency (Fama, 1970). Stock prices reaction to economic, catastrophic and political news has been tested for different stock markets (Cutler, Poterba & Summers, 1989; Shelor, Anderson, & Cross, 1990; Bittlingmayer, 1998).

Studies have been done to check the impact of economic variables on stock prices which came up with mixed results. Some studies reported exchange rate to have no or weak impact on stock prices (Frank &
Young, 1972; Patra & Poshakwala, 2006). However, stock prices were affected by exchange rates in some cases (Kim, 2003; Ahmad, Rehman & Raoof, 2010).

Stock prices are also stated to be affected by interest rate (Kim, 2003; Rehman & Raoof, 2010). Similarly other macro-economic variables including inflation and money supply have an impact on stock prices (Patra & Poshakwala, 2006).

The impact of political events on stock returns has been checked for both developed and emerging markets. Niederhoffer (1971) studied the impact of political events happening from 1950 to 1966 on stock prices. He concluded that political events changes stock prices. Liblang and Mukherjee (2005) checked stock market response to Presidential elections and partisan politics in U.S and UK. They included all the presidential elections between 1930-2000. They ended up with the conclusion that stock prices are historically been affected by presidential elections and partisan political policies in the US and UK.

However, Fair (2002) came up with different results for the US stock market. After identifying big price changes he tried to find if they were because of any political and economic news. He used data from 1982 to 1999 which included future prices for 4417 trading days. He could only identify 220 days with any big price change and only 69 could be related with any political or economic news. So he concluded that events or news (political or economic) may not be the cause of big stock price movements.

Beaulieu, Cosset and Essaddam (2005) used a set of 70 news about Quebec separation to find if those political news have any impact on the stock returns and its volatility. Their results show that political news about Quebec separation has a significant impact on stock prices and its volatility.

Bittlingmayer (1998) used political events occurring from 1880 to 1940 to check similar impact for Germany. He reported that political events have an impact on stock prices’ volatility in Germany. However, Dopke and Pierdzioch (2004) while using all the presidential elections from 1960 to 2002 as proxies for political events find no strong evidence to conclude that political process and events causes stock market movements. Furthermore, average returns before and after the elections were reported to be not significantly different.

Fuss and Bechtel (2008) further advanced the case and tried to check this impact for small, mid and large cap firms. They concluded that only small firms are affected by political events while mid and large cap firms remain unaffected. However Government changeover results in new policies which affect stock returns and their volatility. Similarly using 49 events from 1941 to 1987 (Cutler et al., 1989) found a very small impact of political events on stock prices.

Onder and Mugan (2006) studied the impact of political events from Jan 1995 to Dec 1997 on stock returns and volatility for two emerging markets Turkey and Argentina. They concluded that political events have an impact but not much significant. Chen, Bin, and Chen (2005) investigated the impact of 9 political events happening from 1996 to 2002 on Taiwan’s stock market. They concluded that political events have a significant impact on stock prices. Further, stated that good news causes positive abnormal returns while negative news causes negative abnormal returns.

Kim and Mei (2001) included political events from 1989 to 1993 to check its impact on Hong Kong’s Hang Seng Index. They found a significant impact of these events on the returns and volatility of Hang Seng Index. Angelovska (2011) checked the impact of three events related to Macedonian name issue on Macedonian Stock exchange. He concluded that these events have significant impact on stock returns, however, the abnormal returns before and after the events stayed the same.

Zach (2003) considered events from 1993 to 1997 to find its impact on the Israeli Stock Exchange “The Mishtanim Index”. He found significantly extreme and volatile stock returns on the days when a political event happened than non-event days. Kutan and Perez (2002) used Columbia as their playground to find this relationship. They considered 951 political events and 106 kidnapping events happening during 1996-2000. Their study showed that stock returns significantly changes due to political uncertainty, elections and violence like kidnapping.
Aggarwal, Inclan and Leal (1999) identified large shifts in stock returns from 1985 to 1987 in emerging markets and tried to relate them with political events as their cause. Their sample consisted of 10 emerging markets and 6 major markets. They concluded that all those identified stock returns’ shifts were caused by local political events in emerging markets. While the only global event to cause any domestic stock returns’ volatility in emerging markets was the 1987 Crash.

Ma, Sun and Tang (2003) conducted a similar study in an attempt to find the impact of Tiananmen Accident in China on US firms having joint ventures in China. They concluded that this event has a significant impact but small in magnitude on US firms having joint ventures in China. However, it was a short term rather than long term impact.

Very few studies have been performed in Pakistan in this area. Malik, Hussain and Ahmad (2009) used Musharraf resignation as a political event to check its impact on stock returns. They compare 6 months before and after data to find this relationship. They come up with the conclusion that stock returns in KSE have been significantly affected by Musharraf’s resignation, confirming that political events do have an impact on stock returns.

The impact of natural disasters/catastrophes on stock returns has also been investigated by researchers. Shelor et al. (1990) studied the impact of 1989’s Californian Earthquake on the stock returns of U.S real estate firms. Their results varied by regions; as stock returns of firms operating in San Francisco were affected while others were not. Overall, there was no significant impact of Californian Earthquake on stock returns.

Stock returns reaction to 42 catastrophic events happening in Australian has been tested by Andrew, Valadkhani and Worthington (2004). They use forty two events between 1982 and 2002. They conclude that stock returns before and after catastrophes are significantly different. However, it varies from sector to sector.

Wan (2011) used eighty two natural disasters happening in Japan between 1982 and 2011 to check whether these events have an impact on Nekkei 225. These events included Earthquakes, Tsunamis and volcano eruptions. He finds no direct impact of these events on Nekkei 225 returns.

Javid (2007) studied the impact of October 2007 Earthquake on stock returns for Pakistan. Using a sample of sixty firms listed on KSE, he found no significant impact of this Earthquake on the stock returns and volatility of the overall sample. However, stock returns of firms operating in cement, food, steel and banking sectors increased.

Stability of the stock market plays a vital role in the economic growth of a country (Levine & Zervos, 1998). Pakistani stock market (KSE) has got so much fluctuation in the recent years. It is important to know what could be the potential cause of this abnormal and instable behavior. According to Ball and Brown (1968) accounting numbers i.e., company specific information leads to stock market movements. However, the above discussed studies state other factors such as political and catastrophic events to be one of the causes as well. Therefore, this study intends to find whether political and catastrophic events have an impact on stock returns. It will also give an idea that how much time a market takes to absorb news about events.

From the above discussed literature it is obvious that this impact has been investigated using very limited dataset considering few events. As mentioned by Ahmed et al. (2009), time horizon should be extended and new events should be added to get a full insight of this relationship. Also studies investigating the impact of catastrophes are very a few in number in Pakistan. Many catastrophes have struck Pakistan in the recent past and their impact needs to be observed. Considering several events in one study will bring more valuable insights regarding the stock returns’ response to these political and catastrophic events (Andrew, Valadkhani & Worthington, 2004).

2.2 Hypotheses: Based on the discussion so far, we form the following hypotheses.

H1: Mean Index returns before and after the occurrence of political events are different.
H2: Mean Index returns before and after the occurrence of catastrophic events are different.
H3: Mean Index returns before and after the occurrence of favorable events are different.
H4: Mean Index returns before and after the occurrence of unfavorable events are different.

3 Methodology Two different variables are involved in this study. Political and catastrophic events as independent and stock returns as dependent variable. Political and catastrophic events are measured by dummy variables. Days before these events take value “0” and after the event days take value “1”. This study used stock returns as the dependent variable as it tries to check whether stock returns are affected by political and catastrophic events or not. KSE-100 stock returns before and after the occurrences of political and catastrophic events were collected and investigated. This study used logarithmic returns to solve the problem of unit root making data stationary.

\[ R_t = \ln \left( \frac{P_t}{P_{t-1}} \right) \]

Where:

\( R_t \) is the logarithmic return

\( P_t \) is the Current Day return

\( P_{t-1} \) is the Previous Day return

Political and catastrophic events happening from May 1998 to September 2013 are considered in this study. The motive behind selecting this time frame is Pakistan’s volatile political structure and catastrophic disturbances during these years. We observed much foreign political involvement in Pakistan during this era. Similarly, many high impact disastrous natural calamities and catastrophes struck Pakistan during this time frame. It accounts for the most current political and catastrophic events that have not been considered in the previous studies along with some earlier events that were missed previously.

4 Data Collection and Analysis: To test the hypotheses secondary data has been used. It required two kinds of data, one about stock prices while the other dataset about political and catastrophic events. Data about KSE stock returns has been obtained from Yahoo Finance. It consists of a total of 3790 observations from May 5, 1998 to September 30, 2013.

Data about Political and Catastrophic events has been obtained from Pakistan’s leading newspapers and some international sources. Pakistani newspapers accessed were Dawn, Daily Times, The Nation and The Statesman. International sources included BBC and CNN.

Table 1 and 2 respectively, presents political and catastrophic events used in the study along with their days of occurrence and division as either favorable or unfavorable events. This study includes all those events that make a story in majority of the above mentioned sources of information. Events which were timely communicated across the country and appeared in international news and investors being aware of those were included.

The rationale behind this was to include all the authentic and publically known events. It increases the possibility that all investors have the knowledge of these events before making their investment decisions. Thus all these events could possibly have significance. A total of 43 political and 4 catastrophic events have qualified to be considered in the study (see in Table 1). Also the political events are sub-divided into 26 favorable and 17 unfavorable events.
<table>
<thead>
<tr>
<th>No.</th>
<th>Event</th>
<th>Date of Occurrence</th>
<th>Nature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mamnoon Hussain elected as President</td>
<td>09/09/2013</td>
<td>Favorable</td>
</tr>
<tr>
<td>2</td>
<td>Nawaz Sharif elected as Prime Minister</td>
<td>05/06/2013</td>
<td>Favorable</td>
</tr>
<tr>
<td>3</td>
<td>General Elections</td>
<td>11/05/2013</td>
<td>Favorable</td>
</tr>
<tr>
<td>4</td>
<td>Tahir Ul Qadri set in</td>
<td>16/01/2013</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>5</td>
<td>Yusaf Raza Gillani disqualified as Prime Minister</td>
<td>19/06/2012</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>6</td>
<td>Memo case Scandal</td>
<td>17/11/2011</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>7</td>
<td>NATO attack on Salala Check Post</td>
<td>26/11/2011</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>8</td>
<td>Osama Bin Laden killed</td>
<td>02/05/2011</td>
<td>Favorable</td>
</tr>
<tr>
<td>9</td>
<td>Salman Taseer Assassination</td>
<td>04/01/2011</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>10</td>
<td>18th Amendment</td>
<td>08/04/2010</td>
<td>Favorable</td>
</tr>
<tr>
<td>11</td>
<td>NRO abandoned</td>
<td>16/12/2009</td>
<td>Favorable</td>
</tr>
<tr>
<td>12</td>
<td>Swat Military Operation</td>
<td>12/05/2009</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>13</td>
<td>Chief Justice restoration</td>
<td>16/03/2009</td>
<td>Favorable</td>
</tr>
<tr>
<td>14</td>
<td>Attack on Sri Lankan Cricket team</td>
<td>09/03/2009</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>15</td>
<td>Asif Ali Zardari elected as President</td>
<td>09/09/2008</td>
<td>Favorable</td>
</tr>
<tr>
<td>16</td>
<td>PML(N) quit coalition with PPP</td>
<td>25/08/2008</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>17</td>
<td>Musharraf Resignation</td>
<td>18/08/2008</td>
<td>Favorable</td>
</tr>
<tr>
<td>18</td>
<td>Yusaf Raza Gillani elected as Prime Minister</td>
<td>24/03/2008</td>
<td>Favorable</td>
</tr>
<tr>
<td>19</td>
<td>General Elections</td>
<td>18/02/2008</td>
<td>Favorable</td>
</tr>
<tr>
<td>20</td>
<td>Benazir Bhutto’s Assassination</td>
<td>27/12/2007</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>21</td>
<td>Emergency lifted</td>
<td>16/12/2007</td>
<td>Favorable</td>
</tr>
<tr>
<td>22</td>
<td>Elected Govt. tenure Completed</td>
<td>16/11/2007</td>
<td>Favorable</td>
</tr>
<tr>
<td>23</td>
<td>Benazir Bhutto back to Pakistan</td>
<td>18/10/2007</td>
<td>Favorable</td>
</tr>
<tr>
<td>24</td>
<td>Pervez Musharraf stepped down as Army Chief</td>
<td>18/09/2007</td>
<td>Favorable</td>
</tr>
<tr>
<td>25</td>
<td>Nawaz Shareef back to Pakistan</td>
<td>10/09/2007</td>
<td>Favorable</td>
</tr>
<tr>
<td>26</td>
<td>Military Operation on Lal Masjid</td>
<td>3/07/2007</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>27</td>
<td>Chief Justice suspended</td>
<td>09/03/2007</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>28</td>
<td>Sardar Bugti killed</td>
<td>26/08/2006</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>29</td>
<td>Shaukat Aziz elected as Prime Minister</td>
<td>28/08/2004</td>
<td>Favorable</td>
</tr>
<tr>
<td>30</td>
<td>Mir Zafar Ullah Jamali steps down to Ch. Shujaat Hussain as PM</td>
<td>26/06/2004</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>31</td>
<td>Pakistan’s readmission to Commonwealth</td>
<td>22/05/2004</td>
<td>Favorable</td>
</tr>
<tr>
<td>32</td>
<td>Musharraf won vote of confidence</td>
<td>01/01/2004</td>
<td>Favorable</td>
</tr>
<tr>
<td>33</td>
<td>Lahore-Delhi Bus service resumed</td>
<td>11/07/2003</td>
<td>Favorable</td>
</tr>
<tr>
<td>34</td>
<td>Senate elections</td>
<td>24/02/2003</td>
<td>Favorable</td>
</tr>
<tr>
<td>35</td>
<td>Mir Zafar Ullah Jamali elected as Prime Minister</td>
<td>23/11/2002</td>
<td>Favorable</td>
</tr>
<tr>
<td>36</td>
<td>General Elections</td>
<td>10/10/2002</td>
<td>Favorable</td>
</tr>
<tr>
<td>37</td>
<td>Musharraf wins Referendum</td>
<td>30/04/2002</td>
<td>Favorable</td>
</tr>
<tr>
<td>38</td>
<td>Daniel Pearl killed (WSJ reporter)</td>
<td>1/02/2002</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>39</td>
<td>WTC and Pentagon attack (9/11)</td>
<td>11/09/2001</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>40</td>
<td>Agra Summit (Musharraf Vajpaaye talk)</td>
<td>15/07/2001</td>
<td>Favorable</td>
</tr>
<tr>
<td>41</td>
<td>Musharraf dismissed President</td>
<td>20/06/2001</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>42</td>
<td>Musharraf dismissed Nawaz Sharif</td>
<td>12/10/1999</td>
<td>Unfavorable</td>
</tr>
<tr>
<td>43</td>
<td>Nuclear tests</td>
<td>28/05/1998</td>
<td>Favorable</td>
</tr>
</tbody>
</table>
Table 2: Date wise Catastrophic Events

<table>
<thead>
<tr>
<th>No.</th>
<th>Event</th>
<th>Date of Occurrence</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Earthquake</td>
<td>24/9/2013</td>
</tr>
<tr>
<td>2</td>
<td>Floods</td>
<td>26/07/2010</td>
</tr>
<tr>
<td>3</td>
<td>Floods</td>
<td>27/6/2007</td>
</tr>
<tr>
<td>4</td>
<td>Earthquake</td>
<td>8/10/2005</td>
</tr>
</tbody>
</table>

Fama (1991) titled studies which investigate the impact of publically available information on stock returns as an Event Study. This method compares the mean stock returns before and after the happening of an event or any publically available information. For this purpose Independent t-test has been used because it consists of two independent data groups i.e. before events data and after events data.

As discussed in the existing literature section that many studies have checked this impact however this research checked the impact considering four (4) different event windows. Cheng and Leung (2006) included six (6) different event windows in their study. They further suggested using different windows to get a better insight of events. It also helps in finding out when does stock prices reflect the information in case there is an impact.

Both of the data groups (i.e. political and catastrophic) have been separately analyzed for each of the four event windows. Also the same method was adopted for finding the impact considering favorable and unfavorable political events.

The four event windows used were (a) t= -1, t= +1 (b) t= -5, t= +5, (c) t= -10, t= +10 and (d) t= -15, t= +15. So the first window compares the mean returns for 1 day before and 1 day after the events. The second window compares mean returns for 5 day before and 5 days after the occurrence of the events. The third window considers comparing 10 days before and 10 days after the event mean returns. And finally event window four assumes finding 15 days before and after effect. Days before the occurrence of the events in each window takes value ‘0’ while days after the event takes value “1”.

Table 3 provides the descriptive statistics of the data being used.

Table 3: Descriptive statistics

<table>
<thead>
<tr>
<th>Observations</th>
<th>Mean</th>
<th>St. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>3790</td>
<td>0.0006</td>
<td>0.0161</td>
<td>-0.1321</td>
<td>0.1276</td>
<td>-.322</td>
<td>3.709</td>
</tr>
</tbody>
</table>

The data consisted of 3790 observations from April 2, 1998 to Sep 30, 2013. The mean value for logarithmic returns was 0.0006 with a minimum value of -.1321 and maximum of .1276. The disparity in the minimum and maximum values for the data shows the wide range in stock returns on different days. The standard deviation is 1.61% which means that the data has some deviations from the average value. Also Kurtosis of 3.709 suggested the data to be slightly leptokurtic. The data has a skewness of -.322, which is close to 0 suggesting the data to be normal.

4.1 Impact of Political Events

Table 4 provides the empirical results for the tests observing the impact of political events.
Levene’s test was conducted to find whether the data would consider t-value for equal variances assumed or equal variances not assumed. The data is homoscedastic when there are equal variances and heteroscedastic when equal variances are not there. A value less than 5% means that there are no equal variances in the data i.e., heteroscedastic. In this case P-value stated in front of “Equal variances not assumed” will be interpreted. While Levene’s value greater than 5% means that the data is homoscedastic that is having equal variances. In this case P-value mentioned in front of “Equal variances assumed” would be interpreted.

Levene’s value was less than 0.05 i.e. 0.045 and 0.025 for 1-day and 5-days event windows respectively. Thus in these two event windows P-values for equal variances not assumed were considered. Levene’s value was greater than 5% i.e. 0.155 and 0.105 for 10-days and 15-days event windows respectively. In those cases P-values for equal variances assumed were interpreted.

4.1.1 Impact of Political Events using 1-day Event Window: Referring to Table 4 the P-value using 1-day event window is 0.2407. This value is greater than 5% which means that the stock returns before and after political events were not different. So there is no impact of political events on stock returns using 1-day window.

4.1.2 Impact of Political Events using 5-days Event Window: The P-value for the study using a 5-days Event window is 0.048 which is smaller than 5%. The results suggest that stock returns after happening of political events changed significantly. Thus on 5-days window the study show the impact of political events on stock returns.

4.1.3 Impact of Political Events using 10-days Event Window: The result for 10-days event window is also in alignment with those for 1 and 5-days windows. The P-value 0.758>5% so even on 10-days window the study could not find any impact political events could have on stock returns.

4.1.4 Impact of Political Events using 15-days Event Window: Stock returns before and after the occurrence of political events are not different in case of 15-days window as the P-value 0.374>5%.

So using 5-days window the study confirmed the impact of political events on stock returns. That is the mean returns were reported to be different after political events. It showed the short term affect as the other windows fails to reject the null hypothesis.

4.2 Impact of Catastrophic Events

Table 5 summarizes the impact of catastrophic events on stock returns.

<table>
<thead>
<tr>
<th>Test statistics</th>
<th>1-day Window</th>
<th>5-days Window</th>
<th>10-days Window</th>
<th>15-days Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene’s value</td>
<td>0.22</td>
<td>0.829</td>
<td>0.204</td>
<td>0.052</td>
</tr>
</tbody>
</table>
Table 5 presents the results about the impact of catastrophic events on the mean returns in KSE 100 index. Levene’s values for all the four event windows were insignificant i.e. greater than 5%. This means that the data considered is homoscedastic. Thus P-values for “equal variances assumed” would be interpreted below.

4.2.1 Impact of Catastrophic Events using 1-day Event Window: Alike political events, the impact of catastrophic event has also been checked using four event windows. The P-value using 1-day window is 0.422 which is greater than 5%. This led to the conclusion that in case of 1-day window catastrophic events did not impact stock returns and thus not rejecting the null hypothesis.

4.2.2 Impact of Catastrophic Events using 5-days Event Window: The P-value for 5-days event window to determine the impact was 0.411. This value is again greater than 5% which led to the acceptance of the null hypothesis. Thus the mean returns before and after the occurrences of catastrophes were not different at 5-day windows.

4.2.3 Impact of Catastrophic Events using 10-days Event Window: The study could not find the impact of catastrophes on the mean returns as the P-value is 0.509 that is greater than 5%.

4.2.4 Impact of Catastrophic Events using 15-days Event Window: Using 15-days event window to check the impact of catastrophic events on mean returns the study showed different result than on the other event windows. The P-value is 0.001 which is highly significant indicating that the mean returns before and after the catastrophic events were significantly different. The mean returns before the events were 0.00343021 while it dropped significantly to -0.00410272 after the catastrophic events.

So catastrophic events did not impact the mean returns for 1, 5 and 10 days windows. The mean returns before and after the catastrophic events were not different. However, checking the impact using an event window of 15 days brought completely different results. In this case the mean returns were different before and after the events. The possible reason could be that for the first 10 days the investors were hoping the market to observe the pressure catastrophic events exerted. However the market could not adjust to the catastrophes and started showing abnormal returns as shown by the 15-days window results.

4.3 Impact of Favorable Political Events:
Table 6 summarizes the impact of favorable political events on stock returns.

<table>
<thead>
<tr>
<th>Test</th>
<th>1-day Window</th>
<th>5-days Window</th>
<th>10-days Window</th>
<th>15-days Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene’s test value</td>
<td>0.033</td>
<td>0.108</td>
<td>0.249</td>
<td>0.333</td>
</tr>
<tr>
<td>P-value</td>
<td>0.195</td>
<td>0.031</td>
<td>0.953</td>
<td>0.381</td>
</tr>
</tbody>
</table>

Table 6 shows results for the favorable events separately. Here also first we checked which P-value has to be interpreted. Levene’s test indicated that except value for the 1-day window all values are insignificant. So the data in 1-day window is heteroscedastic and thus we will interpret the P-value for “equal variances not assumed”. For the rest of the three event windows P-value for “equal variances assumed” will be interpreted.
4.3.1 Impact of Favorable Political Events using 1-day Event Window: Here one day before and one day after data has been used to study favorable events’ impact on the mean stock returns. As shown in the table above the P-value is 0.195, which is greater than 5%. This lead us to conclude that mean stock returns before and after favorable political events are not different.

4.3.2 Impact of Favorable Political Events using 5-days Event Window: The P-value for the impact of favorable political events using 5-days event window is 0.031. This value is smaller than 5%. So, on the basis of this value it is concluded that the null hypothesis should be rejected. Thus, before and after mean returns are different and show an impact.

4.3.3 Impact of Favorable Political Events using 10-days Event Window: Moving on to find the impact using 10 days event window the study failed to find if favorable political events could have an impact on the mean stock returns. The P-value of 0.953>5%, thus, we could not reject the null hypothesis.

4.3.4 Impact of Favorable Political Events using 15-days Event Window: Even using 15 days before and after affect the study could not find any impact favorable political events could have on the mean returns. We accept the null hypothesis as the P-value 0.381>5%.

From the above stated results and discussions about the impact of favorable political events the study concluded that the mean returns before and after these events were not different using 1, 10 and 15 days windows. However, a significant impact was observed for 5 days window. Thus favorable political event only impact stock returns in shorter period. However this impact could not be confirmed in the longer period.

4.4 Impact of Unfavorable Political Events

Table 6 summarizes the impact of unfavorable political events on stock returns.

Table 6: Empirical Results for Unfavorable Political Events

<table>
<thead>
<tr>
<th>Test</th>
<th>1-day Window</th>
<th>5-days Window</th>
<th>10-days Window</th>
<th>15-days Window</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene’s test value</td>
<td>0.697</td>
<td>0.082</td>
<td>0.187</td>
<td>0.247</td>
</tr>
<tr>
<td>P-value</td>
<td>0.023</td>
<td>0.037</td>
<td>0.681</td>
<td>0.759</td>
</tr>
</tbody>
</table>

Levene’s values for all the four event windows used are greater than 5%. Thus, data was homoscedastic and P-values for equal variance assumed were referred to for interpretations.

4.4.1 Impact of Unfavorable Political Events using 1-day Event Window: Overall political events were divided into favorable and unfavorable events. Here the impact of unfavorable political events will be discussed. The P-value while using a 1-day event window is significant as this value 0.023<5%. Thus, we would accept the hypothesis i.e., the mean returns before and after unfavorable political events are different.

4.4.2 Impact of Unfavorable Political Events using 5-days Event Window: While using 5 days event window, the P-value is 0.037. This lead to the conclusion that even the impact of unfavorable political events is observed in the next five days after the events happens.

4.4.3 Impact of Unfavorable Political Events using 10-days Event Window: The P-value calculated suggests we cannot reject the null hypothesis even using 10 days event window. The P-value of 0.681, which is greater than 5% lead us to this conclusion.
4.4.4 Impact of Unfavorable Political Events using 15-days Event Window: The P-value 0.759 suggests that the mean returns before and after unfavorable political events are not different.

Based on the P-values calculated, the study concludes that unfavorable political events had abrupt impact on the mean returns for shorter periods of one and five days. However, by increasing the days of analysis the impact disappears.

5 Conclusion

The idea that stock prices absorb the effect of news and not allowing investors to make abnormal profit is termed as Efficient Market Hypothesis. This behavior of the market when observed during publically available information is considered to be the semi strong form of Market Efficiency. Political and catastrophic events also come in this category of publically available information. During the last fifteen years many political and catastrophic events happened in Pakistan. Pakistan experienced both dictatorship and democracy in this era. Many important political and public figures got assassinated. Pakistan also experienced instability due to war on terror. Similarly there have been drastic catastrophes and natural calamities like earthquakes and floods. Because of these uncertain situations investors are pessimistic about the market. But there is a possibility that investors over weighted the impact of these events.

This research aimed to investigate the impact of political and catastrophic events happening in the last fifteen years in Pakistan on the KSE-100 Index returns. It considered forty three political and four catastrophic events from May 1998 to September 2009. The impact was checked using four different event windows to show when did stock prices started reacting to the news. Political events were reported to have a short time impact on stock returns. However, there was neither abrupt (one day) nor long lasting impact observed.

Political events included both favorable and unfavorable events collectively. Stock returns’ response to both favorable and unfavorable events also were checked separately. There were twenty six favorable events and seventeen unfavorable events in the study. Favorable political events were reported to have an impact lasting for five days while unfavorable political events’ impact was observed even on the first day after the events and lasting for five days. Therefore the impact of political events, favorable events could be observed for five days and not significant on 10 and 15 days window. While market responds to unfavorable events right on the next day till at least 5 days.

The results for catastrophic events were quite different. Stock prices did not respond to catastrophic events for the 1, 5 and 10-days event windows. However stock returns were reported to have been significantly affected by catastrophic events considering 15-days window. The possible reason could be the calculation of exact losses later on. This means that investors might have optimistic opinion about the catastrophic events that they would stop and won’t cause much loss. However later on demand for stocks decreased which might be due to the uncertain and affected economic conditions resulting in negative stock returns.

In a nutshell, political events have an impact on stock returns for shorter period after which returns start adjusting. It makes KSE an inefficient market in semi strong form. While catastrophic events’ impact on stock returns depend on the time when information about the exact severity and losses caused by catastrophic events were completely available to the investors. It means that stock returns do change because of political or catastrophic events. Investors should do cost and benefit analysis while investing in KSE for their fear regarding political and catastrophic uncertainty. They should invest only in sectors which prove to have no significant response to political and catastrophic events. They must also consider other factors (economic) that have a direct impact on stock returns.
REFERENCES


THE IMPACT OF MILITANCY ON FEMALE EDUCATION OF DISTRICT SWAT KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT The education of female is an important obligation for any society. The study investigated the impacts of militancy on female education of District Swat Khyber Pakhtunkhwa, Pakistan. The study aimed at the exploration of damages done to the female educational infrastructure, injuries inflicted on female students, their teachers and parents by the militants and the overall adverse psychological impacts on female students of the area. The population of the study was all the 220 heads of the damaged female educational institutions of District Swat. A sample of 20 heads of the damaged female institutions was selected through stratified random sampling technique from the target population of fully and partially damaged schools. Semi-structured interview, documents analysis and researchers’ observation were used as tools of data collection. The study reported the destruction of about half of the female educational institutions, loss of books and furniture, adverse psychological impacts for the female students, their teachers and parents, the present problems of female education in the area and the process of rehabilitation of the affected sector. The study suggested measures for improvement and identified areas for future research.
Key words: Impact, militancy, Swat, Female education, Pakistan

Introduction: Islam is a complete code of life and guides its followers in all the spheres of life. It lays special emphasis on the acquisition of education and knowledge and therefore, recommends its compulsory attainment for both the genders in order to know their lord, their world and themselves. According to Ashraf (2006) who quotes the Hadith of the Holy prophet (SAW) that it is the duty of every Muslim (both male and female) to get education. In a similar vein, Khadija (2007) argued that the Holy Prophet (SAW) declared education to be compulsory for both male and female. Similarly, Quazi (2008) declared that the Holy prophet (SAW) described that if one had a girl child, educated her and gave away her in marriage, he will be with me (prophet, SAW) in heaven. The above statements testify the obligation of compulsory education in Islam for both male and female and clearly provide female children with their right to education.

It is an admitted fact that no nation in the world can prosper without female education. According to Ashraf (2006) none of the modern societies can neglect female education because education for the female is the education for the future family. Similarly, Sharma (2007) and Misra (2006) argued that the future of a nation is shaped by the educated mothers. The better educated, trained and skilled are the mothers the better educated, trained and skilled will be the nation. Verma (2006) viewed that both male and female children have the right to education. Similarly, Medel and Bochynek (2004) stressed upon the parity in education of both the genders. The above lines strongly established the importance of female education and declared its negligence as a serious loss for any society in modern times.

There are many obstacles like, poverty, illiteracy, gender discrimination, violence, ignorance, child labor, early marriages and terrorism in the way of female education. According to Khan (2009) militancy is going to be the main hurdle in the way of acquiring female education. Similarly, Verma (2006) and Gaur and Rani (2007) declared
poverty, illiteracy, sexual violence, cultural barriers, early marriages and child labor as hurdles for the female education. Similarly, Das (2006) and Misra (2005) described education as the most powerful tool for the empowerment of females in all spheres of life. Varghese (2005) declared illiteracy as the main cause of female oppression in the society. It became crystal clear that there are many obstacles in the way of female education and militancy is also one of the burning issues for the female education. Since its inception in 1917, the former state of Swat before its merging in Pakistan in 1969 encouraged female education along with the education of male. For this purpose a girl school was established in 1926. At the time of its mergence in Pakistan, it had more than two hundred schools for education and even co-education was encouraged for the education of females (Sultani-Rome, 2008). It showed the love of the people of the area for the female education even in the period of Swat state.

According to Abbas (2007) the militants started their movement in the guise of Islam, termed themselves as holy fighters and guardians of the cause of religion. But later on they started misleading the local people, turned violent, razed school buildings and banned female education. The illiteracy, poverty and ignorance of the local masses also encouraged the cause of the militants. Subramanin (2009) reported that in February 2009 the militants completely banned female education and termed it as a source of obscenity. Similarly, Hussain (2008) reported that the orders of the militants completely deprived female students of the area from education for a considerable period of time and teachers along with parents were terrified for the dire consequences if they went against the verdict of the militants. In the similar vein, Khan (2009) and Geller (2008) reported that female children were banned from getting education as it was meant for the inculcation of the western values.

In the light of the above discussion, it is clear that Islam is clearly in favor of female education and makes it obligatory for the Muslims irrespective of gender. It is important for the progress and prosperity of all the nations but the militants in Swat had deprived them of their due right to education. Therefore, the researchers conducted the study in order to pinpoint the damages done to the female educational sector by the militancy and suggesting remedial measures for overhauling these damages.

**Methodology**

**Population and Sampling:** The population of the study was all the heads of the 220 affected female institutions of the District Swat. Among these 123 heads were from fully damaged and 97 were from partially damaged schools. A sample of twenty 20 heads i.e. 10 heads from the fully damaged and 10 heads of the partially damaged female institutions was selected through stratified random sampling technique from the fully and partially damaged schools of the area.

**Instrumentation:** Semi-structured interview, documents analysis and researchers’ observation were the main tools of data collection. Semi-structured interview was used in order to get an insight into the impacts of militancy on female education i.e. damages to the female schools, injuries to students, teachers and parents, adverse psychological impacts on the female students of the area and to have a close look at the present state of female education in District Swat.

**Data collection:** The data were collected through Semi-structured interview from the respondents. For this purpose a female volunteer was recruited and trained who collected data from the female participants. Ethical guidelines i.e. informed consent; confidentiality and anonymity of the research participants were observed.

**Results and Discussion:** In the light of the research objectives, the following results have been drawn.

<table>
<thead>
<tr>
<th>Schools</th>
<th>Fully damaged</th>
<th>Partially damaged</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>High</td>
<td>12</td>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>Middle</td>
<td>21</td>
<td>15</td>
<td>36</td>
</tr>
<tr>
<td>Primary</td>
<td>84</td>
<td>75</td>
<td>159</td>
</tr>
<tr>
<td>Grand Total</td>
<td>120</td>
<td>93</td>
<td>213</td>
</tr>
</tbody>
</table>
The above table shows that during militancy 213 female schools sector were affected. Among these 120 schools were fully damaged while 93 were partially affected.

Table: 02 Number of damaged Private sector Schools in District Swat:

<table>
<thead>
<tr>
<th>Schools</th>
<th>Fully damaged</th>
<th>Partially damaged</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Middle</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Primary</td>
<td>1</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Grand Total</td>
<td>3</td>
<td>4</td>
<td>7</td>
</tr>
</tbody>
</table>

The above table identifies that during the war period seven (07) private sector female institutions were also affected. Among these three (03) were fully and four (04) were partially damaged.

Table: 03 Number of students in Govt sector damaged schools.

<table>
<thead>
<tr>
<th>Schools</th>
<th>Fully damaged</th>
<th>Partially damaged</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher</td>
<td>2663</td>
<td>550</td>
<td>3213</td>
</tr>
<tr>
<td>High</td>
<td>4015</td>
<td>1574</td>
<td>5589</td>
</tr>
<tr>
<td>Middle</td>
<td>1878</td>
<td>1905</td>
<td>3783</td>
</tr>
<tr>
<td>Primary</td>
<td>12606</td>
<td>14992</td>
<td>27598</td>
</tr>
<tr>
<td>Grand Total</td>
<td>21162</td>
<td>19021</td>
<td>40183</td>
</tr>
</tbody>
</table>

The above table states that there were 40183 students in the damaged female schools. Among these 21162 students were in the fully damaged schools while 19021 students were in the partially damaged schools.

Table: 04 Number of students in Private sector damaged schools.

<table>
<thead>
<tr>
<th>Schools</th>
<th>Fully damaged</th>
<th>Partially damaged</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Higher</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>High</td>
<td>126</td>
<td>134</td>
<td>260</td>
</tr>
<tr>
<td>Middle</td>
<td>74</td>
<td>193</td>
<td>267</td>
</tr>
<tr>
<td>Primary</td>
<td>45</td>
<td>437</td>
<td>482</td>
</tr>
<tr>
<td>Grand Total</td>
<td>235</td>
<td>764</td>
<td>1009</td>
</tr>
</tbody>
</table>

The above table indicates that there were 1009 students in the damaged private sector female schools in which 235 students were in the fully damaged and 764 students were in the partially damaged schools.
Impacts of militancy on female education: The militants at first gained local support through their strong propaganda system and when they considered themselves strong enough to challenge the authority of the government, they turned against female education and termed it as un-Islamic. They banned female students to go schools and started razing the buildings of the girls’ schools. Those who dared to go against the verdict of the militants were terrified for the dire consequences. This resulted in the destruction of half of the female educational institutions and deprivation of females from their right of education. One of the respondents described the situation in these words:“The militants started their movement on their radio and influenced the public opinion in their favor by saying that they were safeguarding the cause of Islam and then they banned female education and destroyed school buildings and no one dared to speak against them”.

Impacts on female students: Female students were the easy victims of the threats of militants. They were terrified to abandon their education or be ready to face the wrath of the militants. They received threats on their way to school and in the society. Some female students were also impressed by the teachings of the militants and they bade goodbye to schools. Those who remained in schools and continued their education were under mental stress and anxiety due to the prevailing fear and frustration. They were not in a position to focus on their studies and this deteriorated their educational efficiency and led them to educational backwardness. One of the participants told: “Female students were ordered to stop their education or they would meet death”. Another participant told: “Our girl students were terrorized on the way to school”. Another of the respondents told: “Our students were very much afraid and all the day used to speak about fear, they had become very weak and even teachers and school heads used to speak about fear all the time”.

Impacts on female teachers: Female teachers were under the continuous threat by the hands of militants. They were regarded as un-holy women and were only serving the cause of the westerners and propagating the secular ideology of obscenity. They and their families were under the continuous threat of the militants. They were not in a position to continue their duties of teaching and were suffering from mental torture. They had no option but either to obey the orders of the militants or to quit their jobs and migrate to the safer parts of the country. One of the participants told: “We used to come for teaching in great fear”. Similarly another told: “The militants used to call us un-holy women who were spreading only obscenity and we were compelled to leave our jobs or take shelter in safer areas of Pakistan.”

Impacts on parents: The parents were terrified for sending their female children to schools. They were discouraged to send their females to educational institutions. They received threats and mental torture due to their worries for the safety of their daughters. They had no options but to obey the commands of the militants. One of the participants told: “The parents were hesitant to continue the education of their girls, they got threats from people to stop their daughters from schooling or they along with their children will be slaughtered, the girls often used to remain absent from school”.

Impacts on society: The society in general was not in a position to support the cause of female education. Though they were staunch supporters of the female education but they were compelled to show hatred for the female education. No one even dared to speak against this situation and those who spoke they were made to pay for it. This resulted in a complete ban on female education for a considerable period of time. One of the participants told: “Society in general was unable to favor female education because of fear and those who show any support were terrified, it encouraged them (the militants) to ban education of our children”.

Present scenario of female education in swat: The affected schools have been reopened either in tents or in rented buildings, without furniture and other basic amenities. The reconstruction and rehabilitation of the affected school buildings is under process through the assistance of the foreign aid under the supervision of foreign NGOs and Pak Army. One of the participants told in this regard: “We have started our schools in tents but we don’t have water and toilet facilities but we hope soon our schools will be built by the help of army and foreign NGOs aid”.

Discussion: The study was about to determine the impacts of militancy on female education of District Swat. The militants started their campaign against female education as it was only meant for the propagation of obscenity. They destroyed female school buildings and most of the female schools in Swat, have either fully or partially been
damaged by the militants. Two hundred and thirteen 213 government and seven (7) private sector schools have been damaged during the insurgency. These schools have re-opened either in tents or in rented buildings (Education department Swat, 2012). The militants bombed more than 200 schools and on January 15th 2009, completely banned female education by saying that it was promoting, western values and obscenity. They warned educators and girls students for serious consequences if they didn’t comply with the orders issued by the militants. Drivers were warned to stop transporting girls to schools (Irtiqa, 2009).

The militants termed themselves to be the guardians of Islamic cause and that female education was against it, therefore, they were not in favor of it. They failed to represent the true spirit of Islam which guarantees female education. As they were devoid of the true teachings of Islam, therefore, they turned against female education and deprived girls from the modern education (Khadija, 2007).

Girls students have lost their interest in their studies and they are under mental stress. They consider themselves insecure and they are in uncertain situation but it is encouraging that they are coming to schools and are about to retain their previous tempo. Similarly, parents have also lost their confidence but they are hoping for the better futures of their daughters. Female teachers are also very much enthusiastic about their job and are working hard for the betterment of their students. The society in general is very much cooperative and the present scenario is quite encouraging for the female education.

**Conclusion:** In the light of the above study the following conclusion has been drawn. The militants started their campaign against female education in the guise of religious teachings and when they got hold of the nerves of the locality, they declared girls’ education as un-Islamic, threatened those students and teachers who attended the schools and finally, destroyed the female schools as they were the places for the propagation of the western cultures and obscenity. Parents and their girl children lost their interest in education. The female students of the area suffered from anxiety and psychological depression and their teachers were compelled to go to safer parts of the country.

**Recommendations:** Owing to the present situation of the female education in the area, the researcher made the following recommendations.

1. The infrastructure of female education must be re-established on war basis by the provision of necessary financial and technical assistance by the government.
2. There should be Guidance and Counseling programs for the rehabilitation of the psychologically affected students of the area to overcome the problems of anxiety and depression.
3. The government and non-governmental organizations should encourage female education through financial aids of female students for school uniform, books and transportation.
4. The society in general and parents in particular should actively participate and cooperate with the government in the reconstruction and rehabilitation of the female education sector.
5. The ulemas and religious scholars should be encouraged to present the true Islamic spirit, as it is totally in favor of female education,
6. Future researchers may conduct studies on the Psychological impacts of militancy on the female school students of the area.

REFERENCES


FAMILY INVOLVEMENT AND ITS IMPACT ON STUDENTS’ ACHIEVEMENT

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ABSTRACT: Family is a key factor in the education and training of a child and its role at the early school days is very important for the overall educational development of a child, therefore, the study aimed at the exploration of family’s role in the education of children and its impact on the achievement of children at the primary level. Generally, it has been observed that families do not shoulder the responsibility of educating their young ones and expect too much from teachers and schools in this regard. Therefore, the researchers tried to find out the role of family involvement in educating, training and developing students abilities at the primary level. The population of the study was all the teachers and parents of the 1270 primary schools of District Swat, Khyber Pakhtunkhwa, Pakistan. A sample of 80 respondents i.e. 40 teachers and 40 parents was selected from 20 primary schools i.e. 10 public and 10 private sector schools through stratified random sampling technique. The data was collected through self administered questionnaires regarding all the aspect of the study. The study brought into light that family involvement in early life is the foundation of sound personality development and overall educational success of children in the future life and children with strong family support were able to have balanced development of their basic skills and potentialities at their primary level of education. Procedures for improving family involvement and areas for further research were identified.
Key Words: Family, Involvement, impact, achievement

Introduction Family is an important factor in the educational achievement of a child at the primary level. The better involved and cooperative the family the high will be the achievement of children at the primary level. At the primary schools’ level children are babies in the field of education and when they are fully supported, they show high level of success. According to Desimone (1999) higher family involvement at the early school’s stages ensures high achievement for the children. Several studies have identified the relationship between positive family involvement and its impact on the students learning outcomes at the primary school level. The skills and abilities learnt at the early school days have an everlasting effect on the later educational career of children. (Hinderson & Mapp, 2002)

Many studies have highlighted that active relationship between family and schools raises the level of achievement of students at the primary school level. According to Eldridge (2001) identified that family and parents are the agents of educational success for the children of early school classes. They help them to attain their maximum potential development at this stage by keeping better communication with schools, supervising and encouraging children and provide emotional warmth. Voel and Anna (2000) reported that there are many families who face hurdles in the way of smooth relationship with school due to lack of time and resources because of their busy schedules.

Studies have found that families guide their children to keep pace with the work at school and supervise their children in doing the home work assignments at their homes (Friemen & Bereley, 2002). Those schools where parents are actively engaged by the school authorities and teachers in the affairs of the students enjoy the cooperation and confidence of parents and families which positively affect the achievement of children at the school (Epstein & Dauber, 1991). Schools where there is better communication between the family and the authorities at the school are in a better position to
solve the problems of students in time and may help students to overcome their difficulties effectively (Goldenber, 1987).

Active involvement of parents and family members enhances the motivational level of the children and make them more efficient in school activities. Children with support from families were found better in their performance at the schools as compared to the students who do not enjoy the support of their families (Gorton, 1997). Familial support is more needed at the early school days than in the later stages of the schooling (Dauber, 1991). Several studies have also highlighted the relationship between family involvement and the dropout rates of children at the early school stages. According to Hinderson and Berla (1994) those families who do not provide positive support to their children for schooling in the early days often punish their children for the low achievement at the school, therefore, high ratio of dropout was found for the children of such families in the early school life. Active relationship between family and the school authorities ensures smooth schooling of the children and avoids the tendencies towards wastage in the early school days (Hillfield, 1994).

Schools where parents are encouraged to engage actively in the affairs of children education enjoy proper support of them and are in a better position to solve the problems and issues of the students in an effective manner (Scott, 1987). Good relationship between family and school coupled with the hard work of skilled teachers enhanced the achievement of the children at the primary school level (Dauber & Epistein, 1989). There are three factors in the familial involvement in children education at the early school days. First how family perceive its role in the education of the children, secondly their belief in their active role in the education of their children and thirdly the opportunity of involvement provided by the school and its authorities for the family (Stearn and Peterson, 1973).

According to Wolfendale and Bastiani (2000) Families are the key elements in the educational lives of the early school children who set standards for the educational progress of their children and help them in achieving maximum potential development at the later stages of life. Those students who enjoyed the active support of their families in their educational affairs usually performed better academically as compared to those who do not enjoy (Vermont, 1999). Those children who were helped by their parents in their assignments at home performed better in the school activities (Epstein & Dauber, 1991). Parents, school and skilled teachers are the prerequisite for the maximum educational development of children (Hinderson & Berla, 1994).

It is a well established fact that parents are the key factor for the educational advancement of their children in general and early childhood in particular, therefore the researchers felt the need to explore the impacts of family involvement on the education of children at the stage of primary school days recommend procedures for further enhancement of parental support for children' education at this level.

**Objectives of the study**

1. To explore the impact of family involvement in educational achievement of children at the primary school level.
2. To find out the areas of family involvement in children education at the primary school level.
3. To recommend procedures for the enhancement of family involvement in the education of children at the primary school level.

**Methodology**

**Population and Samplin:** All the teachers and parents of children in 1270 primary schools of District Swat, Khyber Pahktunkhwa, Pakistan was the population of the study. A sample of 80 respondents i.e. 40 teachers and 40 parents was selected from 20 primary schools i.e. 10 public and 10 private sector schools of the area through stratified random sampling technique for the purpose of study.

**Tool of Data collection:** Two Likert type Questionnaires, one for teachers and one for parents were designed, pilot tested and validated through expert opinion for the collection of data.
Data collection and Analysis: The researcher collected the data through self administered questionnaire from the respondents. The collected data were organized and tabulated through percentage method. Findings, conclusion were drawn and recommendations were made.

Results and Discussion

Findings The major findings of the research are the following.

- Among the respondents 20% of the parents agree that only results are important to judge their children’s performance at school, while 72% of the parents viewed that the results as well as the parents teachers (PT) meetings are important to judge how their children are getting on in school. It identifies that PT meetings is a key element for judging the achievement of students at the primary level.

- In parents 32% feel successful about their efforts to help depends upon the results of the child as well as the comments from the teacher at the PT meeting. While 16% feel results only prove to be a good indicator of the child performance. Majority of families tried to have better communication with school.

- Similarly 30% parents believe that it is their responsibility to contact with school authorities while 24% do not consider it their obligation to contact with the school. Most parents viewed communication with school for better achievement of their children as their responsibility.

- As for assistance in home work is concerned 30% parents believe that it is their responsibility to help their child with homework, while 16% do not consider it their responsibility to help their child with homework. Majority of families tried to have better communication with school.

- In parental information about their children subject 34% parents have knowledge about their children’s subjects while 10% have no knowledge about their children’s subject. Majority of parents know about the subjects of their children.

- For communication with teachers 30% parents agree that they have enough time and energy to communicate with teachers. 20% of parents have not enough time and energy to communicate with teachers. Most of parents have time to contact with teachers.

- Encouragement of children for school work in view of 38% teachers, families encourage children in doing schoolwork, while in view of 12% teachers families do not encourage children in doing school work. Majority of families encourage their children for doing home work.

- Parents teaching of dealing with other students at school in view of 32% teachers parents teach how to get along with others, while 10% view that parents do not teach how to get along with others. Mostly parents guide their children for having better relations with school children.

- Parental guidance regarding following teachers instruction, according to 36% teachers, parents teach children how to follow teacher’s direction, while 10% teachers view parents do not teach children, how to follow teacher’s directions. Mostly parents teach their children about how to act upon the instructions of their teachers.

- In parental support 22% teachers are agree that they need parental help, however 18% teachers disagree that they do not need parental help. Majority of teachers feel the need of parental support.

- Encouraging children questions at home 28% teachers agree that their parents teach their children to ask question, while 14% teachers do not agree that parents teach their children to ask questions from teachers when they have any problem. Parents encourage children to ask questions from their teachers.

- About class room activities 28% teachers agree that parents teach children to talk with their teachers, while 15% disagree that their parents do not teach them to talk with their teachers.
when they have any problem. Majority of parents teach their children how to interact with their teachers.

- Family support in facing challenges at school 22% teachers agree that their families teach them to keep trying when they are stuck, however 24% disagree that their families do not teach them to keep trying when stuck with work. Mostly parents give advice for hard work.

- Family support for interest in studies 30% teachers agree that families encourage their children to develop interest in their schoolwork, while 14% disagree that their parents encourage them to develop interest in their schoolwork. Majority of families encourage children to show interest in their studies.

- Among teachers 61% agree that families encourage students to follow teachers’ direction, while 32% disagree that students are not encouraged by their parents to follow teacher’s direction. Majority of parents encourage children to follow the directions of their teachers.

- In parental role in student’s achievement 24% teachers agree that parental help get students better grades while, 16% s do not agree that parental help get them better grades. Mostly teachers view the role of parents in children’s educational achievement.

**Conclusion:** The study brought into light that their exist a close relationship between family support and children’s performance at primary level. Conducive family environment and supportive attitude of family and parents pave the way for maximum development of children potentialities at primary level. Supportive family role, quality education and encouraging attitude of parents are the pre-requisites for optimum abilities development of students at primary level. Family is a source for the development of personality traits and basic skills of primary school students and family support have a positive impact on the development of children children achievement at the primary level.

**Discussion:** This study revealed the presence of highly significant relationship between family involvement, family support, family encouragement and students’ performance. Family involvement in basic education of a child acts as a prerequisite for the successful journey of children on the route to Secondary and Higher Education.

Conducive learning environment, skilled teachers and encouraging family attitude is the prerequisite for the better achievement of students at the early school days of children. With changes in the global scenario, parents in this regard also wants their children to be high achievers at the international level irrespective of the expenses that they have to make in their children education. The families are also engaging themselves in, by investing in their children’s education for the long term purpose.

As any child learns how to read and write at the basic educational level, it is the basic concept that familial help enable the children to learn the skills and values at the early school days and they are better equipped for higher education.

The study will have important implications for the parents and teachers and they will try their level best to ensure better parental support for the greater achievement of students at the primary school level. The study reveals that there is a strong connection between the efforts generated by heads of the family that is father and mother and student performance. Because fathers and mothers are highly involved in their children education with respect to teaching and encouraging them in doing schools work and interacting with others. Similarly there is also a strong connection between the age of parents and students performance. The study reveals highest level of parental involvement is at the kindergarten stage. Parents appear to be moderately involved at the primary stage.

There appears to be a strong relationship between family involvement and the indicators with which parents judge their younger’s performance. With the exception of very few parents, most parents rely on both results and comments from teachers at the PT meeting to judge how their child is doing in school.
Recommendations

- Family and home environment should be encouraging and co-operative to develop the confidence and self esteem of primary school students.
- The family should provide emotional, financial and moral support to improve their performance at primary level.
- The school should educate society in general and parents in particular through school based programs to know the rights of children and may fulfill their duties towards them.
- The parents should educate their children at primary level according to their aptitude and interest.
- The families and school should work in close collaboration to satisfy the needs and demands of primary students for the balanced development of students’ potentialities.
- There should be proper communication between parents and school authorities for the speedy solution of the various problems of primary school children.
- The government should legislate to make parents responsible for the fulfillment of their primary school children rights.
- The school and family with collaboration should launch the guidance and counseling programs in the school for the balanced development of children.

REFERENCES


EXTRACTS FROM ASPARAGUS ADSCENdENS EXHIBITS POTENTIAL ANTIFUNGAL ACTIVITY

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ABSTRACT: Asparagus adscendens (A. adscendens) has been used as traditional herbal medicine for centuries. In this study, methanolic root and leaves extracts of A. adscendens were evaluated for antifungal activity. Antifungal activity and percentage inhibition of the methanolic root and leaves extracts of A. adscendens and antibiotic Fluconozol was analyzed at the concentration of 1000 µg/mL, 500 µg/mL, 250 µg/mL, 125 µg/mL and 62.5 µg/mL against four different strains of fungi including Aspergillus flavus (A. flavus), Aspergillus terreus (A. terreus), Aspergillus niger (A. niger) and Alterneria spp. The results showed that linear fungal inhibition for root and leaves extract was maximum at 1000 µg/mL and minimum at 62.5 µg/mL. Area of inhibition of fungal strain for different concentration of methanolic root and leaves extracts of A. adscendens were also analyzed. Extracts at 1000 µg/mL concentration showed activity against all fungal strains ranging from 3.45 cm for A. niger to 1.8 cm for Alterneria spp. Mean of mycelial inhibition percentage of fungal strains of methanolic root and leaves extract of A. adscendens showed activity against all fungal strains ranging from 115 % for A. niger to 78.6 % for A. flavus. Minimum Inhibitory Concentration (MIC) of methanolic root extract was 1000 µg/mL each for A. flavus, A. niger and Alterneria spp, while MIC of methanolic leaves extract was 62.5 µg/mL for A. flavus, 250 µg/mL for A. niger and 1000 µg/mL for Alterneria spp. In the same way, MIC for antibiotic fluconozol was 125 µg/mL for A. terreus and Alterneria spp, while it was 62.5 µg/mL each for A. flavus and A. niger. Our results show that the methanolic extract of A. adscendens have significant antifungal activity and can be used as herbal medicine to treat different infections caused by the tested organisms.

KEYWORDS: Asparagus adscendens; Antifungal activity; methanolic extract; medicinal plant

Introduction: Medicinal plants, since times immemorial, have been used in virtually all cultures as a source of medicine (Hoareau & DaSilva, 1999). Traditionally, thousands of herbs have been investigated and suggested for therapeutic and medicinal purpose all around the world (Ali, Vishwakarma, khan, & Sohaib, 2014). The practice of traditional medicine is widespread in China, India, Japan, Pakistan, Sri Lanka and Thailand (Hoareau & DaSilva, 1999). Antimicrobial and antifungal activity of variety of herbal extracts has been noticed and found effective in different ailments (Chung, Chung, Ngeow, Goh, & Imiyabir, 2004; Umashanker & Shruti, 2011). About 3000 species of Asparagus are known to occur in world. The genus Asparagus has been recently moved from the family Liliaceae to newly created family Asparagaceae (Goyal, Singh, & Lal, 2003).
Asparagus adscendens is a member of the genus *Asparagus* belonging to the family Liliaceae (Gautam et al., 2004). *Asparagus adscendens* is commonly referred to as Shweta musali in India and Sufaid musk in Pakistan (Mathews, Flatt, & Abdel-Wahab, 2006). *A. adscendens* is distributed in Punjab plains and foothill regions of Pakistan Kashmir and India (Chen et al., 2000; Mehta & Subramanian, 2005). *A. adscendens* is used as rejuvenative herb and is also very powerful aphrodisiac and is very beneficial herb for treating low sperm count and male infertility with a very high demand in the market (Mathews et al., 2006). *A. adscendens* provides a rich source of potential antidiabetic agents for diabetic persons (Mathews et al., 2006; Umashanker & Shruti, 2011). The roots of *A. adscendens*, showed a significant antitumor action in skin and fore stomach papillomagenesis (Umashanker & Shruti, 2011). In Ayurveda, *Asparagus adscendens* is also used in making health. It is also used in curing problems like leucorrhea, menorrhagia, arthritis, pre-natal and post-natal sufferings (Mathews et al., 2006; Umashanker & Shruti, 2011).

*Asparagus* genus is considered to be of medicinal importance because of the presence of steroidal saponin and sapogenins in various parts of the plant (Sharma, Chand, & Sati, 1982). Other species of this genus possess potential antimicrobial ability against various microbes. Mshelia et al. (2008) evaluated the phytochemistry and antimicrobial effect of the stem, bark and leave of *Asparagus flagellaris* (Mshelia, Zaria, Mohammed, & Jaji, 2008).

Uma et al. (2009) reported the antifungal activity of *Asparagus racemosus* roots and tubers extract against *Candida albicans*, *Candida tropicalis*, *Candida krusei*, *Candida guillermondii*, *Candida parapsilosis* and *Candida stellatoidea*. The extract of *Asparagus racemosus* showed high degree of activity against all the *Candida* strains. The inhibitory effect of the extract against all the *Candida* tested was found comparable with that of standard antibiotics used (Uma, Prabhakar, & Rajendran, 2009).

Sangvikar (2012) investigated the root extracts of five plants namely *Asparagus racemosus*, *Chlorophytum tuberosum*, *Hemidesmus indicus*, *Withania somnifera*, *Rauwolfia tetraphylla* against two seed borne pathogenic fungi *Alternaria solani*, *Fusarium moniliforme*. Out of the five root extracts, two showed strong antifungal activity. The extract of *Hemidesmus indicus* showed maximum activity while minimum activity was observed by *Rauwolfia tetraphylla* (Sangvikar).

The screening of plant extracts and their product for antifungal activity has shown that higher plants represent a potential source of novel antibiotic prototypes. Thus, this study was conducted with aim to evaluate antifungal activity of the methanolic root and leaves extract of *Asparagus adscendens* on various fungal strains.

**Materials And Methods:**

**Collection of plant:** The fresh plants of *Asparagus adscendens* were collected from different area of Hangu including Alizai, Marai, KaamSaam, and Usterzai. The taxonomic identification of *Asparagus adscendens* was confirmed by the taxonomic key and flora of Pakistan.

**Fungal Strains:** The fungal strains evaluated in the present study were *Aspergillus flavus*, *Aspergillus terreus*, *Aspergillus niger* and *Alternaria* spp.

**Antibiotics Dilution Method:** 10 mg reference antibiotic, Fluconozol (Glaxo Smith Kline Beecham, Pakistan) was prepared in Dimethyl Sulfoxide (DMSO) at the concentration of 10,000 µg/mL, 1000 µg/mL, 500 µg/mL, 250 µg/mL, 125 µg/mL and 62.5 µg/mL in 1.5 mL Eppendorf tubes and used for antifungal activities.

**Methanolic Root and Leaves Extract Preparation:** The leaves and roots of *A. adscendens* were washed with distilled water and shade dried under room temperature. After drying, plants were powdered using electrical grinder. About 120 g of leaves powder and 90 gram of the roots powder was suspended in 200 mL (95 %w/w) of absolute methanol in 1000 mL flat bottom flask and kept at room temperature for maceration at 37 °C for about 15-20 days. The mixture was filtered through Whatman filter and a viscous mass was obtained by evaporating in rotatory evaporator which was then dried under reduced pressure at 40-50 °C. The dried crude extracts obtained this way were stored at 4 °C and used for antifungal activities.
Screening of Antifungal Activities: In order to check the antifungal activities, sterilized 5 mL media was poured to each test tube and kept in slant position for solidification in aseptic and sterilized environment of biosafety cabinet. The inoculum from the fungal strain was taken for inoculation on the medium in test tubes.

The stock solution of both roots and leaves extract at the concentration of 10,000 µg/mL was prepared by taking 1 mg of dried extract both from roots and leaves and dissolved in 1 mL of DMSO (Dimethyl Sulfoxide). Then from the stock solution of 10,000 µg/mL, further dilutions of concentration of 1000 µg/mL, 500 µg/mL, 250 µg/mL, 125 µg/mL and 62.5 µg/mL were prepared. The control antibiotic was also diluted from the stock solution at same concentrations.

About 500 mL of each concentration of roots and leaves extract of Asparagus adscendens and standard control (antibiotic) was poured into the 5 mL pre solidified SDA media in test tubes. After 30 minutes the SDA media was solidified and streaked from standard fungal strain under sterilized conditions. The test tubes were then kept in refrigerator at 4 °C in slant position in order to allow the medium to diffuse effectively. The test tubes were incubated at 37 °C for 3 night period of time.

Statistical Analysis: After incubation of the test tubes at 37 °C for 3 nights, different concentrations of methanolic root and leaves extracts and standard control (antibiotic) were analyzed for the antifungal activities by measuring the Fungal Inhibition, Mycelial Inhibition Percentage and Minimum Inhibitory Concentration (MIC).

Results And Discussion: Finding the in vitro antimicrobial activity of plant extracts is first step in the development of new drugs. Antifungal activity and percentage inhibition of the methanolic root and leaves extracts of A. adscendens and antibiotic Fluconozol was analyzed at the concentrations of 1000 µg/mL, 500 µg/mL, 250 µg/mL, 125 µg/mL and 62.5 µg/mL against four different strains of fungi including A. flavus, A. terreus, A. niger and Alternaria spp. In the present study, Linear Fungal inhibition of methanolic leaves and root extract of Asparagus adscendens was analyzed at the concentration of 1000 µg/mL, 500 µg/mL, 250 µg/mL, 125 µg/mL and 62.5 µg/mL. Tables 1 and 2 show linear inhibition of antibiotic and plant roots and leaves extract, respectively. Figures 1.A, 1.B, 1.C and 1.D show the antifungal activity of antibiotic Fluconozol and A. adscendens roots and leaves methanolic extracts against A. flavus, A. terreus, Alternaria spp and A. niger, respectively.

Table 1: Linear Inhibition of Root Extract and Antibiotic (Fluconozol)

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>1000 µg/mL</th>
<th>500 µg/mL</th>
<th>250 µg/mL</th>
<th>125 µg/mL</th>
<th>62.5 µg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Antibiotic</td>
<td>Root Extract</td>
<td>Antibiotic</td>
<td>Root Extract</td>
<td>Antibiotic</td>
</tr>
<tr>
<td>Aspergillus flavus</td>
<td>3.5</td>
<td>2.2</td>
<td>3.2</td>
<td>2</td>
<td>3.1</td>
</tr>
<tr>
<td>Aspergillus terreus</td>
<td>1.6</td>
<td>1.3</td>
<td>1.45</td>
<td>1</td>
<td>1.2</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>3.1</td>
<td>2.3</td>
<td>2.7</td>
<td>1.8</td>
<td>2.6</td>
</tr>
<tr>
<td>Alternaria spp</td>
<td>1.45</td>
<td>1.2</td>
<td>1.4</td>
<td>1</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Table 2: Linear Inhibition of Leaves Extract and Antibiotic (Fluconozol)

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>The Linear Inhibition of Leaves Extract and Antibiotic (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td>----------------</td>
<td>------------</td>
</tr>
<tr>
<td>Aspergillus flavus</td>
<td>3.5</td>
</tr>
<tr>
<td>Aspergillus terreus</td>
<td>1.6</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>3.1</td>
</tr>
<tr>
<td>Alternaria spp</td>
<td>1.45</td>
</tr>
</tbody>
</table>

The results showed that linear fungal inhibition for root and leaves extract was maximum at 1000 µg/mL and minimum at 62.5 µg/mL. Similar results were also obtained by Naz and Bano (2012) who investigated the antifungal activity of methanolic and aqueous leaf extracts of *Ricinus communis* against selected fungal strains including *Aspergillus fumigatus* and *Aspergillus flavus*. They noticed that methanolic and water extracts of *R. communis* were able to show broad spectrum antifungal activity against the selected fungal strains at 12 mg/mL final concentration. Leaf extracts in methanolic and water from *R. communis* inhibited the growth of *A. fumigatus* and *A. flavus* by 59.5 % and 56.3 %, respectively (Naz, Bano, & Ilyas, 2012).

Table 3: Area of Inhibition of fungal strains for different concentrations of root extract of *Asparagus adscendens*

<table>
<thead>
<tr>
<th>Fungal strains</th>
<th>Area Of Inhibition Of Fungal Strains For Root Extract (cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td>Aspergillus flavus</td>
<td>3.3</td>
</tr>
<tr>
<td>Aspergillus terreus</td>
<td>1.95</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>3.45</td>
</tr>
<tr>
<td>Alternaria spp</td>
<td>1.8</td>
</tr>
</tbody>
</table>
**Table 4:** Area of Inhibition of fungal strains for different concentrations of root extract of *Asparagus adscendens*

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>Area Of Inhibition Of Fungal Strains For Leaves Extract (cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td>Aspergillus flavus</td>
<td>4.5</td>
</tr>
<tr>
<td>Aspergillus terreus</td>
<td>1.95</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>3.45</td>
</tr>
<tr>
<td>Alternaria spp.</td>
<td>1.8</td>
</tr>
</tbody>
</table>

Area of inhibition of fungal strain for different concentration of methanolic root extract and leaves extract of *A. adscendens* were also analyzed. Extracts at the concentration of 1000 µg/mL showed activity against all fungal strains ranging from 3.45 cm² for *A. niger* to 1.8 cm² for *Alternaria spp*. The maximum area of inhibition was observed at the concentration of 1000 µg/ml that was 3.45 cm² for *A. niger*, 3.3 cm² for *A. flavus*, 1.95 cm² for *A. terreus* and 1.8 cm² for *Alternaria spp*. While at 62.5 µg/ml, area of inhibition was 1.65 cm² for *A. niger*, 1.35 cm² for *A. terreus*, 0.75 cm² for *A. flavus* and 0.6 cm² for *Alternaria spp.*

**Table 5:** Area of Inhibition of Fungal Strains for Different Concentrations of Fluconozol Antibiotic

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>Area Of Inhibition Of Fungal Strains For Fluconozol (cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td>Aspergillus flavus</td>
<td>5.25</td>
</tr>
<tr>
<td>Aspergillus terreus</td>
<td>2.4</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>4.57</td>
</tr>
<tr>
<td>Alternaria spp</td>
<td>2.17</td>
</tr>
</tbody>
</table>

**Table 6:** Mean of Mycelial Inhibition percentage of fungal strain for different concentration of methanolic root extracts of *Asparagus adscendens*

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>Means Of Mycelial Inhibition Percentage Of Fungal Strains (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td>Aspergillus flavus</td>
<td>78.6 ± 0.7</td>
</tr>
<tr>
<td>Aspergillus terreus</td>
<td>86.6 ± 0.84</td>
</tr>
<tr>
<td>Aspergillus niger</td>
<td>115.0 ± 2.82</td>
</tr>
<tr>
<td>Alternaria spp</td>
<td>80.0 ± 1.41</td>
</tr>
</tbody>
</table>
Mean of Mycelial inhibition percentage of fungal strains of methanolic root and leaves extract of *Asparagus adscendens* was analyzed at the concentration of 1000 µg/mL, 500 µg/mL, 250 µg/mL, 125 µg/mL and 62.5 µg/mL against four different strains of fungi including *A. flavus, A. terreus, A. niger* and *Alternaria spp.* Methanolic root extracts of *Asparagus adscendens* at 1000 µg/mL concentration showed activity against all fungal strains ranging from 115% for *A. niger* to 78.6% for *A. flavus*. The maximum Mycelial inhibition percentage at 1000 µg/mL concentration was 115% for *A. niger*, 86.6% for *A. terreus*, 80.0% for *Alternaria spp* and 78.6% for *A. flavus*. Similarly, methanolic leaves extract of *Asparagus adscendens* at the concentration of 1000 µg/mL showed activity against all fungal strains ranging from 188.8% for *A. niger* to 78.6% for *A. flavus*. The maximum Mycelial inhibition percentage at the concentration of 1000 µg/mL was found 188.8% for *A. niger*, 115.5% for *A. terreus*, 92.8% for *Alternaria spp* and 78.6% for *A. flavus*.

**Table 7:** Mean of Mycelial inhibition percentage of fungal strain for different concentration of methanolic leaves extract of *Asparagus adscendens*

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>Means Of Mycelial Inhibition Percentage Of Fungal Strains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td><em>Aspergillus flavus</em></td>
<td>78.6 ± 0.7</td>
</tr>
<tr>
<td><em>Aspergillus terreus</em></td>
<td>115.5 ± 2.54</td>
</tr>
<tr>
<td><em>Aspergillus niger</em></td>
<td>188.8 ± 9.3</td>
</tr>
<tr>
<td><em>Alternaria spp</em></td>
<td>92.8 ± 0.56</td>
</tr>
</tbody>
</table>

**Table 8:** Mean of Mycelial inhibition percentage of fungal strain for different concentration of Antibiotic Fluconozol

<table>
<thead>
<tr>
<th>Fungal strains</th>
<th>Means Of Mycelial inhibition percentage of fungal strains</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1000 µg/mL</td>
</tr>
<tr>
<td><em>Aspergillus flavus</em></td>
<td>233.3 ± 0.42</td>
</tr>
<tr>
<td><em>Aspergillus terreus</em></td>
<td>133.3 ± 2.4</td>
</tr>
<tr>
<td><em>Aspergillus niger</em></td>
<td>244.0 ± 2.82</td>
</tr>
<tr>
<td><em>Alternaria spp</em></td>
<td>116.0 ± 2.8</td>
</tr>
</tbody>
</table>
Table 9: Minimum Inhibitory Concentration (MIC) of Methanolic leaves, root extracts of *Asparagus adscendens* and Antibiotic Fluconozol against fungal strains

<table>
<thead>
<tr>
<th>Fungal Strains</th>
<th>Minimum Inhibitory Concentration (MIC) µg/ml</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Asparagus adscendens root extract</td>
</tr>
<tr>
<td><em>Aspergillus flavus</em></td>
<td>n.d.</td>
</tr>
<tr>
<td><em>Aspergillus terreus</em></td>
<td>1000</td>
</tr>
<tr>
<td><em>Aspergillus niger</em></td>
<td>1000</td>
</tr>
<tr>
<td><em>Alternaria spp.</em></td>
<td>1000</td>
</tr>
</tbody>
</table>

* n.d. = Not determined

Minimum Inhibitory Concentration (MIC) of methanolic root extract, leaves extract of *Asparagus adscendens* and antibiotic Fluconozol was evaluated. Minimum Inhibitory Concentration (MIC) of methanolic root extract was 1000 µg/mL each for *A. flavus*, *A. niger* and *Alternaria spp*. While MIC of methanolic leaves extract was 62.5 µg/mL for *A. flavus*, 250 µg/mL for *A. niger* and 1000 µg/mL for *Alternaria spp*. In the same way, MIC for antibiotic Fluconozol was 125 µg/mL for *A. terreus* and *Alternaria spp*. while it was 62.5 µg/mL each for *A. flavus* and *A. niger*.

Fungi are responsible for many skin diseases. Many fungal species fungi also cause several plant infections. *A. adscendens* was evaluated for antifungal activity and considerable activity was noticed. Root and leaves extract at the concentration of 1000 µg/mL inhibited mycelial growth up to 115.0 % for *A. niger*, 86.6 % for *A. terreus*, 80.0 % for *Alternaria spp.* and 78.8 % for *A. flavus*. With the development of resistance against antibiotics, medicinal plants should be considered as alternative to get all the possible antimicrobial benefits of the useful compounds contained in medicinal plants. Thus these studies indicated that this plant can be used as an herbal medicine to treat the infections caused by these tested organisms.

**Conclusion:** The present study revealed that the methanolic root and leaves extracts of *Asparagus adscendens* exhibit promising antifungal activity against fungal strains tested. Methanolic root and leaves extracts of *A. adscendens* may be used as useful medicine against diseases caused by the test fungal strains.

**Acknowledgements:** The authors would like to thank Abdul Wali Khan University Mardan (AWKUM), Kohat University of Science and Technology (KUST) and Higher Education Commission of Pakistan for the financial support.

**REFERENCES**


Figure 1.A: Linear Inhibition of *Aspergillus flavus* by Root and Leaves extracts of *Asparagus adscendens* and Fluconozol.

Figure 1.B: Linear Inhibition of *Aspergillus terreus* by Root and Leaves extracts of *Asparagus adscendens* and Fluconozol.
**Figure 1.C:** Linear Inhibition of *Alternaria spp.* by Root and Leaves extracts of *Asparagus adscendens* and Fluconozol.

**Figure 1.D:** Linear Inhibition of *Aspergillus niger* by Root and Leaves extracts of *Asparagus adscendens* and Fluconozol.
SIMULATION OF DIFFUSION EQUATION IN IRREGULAR DOMAIN USING LOCAL KERNEL-BASED METHOD

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ABSTRACT. In this work, the implementation of local kernel-based method for heat equation is investigated. The method is local and resulted sparse differentiation matrices. Only small dimension of linear systems of equations are to be solved for every center in the domain. This procedure is more efficient and reliable in solving large scaled engineering problems in irregular domain. Three test cases are done, in the first case the square domain is selected, in the second case the L-shaped domain is considered, while in the third case the circular domain is chosen to approximate the solution of the given problem. The accuracy of the method is tested in terms of L∞ error norm with respect to the density of interpolation nodes, stencil size, multiquadrics kernels.

Keywords: Local kernel-base method; radial kernels; diffusion equation; irregular domain; meshless method.

1. Introduction. Most problems in engineering sciences may be formulated as coupled partial differential equations. The exact solution of such type equations in many cases are not easy to obtain, particularly in irregular shaped domain. The recent development of such types of kernel-based methods are investigated in the most recent monographs [1-7] and some of their applications are given in [8-13]. The Kernel-based meshless method or Kansa method [14] is the more famous of them. This meshless approch has been extended to symmetric kernel-based method [15], to the modified collocation method [16] and to the indirect kernel-based method [17]. In contrary to advantages over mesh-dependent methods, unfortunately all the mentioned methods fail to perform dealing for problems with large set of collocation points in the domain, because they resulted fully populated differentiation matrices, which are very sensitive to free shape parameters involved in the kernel functions. Sparse interpolation matrices can be obtained by using compactly supported kernel functions. Sarler and Vertnik, developed a local meshless methods which over come all the difficulties of full-populated differentiation matrices [18]. This approach have been applied for a variety of problems, see for example [19-24]. We further extended this approach for solving the diffusion equation in irregular domain.

2. Local kernel-based approximation. For a given sample data points of unknown smooth function \( u(x) \), \( u(x_i) \), \( i = 1, 2, ..., N \), where the \( N \) centers \( \{x_1, ..., x_N\} \subset \Omega \), where \( \Omega \) is arbitrary shaped domain and the centers can be chosen anywhere in the domain \( \Omega \). The local kernel-based approximation of the function \( u(x) \), at each center \( x_i \in \Omega \), is obtained in the form
\[ s(x_i) = \sum_{j=1}^{n} \alpha_j k(\|x_i - x_j\|), \quad j = 1, 2, \ldots, n \in K_j(n) \subset \Omega \]  

where, \( \alpha_j \)'s are the expansion coefficients, \( r = \|x - x_j\| \) is the Euclidean norm between two centers \( x \) and \( x_j \), \( \mathcal{K}(r) \) is a radial kernel function defined for \( r \geq 0 \) and \( K_j(n) \) is a vector contains the index of center \( x_j \) along with the indices of the remaining \( n-1 \) centers. This set of centers for the indexed set \( K_i(n) \) is call a stencil as shown in figure 1. Consequently, we have \( N \) number of \( n \times n \) small size linear systems of equations,

\[ s^i = B^i \alpha', i = 1, 2, \ldots, N, \]  

the entries of the matrix \( B^i \) are \( b^i_{kj} = k(\|x_k - x_j\|), k, j \in K_i(n) \), the matrix \( B^i \) is called the system matrix, we have to solve each system for the unknown coefficients. Next, we approximate the linear differential operator \( L(x) \), by

\[ Ls(x_i) = \sum_{j=1}^{n} \alpha_j Lk(\|x_i - x_j\|), \quad j = 1, 2, \ldots, n \in K_i(n) \subset \Omega \]  

we write eq.(3) as the dot product of two vectors, given by

\[ Ls(x_i) = v^i \circ \alpha^i \]  

where the \( n \times 1 \) vector \( \alpha^i \) is unknown coefficients, and \( 1 \times n \) vector \( v^i \) have the entries

\[ v^i = Lk(\|x_i - x_j\|), \quad j = 1, 2, \ldots, n \in K_i(n), \]  

using eq.(2), we eliminate the unknown coefficients,

\[ \alpha^i = (B^i)^{-1} s^i, \]  

by inserting the values of \( \alpha^i \) from (6) in (4) to get,

\[ Ls(x_i) = v^i (B^i)^{-1} s^i = w^i s^i \]  

\[ w^i = v^i (B^i)^{-1}, \]  

denote the corresponding weight for the center \( x_i \). Consequently for every centers locations, the kernel-based spatial approximation of the linear differential operator is obtained

\[ Ls = Ws \]  

Where the \( N \times N \) sparse differentiation matrix \( W \) having \( n \) non-zeros entries, and \( N-n \) with zeros entries, where \( n \) is stencil size.

When kernel-based local approximation has done, then the problem defined by

\[ u_i = Lu \]  

reduced to the system of ODEs in the form

\[ s_i = F(s), \]  

In the present case, we have \( F(s) = W(s) \). The time integration may be carried out by any ODE solver, e.g.
ode113, ode45, which are built-in Matlab. The initial solution vector would be the initial solution $u_0$. An appropriate ODE solver adaptively select a correct time step size $\delta t$, which overcome stiffness of our ODEs system.

In the present work, we use MQ radial kernel function, which contains a free scale factor known as a shape parameter, defined as $\kappa(r) = \sqrt{1 + (\varepsilon r)^2}$. The solution accuracy is very sensitive the scale factor $\varepsilon$. We have obtained the correct scale to get maximum accuracy. A variety of criteria are available in the literature. In the present case, we are using the procedure for getting optimal value of shape parameter available in the literature [7]. In this procedure search for $\varepsilon$, when it satisfy the condition $10^{13} < \kappa < 10^{15}$, $\kappa$ is the condition number of the system matrix $B$. We then use singular value decomposition of the system matrix $B'$ by $[U, M, V = \text{svd}(B')]$. Here the $N \times N$ matrices $U$, and $V$ are orthogonal, and the $N \times N$ matrix $M$ is diagonal with $N$ singular values of the system matrix $B'$, and $\kappa = \|B'\|\|B'^{-1}\| = \max(M)/\min(M)$ is the condition number of the system matrix $B'$.

3. Numerical experiments
Here we implement the kernel-based local meshless method developed above for the diffusion equation

$$w_t = \nabla^2 w,$$

with the analytic solution

$$w(x, t) = \sin(\pi x) \sin(\pi y) \exp(-2\pi^2 t).$$

3.1 Rectangular domain
We select the rectangular domain $[-1,1]^2$ to approximate the solution of diffusion equation using the kernel-based meshless method derived in the above section. The time integration are carried out by Rk4 method. The step size $\delta t = 0.001$, the interpolation nodes $N = 400$ are selected in our computations. The approximate solution in terms of the $L_\infty$ error norm, the stencil size $n$, the condition number $\kappa$, of the system matrix are shown in table 1. For maximum sparsity, we have to choose stencil size $n$ much smaller than the number of centers in the domain. However the stencil size $n$ is problem dependent and is related to the condition number $\kappa$ of the interpolation matrix. The stencil size is selected in such a way that the condition number of the interpolation matrix be kept within the specified range as discussed above. The sparsity pattern shows the location of non-zero entries in the differentiation matrices as shown in figure 1. These sparsity pattern show how well is the kernel-based method, which resulted full differentiation matrices.

The present method is very well suited to large scaled problems, where the classical global kernel-based method may faces problems for its implementations.

<table>
<thead>
<tr>
<th>$n$</th>
<th>$L_\infty$</th>
<th>$\kappa$</th>
<th>$c$</th>
<th>C.time(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>2.6012e-003</td>
<td>2.3567e+013</td>
<td>0.0100</td>
<td>1.337908</td>
</tr>
<tr>
<td>10</td>
<td>7.0388e-004</td>
<td>6.1889e+013</td>
<td>0.2100</td>
<td>1.480991</td>
</tr>
</tbody>
</table>

Table 1: Numerical results with different stencil sizes $n$, when $N = 400$, $t = 0.1$, $\delta t = 0.001$, in rectangular domain.
Figure 1. Centers distributions and a stencil corresponding to boundary center (red) and an interior center (green), and the sparsity pattern of the differentiation matrix W, when rectangular domain is used for $N = 400, t = 0.1, \Delta t = 0.001$.

Figure 2. Approximate solution of diffusion equation in the rectangular domain using kernel-based method, when $N = 400, t = 0.1, \Delta t = 0.001$. 
3.2 L-shaped domain
We apply the local kernel-based method for approximating the L-shaped domain shown in figure 3. The Runge-Kutta method of order four is used to integrate in time the diffusion equation. In this numerical experiment the time step size $\delta t = 0.001$ is selected. The uniformly distributed centers $N = 176$ are selected in the L-shaped domain. The approximate solution in terms of the $L_{\infty}$ error norm, the stencil size $n$, the condition number $\kappa$ of the system matrix is investigated and is shown in table 2. The centers distributions and sparsity of the differentiation matrix $W$ are given in figure 3. The approximate solution of the diffusion equation via local kernel-based method at various time are shown in figure 4. The results again demonstrate the effectiveness of the current method in such a complicated domain for simulating the diffusion equation.

<table>
<thead>
<tr>
<th>$n$</th>
<th>$L_{\infty}$</th>
<th>$\kappa$</th>
<th>$c$</th>
<th>C. time(s)</th>
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<tr>
<td>10</td>
<td>7.0388e-004</td>
<td>6.1889e+013</td>
<td>0.2100</td>
<td>1.480991</td>
</tr>
</tbody>
</table>

Table 2: Numerical results with different stencil sizes $n$, when $N=176$, $t = 0.1, \delta t = 0.001$, in L-shaped domain.

Figure 3. Centers distributions, sparsity pattern of the matrix $W$, when L-shaped domain is used.
Figure 4. Approximate solution of diffusion equation in the L-shaped domain using kernel-based method, when $N = 176, t = 0.1, \delta t = 0.001$.

3.3 Circular domain: Now we approximate the solution in a circular domain of radius $R = 1$ centered at origin. For time integration once again we used Runge-Kutta method to simulate the diffusion equation with time step $\delta t = 0.001$. The interpolation nodes $N = 225$ are selected which are uniformly distributed in the circular domain. The results via local kernel-based method are given in table 3 and figures 4-5. Once again the local-kernel based method performed very well in the circular domain.

<table>
<thead>
<tr>
<th>n</th>
<th>$L_{\infty}$</th>
<th>$\kappa$</th>
<th>c</th>
<th>C.time(s)</th>
</tr>
</thead>
<tbody>
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</tr>
<tr>
<td>10</td>
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<td>2.3019e+013</td>
<td>0.080</td>
<td>1.455471</td>
</tr>
</tbody>
</table>

Table 2: Numerical results with different stencil sizes $n$, when $N=225$, $t = 0.1, \delta t = 0.001$, in circular domain.

Figure 5. Centers distributions, sparsity pattern of the matrix $W$, when circular domain is used.
3. Conclusion. In this work we extend the work of authors in [18] for approximating the solution of diffusion equation in irregular domain. By the use these radial kernels the present method have a great potential for solving many problems in higher dimensions with irregular shaped domain. It is not easy to implement the global kernel-based method for problems with large set of interpolation nodes in the domain. However the present local kernel-based method have the capability of solving problems with large data sites in the domain. This procedure has the flexibility to keep the differentiation matrix sparse. This relatively new kernel-based approach is (very) simple meshless formulation for solving a wide range of diffusion problems. The time-marching is done with RK4 method. In the present method the complex-shaped domain can easily incorporated. This meshless procedure appears efficient, it does need full dense systems like the Kansa’s global approach. But only small dimension system matrices have to be solved in time step corresponding to each center in the domain. The procedure discussed in this work can be easily be extended to solve other similar types of partial differential equations.

REFERENCES


NUMERICAL AND ANALYTICAL SOLUTIONS OF A MODEL OF POPULATION DYNAMICS

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ABSTRACT. The study presents numerical and approximate analytical approximations to a model of population dynamics with unbounded mortality function. The mathematical model involves a nonlocal boundary condition. A finite difference method is implemented for the numerical solution while the homotopy analysis method (HAM) is applied to obtain the approximate series solution. The HAM solution contains an auxiliary parameter which provides a convenient way of controlling the convergence regions of series solution. Results are presented for typical test problem provided in literature. Comparison of the results of both methods show validity and efficiency of the methods.

Keywords: Population dynamics; approximate solution to system of PDEs and ODEs; homotopy analysis method; nonlocal boundary value problems.

1. Introduction. In this, we consider the following linear initial - boundary value problem introduced by Lotka - MC Kedrick[7]

\[ \frac{\partial u}{\partial t} + \alpha \frac{\partial u}{\partial x} + \mu(x)u = 0, \quad 0 < x < x_*, \quad 0 < t < T \]

\[ u(0, t) = \int_{0}^{x_\ast} \beta(x)u(x, t)dx, \quad 0 < t < T \]

\[ u(x, 0) = u_0(x), \quad 0 \leq x \leq x_* \]

where, \( u(x, t) \) represents the age-specific density of individuals of age \( x \) at time \( t \). The demographic parameters \( \mu(x) \geq 0 \) and \( \beta(x) \geq 0 \) denotes the age-specific mortality and natality rates, respectively. This system describes the evolution of the age density \( u(x, t) \) of a population for the maximum age \( x_\ast < \infty \). The parameters \( \mu(x) \) and \( \beta(x) \) regulates the growth rates.

The numerical study of proposed model has been an interesting topic in literature. For instance the work presented in [6, 9, 10, 12, 14, 15, 17, 18] provide a good review to the reader. Milner [18] presented a standard Galerkin finite element in age by using backward Euler in time. Authors in [11] have obtained the numerical solutions by employing a discontinuous Galerkin (DG) to the model of population dynamics, which is known to be optimal DG method.

In this paper, we have solved the presented model by homotopy analysis method (HAM) and a novel finite difference method. Special attention is devoted to the treatment of non-local boundary condition. The work presents the series analytic solutions for the model (1). Appropriate analytical solutions are obtained by
implementation of homotopy analysis method, originally proposed by Liao [15]. The detailed description on formulation of the method is presented in [6]. A remarkable number of applications are available in the literature. These areas include linear, non-linear, homogeneous and non homogeneous systems of differential equations. These systems results from modelling physical phenomena from science and engineering. non-linearity and implementation of physical boundary conditions imposes a challenging task for solving such models mathematically. The homotopy analysis method (HAM) is applied for this purpose. The HAM contains a certain auxiliary parameter $h$ which provides us with a simple way to adjust and control the convergence region and rate of convergence of the series solution. In this paper, an alternative approach based on HAM is presented to approximate the solution on nonlinear coupled system of PDEs.

The article is organized as follows: Section II presents a brief introduction to the homotopy analysis method. In section III, the series analytic solution is presented for the system. The finite difference method is formulated in section IV. Section IV comprises of the comparison of analytical and numerical solutions for some test problems. A concluding remark is given in the final section.

2. Basic Ideas of HAM. Let us consider the differential equations given as,

$$N_i[z_i(x,t)] = 0, \quad i = 1, 2, \ldots, n,$$  \hspace{1cm} (2)

where $N_i$ stands for nonlinear operators of the whole equations, $x$ and $t$ denote the independent variables and $z_i(x,t)$ are the unknown functions in variables $x$ and $t$ respectively. Adapting the generalized homotopy method, Liao [13], the zero-order deformation equations are obtained as follows,

$$(1-q)L[\phi_i(x,t;q)-z_{i,0}(x,t)] = qh_i[N_i[\phi_i(x,t;q)]]$$  \hspace{1cm} (3)

where $q \in [0,1]$ is an embedding parameter, $h_i$ are nonzero auxiliary functions, $L$ is an auxiliary linear operator, $z_{i,0}(x,t)$ are initial guesses of $z_i(x,t)$ and $\phi_i(x,t;q)$ are unknown functions. It is important to note that, one has great freedom to choose auxiliary objects in HAM. Obviously, when $q = 0$ and $q = 1$, both $\phi_i(x,t;0) = z_{i,0}(x,t)$ and $\phi_i(x,t;1) = z_i(x,t)$ hold. Hence the approximate solution approaches the exact solution as $q$ increases from 0 to 1. Taylor series expansion of $\phi_i(x,t;q)$ with respect to $q$, is

$$\phi_i(x,t;q) = z_{i,0}(x,t) + \sum_{m=1}^{+\infty} z_{i,m}(x,t),$$  \hspace{1cm} (4)

Where

$$z_{i,m} = \frac{i}{m!} \frac{\partial^m \phi_i(x,t;q)}{\partial q^m} \bigg|_{q=0}$$  \hspace{1cm} (5)

The series equation [4] converges at $q = 1$ subject to suitable choices of the auxiliary linear operator, the initial guess, the auxiliary parameters and the auxiliary functions and the auxiliary functions. So proceed as follows under this assumption of suitable choice and we have

$$\phi_i(x,t;1) = z_{i,0}(x,t) + \sum_{m=1}^{+\infty} z_{i,m}(x,t),$$  \hspace{1cm} (6)
as one of solutions of the original nonlinear equations, as proved by Liao [2]. As \( h_i = -1 \), Eq [3] becomes

\[
(1 - q)L[\phi_i(x,t;q) - z_{i,0}(x,t)] = qN_i[\phi_i(x,t;q)],
\]

which are frequently used in the homotopy-perturbation method [29].

According to [5], the governing equations can be deduced from the zero-order deformation equations [3]. Define the vectors,

\[
Z_{i,n} = \{z_{i,0}(x,t), z_{i,1}(x,t), \ldots, z_{i,n}(x,t)\}.
\]

Differentiating [3] \( m \) times with respect to the embedding parameter \( q \) and then setting \( q = 0 \) and finally dividing them by \( m! \), we have the so-called \( m \)-th order deformation equations,

\[
L[z_{i,m}(x,t) - \chi_m z_{i,m}(x,t)] = h_i R_{i,m}(z_{i,m-1}),
\]

Where

\[
R_{i,m}(z_{i,m-1}) = \frac{1}{(m-1)!} \left. \frac{\partial^{m-1} N_i[\phi_i(x,t;q)]}{\partial q^{m-1}} \right|_{q=0}
\]

and

\[
\chi_m = 0 \text{ for } m \leq 1 \text{ while, } \chi_m = 1 \text{ for } m > 1.
\]

3. Finite Difference System. For the numerical solution of system [1] using finite difference method a uniform mesh is considered. The interval \([0, x]\) is discretized into uniform intervals each having length \( h \). Let \( h = \Delta x = l / M \) and \( k = \Delta t = T / N \) be the space and time discretizations and take \( x_i = i h \) and \( t_n = n k \) as a grid point in the domain \([0,1] \times [0, t] \). Here \( M \) and \( N \) are the total number of intervals along space and time axis respectively. Define \( u_{i,n} = u(x_i, t_n) \) as the discrete analogue of the continuous density function \( u(x,t) \). The forward difference approximation is used for time derivative discretization and a backward difference approximation is employed for the space derivative discretization. For the treatment of nonlocal boundary condition, the trapezoidal rule has been incorporated. This yield a finite difference system which is presented in the matrix form as follows.

\[
u_{i}^{k+1} = A^k u_{i}^k + b_i^k,
\]

where,
Is a matrix of order \((M - 1) \times (N - 1)\). The column vector \(b_i^k\) corresponds to the constant values from initial and boundary conditions. Here, \(\theta^k = -r + r, \frac{\beta(1)}{2} \theta^k - \Delta t, \mu(x_i) + 1\), \(r = \frac{\Delta t}{\Delta x}\) and \(\theta_0 = u_0^0, \beta_0 / (2 - 2\beta(x_i))\) and \(\delta_1 = -r + 1 - \Delta t, \mu(x_i)\). A Matlab code is designed for the numerical implementation of these methods. The results are shown in Figure 1 and Figure 2.

4. Numerical Tests

4.1. Problem 1:
Consider the following differential system:

\[
\frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} + \mu(x)u = 0, \quad t < T < 0, \quad 0 < x \leq 1
\]

\[
\mu(x) = 10e^{-100(1-x)},
\]

\[
u(0, t) = 2 - e^{-t}, \quad t < T < 0
\]

\[
u(x, 0) = w_0 e^{\alpha x}, \quad \beta(x) = 20x(1-x), \quad 0 < x \leq 1.
\]

In order to get the solution of [13] by homotopy analysis method, the initial approximations are chosen as

\[
u_0(x, t) = w_0 e^{\alpha x}, \quad \text{(14)}
\]

while the linear operator is taken as follows

\[
L[\phi_i(x, t; q)] = \frac{\partial \phi_i(x, t; q)}{\partial t}, \quad \text{(15)}
\]

with \(i = 1\) and the property

\[
L[c_i] = 0, \quad \text{(16)}
\]

where \(c_i\) are the integral constants. According to these definitions, the zeroth-order deformation equations are

\[
(1 - q)L[\phi_i(x, t; q)] = \frac{\partial \phi_i(x, t; q)}{\partial t}, \quad i = 1
\]

For \(q = 0\) and \(q = 1\), we have

\[
u(x, t; 0) = z_{i, 0}(x, t) = u_0(x, t), \quad \phi_i(x, t; 1) = u(x, t). \quad \text{(18)}
\]
Thus as \( q \) from 0 to 1, the solution varies from the initial guess to the exact solutions. Expanding in Taylor series with respect to \( q \), one has

\[
\Phi_i(x, t; q) = z_{i,0}(x, t) + \sum_{m=1}^{\infty} z_{i,m}(x, t) q^m,
\]

where

\[
z_{i,m} = \left. \frac{i}{m!} \frac{\partial^m \Phi_i(x, t; q)}{\partial q^m} \right|_{q=0}.
\]

For suitable choices of the auxiliary linear operator, the initial guess, the auxiliary parameters and the auxiliary functions, the series equation \([19]\) converges at \( q = 1 \) and we have

\[
u(x, t) = z_{1,0}(x, t) + \sum_{m=2}^{\infty} z_{1,m}(x, t),
\]

Which must be one of the solutions of the system. Consider a vector which is defined as

\[
Z_{i,n} = \{z_{i,0}(x, t), z_{i,1}(x, t), \ldots, z_{i,n}(x, t)\}.
\]

So the \( m \text{-th order deformation} \) equations are

\[
L[z_{i,m}(x, t) - \chi_{m} z_{i,m}(x, t)] = h_i R_i,m (z_{i,m-1}),
\]

With the initial conditions

\[
z_{i,m}(x, 0) = 0.
\]

And

\[
R_i,m (z_{i,m-1}) = (z_{1,m-1}),_{1} + (z_{1,m-1})_{1} + \mu(x,t)(z_{i,m-1}).
\]

The solution of the \( m \text{-th order deformation} \) equation \([23]\) is given as

\[
z_{i,m}(x, t) = \chi_{m} z_{i,m-1}(x, t) + h_i \int_{0}^{t} R_i,m (z_{i,m-1}) d\tau + c_i,
\]

Where the integration constant \( c_i \) are obtained by the initial conditions given in \([13]\). The series solution by HAM can be written in the form as follows

\[
u(x, t) = z_{1,0}(x, t) + z_{1,1}(x, t) + z_{1,2}(x, t) + z_{1,3}(x, t) + \cdots.
\]

For \( h = -1 \), the approximated series solutions are computed as follows:

\[
u(x, t) = w_0 \alpha e^{\alpha x} + 2h[w_0 \alpha e^{\alpha x} t + w_0 \mu(x)e^{\alpha x} t + S],
\]

\[
S = h^2 [w_0 \alpha e^{\alpha x} + w_0 \mu(x)e^{\alpha x} t + w_0 \alpha^2 e^{\alpha x} t^2 / 2 + w_0 \alpha^2 e^{\alpha x} t^2 / 2(1+\alpha)].
\]

A plot is shown below for \( \nu(x, t) \) at \( t = 0.3 \) and \( h = -1 \).

\[\text{4.2 Problem 2.}\]

To demonstrate the application of HAM for a larger class of reaction functions, a more general system is taken as follows:

\[
\frac{\partial u}{\partial t} + \frac{\partial u}{\partial x} + \mu(x)u = 0, \quad t < T < 0 \quad 0 < x \leq 1
\]

\[
\mu(x) = 1/(1-x), \quad 0 < t < T
\]

\[
u(0, t) = (1-x)e^{-x}, \quad 0 < t < T
\]
\[ u(x,0) = w_0 e^{\alpha x}, \quad \beta(x) = 20x(1-x), \quad 0 < x \leq 1. \]
The series solution is computed by HAM presented as:

\[ u(x,t) = (1-x)e^{-x} + 3htxe^{-x} + h^2\left[xte^{-x} - x^2e^{-x} / 2 + t^2xe^{-x} / (2 - 2x)\right] + \cdots. \quad (30) \]

It is important to note that the series solutions are valid with the assumption that series \([30]\) converges for \( q = 1 \). The auxiliary parameter plays a basic role for this assumption. For different values of \( h \), the curves are plotted and checked the region of \( h \) for which solution series is convergent. For that proper values of \( h \), the solution is best approximation of the exact solution of the problem.

The plots shown in Figure 1 and Figure 2 shows the solution obtained by HAM and finite difference method. The time is taken to be \( t = 0.3 \).

5. Conclusion. This study is based upon the approximate series solutions and numerical solutions for some problems from literature. Series solutions are obtained by the well known homotopy analysis method, while the numerical results are computed by implementation of finite difference algorithm. Both of these methods have applied first time in the literature for the presented problems. The plotted results agree with those already available. The techniques ensures an efficient and alternative way for mathematical analysis of the problems from different aspects. The numerical methods gives a stable solution that is checked by stability analysis of the scheme, while approximate solutions obtained by HAM are convergent series solution which is confirmed by the appropriate convergence region of the auxiliary parameter.

Future study is in progress for developing non-standard finite difference algorithms and their stability analysis.

![Figure 1. Result of Problem 1.](image1)

![Figure 2. Result of Problem 2.](image2)
REFERENCES

TEACHERS’ WAY OF GREETING ALL STUDENTS IN SPECIAL SCHOOLS IN PAKISTAN

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ABSTRACT. The study investigates how special education teachers greet students with and without special education needs in schools in Pakistan. The study gets roots from theory and practices of inclusion across globe where emphasis is to explore the possibilities of inclusion in both regular and special schools to socialize all students i.e., students with and without special education needs. Population of the study consists of male and female teachers from special schools of Punjab, Pakistan. Teachers (n=80) were selected on convenient basis from urban special schools. Questionnaire was used as a tool for data collection. The results indicate that teachers greet and welcome all students with and without special education needs in their schools although sometimes they get confused. The study supports global inclusive practices although variations exist. Teachers’ reflections show that they favour shift from segregation to inclusion in special schools also. Based on the study, it is suggested that opening up and widening the gates of existing special schools for both students with and without special education needs would be fruitful rather limiting special schools only to students with special needs.

Keywords: Ways of greeting, All students, Special schools

Introduction. The idea of greeting all students in special schools is conceived from philosophy of inclusive education. Instead of setting separate institutions, opening up special institutions for all students is becoming a need of the day to socialize all students including students with special education needs. Inclusive education is a move that gives stress on how to change learning systems in order to accommodate variety of learners. Convention against Discrimination in Education emphasizes that government has to expand educational opportunities and facilities for all learners. Since inclusive education is a new phenomenon in Pakistan, inclusion is now being trialed in various projects administered by the Government of Pakistan with the help of others non-government organizations as well as foreign agencies like IDP Norway, sight savers Pakistan and USAID (Rieser, R. 2012). As emphasis is being given to open up and widen the regular schools so that these can accommodate and absorb both students with and without special education needs. Similarly, it seems also appropriate to opening up and widening the gates of existing special schools to greet both students with and without special education needs that ultimately promote socialization among them. Inclusion means that every child has a right to belong and to share normal experiences with family, neighbors and peers. Every child has a right to a quality education in his or her school. Booth & Ainscow, (2002) opined that all children working side by side can learn and develop with various skills and abilities.

Teachers become a vital force to make the practices successful. At present, special and regular education teachers are facing the challenge in regular education classrooms. Terms like integration, mainstreaming, and, ultimately, inclusion have been used to describe this educational movement. UNESCO (1994) states that inclusion or participation is necessary to human dignity, satisfaction and exercise of human rights. In the field of education, the schooling of students with special educational needs is reflected by these ideas that is, to provide equal education opportunity to that which exists for other students. Foreman (2005) states that the concept of inclusion is based on the notion, that school provides need of all children, whatever the level of their ability or disability. Booth &
Ainscow (2002) explained that basis for inclusive education is that all students should be included within the traditional classrooms and provided with the support and assistance needed to succeed at a level that is appropriate for the individual. Inclusive education advocates that all children should learn together in mainstream schools, regardless of their abilities. Further, Booth & Ainscow (2002) elaborated that children with Special Needs have the same rights to education as other children. Salamanca declaration (1994) advocates all children should be educated together regardless of their ability. Children with special needs have the right to receive schooling in mainstream schools along with their same age peers. The special schools in Pakistan can also be mainstreamed through inclusion because inclusive education recognizes that all children can learn together and socialize at the same place not in isolated settings and their potential can be explored to its fullest.

Inclusive education depends on many factors such as; teachers’ attitude and the quality of instruction they offer their students. Attitudes of the teachers about inclusive education have been significant factor that lays impacts on implementation of inclusion for children with special educational needs. In Pakistan, implementation of inclusive education in selected number of schools in Islamabad started in 2007 with the collaboration of Federal Directorate of Education (Islamabad), Directorate General of Special Education (Islamabad), the sight savers Pakistan and IDP (International Development Partners), Norway. The purpose of the project was to create awareness about inclusion and remove the barriers of learning, development and participation in schools and communities through implementation of the programs. These were the schools which were selected for inclusive purpose, already working for general education (Rieser, R 2012). Children with special needs have the right to receive schooling in mainstream schools along with their same-age peers. Many researchers do their research on the inclusion of special students into regular classrooms. The idea we are working on is to include all students with and without special education needs in special schools in Pakistan.

Rationale of the study. Special education teachers’ experiences and practices revolve around students with mild to severe disabilities. They know to what extent it is difficult to work with these students. Getting their stance about inclusive setting is primarily important as their direct experiences in special education set-up can be productive for inclusive setting. Hence the study was designed to investigate the greeting mode of special education teachers towards all students for inclusive settings in special schools. The experiences they gained inform us how confining students with special education needs within the boundaries walls of special schools ultimately segregate them in a society. The schools which are the centre of socialization deprive these students away from getting social with students without special education needs. Teachers lacking in experience to interact with students with special education needs do not fully support inclusion. Hassan, Farooq & Parveen (2012) explored that teachers of regular schools have qualms to include students with special education needs in regular schools. The present study emerged to find out whether special education teachers have the same greeting mode towards all students for inclusive settings or their ways of greeting vary.

Statement of the problem. The purpose of the study is to investigate the ways the special education teachers adopt to greet students with and without special education needs for inclusive setting. It further examines the kind of stance of special education teachers who have been experiencing students with special education needs in segregated-cum-integrated classrooms. Moreover, this study facilitates to discern possibilities of socializing students in inclusive setting hence to improve schools for all students with and without special education needs.

Objectives.
1. To investigate greeting mode of special education teachers toward students with and without disabilities for inclusive setting
2. To examine the kind of stance special education teachers have towards inclusion
3. To entail possibilities of socializing students with and without disabilities in inclusive setting.

Research questions. Following research questions were formulated:

1. Do teachers hold a positive, neutral or negative ways towards greeting all students for inclusive settings?
2. Do teachers believe that all students can be benefitted from inclusive setting?
3. Is inclusion the best setting for socializing students with and without disabilities?
4. Is there any significant difference on gender basis among teachers’ mode of greeting, awareness, advantages, disadvantages, barriers, training’s need to teach in inclusive setting?
5. Is there any significant difference between urban and rural teachers’ mode of greeting, awareness, advantages, disadvantages, barriers, training’s need to teach in inclusive setting?

6. Is there any significant difference between public and private teachers’ mode of greeting, awareness, advantages, disadvantages, barriers, training’s need to teach in inclusive setting?

6. **Significance of the study:** The present study paid attention on identifying teachers’ ways of greeting of special education teachers towards inclusion. Similar to other developing countries, Pakistan is trying to implement inclusive education on the basis of various international and national declarations. The study contributes in the development of field and knowledge in inclusive education in Pakistan. It is significant for stakeholders like teachers, educationists, parents, policy makers and other relevant public or private institutions and agencies. It is also significant for future teachers to get well-informed knowledge and current practices in the field of inclusive education. It further highlights manifold barriers in transforming special to inclusive schools. The study identifies the advantages, disadvantages, nature of training needed as teachers perceive. It intends to contribute in understanding and investigating teachers’ ways of greeting towards all students with and without special education needs in special schools. It also flashes most significant barriers for teachers, administrators, parents and public to understand and in achieving the goal of inclusion in Pakistan.

7. **Research Methodology:** According to Cresswell (2009), educational research is based on some ways of thinking and certain methods of establishing viewpoint and understanding.

7.1 **Description of variables**

7.1.1 **Context of the study:** To investigate the phenomena, the study adopted quantitative approach. The researcher wanted to obtain data to determine specific greeting mode of teachers of special education schools of Punjab. The study finds the significant difference among the variables (awareness, advantages and disadvantages, barriers and nature of training required related to inclusive pedagogy for inclusive settings) on the basis of type, locality of schools & gender of teachers. According to Fraenkel & Wallen (2009), the study is cross-sectional in survey because the researchers collected the information at just one point in time, although the time it takes to collect all of the data may take anywhere from a day to a few weeks or more. The data for the study had been collected from primary public & private schools located in urban and rural areas.

7.1.2 **Research variables:** The research variables in the study were awareness, advantages, disadvantages, barriers and nature of training related to inclusive education. Researcher has tried to identify significant difference among the variables (awareness, advantages and disadvantages, barriers and nature of training related to inclusive pedagogy for inclusive settings) on the basis of type, locality of schools & gender of teachers.

<table>
<thead>
<tr>
<th>Sr No.</th>
<th>Categorical variables</th>
<th>Continuous variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Demographics e.g gender, school locality, school type, Teachers experiences, prof. &amp; academic qualification etc.</td>
<td>Awareness</td>
</tr>
<tr>
<td>2</td>
<td>Demographics e.g gender, school locality, school type, Teachers experiences, prof. &amp; academic qualification etc.</td>
<td>Advantages/disadvantages</td>
</tr>
<tr>
<td>3</td>
<td>Demographics e.g gender, school locality, school type, Teachers experiences, prof. &amp; academic qualification etc.</td>
<td>Barriers</td>
</tr>
<tr>
<td>4</td>
<td>Demographics e.g gender, school locality, school type, Teachers experiences, prof. &amp; academic qualification etc.</td>
<td>Training required</td>
</tr>
</tbody>
</table>

Table 1: Variables of the study

Researcher identified that in our study disability is an issue that turns its advantages into disadvantages. Inclusion would be of little benefit to children with disabilities and therefore questioned the advantages of inclusion. Lack of
awareness also becomes the disadvantage of inclusion. Teachers normally have low expectations from students with disabilities. Low expectations towards students with disabilities reflects that the apparent difference of the students causes them to be considered as inferior to other students who are considered as normal in the society. Gyimah, Sugden & Pearson (2009) explained that teachers have the tendency to reject students with severe problem and disabilities because the severity affects perception and expected outcomes.

Keeping in view the need of transforming special and regular schools into inclusive, teachers’ experiences with students with disabilities have great importance. Analyzing special education teachers’ views on the variables like awareness, advantages/disadvantages of inclusive settings, barriers as they perceived and the need of training they suggest for transforming schools to inclusive become important variables for the current study. As special education teachers experiences students with disabilities hence researcher wanted to investigate their mode of welcoming for inclusive settings.

8. Population, sampling and sample

8.1 Population
All male and female teachers of special school of Punjab, Pakistan make the population of the study.

8.2 Sampling and Sample: In this study the researchers used convenient sampling for selecting special education teachers. Total number of participants are n=80 from these special schools. The researchers went to the schools and selected participants with the help of the schools head teachers. All female and male teachers were selected. n=39% of the participants were male and n=61% of the participants were female. The questionnaire was given to all teachers of special schools of Punjab. The researcher distributed the questionnaires by themselves among the heads of the schools and the teachers. The respondents individually respond the questionnaires and returned after two to three days to the researcher. Some teachers did not return. Researchers distributed 106 questionnaires among the teachers and 95 teachers returned. Some questionnaires were found incomplete so after data cleaning, 80 questionnaires were included for final analysis of the study. The return-rate of questionnaires was 89.62%.

9. Instrument: The instrument developed was used to explore the greeting’ ways of special education teachers towards inclusion of ordinary students in special schools. The questionnaire asked the teachers to provide the information about the inclusion of ordinary students in the special education classroom. The teachers were to respond on a three point scale – (1) Agree (2) Uncertain (3) Disagree. The reason behind using three point-scale was to capture respondent attention because the construct of the study was simple and researcher didn’t want to contaminate the data with extended point-scale. According to Dolnicar, Grun, Leisch & Rossiter (2011), both five and seven point scale items take longer time to complete and have a more chance to be contaminated. The questionnaire was organized to collect complete information in a short time by asking the teachers to answer to specific statements relating to inclusion. The study asked the teachers to respond to information including gender, school type & locality.

10. Pilot Study: Before collecting the final data, the researchers carried out a pilot study to ensure instrument’s reliability and validity. Pilot testing of research instruments was made in Sargodha and Hafizabad districts. Reliability of the questionnaire was .88 after analysis. The instrument was reviewed by expert reviewers. Suggestions were incorporated into a revision of the instrument. The survey was administered to elementary, middle, and high school special education teachers in six District of Punjab. After pilot testing, the questionnaires were revised.

11. Data Collection Procedure: The instrument for data collection used in this study was a questionnaire that was divided into two parts. Part one of this instrument was designed to obtain participants professional and demographic data. Special schools’ teachers in Islamabad, Faisalabad, Gujranwala, Sheikhupura, Chiniot and Hafizabad were asked to provide information Part two of the questionnaire was developed by the researchers to investigate the ways of greeting of special education teachers towards inclusion of ordinary students in special schools.

12. Problem Encountered During Data Collection: As the research was carried out, the researchers encountered many problems concerning data collection. First, there was a problem faced by the researchers for receiving permission from the head teachers of schools for collecting data from others teachers. After getting permission and cooperation of head teacher, the researchers talked with the participants and provide them information on this research and also gave the instructions which were required for participants to complete the questionnaire. After visiting so many times, researcher got data from teachers. Secondly, the dates scheduled for
data collection were not convenient for some schools, because of their admission days and exam vacations also, which made it difficult for the researchers to collect data to the school teachers. Another problem faced was that many teachers had no information about inclusive education.

13. **Limitations:** Current study is based on smaller sample of teachers (n=80) because in special education less staff is recruited because of less number of students. Further, due to convenient sampling result might not be as generalizable as these should be in quantitative research.

14. **Data Analysis:** Data were analyzed by using inferential and descriptive statistic. Statistical Package for Social Sciences (SPSS) has been used for data analysis. Descriptive statistics to measure means and percentages were used. Inferential statistics such as t-test and one-way ANOVA were used to examine statistical difference between respondent's views. Analysis shows that most of the participants 60.9% are females, only 39.1% are male. It shows that at primary level most of the female teachers are teaching in inclusive schools. Most of the participants 75% are urban and only 25% are rural. Most of the participants 95.3% belong to public schools. Only 4.7% belong to private schools. Analysis shows the frequency distribution of respondent according to their age. In this study 50.5% respondents are between the age group of (25-30) years, 23.8% are between the age group of (31-35) years, 7.1% respondents are between the age group of (46-50) years, 6.0% respondents are (41-45) and less than 25 years of age. Only 1.2% respondents are (51-55) and above 55 years of age. Analysis shows that most respondents agreed that both students should learn in the same schools. It also shows that most respondents agreed that problems and difficulties arise if both students will be learning together. Most respondents agreed that learning together will increase social skills of all students. According to this table most of the teachers agreed that “all teachers have enough time to teach students with and without disabilities. Analysis shows that special education teachers and regular teachers need to work together in order to teach all students including students with and without disabilities. Analysis indicates that majority of teachers agreed that special education teachers and ordinary teachers’ collaborations may become fruitful to support all students in the same class and school. It also indicates that majority of teachers agreed that special education teachers have the skills necessary to provide instructions to all students including students with and without disabilities. Analysis shows that special educators are willing to make needed instructional adaptations for all students including students with and without disabilities. According to analysis, most of the teachers are agreeing that the presence of all students in my classes have a positive impact on all students with and without disabilities. The analysis shows the majority of the teachers agreed that students with disabilities” may develop friendships with classmates without disabilities. According to analysis, 45% teachers agreed that ordinary students will benefit from the students with disabilities in classrooms. It is clear indication that majority of teachers agreed that special students have the right to get an education with their counterparts without disabilities in the same classes. The analysis shows that teachers agreed that special and ordinary students are socially well adjusted in the same classroom. The analysis also shows that the teachers agreed that the Parents of all students including with without disabilities will accept, provide adequate support and assistance to the teachers to teach all students in the same class.

**Table 2: Independent Samples t-test comparing male and female teachers towards the advantages of inclusion**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>S. D</th>
<th>T</th>
<th>Sig. (2tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>37.6765</td>
<td>8.95687</td>
<td>-.318</td>
<td>.751</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>38.4906</td>
<td>10.09307</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value .318 which is not significant at .05 significant levels. The difference exists between male and female teacher where female teachers mean was greater than male teacher but this difference is not statistically significant.

**Table 3: Independent Samples t-test comparing male and female teachers to the disadvantages of inclusion**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>S. D</th>
<th>T</th>
<th>Sig.(2tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>10.1765</td>
<td>2.81199</td>
<td>.843</td>
<td>.402</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>9.4340</td>
<td>2.49237</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This table shows t-value .843 which is not significant at .05 significant levels. The difference exists between male and female teacher where female teachers mean was greater than male teacher but this difference is not statistically significant.

**Table 4: Independent Samples t-test comparing male and female teachers to the barriers to inclusion**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig.(2tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>9.0294</td>
<td>2.99985</td>
<td>-1.369</td>
<td>.174</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>9.8679</td>
<td>3.01941</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -1.369 which is not significant at .05 significant levels. The difference exists between male and female teacher where female teachers mean was greater than male teacher but this difference is not statistically significant.

**Table 5: Independent Samples t-test comparing male and female teachers to the awareness of inclusion**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>3.4706</td>
<td>1.30814</td>
<td>.471</td>
<td>.639</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>3.3396</td>
<td>1.23947</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value .471 which is not significant at .05 significant levels. The difference exists between male and female teacher where female teachers mean was greater than male teacher but this difference is not statistically significant.

**Table 6: Independent Samples t-test comparing male and female teachers to the training need**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>5.9706</td>
<td>1.50726</td>
<td>-1.369</td>
<td>.174</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>6.5472</td>
<td>2.13547</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -1.369 which is not significant at .05 significant levels. The difference exist between male and female teacher where female teachers mean was greater than male teacher but this difference is not statistically significant.

**Table 7: Independent Samples t-test comparing male and female teachers to ways of greeting**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>32</td>
<td>66.3235</td>
<td>11.98919</td>
<td>-.444</td>
<td>.658</td>
</tr>
<tr>
<td>Female</td>
<td>48</td>
<td>67.6792</td>
<td>14.99458</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -.444 which is not significant at .05 significant levels. The difference exists between male and female teacher where female teachers mean was greater than male teacher but this difference is not statistically significant.
Table 8: Independent Samples t-test comparing urban and rural teachers with respect to the advantages of inclusion

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>37.000</td>
<td>10.03630</td>
<td>-2.123</td>
<td>.037</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>42.100</td>
<td>6.91984</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -2.123 which is not significant at .05 significant levels. The difference exist between urban and rural teacher where urban teachers mean was greater than rural teacher but this difference is not statistically significant.

Table 9: Independent Samples t-test comparing urban and rural teachers with respect to the disadvantages of inclusion

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>9.6567</td>
<td>2.57348</td>
<td>-.435</td>
<td>.664</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>9.9500</td>
<td>2.87411</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -.435 which is not significant at .05 significant levels. The difference exists between urban and rural teacher where urban teachers mean was greater than rural teacher but this difference is not statistically significant.

Table 10: Independent Samples t-test comparing urban and rural teachers with respect to the barriers of inclusion

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>9.3134</td>
<td>3.00610</td>
<td>-1.286</td>
<td>.202</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>10.300</td>
<td>3.02794</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -1.286 which is not significant at .05 significant levels. The difference exists between urban and rural teacher where urban teachers mean was greater than rural teacher but this difference is not statistically significant.

Table 11: Independent Samples t-test comparing urban and rural teachers with respect to the need of training of inclusion

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>6.3284</td>
<td>1.97245</td>
<td>-1.286</td>
<td>.202</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>6.3000</td>
<td>1.80933</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table shows t-value -.057 which is significant at .05 significant levels. The difference exists urban and rural teacher where urban teachers mean was greater than rural teacher but this difference is not statistically significant.

Table 12: Independent Samples t-test comparing urban and rural teachers with respect to the need of training of inclusion

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>3.2985</td>
<td>1.27938</td>
<td>-1.254</td>
<td>.213</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>3.7000</td>
<td>1.17429</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This table shows t-value -1.254 which is not significant at .05 significant levels. The difference exists between urban and rural teacher where urban teachers mean was greater than rural teacher but this difference is not statistically significant.

Table 13: Independent Samples t-test comparing urban and rural teachers with respect to the awareness

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>3.2985</td>
<td>1.27938</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>3.7000</td>
<td>1.17429</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th>Awareness</th>
<th>T</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.254</td>
<td>85</td>
<td>.213</td>
</tr>
</tbody>
</table>

This table shows t-value -1.254 which is not significant at .05 significant levels. The difference exists between urban and rural teacher where urban teachers mean is greater than rural teacher but this difference is not statistically significant.

Table 14: Independent Samples t-test comparing urban and rural teachers with respect to way of greeting

<table>
<thead>
<tr>
<th>Residence</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>60</td>
<td>65.5970</td>
<td>14.33586</td>
</tr>
<tr>
<td>Rural</td>
<td>20</td>
<td>72.3500</td>
<td>10.77656</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th>Way of greeting</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>-1.946</td>
<td>85</td>
<td>.055</td>
</tr>
</tbody>
</table>

This table shows t-value -1.946 which is not significant at .05 significant levels. The difference exists between urban and rural teacher where urban teachers mean is greater than rural teacher but this difference is not statistically significant.

Table 15: Independent Samples t-test comparing public and private school teachers with respect to the advantages

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>76</td>
<td>38.3133</td>
<td>9.78043</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>35.2500</td>
<td>5.12348</td>
</tr>
</tbody>
</table>

Independent Samples Tests

<table>
<thead>
<tr>
<th>Advantages</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>.620</td>
<td>85</td>
<td>.537</td>
</tr>
</tbody>
</table>

This table shows t-value .620 which is not significant at .05 significant levels. The difference exists between public and private schools teacher where public schools teachers mean is greater than private schools teacher but this difference is not statistically significant.
Table 16: Independent Samples t-test comparing public and private school teachers with respect to the disadvantages

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>76</td>
<td>9.8072</td>
<td>2.65246</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>8.0000</td>
<td>1.41421</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Disadvantages</td>
<td>1.348</td>
<td>85</td>
<td>.181</td>
</tr>
</tbody>
</table>

This table shows t-value 1.348 which is not significant at .05 significant levels. The difference exists between public and private schools teacher where public schools teachers mean is greater than private school teacher but this “difference is not statistically significant.

Table 17: Independent Samples t-test comparing public and private school teachers with respect to barriers

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>76</td>
<td>9.5663</td>
<td>3.08890</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>9.0000</td>
<td>.81650</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th></th>
<th>T</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barriers</td>
<td>.364</td>
<td>85</td>
<td>.717</td>
</tr>
</tbody>
</table>

This table shows t-value .364 which is not significant at .05 significant levels. The difference exists between public and private school teacher where public school teachers mean is greater than private school teachers but this “difference is not statistically significant.

Table 18: Independent Samples t-test comparing public and private school teachers with respect to training

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>76</td>
<td>6.3373</td>
<td>1.96479</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>6.0000</td>
<td>.81650</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>.340</td>
<td>85</td>
<td>.734</td>
</tr>
</tbody>
</table>

This table shows t-value .340 which is not significant at .05 significant levels. The difference exists between public and private school teacher where public school teachers mean is greater than private school teacher but this “difference is not statistically significant.
Table 19: Independent Samples t-test comparing public and private school teachers with respect to the awareness

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>76</td>
<td>3.3855</td>
<td>1.28624</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>3.5000</td>
<td>.57735</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>-.176</td>
<td>85</td>
<td>.860</td>
</tr>
</tbody>
</table>

This table shows t-value -.176 which is not significant at .05 significant levels. The difference exists between public and private schools teacher where private schools teachers mean is greater than public schools teacher but this “difference is not statistically significant.

Table 20: Independent Samples t-test comparing public and private school teachers with respect to way of greeting

<table>
<thead>
<tr>
<th>School</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>76</td>
<td>67.4096</td>
<td>14.06521</td>
</tr>
<tr>
<td>Private</td>
<td>4</td>
<td>61.7500</td>
<td>6.55108</td>
</tr>
</tbody>
</table>

Independent Samples Test

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Welcoming mode</td>
<td>.797</td>
<td>85</td>
<td>.428</td>
</tr>
</tbody>
</table>

This table shows t-value .797 which is not significant at .05 significant levels. The difference exists between public and private school teacher where public school teachers mean is greater than private school teachers but this difference is not statistically significant.

Findings

1) Mostly teachers agreed that ordinary students should learn with special students.
2) It showed positive way of greeting all students with inclusive setting. Teachers were agreeing that both students should learn in the same schools.
3) A significant difference exists between male and female teachers with respect to the way of greeting of teachers toward inclusion of ordinary students into special classes.
4) A significant difference exists between male and female teachers with respect to the advantages of inclusion of ordinary students into special classes.
5) Difference exists between male and female teachers with respect to the disadvantages of inclusion of ordinary students into special classes.
6) Significant difference exists between male and female teachers with respect to the barriers to inclusion of ordinary students into special classes.
7) Significant difference exists between male and female teachers with respect to the awareness of inclusion.
8) Difference exists between male and female teachers with respect to the training of inclusion.
9) A difference exists between urban and rural teacher where urban teachers mean is greater than the rural teacher.
10) Significant difference exits between urban and rural teachers with respect to the advantages of the inclusion of ordinary students into special classes.
Difference exits between urban and rural teachers with respect to the disadvantages of the inclusion of ordinary students into special classes.

Difference exits between urban and rural teachers with respect to the barriers of the inclusion of ordinary students into special classes.

Significant difference exits between urban and rural teachers with respect to the training of the inclusion of ordinary students into special classes.

Difference exits between urban and rural teachers with respect to the awareness of the inclusion of ordinary students into special classes.

A difference exists between public and private school teacher where public school teachers mean is greater than private school teachers.

Significant difference exists between public and private teachers with respect to the advantages of inclusion of ordinary students into special classes.

Difference exists between public and private teachers with respect to the disadvantages of inclusion of ordinary students into special classes.

Significant difference exists between public and private teachers with respect to the barriers to inclusion of ordinary students into special classes.

Difference exists between public and private teachers with respect to the needs of training of inclusion of ordinary students into special classes.

Significant difference exists between public and private teachers with respect to the awareness toward the inclusion of ordinary students into special classes.

21. Discussion: The study was intended to contribute to understanding and investigating of teachers’ way of greeting all students with and without special education need in special schools. Mostly teachers were agreeing that ordinary students should learn with special students. It shows positive way of greeting all students in special schools. Teachers were agreeing that both students should learn in the same schools. Mostly respondents were agreeing that learning together will increase social skills of all students. The results showed that special teachers should accept ordinary students in their classes.

Majority of teachers were agreeing that all teachers receive adequate training related to teach all students including students with and without special education need. Majority of teachers are agreeing that they had the instructional background to teach all students including students with and without disabilities effectively. Most of the teachers were agreeing that ordinary students would have a negative impact upon the learning environment of classroom. It is contrary to some global researches conducted in regular schools. For example, Lifshitz, Glaubman and Issawi (2004) found that Palestinian school teachers’ views were not encouraging of inclusion in the education coordination. Research had also shown that both groups of teachers have similar feelings of uncertainty with regard to the ability of the regular education. Many studies have also shown that special education teachers had a propensity to hold more constructive and confident views about inclusion. The global studies conducted on special education teachers have shown positive conclusion towards socialization. For example, special education teachers tend to be more tolerant of inclusion and see themselves as important in facilitating positive social relationships between children with and without special education need and are more likely to mediate during conflict (Pavri & Lufting, 2001). Teachers show to be more willing to integrate students with mild disabilities, rather than those with more severe disabilities and with challenging behavioural problems in regular schools. According to Scruggs & Mastropieri (1996), there are great variations and individual differences in teachers’ beliefs, attitudes and confidence in moving toward inclusion. Carroll, Forlin, & Jobling (2003) elaborated that female teachers have greater tolerance for inclusive education and generally have higher levels of sympathy and lower levels of fear than male teachers.

Researchers suggest that there is a positive relationship between disability education and educator’s positive modes towards inclusion. Studies that have examined teachers’ modes and anxiety towards inclusive education have accounted successful accomplishment of inclusive policy that is dependent upon holding positive ways and having received appropriate training together with the availability of physical and human resources. Similarly as Bradshaw & Mundia, (2006) suggests positive cooperation with parents is an important element in achieving inclusion.

22. Conclusion: The study concludes that special education teachers based on their direct interaction with students with special education need albeit warmly greet all students with and without special education need for inclusive settings but they equally have reservations. Some of them warmly greet but some do not. A number of teachers feel it suitable for all students with and without special education need to be learned in the inclusive setting,
while others are saying it is not beneficial for some of the students (UNESCO, 2006). Teachers were agreeing that both students should learn in the same schools. Special education teachers support and greet both students with and without special education need for inclusive setting. They reflected that the hub for socialization of students with and without special education need is inclusive setting. Rather retaining students with disabilities in special schools, the students special education needs can only be fulfilled in inclusive settings. They agree that both kinds of students should learn in the same class and school. They continue to respond that students’ can be fulfilled if they learn together in the same class and school. Based on their experiences within special schools, teachers also require training to teach in diverse classroom of inclusive setting. Even then reservations concerning teaching and learning process in inclusive setting remain prevail. The results indicate that teachers greet and welcome all students with and without special education needs in their schools although sometimes they get confused. The study supports global inclusive practices although variations exist. Teachers’ reflections show that they favour shift from segregation to inclusion in special schools also. Based on the study, it is suggested that opening up and widening the gates of existing special schools for both students with and without special education needs would be fruitful rather limiting special schools only to students with special needs.

REFERENCES

ABSTRACT. In the 21st century, Globalization has become the most significant process. The opportunities which emerged parallel to developing technology have removed the borders between countries and people. From now on, people could simultaneously receive the news from the other end of the world. Besides, after industrial society, the knowledge society which rose with the development of science and technology provides people with any information handily in a short time. The fundamental dynamics of the society, which were based on the power of the machine and people in the industrial society, are now based on acquiring knowledge. Thus; among people, the most crucial power has become knowledge. The knowledge-based society and global structure have resulted in adjustments of various fields, firstly in sociological relations. Education is the most notable of these fields. In the education, higher education is the pioneer of the changes considering that the most part of the academic work has been accomplished by the people of higher education in its institutions. The academic exchange constitutes the remarkable part of the changes in the field of higher education by means of the globalization. In this paper, studies of The Council of Higher Education concerning the globalization of Turkish Higher Education system will be discussed. Additionally, detailed information for Mevlana Exchange Programme, conducted by The Council of Higher Education, will be presented.

Keywords: Globalization, knowledge society, higher education, academic exchange, Mevlana exchange programme
parallel to these developments.

2. **Globalization** “Globalization, the process of continuing integration of the countries in the world, is strongly underway in all parts of the globe. Supported by accelerating pace of technological change, by price and trade liberalization, and by growing importance of supranational rules, globalization has exposed national economies to much more intense competition than ever before.” (Mrak, 2000, p.iii) In other respects, “Globalization as a concept has been used in both positive and negative way by different people in different situations. Everyone looks at the concept from his or her point of view and interests. However, there is an agreement among all theorists that globalization has had enormous impact on societies at economic, political, and cultural levels.” (Al’abri, 2011, p.491) Each country regards the globalization of all fields in accordance with its opportunities and potential. The globalization and knowledge society have revealed the necessity for the alterations in all fields, notably in education.

In the international relations, the endeavours for the globalization of the education began in the middle of the 20th century, particularly in 1945 with the foundation of The United Nations Educational, Scientific and Cultural Organization (UNESCO). Moreover, many international organizations and institutions such as The Organization for Economic Co-operation and Development (OECD), The European Commission (EC), and The European Council (EC) are working for the globalization of the education. The research and academic publications of these institutions and organizations are crucial for the knowledge-based society. The sustainability along with the knowledge-based society and the endeavours for globalization has become necessary in education. For instance, The European Commission conducted Lifelong Learning Programme-LLP between 2007 and 2013 in order to support the sustainability of the education. “The Decision establishing the Lifelong Learning Programme was published in the Official Journal of the European Union L327/45 on 24 November 2006. LLP has a budget of nearly €7 billion for the period 2007 to 2013” (EC, 2013). The budget for the sustainability of lifelong learning is estimated as 15 billion € in future 2014-2020 Erasmus+. The European Commission’s budget for Erasmus+ is compelling as it is indicating that the member countries are attaching importance for the sustainability in education. Nonetheless, above mentioned endeavours are specifically meant for the field of higher education as “the number of students around the globe enrolled in higher education is forecast to more than double to 262 million by 2025.” (University World News, 2012)

3. **Globalization of Higher Education** “We must ensure our system of higher education offers world-class quality for a world-class economy.” (Taft, BrainyQuote, 2001)

“State support for education in general, and higher education in particular, was more forthcoming prior to the 1980s, when the financial crisis weakened the State and reduced its capacity to fund public investments in many areas. Due to the structural adjustment programmes of the 1980s, policies often curbed public expenditure, resulting in a reduction of public subsidies in all sectors and a decline in investment in ‘unproductive’ sectors, such as education.” (Varghese, 2008, p. 10) However today; according to the statistics of UNESCO and OECD, experts estimate that in higher education, the number of enrolled students around the world will exceed 250 million in the first quarter of the 21st century. Subsequently, the capacity of the higher education institutions in the world will not meet this massification’s demand. Therefore, many countries are profoundly changing policies by allocating higher budgets.

The massification of the higher education is caused by the rising demand of the traditional students defined between the ages of 18-23 in developing and least developing countries. On one hand, the population of young people in the developed countries is decreasing; on the other hand the demand for the higher education is increasing. This demand is a result of the immigrant and international students. Besides, the age group who wants to enroll in higher education is widening, thus the definition of traditional student is substituted by the new profile of the students between the ages of 24-34. (YOK, 2007) Hence, the number of students enrolled in higher education is gradually increasing in countries all over the world. This increase in quantity has brought about the problems as for the quality and standards of higher education. Consequently, the young people are attempting to obtain various scholarships in order to study abroad. Additionally, the young who wants to be a part of the global market are worried that their education at home is not recognized by other
countries. As a result, the young in the least developed and developing countries are seeking for a higher education institution which is recognized globally. According to OECD’s statistics, since 2010 the number of international students in the world is 4.1 millions. This number was 0.8 million in 1975, in 1980 - 1.1 million, and in 2000 - 2.1 millions. (Kritz, 2012, p. 2) The increase in the last decade shows the estimated numbers will be 8 or 10 million by 2020. Based on the statistics of 2010, the first country to host the most international students is the USA with %16.6; the second is the UK with % 13. The other countries are respectively; %6.6 Australia, % 6.4 Germany, and % 6.3 France. “The USA is estimated to obtain approximately 20 billion dollars of income by the international students until 2010. Likewise, Australia is considered to obtain nearly 16 billion dollars in the same period.” (Yılmaz, 2012, p.172) The USA and Australia’s serious incomes obtained entirely by the globalization of higher education are encouraging for the other countries such as Turkey. As one of the most rapidly developing countries, Turkey is also working hard for a global higher education system.

4. Turkish Higher Education Today “Ensuring quality higher education is one of the most important things we can do for future generations.”(Lewis, BrainyQuoe, 2001)

As one of the most rapidly developing countries of 21st century, Turkey is reforming in the field of education as well as all the other fields within the framework of 2023 vision. The utmost importance has been attached to higher education. There have been many attempts in order to increase the existing number of the universities. In 2006 the number of the universities was 78 in Turkey. However, “the year 2006 is similar to 1992 since the new universities were founded at the same time. Hence; in various regions of Turkey, 16 universities were founded with the regulation published on 01.03.2006 (num: 5467)”. (Sargın, 2007, p.144) Afterwards, in 2007 - 22, in 2008 - 15, in 2009 - 9, in 2010 - 17, in 2011- 9, and between 2012 and 2013, 4 universities were founded. In total 92 universities were founded in 8 years. According to The Council of Higher Education, since 2013 there have been 170 universities. This increase is notable considering the other countries in the same years. The work of The Council of Higher Education is definitely not only increasing the quantity of the universities but also, a lot has been done to increase the quality of old universities. For instance, the budget allocated for academicians to research also increased. Accordingly, up to one year academicians could go abroad with the regulation of The Council of Higher Education (num: 2547/7). Additionally, academicians are provided with post-doctoral scholarships as well as other scholarships. In 2011, The Council of Higher Education launched the ‘Faculty Development Programme’, which was established to train academicians in order to meet the needs of newly found universities, and recruitment of the academicians was increased rapidly. (YOK, 2011) Moreover, the fees for undergraduate and post-graduate students were abolished which was a big step for encouraging the enrolment of the individuals in higher education. “Additional 548 million TL from 2014 budget was allocated for merely these fees. Also the scholarship for undergraduate student in 2002 was 45 YTL, in 2013 this amount was increased to 280 TL.” (Şimşek, 2013, p.81)

Within the framework of 2023 visions Turkey has accomplished many goals in order to increase the qualitative and quantitative facilities of the universities nationally and also internationally. For this purpose the first attempt was integration into the Bologna Process conducted in European Union’s Higher Education Institutions. However, this attempt is not the primary goal of the Council of Higher Education. As the president of The Council of Higher Education Prof. Dr. Gökhan Çetinsaya remarked on 25 November 2013, ‘The knowledge based is revealed by our country’s goal of being one of the biggest economies in the world in 2023. Universities have gained importance more than any other time in this process. [...] for the future of Turkey the globalization of our higher education is inevitable and for this reason the Bologna Process is of course important, yet not the utmost goal just an important means.” The president expressed the three fundamental issues in higher education strategy document of 2023, which will be announced in the following months. These three issues are: turning quantitative development into qualitative development by focusing on the issue of quality, developing the doctoral education both in quantity and quality, and globalization. (Çetinsaya, 2013)

As it is obvious in the 2023 policy of The Council of Higher Education, the globalization of Turkish Higher Education is crucial. Consequently, the international students and international student exchange programmes are regarded as significant. To be able to meet this goal the number of international students is trying to be
increased. For instance, The Ministry of Economy financially supports the annual edufairs abroad to introduce the higher education institutes. Moreover, by means of the Presidency of Turks Abroad and Related Communities, the international students have received Turkish Scholarship in order to study in Turkish universities since 2011. Apart from this, a website designed for the international students who want to study in Turkey. This website of The Council of Higher Education provides the candidate students with the detailed information about Turkey and Turkish universities since 2013. The website is available in English, Turkish and Russian; and later will be available in Arabic. All this endeavours so far is not sufficient to introduce Turkish higher education in global market. In line with the aim of increasing the recognition of the Turkish higher education institutions, The Council of higher Education launched an international student and academician exchange programme named as “Mevlana Exchange Programme”.

5. A Globalization Story: Mevlana Exchange Programme: Mevlana Exchange Programme is a programme which aims the exchange of students and academic staff between the Turkish higher education institutions and higher education institutions of other countries. With the regulation published in August 23, 2011 (num: 28034), students and academic staff exchange between Turkish higher education institutions and higher education institutions of other countries has been possible.

The programme includes all higher education institutions throughout the world without discriminating between the geographical borders. The higher education institutions of EU countries benefiting from Erasmus programme will not be included in Mevlana Exchange Programme in 2013-2014 academic year. Students may study abroad for one (minimum) or two (maximum) terms and academic staff may lecture abroad from one week (minimum) to three months (maximum). Accordingly, students and academic staff from any country may benefit from this programme being hosted by Turkish higher education institutions in order to study or lecture.

The primary objective of Mevlana Exchange Programme is to exchange students and academic staff between the Turkish higher education institutions and higher education institutions of other countries. Additionally, Mevlana Exchange Programme aims:

- Making Turkey a centre of attraction in higher education area,
- Increasing the academic capacity of Turkish higher education institutions,
- Contributing to the globalization process of higher education,
- Sharing the historical and cultural heritage of Turkey in a global scale,
- Enriching the culture of respect and tolerance to differences by increasing intercultural interaction.

All academic staff who works in a national or foreign higher education institution, on condition that the higher education institutions signed a bilateral Mevlana Exchange Protocol, may benefit from Mevlana Exchange Programme. This mobility includes educational activities to be performed in host institution. Incoming students and academic staff from other countries to Turkish higher education institutions are granted according to the scholars determined by Council of Higher Education Executive Board.

The current international and regional exchange programmes executed by some countries and regional organizations have limited contribution to the “globalization of higher education” approach of Turkish Higher Education Council. Students who apply to Mevlana Exchange Programme, a significant means of global higher education vision, will have the opportunity to study at a university they desire in any part of the world. (YOK, 2013)

6. Conclusion: In accordance with the aforementioned visions of 2023, Turkey aims to be an important part of the field of higher education in the world. Accordingly, Turkey desires to be a centre of international students particularly from the Balkans, the Middle East and the Middle Asia, to all of which Turkey is particularly bounded historically and culturally. Besides, the existing national and international exchange protocols are not sufficient to contribute the globalization of Turkish Higher Education. Turkey is currently the part of the Erasmus exchange programme only. This programme seems to be barely adequate. “The number of outgoing students participated in Erasmus programme in 2010 was 8,993 and incoming was 3,784, in 2011 the outgoing 10,385 and incoming 4,452 and 2012 outgoing 14,052 and incoming 5,389. Although these programmes have been successful and rapidly improved, considering the population of higher education students is exceeding 3 millions in Turkey, it is obvious that these
programmes are not sufficient and required to be supported by the other exchange programmes. Still only the 0, 5% of the students in Turkey could benefit from the international exchange programmes.”(Erdogan, 2013, p.48) These statistics led The Council of Higher Education to seek new ways. Following the research, Mevlana Exchange Programme was launched in the 2013-2014 academic year. In the worldwide, at first Erasmus+ was financed by European Union and the other members of the programme, and afterwards there are other student and academician programmes between the countries such as University Mobility in the Asia and the Pacific (UMAP) and Belgian American Educational Foundation (BAEF). Most of these programmes are limited to the exchange between two countries. The distinction of Mevlana Exchange Programme is that it is executed and financed only by the Council of Higher Education and intended for all the countries in the world in 2014-2015 academic year. Finally, Mevlana Exchange Programme discussed as a globalization story in this paper, hopefully will be a success story in future.

REFERENCES


INVESTIGATION & DEVELOPMENT OF VOICE BASED VEHICLE-2 VEHICLE COMMUNICATION SYSTEM TO ANTICIPATE THE VIDEO BASED VEHICLE-2 VEHICLE COMMUNICATION SYSTEM PROBLEMS

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ABSTRACT: In this research work we have investigated and developed a Voice based Vehicle-to-Vehicle (V2V) communication system to overcome the problems of video based V2V communication system. The Voice based V2V communication system enable a vehicle to predict and react to the different driving situations and then instantly warn the drivers using speech based warnings to avoid a possible accidents and deadly collisions as it has been investigated that video based accident warning systems are danger by their selves and creating distractions for drivers. The practical bed for Voice based V2V communication system has been proposed. For this purpose a specialized hardware has been employed. The proposed system is then tested in field for different road crash scenarios and its performance has been evaluated. It has been found that voice based systems can avoid efficiently road accidents as compare to the video based v2v communication systems. Two types of testing have been done to prove the efficiency of voice based v2v communication system. In first testing phase the functionality of voice based v2v communication system has been evaluated. After collecting data from field tests 2nd type of testing has been done using C# based simulator. The performance of voice based and video based v2v communication a system has been compared for T and Y junctions. The simulation results show the dominance of voice based v2v communication system over video based v2v communication system.

Introduction: In 2009 a report was published by world health organization, which declares road accidents as 9th major reason of deaths in the world. The report shows that only in 2009, 1.27 million died due to the road accidents [1]. To decrease this enormous ratio of deaths researchers started work on technology, which makes vehicles able to communicate with each other to avoid road accidents by exchanging information about their speeds, locations and headings. This research field is known as Vehicle–2-Vehicle (V2V) communication system [2]. In all technology advance countries like USA, Japan, and European countries, V2V communication system is in development phase. But in Pakistan this research area is very new and very few researchers are working in this field. V2V is a subfield of Intelligent Transport System (ITS). ITS is very hot research area and the aim of this field is to improve driver’s safety and comfort during driving [2].

In V2V communication system, vehicles are equipped with communication technology and on board sensors like ultrasonic radars and/or GPS receivers and are able to exchange their speeds, headings and
locations to evade possible collisions. It helps passengers and drivers to increase their life security. V2V communication system also helps drivers to save their time by avoiding road jams by having road jams alerts. [3]. Vehicles equipped with audio/video gadgets help the drivers to make their decisions. But it has been reported that video displays can create distraction for drivers and can be create dangerous situations for drivers and passengers. Also it has been found from a survey that drivers take long time to decide about which one safety maneuver is suitable to evade road accident due to video displays. In [5] it has been elucidated that video gadgets increase the driver reaction time to avoid the road accidents. However a quick response is necessary by the driver to avoid the possible collisions [4].

In this research paper we have first proved that video based V-2-V communication system creates distraction for the drivers. Then we have proposed a voice based V-2-V communication system test bed. Infield experiments and simulation results proved the effectiveness of proposed system. The remaining paper is arranged as follow. In section II drawbacks of video based V2V communication system are discussed. Section III elucidated the utilization of voice in V2V communication system. Section IV presents our proposed voice based V2V communication test bed. Section V discusses simulation and result. Performance analysis of proposed solution is made in section VI. In the last section VII concludes the paper.

**Draw Backs Of Video Based V2V Communication System:** A video based V2V communication system can be explained as that all vehicles are equipped with on-roof cameras and video sending/receiving hardware and software. The proceeding car sends video alerts to the neighboring cars. The video contains information about the road hazards, road accident or road jam.

The concept of video based information system is not new and it is with us from many decays. But now new advancements in technology have made it far better than old video based information systems. To decrease the road accident possibility many V2V communication systems have proposed video based driver alert systems. The V2V com systems are using mostly IEEE 802.11 g/n for the exchange of video information.

To prove the driver distraction during the utilization of video based V2V communication system we performed infield tests. For this purpose a C# based video based V2V communication application was developed. The experimental topology includes two vehicles, one act as a server vehicle and other as a client vehicle. Server vehicle takes the video using 16 megapixel camera whereas client vehicle captures video data from the server and display it on the video LCD installed in the front of the driver. After deploying video based v2v test bed we conducted in field tests and surveys. For this purpose we select a technical crew, consist of five people. Two were sitting in server vehicle and two were in client vehicle. One other person was acting as a supporting staff.

In figures 3 and 4 it can be seen clearly that in daylight even a highest resolution cameras are failed to give the clear view of traffic flow or any road hazard. Drivers have to serve more time on video displays to understand the possibility of any dangerous situation. These on road experiments of video based IVC system proved that, there is a need of some sort of new solution which relaxes the drivers from paying their attention on these gadgets and help them to achieve secure and comfortable driving.

In figure 4 it can also seen clearly that the driver on client side vehicle is not able to see the results of video stream sent from the server side vehicle. The reason is sunlight effect.

![Fig. 4 Non-cleared client Side video display.](image-url)
In Video based IVCs, drivers have to pay attention towards video displays which can create a dangerous situation itself. Video based V2V communication system Driver has Problem to manage multiple tasks like see video display, speed, and tracking other vehicles etc.

When We Used Voice Based Warnings: When driver drive a car he/she manage multiple tasks, e.g. steering, monitoring speed and changing gears through visual channel then sounds channel can be used for intelligent warnings. Omni directional antennas are used for to transfer information for voice communication. According to [6], sound warnings require little directional search and responses tend to be faster than visual displays. Authors also noted that human’s eyes have missing blocking ability as compared to ears, because he cannot shut his ears unlike the eyes.

Proposed Voice Based Vehicle To Vehicle Communication Test Bed: Our Voice based V2V communication system has capability to share ((long, lat), speed, and heading) of vehicle to evade the accident possibilities. We develop this system to overcome the above mentioned problems of video based V2V communication system. The communication standard which we used as a communication medium is IEEE 802.11 N The functionality of V2V test bed is given as under.

The position of vehicles has been tracked using GPS (Global Positioning System) receiver. For this purpose GermeneTrex legend GPS receiver has been utilized. Specialized V2V communication (peer to peer) software has been coded in Visual studio .NET using C# language. GPS (Global Positioning System) is the system able to show us our exact position on the Earth anytime, in any weather and in anywhere.

The longitude and latitude of both vehicle V1 and vehicle V2 are exchanged between each other long using specialized GPS hardware mentioned above. To test the functionality of a proposed test-bed a wireless network of 3 kilometers range was deployed. For this purpose Wi-Fi (IEEE 802 n) TL-WA801ND wireless access point of TP-Link company has been used. The TP- LINK wireless N access point TL-WA801ND is design or expands a scalable high speed wireless network. After exchange of latitude and longitude between both vehicles distance, speed and heading of both vehicles computed in next step to measure the rate of expected collision danger. On the bases of speed, distance, and heading the system will check the distance between two vehicles and it is less than 5m then it check the different directions either it is left, right, front or back side so it will generate audio based warning tone for driver to safe vehicles. The alarm/audio warning is generated three times. After two warnings if driver does not response then a specialized module has been introduced in our test-bed and after third warning the ABS (automatic braking system) will be activated.

Results of Testbed: Figure 1 shows that Vehicle 1 is connected with vehicle 2 and share latitude and longitude with vehicle 2. The Latitude and Longitude of vehicle 2 is 33.2700 and 73.1331 and Latitude and Longitude of vehicle 1 is 33.2701 and 73.1331 respectively. Distance between vehicle 1 and vehicle two is 0.0112 km. Whereas speed and direction of vehicle 2 are 10.536 and straight respectively. Speed and direction of vehicle 1 is 40.032 km/h and direction is Straight as well according to the angle between both vehicle that is 0.
When Vehicle 2 is connected with vehicle 1, it shares its latitude and longitude with vehicle 1 and calculates the distance from vehicle 1. After calculating the speed of vehicle 2, it calculates the direction of vehicle 2, according to the previous calculations. Figure 2 highlights the direction of vehicle 2 which is straight with respect to angle 0.

![Figure 2](image1)

**Fig.2 Calculation of Direction by using Longitude & Latitude.**

Figure 2 shows successful communication and calculation of distance, speed and direction of both vehicles. The next step is generating a voice tone to warn the driver about the possible collision. Figure 3 shows the direction and angle of vehicle 1 and also vehicle 2 that is Right and Left respectively and the distance is less than danger threshold, so the voice-based warning for the vehicle 1 is generated which is “Danger from Right side”.

![Figure 3](image2)

**Fig.3. Warnings Window**

The proposed test-bed was tested in field. Figure 4 is showing research team setting up the test in the open ground.
Performance Analysis Of Voice Based V2V Communication System: For the rigorous analysis of voice based V2V communication system on T and Y junctions a special C# based simulator was designed. Because testing crash scenarios on world roads can lead to the life and financial risk. 5 test cases were performed for the T-junctions and 5 for the Y-junctions. Due to the lack of space we are describing in details only two T-junction and two Y-junction collision scenarios and the effectiveness of proposed solution in avoidance of accidents. However all test results of both T and Y junctions are presented in table 1 and 2.

A. Test Case 1: The test case 1 (possible collision scenario) is shown in Figure 5 in which Vs (skidding vehicle) is travelling with the speed of 50 km/h and Ts (Target vehicle) is moving with the speed of 50 km/h. The whole simulation for test case 1 works as. Vs is moving on road1 and Ts is moving on road2 of T junction. In this test case it has been supposed that driver of Vs suddenly changes its road due to any of the following reasons like drowsiness or due to tire blast. The collision level presented with yellow color is showing possible collision. The simulator calculates the distance between both vehicles and then using mathematical formulas calculates the time to collision (TTC) and time to avoidance (TTA). TTC in this case is 1.90 seconds and TTA is 0.771 seconds. Human driver needs 5.678 seconds [Faisal] to avoid this accident using video based emergency alerts, which is not possible in this case. Using audio based v2v communication system time of our crash sensing is 0.493 milliseconds; the possible collision can be avoided.
B. Test Case 2: The test case 2 (possible collision scenario) is shown in Figure 6 in which Vs is travelling with the speed of 60 km/h and Ts is moving with the speed of 65 km/h. The whole simulation for test case 2 works as. Vs is moving on road 1 and Ts is moving on road 2 of T junction. In this test case it has been supposed that driver of Vs suddenly changes its road due to any of the following reasons like drowsiness or due to tire blast. The collision level presented with yellow color is showing possible collision. The simulator calculates the distance between both vehicles and then using equations 1 to 3 calculates the time to collision (TTC) and time to avoidance (TTA). TTC in this case is 2.37 seconds and TTA is 1.43 seconds. Human driver needs 5.678 seconds to avoid this accident using video based emergency alerts, which is not possible in this case. Using audio based v2v communication system time of our crash sensing is 0.493 milliseconds; the possible collision can be avoided.

The results of T-junctions tests are presented in table 1. The average TTA is 1.60 seconds. It means driver reaction time is 1.60 seconds on T-junctions and it is 4.078 seconds faster than video based V2V communication system [5].

![Fig 6. T Junction test case 2 scenario](image)

**TABLE I**

<table>
<thead>
<tr>
<th>Test</th>
<th>Distance</th>
<th>Vs speed</th>
<th>Ts speed</th>
<th>TTA</th>
<th>TTC</th>
<th>Video</th>
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<td>50</td>
<td>0.771</td>
<td>1.90</td>
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<tr>
<td>2</td>
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<td>60</td>
<td>65</td>
<td>1.43</td>
<td>2.37</td>
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<tr>
<td>3</td>
<td>77.10</td>
<td>85</td>
<td>100</td>
<td>2.60</td>
<td>3.26</td>
<td>5.678</td>
</tr>
<tr>
<td>4</td>
<td>116.49</td>
<td>100</td>
<td>80</td>
<td>Safe scenario</td>
<td>Safe scenario</td>
<td>5.678</td>
</tr>
<tr>
<td>5</td>
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<td>80</td>
<td>90</td>
<td>1.61</td>
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<td></td>
<td></td>
<td>1.60</td>
<td>2.55</td>
<td>5.678</td>
</tr>
</tbody>
</table>

Intersection where three roadways connect and none of the roadways continue across the others. The roadways form a Y junction.
C. Test Case 1: The test case 1 (possible collision scenario) is shown in Figure 7 in which Vs is travelling with the speed of 80 km/h and Ts is moving with the speed of 90km/h. The whole simulation for test case 1 of Y junction works as, Vs is moving on road1 and Ts is moving on road2 of Y junction. In this test case it has been supposed that driver of Vs suddenly changes its road due to any of the following reasons like drowsiness or due to tire blast. The collision level presented with green color is showing safe scene.

![Fig. 7 Y Junction test case 1 showing safe scenario](image)

D. Test Case 2: The test case 2 (possible collision scenario) is shown in Figure 8 in which Vs is travelling with the speed of 80 km/h and Ts is moving with the speed of 90km/h. The whole simulation for test case 2 works as, Vs is moving on road1 and Ts is moving on road2 of Y junction. In this test case it has been supposed that driver of Vs suddenly changes its road due to any of the following reasons like drowsiness or due to tire blast. The collision level presented with yellow color is showing possible collision. The simulator calculates the distance between both vehicles and then using equations 1 to 3 calculates the time to collision (TTC) and time to avoidance (TTA). TTC in this case is 2.73 seconds and TTA is 1.67 seconds. Human driver needs 5.678 seconds to avoid this accident using video based emergency alerts, which is not possible in this case. Using audio based v2v communication system time of our crash sensing is 0.493 milliseconds; the possible collision can be avoided.

![Fig. 8 Y Junction test case 2 scenario](image)

The results of T-junctions tests are presented in table 2. The average TTA is 1.31 seconds. It means driver reaction time is 1.60 seconds on Y-junctions and it is 4.368 seconds faster than video based V2V communication system [5].
TABLE II
Test Results of proposed system on Y-Junction

<table>
<thead>
<tr>
<th>Test</th>
<th>Distance</th>
<th>Vs speed</th>
<th>Ts speed</th>
<th>TTA</th>
<th>TTC</th>
<th>Video</th>
</tr>
</thead>
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<tr>
<td>2</td>
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</tr>
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<td>90</td>
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<td></td>
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<td>1.31</td>
<td>2.42</td>
<td>5.678</td>
</tr>
</tbody>
</table>

**Conclusion:** Video based V2V communication systems can cause distraction for the drivers instead of facilitating them. Our proposed voice based V2V communication test-bed has proven its efficiency and can be used as a guideline for the automakers which are working on V2V communication enabled vehicles.

**REFERENCES**


ROLE OF EDUCATIONAL TECHNOLOGY IN PROMOTING DISTANCE EDUCATION

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ABSTRACT: Educational technology plays an important role in distance education system. By adapting new communication educational technologies in distance educational programmes their quality could be ensured. Instructions conducted through the use of technologies which significantly or completely eliminate the traditional face to face communications between teacher and students lead to distance education. Now a days, media such as computer artificial satellites, digital libraries, telephones, radio and television broadcasting and other technologies are presenting their potential for the purpose. Audio, video and print materials provide the base while internet is becoming cheap, facts and effective medium. Immense resources are already available on the web. In addition, technology is rushing to bring in revolution in the field of distance education. So in future, positive changes can be apprehended.

Key Words: Educational Technology, Distance Education, Uplifting, Role

1. Introduction: Technology is embedded in our culture and we are immersed and dependent on it as well. It changes so rapidly and has such a pervasive impact that it is actually determining our culture. Michael Osit (2008) stated:

Children and adolescents are prime users and beneficiaries. Administrators and educators need to keep pace with life outside the classroom in order to integrate and access the wonderful learning opportunities the internet, iPods, cell phones, podcasting, and even social networking sites and video game play offer... Teaching in a didactic/lecture format no longer works, and it is not utilizing the power of technological advances. Teachers need to invite students to learn by using what they know best-tech gadgets.

Educational technology is developing rapidly and is exhibiting many new characteristics. Riding and Rayner (1995) pointed out six characteristics of the superhighway and personal computers that are helpful to understand distance learning: (1) control of the mode of delivery and presentation rate; (2) control of the order of presentation, pace of instruction and selection of learning activities; (3) monitoring of learning performance, storing responses and conducting assessments; (4) provision of simulations which supply learning experiences in a variety of low-cost and risk-free topics; (5) formation of a collaborative learning group by linking the learner to the instructor and to other students for support; and (6) access to learning resources and assessment materials.
Moreover, distance education technology has the responsibility of following functions. McCreary and Duren (1987) points ten educational functions of computer conferencing such as (1) the notice board, (2) the public tutorial, (3) the individual project (4) free flow discussion (5) the structured seminar, (6) peer conferencing (7) collective database (8) group products (9) community decision making and (10) inter-community network.


“Educational technology consists of all modern media, methods and materials and needs to be used in a well integrated manner of maximizing the learning experiences of students at various levels. It implies a behavioural science approach in teaching and learning and makes use of relevant scientific and technological methods and principles developed in psychology, sociology, linguistics, communication and other related areas”

It further seeks to incorporate the management concepts of cost effectiveness, system approach and the efficient deployment and utilization of human as well as material resources. It helps in optimization of educational outcomes through the development application and evaluation of systems, methods, and techniques in the field of teaching and learning. It is not the electronic media only; it is a part of whole and one of the components that constitute educational technology.

On the other hand distance education is emerging as a viable and vital force in educational delivery system in recent years, especially in higher education. Much of the growth comes from a rapidly growing demand for educational opportunities directed towards and designed for some specific target groups (Garrison, 1987).

Distance learning activities are designed to fit the specific context for learning, the nature of the subject matter; intended learning outcomes, need and goals of the learner, the learner’s environment and instructional technologies methods.

Apart from distance education, the field of educational technology was a 20th century movement with the major developments occurring during the immediately after World War-II. Emphasis on audiovisual communications media according to Inoue, Y. and Bell, S.T. (2006, p.28) “gradually focused on the systematic development of teaching and learning procedures that were based in behavioural psychology”.

The technology is capable of bringing fruitful results in short period of time. It is such a vehicle which leads learners as well as teachers towards more clarity of concepts and ideas. Moore, M.G. (2005, p.13) further adds that in England vast majority of school 133,000 students receive instruction entirely at a distance through technology. More than 20 other countries have national Open Universities in which all instruction is provided by distance education methods.
2. Technology and Distance Education:

Distance Education is a field of education that focuses on pedagogy/andragogy, technology and incorporated in delivering education to students who are not physically “on site” (Simonson, M.R. (2006, p.35) to receive their education. Instead, teachers and students may communicate asynchronously by exchanging printed or electronic media, or through technology that allows them to communicate in real time. He further points the distance education course that requires a physical on-site presence for any reason including the taking of examination is considered to be a hybrid or blended course or programme.

The practice of distance education has dramatically changed since the early 1990s. Educators are using technology to increase the distant learner’s access to the local classroom, to improve access of all learners to resources and to make the experience of the remote student comparable to that of the local learner. According to Moore, M.G. (2005, p.7):

“Distance education no longer relies heavily as it used to on the delivery of point and broadcast media technologies. Recent innovations in hardware, software and internet technologies have made communications based distance education systems more available, easier to use and less costly”.

Technology is an important factor in distance education. For the communication purposes different types of technologies are used. Rumble, G. (1994) said that four media namely print, audio, television, computers are available for teaching purposes, in one technological form or another. Electronic publishing will be a major development in distance education. Over the next decade, it would expect at least 70% of the various steps in publishing to be carried out electronically in most European distance teaching institutions. Every learner is acquainted with text books as a potential print-based study material (Bates, 1994). Finally Islam (2005) added that the distinction between media and technology is a useful one. A medium is a generic form of communication associated with particular ways of presenting knowledge. There are five important media in education direct human contact (face to face), text (including still graphics), audio, television and computing. The use of each medium gives both variety and chance of accommodating different learning styles.

3. Skills required for effective participation in Distance Education:

As distance education is a different mode of education. For the purpose different skills are required which lead it towards success. In this context the first one is the ability to use the media for example a student of distance education who wants to be benefited from the web must know the use of computer at first hand, in order to discover quality content.

Independent study skills come at second place. Activities such as time management, personal class involvement and peer group support comes under these skills. For Bansal, A. (2004, p.43):
“Distance students prove themselves successful in all these skills. As distance education is not for everyone, because the focus of responsibility shifts to the pupil from the teacher. Students who work independently, who are excellent time managers, who are comfortable with the technology and who do not feel a strong need for face to face interaction with instructors or fellow students can prosper in distance education”.

It shows that independent study skills are equally important as of media skills.

4. **Distance Education use around the world**

All over the world distance education put a strong and varied impact. In fact education system now-a-days needs the support of distance education to meet the demand of public enthusiasm about education. The following are the certain example in this context.

Sub-Saharan African counties are surely facing tremendous problems in the field of education. There is shortage of classrooms at one hand and lack of teachers besides instructional material at other hand.. In this grim situation Michael R. Simonson recommends a solution by saying that “distance education has the potential to contribute to national reconstruction by providing economically feasible educational opportunities to people in disparate geographic regions”.

In China the population growth rate is very high beside the cost of higher education. The only solution of such problems was the establishment of the national distance learning programme for higher education in the last decade of nineteenth century. In the end of 1970’s and the start of 1980’s the Chinese government developed a national radio and television university system to meet its goals of higher education.

In European countries such as Spain, France, UK distance education got deep roots now. Many programmes were offered to the public at large not only for education purpose but for training too in such countries.

In United States the graph of distance education is going upward with the use of new technologies as Michael R. Simonson stated that:

“E-mail has electronic bulletin boards and interactive computer networks now augment or replace mail carries in delivering circular materials, textbooks and examinations to distance learners. Now transmission media capable of providing two-way full motion, live interaction between the student and teacher are increasingly replacing to interactive, one was systems”.

Finally, Turkey has recently joined the category of such nations which is using distance education for learning purpose. Though their distance education plant is only of twelve years but has enrolled almost one million students, annually. It shows the effectiveness of distance education. In short period of time fruitful results can be acquired by harnessing technology.
5. How Distance Education meet its goals?

Distance Education methods of instruction that utilize different communications technologies to carry teaching to learners in different places. As Lockmiller, D.A. (2005) stated:

“Distance education programmes enable learners and teachers to interact with each other by means of computers, artificial satellites, digital libraries, telephones, radio or television broadcasting or other technologies. Instruction conducted through the mail is often referred to as correspondence education”.

Each medium and each technology for delivering it has its own strengths and weakness. One of the worst mistakes an organization or an instructor can make it to become dogmatically committed to delivery by a single medium. Roschelle, Pea, Hoadley, Gordin and Means (2000) identify four fundamental characteristics of how technology can enhance both what and how children learn in the classroom; (1) active engagement (2) participation in groups (3) frequent interaction and feedback and (4) connections to real-world contexts. They also indicate that use of technology is more effective as a learning tool when embedded in a broader education reform movement that includes improvements in teacher training, curriculum, student assessment and a school’s capacity for change. In the same context Hassain, I. (2004, p.13) comments that:

“The distance education universities all over the world are exploring and making the best use of new technologies such as computer, internet and www. Teleconferencing, educational television and other computer related technologies to make the education more productive….so that the distance learner may interact with their fellow learners and tutors”.

6. Weaknesses and Strengthens of applying Technology

Everything has its strengths and weaknesses but this can be covered by the positive handling of an instructor/tutor/teachers. Anyhow in distance environment technology has following advantages.

a. Accessibility and flexibility to be used anytime, anywhere.
b. Lost costs as far as internet facility is concerned.
c. Broader view of possibilities for the use of technology.
d. There are unlimited resources in the context.
e. Great for technology to literate people through computer.

Michael Osit (2008) technology put the following positive effects:

1. Supportive in students achievement
2. Improve professional abilities
3. Fulfill special needs
4. Encourage continuing education
5. Provide workforce skills

On the other hand there are also some problems which are faced in distance education situation in the use of technology such as:

1. High cost of technology
2. Mostly people are unfamiliar with technology.
3. Problems with technology such as server down, internet connection failures, individual problems, etc.

Due to all of these learning surely effects. A distant learner who is already going away from the learning boundaries and dejected one will hardly accommodate or motivate himself to stay linger on with education. However, this position can be cleared out by a vigilant teacher.

7. **Future of Educational Technology in Distance Education:**

There is no doubt in this fact that the future of educational technology in education is very bright. This is further recommended by James, L. Morison (2009) in his article entitled “The Role of Technology in Education Today and Tomorrow” i.e. wireless high-speed networks will be common:

“Multimedia and three dimensional modeling, now in their infancy, will show up in more parts of the curriculum. The technologies coming to market over the next decade or more likely to enhance what faculty already to rather than fundamentally change faculty behaviors and practices”.

Keeping in view Solangi, F.A. (1996, p.30) points that Allama Iqbal Open University (AIOU) has replaced its old technology through investing 380 million rupees. Presently the previous facilities at AIOU area upgraded to the level of International Institute of Communication Technology. Allana, G.A. (1985) suggests on distance education, multimedia is like “a land of contracts.” Now here these are more evident than in the technologies used by distance teaching institutions. With great promise for the future, in principle, it implies a commitment to increase accessibility, to a vast variety of audience. Moreover, R.Mc Com (1984) confirmed that “Most educators would now agree that broadcast media have a valuable role to play in education. Even within the context of formal education, broadcasting has been used both in institutional settings and in people’s own homes.”

Moreover, in year 2000 a study commissioned by the software and Information Industry Association, Sivin-Kachala and Biolo (2000) reviewed 311 research studies on the effectiveness of technologies on student achievement. Their findings revealed positive and consistent patterns when students were engaged in technology-rich environments, including significant gains and achievement in all subject areas and improved attitudes towards learning and increased self-esteem.

**Conclusion**

The technology revolution increased the need to educate great number of people. Hellman, J.A. (2003, p.5a) admits that distance education is apparently offering a big potential to its students as well as facilitators. It can provide a high quality education via a diverse technology and media formats. So distance education is essential to the population which is not able from various reasons to attend traditional classroom courses.
In order to successfully implement distance education one must cautiously consider many aspects of distance education such as student’s needs must be carefully balanced with the curriculum and the learning environment, teacher must serve as a supportive element who can ensure effectiveness of distance learning module and finally, selection of most appropriate technology should be done to exchange its materials. In examining large scale state and national studies as well as some innovative smaller studies on never educational technologies. Schacter (1999) found that students with access to any of a number of technologies such as computer assisted instruction, integrated learning systems, simulations and software that teaches higher order thinking, collaborative networked technologies or design and programming technologies show positive gains in achievement. The materials can be in written format (print, e-mail etc), video or audio format and computer based. Due to the proper handling of technology Counts, J. (1996, p.122) points that assuming the societal changes brought, by micro electronic technologies would have greater implications for changes in educational programmes than would be instructional potential of these technologies. It shows that distance education has a bright future.
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MULTILEVEL THRESHOLD AND PSO FOR ICE LOAD DETECTION ON AERIAL LINES

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ABSTRACT. Power cut is one of the power quality issues. Ice on conductor which belongs to aerial line can be caused to power cut. Ice occurs on conductor of electric transmission line (ETL) at cold and humid weather and it is called as ice load. Ice load causes additional weight on conductor. If amount of ice load increases on conductor extremely, transmission line tower bending or conductor breakage can be seen, and electric energy of consumers can be cut for days. So, ice load must be eliminated urgently to prevent faults of ETL. But primarily ice thickness of ice load must be determined. Image processing was used to determine ice thickness of ice load because image processing is one of the best methods for image recognition. In literature, bi-level thresholding and multilevel thresholding have been used for image recognition studies. It was seen in literature that the result of multilevel thresholding is better than the result of bi-level thresholding for image recognition studies. So, multilevel thresholding was used to determine iced conductor thickness in this study. Otsu method can be used for multilevel thresholding. But determination of optimum threshold levels with traditional Otsu Method are difficult. Particle swarm optimization (PSO) was used to determine optimum threshold levels. PSO speed is high and its result is acceptable level. In literature, maximum threshold levels are 5 levels, but this levels are not enough for this study. So, maximum threshold levels were determined as 8 levels threshold to obtain the most accurate results.

Keywords: Ice load, image processing, multilevel thresholding, Otsu method, PSO.

1. Introduction. Ice load damages to conductor and pole of aerial lines. The reasons which cause increase of ice load are humidity, radius of conductor and air temperature. Ice load occurs generally at between 2°C and -8°C temperature and at least 95% humidity. If diameter of conductor increases, ice load increases. Thus electric transmission lines (ETL) are effected by ice load because diameter of ETL conductor is bigger than electric distribution lines. If amount of ice load increases excessively, transmission line pole may be bending or conductor may be breakage. Especially in winter, this case is not desired by customers. Turkey, Canada, China were affected adversely by ice load, and power cut have been seen for days in some regions which belong to these place. For example, in Adıyaman which belongs to Turkey, 122 pieces electric pole were collapsed by ice load. Therefore power cut was seen for days in winter. Thus ice load must be eliminated urgently, but primarily iced conductor thickness which belongs to ETL must be determined. One of the ways of ice thickness determination is ice monitoring. Ice monitoring can be image processing, meterological sensor or different method. But image processing has more accurate results. Image segmentation can be used
as ice monitoring method. There are different applications of image segmentation in literature. These applications are generally related to image recognition. Thus bi-level and multilevel threshold methods were developed to make good image recognition. It was defined in literature that multilevel threshold method is better than bi-level threshold method. Multilevel threshold can be made Otsu method, but detecting of optimum threshold levels is difficult with traditional Otsu method. Thus artificial intelligence methods have been used to detect optimum threshold levels in literature. One of these artificial intelligence methods is Particle Swarm Optimization (PSO). It was seen that when PSO-Otsu method was used, its algorithm speed is faster than traditional Otsu method [1]. Two-dimensional Otsu method can be used in segmentation of low-contrast iced conductor studies. Algorithm speed of two-dimensional Otsu method is low speed. This case is disadvantage for two-dimensional Otsu method [2]. Thus 2D Otsu was developed with genetic algorithm, and genetic algorithm was developed with simulated annealing. But in [2], threshold levels are low. Convergence of traditional PSO can be developed with developed PSO (DPSO). In image segmentation studies with multilevel threshold method, the good results were obtained with DPSO. [3]. But in [3], maximum threshold levels are 5. This threshold level may be not enough for some applications. Video processing can be used to monitor transmission line, but noises of image are important problem. When 2D Otsu method was used with PSO, noises which are on image were eliminated. [4]. But single level thresholding was made in [4]. When hybrid PSO-GA method was made with Otsu method, noises of image were eliminated [5]. But in [5], the best threshold levels are not indicated. Slope-line search algorithm is another method to determine iced conductor thickness. In this method, ice thickness which is on aerial line conductor can be determined by using slope-line search algorithm [6]. But in [6] study single level threshold was used with slope-line search algorithm. Image classification method can be used to determine ice thickness. In literature, determination of ice load was made using image classification methods. Support Vector Machine (SVM) and Artificial Neural Network (ANN) methods were used as classifier. It was seen that when the result of SVM was compared with the result of ANN, the result of SVM was better than the result of ANN [7]. But ice thickness were not indicated.

Determination of ice thickness is first step to prevent ice load effect on ETL. If ice thickness is determined properly, elimination of ice load will be easy. In this study, multilevel threshold method and Particle Swarm Optimization will be used to determine ice thickness. Otsu method will be used as multilevel threshold method, but determination of optimum threshold level with traditional Otsu method is difficult. Thus PSO-Otsu method will be used. PSO-Otsu method was used in literature but maximum threshold levels are 5 levels. It was seen in made studies that this levels are not enough to determine ice thickness. Ice detection which is closest to real image will be tried raising threshold levels. Thus maximum threshold levels have been selected as 8 levels.

2. Problem Formulation. Otsu indicated between-class variance method for image segmentation. In this method, variance of different classes is maximum value. When an image is divided as two classes, these classes can be defined as \( C_0 \) and \( C_1 \). If threshold levels of \( C_0 \) and \( C_1 \) are determined as \( t \), \( C_0 \) includes the gray levels from 0 to \( t-1 \), and \( C_1 \) includes the gray levels from \( t \) to \( L \). Gray levels probabilities are defined as \( w_0 \) and \( w_1 \), and distribution of gray level probability of classes as follows [8]:

\[
C_0 = \frac{p_0}{w_0}, \ldots, \frac{p_{t-1}}{w_{t-1}} \quad \text{and} \quad C_1 = \frac{p_t}{w_t}, \ldots, \frac{p_L}{w_L}
\]

\[
w_0 = \sum_{i=0}^{t-1} p_i \quad \text{and} \quad w_1 = \sum_{i=t}^{L} p_i
\]

The mean levels of classes are defined as \( \mu_i \), the mean levels of image are defined as \( \mu_T \).

\[
\mu_0 = \frac{\sum_{i=0}^{t-1} i P_i}{w_0} \quad \text{and} \quad \mu_1 = \frac{\sum_{i=t}^{L} i P_i}{w_1}
\]

\[
\mu_0 \cdot w_0 + \mu_1 \cdot w_1 = \mu_T \quad \text{and} \quad w_0 + w_1 = 1
\]

Otsu’s method which is based on between-class variance is defined as follows:

\[
f(t) = \sigma_0 + \sigma_1
\]
\[ \sigma_0 = w_0.(\mu_0 - \mu_T)^2 \quad \text{and} \quad \sigma_1 = w_1.(\mu_1 - \mu_T)^2 \]  

(6)

In bi-level threshold studies, optimal threshold level (t) is determined by Otsu method as follows;

\[ t = \arg \max \{ f(t) \} \]  

(7)

Multilevel thresholding of an image can be extended between-class variance function.

\[ f(t) = \sum_{i=0}^{m} \sigma_i \]  

(8)

The number of threshold is \( m \) (\( t_0, t_1, t_2, ..., t_m \)), and the number of classes in original image is \( m \) (\( C_0, C_1, C_2, ..., C_m \)).

Where \[ f(t) = \sigma_0 + \sigma_1 + \sigma_2 + ... + \sigma_m \]  

(9)

\[ \sigma_0 = w_0.(\mu_0 - \mu_T)^2 \] 
\[ \sigma_1 = w_1.(\mu_1 - \mu_T)^2 \] 
\[ \sigma_2 = w_2.(\mu_2 - \mu_T)^2 \] 
\[ \sigma_m = w_m.(\mu_m - \mu_T)^2 \]  

(10)

The optimum threshold levels (\( t_0, t_1, t_2, ..., t_m \)) are determined as follows [8];

\[ (t_0, t_1, t_2, ..., t_m) = \arg \max \{ f(t) \} \]  

(11)

3. Definition of The Proposed Method. In this study, iced conductor thickness which belongs to damaged ETL will be determined multilevel threshold method. Histogram of gray levels image must be obtained. So, some image process application must be applied to iced conductor image. Primarily image is converted to gray image, and then average filter is implemented to eliminate unnecessary objects on image. After these processes are implemented to image which is shown in Figure 1, gray levels histogram can be obtained. Optimal threshold points can be determined by using the obtained data from histogram.

**Figure 1. Iced Conductor**

Multilevel threshold will be made Otsu method. But detecting of optimum threshold values are difficult. Thus PSO will be used to detect optimum threshold values for image segmentation. PSO objective function is Equation (11). So \( t_0, t_1, t_2, ..., t_m \) values which are on gray value histogram can be determined easily by using PSO-Otsu Method. \( t_0, t_1, t_2, ..., t_m \) values are shown Figure 2.
After threshold level and threshold values are determined, edge detection can be made. There are many edge detection methods in literature. These methods can be defined as two topics. These topics are first-order and second-order edge detection operators. First-order edge detection operators are Roberts Cross, Smoothing, Prewitt, Sobel, and Canny. Second-order edge detection operators are Laplacian, Zero-crossing and Laplacian of Gaussian. Marr–Hildreth algorithm was used for edge detection. Marr–Hildreth algorithm is based on the zero-crossings of the Laplacian of the Gaussian operator [9].

4. Particle Swarm Optimization (PSO). PSO is algorithm based on swarm intelligence. Each individual in PSO is defined a particle. Each particle has a position and a velocity. There are not cloning, crossover and mutation operators in PSO. The swarm moves through search space according to position of particles to find optimum result. If swarm consists of i unit particle in D dimensional space, i-th particle position is $X_i = (x_{i1}, x_{i2}, x_{i3},..., x_{iD})$, velocity is $V_i = (v_{i1}, v_{i2}, v_{i3},..., v_{iD})$. Each particle has a memory. The best previous position of particle is saved in memory at the end of iteration. Memory is defined as $p_{best} = (p_{best1}, p_{best2}, p_{best3},..., p_{besti})$. The best position is selected through in the swarm at the end of iteration. This position is defined as $g_{best} = (g_{i1}, g_{i2}, g_{i3},..., g_{iD})$. The optimum result is searched according to $g_{best}$ and $p_{best}$. Velocity of each particle is updated with Equation (12), and also positions of each particle are updated with equation (13) as follows [10]:

$$v_{id}(t+1) = v_{id}(t) + c_1 r_1(p_{bestd} - x_{id}) + c_2 r_2(g_{bestd} - x_{id})$$  \hspace{1cm} (12)$$

$$x_{id}(t+1) = x_{id}(t) + v_{id}(t+1)$$  \hspace{1cm} (13)$$

where $r_1$ and $r_2$ are random numbers between 0 and 1, $c_1$ and $c_2$ are learning coefficient. Particles are directed with these coefficients towards $p_{best}$ and $g_{best}$. $c_1$ and $c_2$ usually are selected as $c_1 + c_2 = 4$.

In this study, algorithm works as following:

1. Position of particles is determined randomly. In first iteration, value of velocity is zero. Each particle occurs from real value codes of $t_0, t_1, t_2,.., t_m$.
2. The fitness value of position of particle is calculated with objective function. Since this problem is a maximization problem, the best position is determined according to particles which have high objective function value. The best position of particle is stored in $p_{best}$. In each iteration, current fitness value is compared with the best previous fitness value of particle in $p_{best}$. If current fitness value of particle is better than the best previous fitness value of particle, $p_{best}(i,d) = x(i,d)$. Otherwise $p_{best}(i,d)$ do not change. Also in 1-th iteration $p_{best}(i,1) = x(i,1)$.
3. The best particle in $p_{best}$ is called as $g_{best}$. $g_{best}$ is selected for all particles.
4. If optimum solution is found, program is stopped and $g_{best}$ is saved. Otherwise new position and new velocity is calculated for each particle according to $g_{best}$. Namely particles are updated according to $g_{best}$. And go to 2-nd step. This process continues until maximum iteration number or optimum value.
4. Experimental Results. PSO-Otsu method can be one of effective method to apply multilevel threshold method. Maximum threshold levels of made studies in literature are 5 levels, but it is seen that high levels thresholding are required to determine iced conductor thickness which is shown Figure 1. So, threshold levels were increased to detect ice thickness which is closest to the real image. Maximum threshold level were determined 8 levels, and minimum threshold levels were determined 3 levels. Iced conductor thickness was determined according to pixels number of image. The results of PSO-Otsu Method are shown in Figure 4 and Table 1. Figure 4 belongs to 7-level thresholding.

Table 1. The results of PSO-Otsu Method

<table>
<thead>
<tr>
<th>Threshold Levels</th>
<th>The Number of Pixels</th>
<th>Threshold Values</th>
<th>The Fitness Value of GA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>56</td>
<td>81 116 1174</td>
<td>1731</td>
</tr>
<tr>
<td>4</td>
<td>50</td>
<td>74 102 133 183</td>
<td>1784</td>
</tr>
<tr>
<td>5</td>
<td>47</td>
<td>70 96 115 148 188</td>
<td>1813</td>
</tr>
<tr>
<td>6</td>
<td>45</td>
<td>66 89 111 128 156 193</td>
<td>1832</td>
</tr>
<tr>
<td>7</td>
<td>40</td>
<td>62 80 101 123 142 164 202</td>
<td>1844</td>
</tr>
<tr>
<td>8</td>
<td>38</td>
<td>41 65 83 98 117 1139 170 207</td>
<td>1850</td>
</tr>
</tbody>
</table>

Figure 4. The Result of PSO-Otsu Method

4. Conclusion. Ice load causes to long-term power outages. A lot methods were developed to eliminate ice load, but primarily ice thickness of ice load must be determined. In this study, PSO-Otsu method was used to detect iced conductor thickness. In literature PSO-Otsu method was used for different applications, and maximum threshold levels were suggested as 5 levels. But it is seen at the end of this study that 5 levels threshold are not enough to detect ice thickness. The result of 7 levels thresholding are closest to the real image size. It was shown in Figure 4. This result is enough to determine ice load on conductor. 7 levels threshold PSO-Otsu method can be used to detect ice thickness.
REFERENCES


PERCEPTIONS OF STUDENTS AND TEACHERS REGARDING SEMESTER SYSTEM OF EXAMINATION IN HIGHER EDUCATION IN PAKISTAN

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ABSTRACT: The purpose of this study was to analyze perceptions of students and teachers regarding Semester System of Examination at Higher Education Level in Pakistan. A sample of 300 students and 50 teachers of 10 different departments of Abdul Wali Khan University Mardan, Pakistan were selected from seven campuses through convenient sampling techniques. Self-administered questionnaires were used as a tool for data collection. Data were analyzed by using SPSS software applying mean score. Results of the research study confirmed that semester system is effective method of effectual learning. However, some of the students disagreed due to excessive drawbacks. Majority in the faculty were in favour of semester system in higher education due to its multi-dimensional perspectives.

Key words: Conventional system, Semester system, Higher education, Perception

1. Introduction: Subcontinent witnessed and launched the native system of examination with the establishment of mother universities at Calcutta, Bombay and Madras in 1857. The induction of this system of examination opened an unending chain of criticism. During the period from 1857 to 1990, untiring effects were made to streamline and reform the examination system but all went futile. Numerous commissions and committees under the supervision of prominent educationist joined heads to locate and repair the weak areas and to in rich the acceptability of the examination. The quality of examination is still defective and vulnerable (Aggarwal, 2003).

According to Merriam Webster Dictionary of English examination means to test by questioning. This questioning may be verbal or non-verbal but its sole purpose is to test and judge the ability of students’ abilities and capabilities for their future academic endeavours i.e. admission in higher classes and also for jobs. Generally, the examination simply means to judge the academic achievement of the students. It is normally based on laid down course for a specific time period. (Collins and O’ Brien, 2011). Hill (1982) stated that examination is normally a research based activity and research is a systematic process for finding solution to a problem. It is an important and significant aspect of the teaching and learning activity and the students’ whole life depends upon it. This is normally conducted and administered by educational institutes as summative evaluation, which includes not only students’ performance but also teachers’ performance and the curriculum etc as a whole.

Examination is an instrument which normally judges students’ overall academic performance including their expertise, mastery, learning and abilities they have achieved during a specified and allocated time. It is like a goal, inducement, cause and catalyst. It guides both the teachers and students towards achievement of common goal. An excellent testing means the fixation and measurement of both teaching and learning (Duncen, 2012, Gay, 1985). Thomas and Page (1978) stated that examination and testing are the instruments to measure students’ mental capacity and excellence. Examination, in this sense, is a comprehensive term. It is also a decisive factor for both the
teachers and learners. Examination, not only measures the performance and excellence of the students, but it also determines the reputation and quality of the institutes (Government of the Punjab, 1992).

Pakistan has evolved the colonial education system, which was initiated by the British. It was founded on accumulative and mechanical learning annually. The decision parameters were established on the summative examination conducted at the end of academic year. Annual examination furnishes the students with ample time of one year to absorb and understand the taught ideas. It is focused on objective and subjective portions but is mainly bending towards subjective assessment. The British have partly abandoned it 50 years ago. Annual examination system has a bulk of loopholes. It develops boredom and laziness in students. It gives birth to indiscipline in students and degrades the value of teachers. Annual exam stops behavioural grooming of students. It encourages malpractices that disfigure this system.

Annual system of examination is based on evaluation at the end of each academic year. It assesses factual and not conceptual and creative capacities of the students. It is teacher oriented instead of students oriented. It is entirely based on rote and mechanical learning and provides unbelievable marks/grades to students. It lacks accuracy and testability of examination papers, which do not prove the validity and reliability of curriculum and methodologies. It lacks skilled paper setters and papers markers which makes it dubious (Mirza, 1999).

Oxford Concise Dictionary defines semester system as “a half-year term in a University”. It has a logical and systematic division of syllabi extended to six months. The process of examination system to semester system was adopted on test based policy in 1968 by the University of Agriculture, Faisalabad. Slowly and gradually it filtered into all the well-known universities in the era of 1971 – 1976 with superb feedback and results. Semester system has strong putting because it focuses on multilateral development i.e. teachers, students and curriculum. It checks and develops academic and non-academic faculties of student. Semester system works on the Holy Trika i.e. faculty → syllabi → students. It has graphical and formative process of evaluation that ensures genuine scanning of students, teachers and their process of sharing and re-sharing of thoughts, concepts and ideas. Keeping in view all the demerits of annual system, it was replaced by semester system keeping the productivity and value of semester system (Patil, 1984).

Semester system is the latest and futuristic system, which is based on the division of curriculum on equal importance in each semester. It is based on semester which is usually timed from 16 to 18 weeks. It omits the annual studied course. It distributes one and two years courses into two and four semester (Ballantyne, 2003).

Objectives of the Study: The following were the two major objectives of the study:
1. To find out the conceptions of teachers and students regarding the effectiveness of the Semester System of Examination.
2. To make useful suggestions for the improvement of Semester System at University level.

Methodology: The population of the study included 7000 students and 300 teachers of Abdul Wali Khan University Mardan. The sample of 300 students and 50 teachers was taken conveniently from 10 different departments i.e. Botany, Chemistry, Computer Science, Management Sciences, English, Islamic Studies, Mathematics, Physics, Education and Zoology. 30 students each were taken from each department, similarly 05 teachers were taken from each department as the convenient sample of the study.

Data Collection and Analysis:

After going through the related literature regarding the study two questionnaires on a five point likert scale were designed to get data to evaluate the students’ and teachers’ understanding and insight about the semester system of evaluation (examination) in higher education at University level. The questionnaires had 10, 10 items respectively. The questionnaires were the data collecting tools for the study and they were administered personally to the target sample. The return of the questionnaires was 100%. The students’ and teachers’ responses were carefully analyzed, calculated and tabulated in the light of the stated objectives of the study. The statistical tool SPSS 18 version was used in the analysis. The responses were obtained on two and out Likert’s scale: 1. Strongly agree, 2. Agree, 3. Undecided, 4. Disagree, 5. Strongly disagree. The results were tabulated in two different tables: Table – 1 and Table – 2 (Appendixes I and II).
Discussion: Each response was separately analyzed and the findings were presented in Table – 1 and Table – 2 (Appendixes I and II).

Table 1. Analysis of Students’ Responses

<table>
<thead>
<tr>
<th>S No</th>
<th>Items</th>
<th>Total. Res.</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SD</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Semester System provides thorough understanding of concepts.</td>
<td>300</td>
<td>106</td>
<td>92</td>
<td>15</td>
<td>81</td>
<td>6</td>
<td>3.70</td>
</tr>
<tr>
<td>2</td>
<td>In Semester System Students are tested through different evaluating techniques.</td>
<td>300</td>
<td>108</td>
<td>90</td>
<td>15</td>
<td>75</td>
<td>12</td>
<td>3.69</td>
</tr>
<tr>
<td>3</td>
<td>Semester System develops better presentation skills.</td>
<td>300</td>
<td>100</td>
<td>98</td>
<td>6</td>
<td>70</td>
<td>26</td>
<td>3.58</td>
</tr>
<tr>
<td>4</td>
<td>Semester System is more conducive for learning.</td>
<td>300</td>
<td>170</td>
<td>68</td>
<td>2</td>
<td>60</td>
<td>26</td>
<td>4.24</td>
</tr>
<tr>
<td>5</td>
<td>Semester System is more costly as compared to annual system.</td>
<td>300</td>
<td>153</td>
<td>69</td>
<td>12</td>
<td>21</td>
<td>41</td>
<td>3.86</td>
</tr>
<tr>
<td>6</td>
<td>Semester System keeps students over burden.</td>
<td>300</td>
<td>98</td>
<td>92</td>
<td>21</td>
<td>33</td>
<td>46</td>
<td>3.44</td>
</tr>
<tr>
<td>7</td>
<td>Semester System provides better learning &amp; evaluation.</td>
<td>300</td>
<td>111</td>
<td>91</td>
<td>9</td>
<td>36</td>
<td>53</td>
<td>3.57</td>
</tr>
<tr>
<td>8</td>
<td>In Semester System faculty resort to favoritism and biased.</td>
<td>300</td>
<td>130</td>
<td>93</td>
<td>1</td>
<td>54</td>
<td>22</td>
<td>3.85</td>
</tr>
<tr>
<td>9</td>
<td>Students obtain comparatively higher grades in Semester System than Annual System.</td>
<td>300</td>
<td>111</td>
<td>109</td>
<td>6</td>
<td>7</td>
<td>67</td>
<td>3.63</td>
</tr>
<tr>
<td>10</td>
<td>Students cannot find enough time for co-curricular activities in Semester System.</td>
<td>300</td>
<td>119</td>
<td>101</td>
<td>16</td>
<td>12</td>
<td>52</td>
<td>3.74</td>
</tr>
</tbody>
</table>

A. Table No. 1 shows that
1. According to the vast majority of the respondents that semester system provides thorough understanding of concepts. It means that semester system is much more knowledge-oriented than that of annual system. Mean score is 3.70.
2. Most of the respondents i.e. 66% were of the view that semester system different techniques are used for testing and judging the students’ performance. It means that semester system is proficient i.e. covering all the aspects of students performance.
3. Approximately 66% of respondents agreed that semester system does enhance presentation skills in students. It means that semester system is entirely based upon research based presentation therefore students are motivated for presentation.
4. Nearly 69% of the respondents were in favour conducive environment for learning in the semester system. It means that the commuting and discussion between the teachers and students are at a high level. That’s why the helpful environment for learning is found in semester system.
5. The majority of students (74%) strongly agreed that semester system is much expensive than annual system.
6. According to 63% respondents semester system increase the workload / burden for students. It means that semester system has variety of activities that’s why it is burdensome.
7. A majority of (67%) students was of the view that semester system provides better learning and evaluation. It means that teachers are fully prepared during their teaching. That’s why they also go for exact evaluation of students’ academic achievement.
8. More than two third (76%) of the respondents strongly agreed that faculty members are involved in favoritism, nepotism and biased attitude. It means that the teachers don’t have lofty character.
9. Majority of the students (63%) do support the statement that students obtained comparatively higher grades in semester system than annual system. It means that the contents are selected from equally distributed syllabuses.
10. Overwhelming majority of the respondents are (73%) supported the statement that semester system cannot provide enough time for co-curricular activities. It means that the tight schedules of semester system should be relaxed up to some extent.
### Table 2. Analysis of Faculty Members’ Responses

<table>
<thead>
<tr>
<th>S No</th>
<th>Items</th>
<th>Total Res.</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SD</th>
<th>Mean Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Semester System provides thorough understanding of concepts.</td>
<td>50</td>
<td>20</td>
<td>11</td>
<td>9</td>
<td>6</td>
<td>4</td>
<td>3.74</td>
</tr>
<tr>
<td>2</td>
<td>In Semester System Students are tested through different techniques.</td>
<td>50</td>
<td>17</td>
<td>14</td>
<td>5</td>
<td>4</td>
<td>10</td>
<td>3.48</td>
</tr>
<tr>
<td>3</td>
<td>Semester System provides better presentation skills.</td>
<td>50</td>
<td>30</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>4.00</td>
</tr>
<tr>
<td>4</td>
<td>Semester System is more conducive for learning.</td>
<td>50</td>
<td>25</td>
<td>7</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>3.74</td>
</tr>
<tr>
<td>5</td>
<td>Semester System is more costly as compared to annual system.</td>
<td>50</td>
<td>35</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>3</td>
<td>4.24</td>
</tr>
<tr>
<td>6</td>
<td>Semester System keeps students over burden.</td>
<td>50</td>
<td>32</td>
<td>5</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>4.1</td>
</tr>
<tr>
<td>7</td>
<td>Semester System provides better learning &amp; evaluation.</td>
<td>50</td>
<td>30</td>
<td>6</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>4.00</td>
</tr>
<tr>
<td>8</td>
<td>In Semester System faculty resort to favoritism and biased.</td>
<td>50</td>
<td>16</td>
<td>12</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>3.52</td>
</tr>
<tr>
<td>9</td>
<td>Students obtain comparatively higher grades in Semester System than Annual System.</td>
<td>50</td>
<td>34</td>
<td>3</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>4.16</td>
</tr>
<tr>
<td>10</td>
<td>Students cannot find enough time for co-curricular activities in Semester System.</td>
<td>50</td>
<td>36</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4.28</td>
</tr>
</tbody>
</table>

Results given in Table – 2

1. Majority of the teachers (62%) are on the view that semester system provides thorough understanding of concepts. It means that semester system is totally research and activity based, that’s why students get thorough understanding and in-depth knowledge of concepts.

2. According to the majority of the teachers (62%) it is true that in semester system students are tested / evaluated through different evaluating techniques, that is, quizzes, seminars and presentations are also considered the part of evaluation.

3. More than two – third faculty members (70%) consider that semester system develops better presentation skills in the students. It means that semester system is thoroughly based upon the presentations on the part of the students.

4. 64% faculty members have agreed that semester system is more conducive and congenial for learning. It means that the teacher and evaluator are the same, therefore, the learning atmosphere is maintained by both i.e. teachers and students.

5. According to the views of 76% faculty members, semester system is more costly as compared to annual system. It means that students have to pay for different activities inside the class and for other related activities. Furthermore, the fee per semester is also very high and out of the reach of a common student.

6. Majority of the teachers (74%) state that semester system keeps students over burden and overwork. It means that students remain busy in their studies throughout the semester and this is the actual essence of semester system.

7. More than two – third of the faculty members (72%) respond that semester system provides better learning and evaluation because the students are under the strict eyes of the teachers and due to sessional marks the students remain disciplined and study oriented and that is the reason that semester system provides better learning and evaluation of the students.

8. According to 56% teachers it is true that semester system breeds favoritism and biased attitude in the teachers.

9. Students obtain comparatively higher grades in semester system than annual system because the semester system is totally study oriented and that is the reason that 74% teachers say ‘yes’ to this item. It means that teachers are also satisfied with the semester system and regarding students’ performance.
10. Semester system does not accommodate time consuming co-curricular activities and that is the perception of 80% teachers also. It means that for co-curricular activities the students will have to think keeping in mind the tight schedule of semester.

Discussion and Conclusion:
In the Universities of Pakistan both the systems of evaluation are in vogue i.e. semester system as well as annual system. The annual system of examination (evaluation) is gradually being replaced by semester system due to the demerits and weaknesses of the annual system of examination. Semester system is considered better evaluation system than the annual evaluation system but semester system is also not free from demerits and flaws.

In the light of the present study, the responses of teachers and students are analyzed carefully. In the light of the findings of this research study, the students state that semester system breeds and promotes subjectivity in the teachers rather than objectivity. It means that teachers fall prey to personal likeness and dis-likeiness. According to students, the teachers award internal (sessional) marks without proper and thorough justification. Both the teachers and students are on the view that semester system is expensive and costly as compared to annual system. Both the faculty members and students have agreed that semester system keeps the students overburden and overwork. Furthermore, the evaluation of students in semester system remains continue throughout the semester. The learning environment in semester system is very conducive and disciplined.

**Recommendations:** The following recommendations have been made under the light of the results, findings and conclusion of this study for the high-ups of universities in Pakistan.

The level of teachers’ competency should be enhanced through different workshops for the more better provision of conceptual as well as factual knowledge.

The evaluating techniques should be made more reliable and valid for the better measurement of students’ performance.

The tools and aids for quality presentation should be provided.

In the conducive learning environment of the semester system, the quarries of the students may be eliminated.

The universities should adopt innovative techniques to increase their revenue rather than relying upon only the fees of the students so that the cost of semester may be decreased and brought in the reach of the common people.

The Relative Grading Methods must be introduced in the semester system so that the biased attitude and favoritism may be curbed.

**REFERENCES:**

MOBILE MARKETING: ACCEPTANCE OF THE SMS ADS IN PAKISTAN

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ABSTRACT. This paper examines the acceptance of SMS marketing on the basis of the role of users’ consent which plays a vital role in its success. This study is of qualitative nature, and is conducted in the context of Pakistan. Data for the study was gathered using twenty semi-structured interviews from two groups each of ten members. The first group (G1) comprised of University level students, while the other group comprised of members from general public. Convenient sampling as a non-probability sampling was used. This study is cross-sectional because the interviews were conducted at one point of time. For analysis purpose, NVivo 10 was used with the help of which the transcribed interviews were assessed. The results of the study show that the marketers should not bombard the subscribers with SMS ads without their consent and permission. Other than consent, the frequency and the timing at which these advertising messages are sent to the users should not be random, and be controlled. The content which is sent by the Mobile Network Operator (MNO) should also be evaluated and controlled, and the SMS advertisements should be checked for the spam.

Keywords: Mobile Advertising, Mobile Marketing, SMS Marketing, SMS Ads, Consumer Behavior, Pakistan

1. Introduction. As the world has become a global village with products and services being available across the globe, the competition among the businesses had increased tremendously. In order to compete both locally and internationally, it is important for any business to give extra attention to the innovative, unique and eye-catching marketing tools. The main purpose of marketing is to grasp the maximum attention on the ads. For this purpose the marketers use new and innovative ways of advertisements to promote the products and services. Televisions, radios, magazines, billboards, pamphlets, internet, e-mails, social networking and many others mediums have been used by the marketers to communicate information about the products and services. Over the decade marketing via the mobile phones especially via the short messaging service (SMS) has been adopted as the latest medium of communication.

It has been due to ease and reach of the SMS that has made it so popular around the world amongst all the mobile
users especially the younger generation, who prefer SMS over the voice calls in order to stay in touch with their social contacts (Rheingold, 2003). Alphanumeric text messages can be transmitted via SMS with a maximum of 160 characters per SMS, with time depending upon the ease or complexity of the keypad or touch layout (Kim, Park & Oh, 2008). It has been the richness of content in SMS, the cost of SMS, the quickness of its delivery and the masses it can reach that has promoted the use of SMS marketing over the other mediums of communication. The good thing about SMS marketing is that the marketers can get directly in touch with the target market customers and have their attention. The other good thing about SMS marketing is that any mobile-service subscriber can send and receive the text messages in real-time, and one does not have to connect to the internet as in case of e-mails.

The widespread of mobile technologies and the advancements in it in terms of 3G and 4G networks around the world has enhanced the role of mobile marketing even more (Rohm et al., 2012). Untethered mobile marketing has been adopted as a platform by many multinational and branded companies in the different parts of the world. Apart from SMS service, the other major usage of the mobiles that is more popular in the developed countries is the access to internet on their handsets. It has been predicted by the experts that by 2015, 90% of the world would be connected via some kind of mobile handset.

According to Dickson (2012), 5.9 trillion messages were sent in the year 2011, and by the year 2016 the number of sent messages is expected to increase to 9.4 trillion messages. According to another press release by Interactive Advertising Bureau (IAB, 2012), $5.3 billion were spent on mobile advertising in 2011 out of which $536 million were spent on advertising through messages across the globe. Although, the developing countries are in the race to adopt such technologies they still lag in providing these services at the earliest. Thus, in the context of Pakistan which is an Asian developing country, we would emphasize on SMS service only. According to the latest report of Dawn News (2012) there are over 119 million mobile phone subscribers in Pakistan.

In the last few years the SMS advertisements are used as a famous mean of marketing. This study would be based on the question that whether this method of marketing is really effective for the business, and does the consent of users have any impact on the acceptance of the SMS ads? The study would try to find out the effectiveness of SMS marketing, its impact on the sales of the company, the customers view point about the SMS marketing, and the potential of SMS to be used as marketing tool in future.

The Section 1 of this paper provides the background of the SMS technology and SMS marketing. It is followed by the literature review in Section 2, and methodology in Section 3. Results from the empirical findings are provided in Section 5. The 6th Section is about the discussion, and the last section, Section 7 concludes the study under the heading Conclusion.

2. **Literature Review.** The technology involved in SMS allows the marketers to send ads in a single message to a number of people who can review it, store it and even forward it to others (Wei et al., 2010). All the communication technologies like radio, television and the internet evolved after going through a commercialization process via which the financial support by the third-party advertisers was provided to these media platforms. Technologically, SMS advertising uses the concept of one-to-many level communication, with the same ad message broadcasted to many users, and also point-to-point interactive communication involving the transmission of message between two users. This has resulted in the convergence of SMS technology with the other mediums such as e-mail and instant messaging (Wei et al., 2010).

Mobile interaction has given the Asian community a voice which was difficult to hear before its advent (Handley, 2006). The adoption of mobile technology in Asia is classified to be the successor of internet, in a way the internet revolutionized the Asian market prior to the widespread use of mobile. It was a precipitated shift in the Asian society coupled with power it has given to the people by allowing them to express themselves by taking the challenge against the customs of the society. Thus, just like the internet, the acceptability of the mobile technology in the Asian countries has given it an access to communicate with the rest of the world. The important thing being discussed by Handley (2006) in his study is the understanding of the target audience for marketing a brand, product or service to them, rather than emphasizing on the medium, the product or the locality used for transmitting the marketing message.

Mobile phone technology is a more private medium of communication and interaction as opposed to the radio, television and internet which are meant for the mass communication. Mobile users and subscribers have strong sense
of ownership as per the usage cost they bear for utilizing the services of it. According to Wei et al. (2010) the critical aspects which should be considered in terms of assessing the attitudes and response of the mobile phone users towards SMS marketing are: prior consent, privacy and tangible benefits. In the aforementioned criticalities, the tangible benefits from the advertiser and marketers should outweigh the other two aspects of prior consent and privacy, and then only the users are likely to accept the SMS ads. These SMS ads are forwarded by the mobile users to their family and friends if they are contented with the matters of consent and privacy.

In their study, Wei et al. (2010) has concluded that mobile users embrace locations based SMS ads with discounts or coupons more happily than the routine SMS ads. Thus the success of marketers is held in finding the right target market for the right product or service at the right time and place, which could be achieved by the advertisers by generating the users’ data from the mobile service providers. The success of SMS advertising has been focused on the implications such as: integration of mobile medium into the marketing mix, avoiding spam messages, and planning one-on-one marketing campaigns which could provide the mobile users with consent-based and benefits-filled interaction, information, and entertainment.

From the perspective of marketing, the advancements in mobile technologies are considered to be the rapidly growing platform of communication for marketers. The reason behind this is the widespread use of a variety of mobile handsets around the world. In their study, Rohm et al. (2012) have found that an individuals’ attitude towards mobile marketing in three large regions of US, China and Western Europe, is directly affected by the “perceived usefulness, consumer innovativeness, and personal attachment” and is negatively affected by “risk avoidance”. SMS is one of the platforms within the mobile marketing, which is defined as the delivering of personalized information to the stakeholders concerning the products and services, in order to generate value for both the organization and the customer (Dickinger et al, 2004).

SMS has gained the popularity amongst all the age groups due to the ease of its usage for interpersonal contact (Dickinger et al, 2004). The elements of success for SMS that are identified by Xu et al. (2003) are: the effectiveness in terms of the cost and the interoperatability of the networks, excessive adoption of the mobile phones, and the competitively low prices for the messaging services. Caroll et al. (2007) in their study have highlighted the concerns of the consumers in terms of their perception of the mobile advertisements and their acceptability. This is because no organization would want to lose their current or potential customers due to unsolicited messages, as the customers are prudent about their rights to the privacy. They have suggested that mobile advertising should be deployed in a cautious manner keeping in view the consumers perception and acceptance. This trust and permission from the consumers’ side is considered to be the biggest challenge for the marketers.

Content relevance, timeliness and the frequency with which the advertising messages are delivered to the consumers, needs to be given focused attention (Carroll et al., 2007). The phenomena of “viral marketing”, which is also referred to as “buzz”, has gained popularity with the increasing use of SMS as it can spread the good or bad image or news about any product or service (Dobele et al., 2005). Viral marketing is the dissemination of information or the spread via the word-of-mouth from one consumer to another prospective consumer. In the case of SMS marketing, viral marketing refers to the forwarding of messages to other people within the social circle by promoting the information about any brand, product or service. The advantages of viral marketing as identified in the study of Dobele et al. (2005) are that the forwarded messages are less expensive, forwarded voluntarily by the end-user, and lastly the person forwarding the message knows the interests of his/her social circle.

Keropyan and Gil-Lafuente (2012) in their paper has talked about how companies use mobile technology for their customer relationship management (CRM) in order to deliver the right marketing message to the right person as per their values through managed marketing strategies. The conclusions they have derived from their study are that for ensuring the CRM, different organizations have adopted different kinds of loyalty programs, mobile (m-) coupons redemption, and brand awareness via mobile platform according to the particular age groups targeted. Studies have been conducted on the perception and acceptance of the mobile (m-) advertisements by the consumers on the basis of cultural differences that prevail across the borders (Liu et al., 2012; Muk, 2007). Muk (2007) did a study on the adoption of SMS advertising on the basis of cultural influences that hold in the context of American and Taiwanese society.

In extension, Liu et al. (2012), in their study have worked on the determinants of perceptions held by consumers in Japan and Austria towards the mobile advertising, and have found that Japanese consumers are not much inclined
towards mobile advertising as does the Austrian consumers. Three antecedents of perceived value of mobile advertising identified by Liu et al. (2012) are: infotainment, irritation and credibility. The perceived value of advertising was identified by them to be most dominating factor of consumers’ attitude towards advertising that are being affect by the prevailing cross-cultural differences.

Kaplan (2012) has proposed the concept of “Four I’s see more than two”, in which four aspects of reaching the mobile phones users through social media has been constructed. These ‘Four I’s’ are: integration, individualization, involvement and initiation. Integration is that companies should integrate their social activities into the life of a user in such a way that they don’t feel nuisance about the firm. Individualization focuses on providing the opportunities to cater the specific preferential needs and interests of the users. Involvement refers to indulging the user in a conversational style whereas initiation emphasizes on triggering the user generated content and word of mouth that ultimately leads to the integration of tasks.

Shankar and Balasubramanian (2009) have proposed that the companies should rethink about their marketing strategies for mobile advertisements. Companies push themselves into the whirls of failure by simply adopting the same marketing strategy for mobile phones which they have used for internet marketing. The target audience should be provided with an opt-in function where they could register for the SMS ads as per their consent, rather than pushing the content on to their mobile screens. Emphasis should be placed on the assessment of the behavior prevailing in the target market regarding the SMS ads medium, in order to better equip themselves regarding what would work and what not. Considerations should also be placed on the elements such as the social networking, location-based ads, and controlling the frequency with which the audience is bombarded with SMS marketing (Okazaki and Taylor, 2008; Kim et al., 2008).

As far as telecom industry in Pakistan is concerned, it is a well flourished industry, which had shown a remarkable progress in last few years. This is because of a strong competition between different telecommunication service offering firms, this strong competition compel them to offer cheaper rates, which made it affordable to almost every social class in Pakistan. This increase in the customer base brings higher returns and positive changes for the company. The number of subscribers increased from 68000 to 95000000, from the year 1996 to 2009 (PTA). The five year cellular growth time in Pakistan, from 2003 to 2008, broke all the world records. The cellular companies in Pakistan showed 100% growth rate for many years (PTA, 2011).

3. Methodology. In order to examine the adoptability of SMS advertising amongst the mobile users in Pakistan and whether the pre-sought permission from the users can drive the acceptance of SMS ads, this study has incorporated qualitative approach. A semi-structured interview method was employed to collect the empirical data from the respondents for which an interview guide was developed on the basis of the findings, theories and models identified in the literature review.

For the purpose of sampling, convenient sampling method was employed which is a non-probability sampling method. Convenient sampling was used due to the limitations of time and the quick availability of the sample. A total of 20 respondents were selected from Attock city in Pakistan. These 20 respondents were from two different groups out of which the first group (G1) consisting of 10 respondents represented the students from a university. These students were either studying at the undergraduate level or at the graduate level. Their age group varied from 18 to 26 years. The other group (G2) also consisting of 10 respondents was the group of normal mobile users/subscribers (businessmen, academicians, managers, and sales personnel). Face to face interviews were conducted with these respondents. Each interview was of 18-20 minutes. In this study, the emphasis has been placed only on the SMS ads sent by MNO firms because so far in Pakistan it is mostly the network service providers who send SMS ads to their subscribers.

Prior to the interviews, the consent of the respondents was sought by sending them a formal letter describing the nature of the research, and then as per their willingness the date and time was decided. On their consent they were provided the interview guide beforehand so that they can prepare for the interview. In accordance with the ethics of the research, the identity of the respondents would not be disclosed and would be kept anonymous. Field notes were taken during the interview, which were later transcribed and then analyzed according to the developed literature review. For the purpose of analysis of the data, the transcribed interviews were fed into the NVivo 10 software to provide the model for the study, text search query, word frequency query, and other assessments.
Among the 20 respondents, 60% (n=12) of the respondents were male, while the other half, 40% (n=8) were females. As there are 5 MNO organizations operating in Pakistan, the sample selection was done in such a way that in each group there is equal representation of each MNO. For this reason 2 respondents of each MNO firm in each group were selected for the interviews. This was done in order to eliminate the biasness and assign equal weight-age to each MNO firm. The age group of the G1 respondents ranged from 18 – 26, with the majority of the respondents in the age between 22 and 23, 60% (n=6). The age group of G2 members varied from 20 – 45 years. 90% of the participants have been using mobile phone from last 2 years.

4. Empirical Results

4.1. Results of group G1 Interviews. The transcribed interviews from group G1 members, who were students of a university, portrayed that all of the subscribers irrespective of the MNO they were registered to, received SMS ads. The subscribers of Mobilink receive the highest number of SMS ads on average (25 SMS/week), followed by Warid subscribers who receive 22 SMS/week on average. Ufone subscribers on the average received 20 SMS/week; Telenor and Zong subscribers received less than 15 SMS/week on average. Table 1 and Figure 1 in the end of the study provide this comparison.

None of the subscribers interviewed were asked for their consent or permission by the MNO prior to sending them SMS ads. It has been identified over and over in the literature review by various researchers that seeking the mobile users’ consent prior to bombarding them with SMS ads plays a very vital role. It is this consent which determines their attitude and reflection towards the product or service, and it might lead to failure and reverse reaction. Some of the respondents said that they did call the help-line or have visited the MNO service/center or franchise in order to block the excessive transmission of SMS ads to their mobile phones.

The reply to SMS ads from the student subscribers was very low. Only three of the respondents had replied to an SMS ad, while the other seven had never replied to an SMS ad. On concern it was identified that these SMS ads were mostly not of interest to them. Sometimes, the subscribers would get the same SMS ad over and over again for days and weeks which make them irritated. Even though when the subscribers tried to opt out of these SMS ads, they still received these SMS ads.

Most of the subscribers added that they mostly delete such SMS ads even without opening it and looking into it that what has been sent to them. When probed the reason for this was the frequency and the timing with which these subscribers were sent these messages by the MNO. None of these subscribers have ever forwarded these SMS ads to their friends and family. The reason provided for this was that they have hardly ever got an attractive offer in these ads which could be either utilized by one or forwarded to others. Apart from this as these SMS ads are from a particular MNO, one does not can take a burden to identify that which of their friends and family uses the same MNO.

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<thead>
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<th>MNO</th>
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<td>Mobilink</td>
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<td>Warid</td>
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<td>Ufone</td>
<td>20</td>
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<td>Telenor</td>
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<td>Zong</td>
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Table 1 & Figure 1: SMS/week sent by different MNOs
The satisfaction of the subscribers from their MNOs’ presented different results for each MNO. The highest level of satisfaction from the services was reported by the subscribers of Telenor and Warid, and were not willing to switch to another MNO. The subscribers of Mobilink and Zong were not extremely satisfied from the services provided by their MNO but they were not willing to switch to another MNO as well. The satisfaction level amongst the Ufone subscribers’ was low and they were prone to switch the MNO if the issues persisted.

Mix opinions were gathered when inquired about the brand awareness created by these SMS ads in terms of informing their subscribers about the new packages and discounts offered by the MNO. 60% (n=6) of the respondents said that these SMS ads did bring into their knowledge the launch of new services, offers, packages (voice calls, SMS, internet), events and discounts. While the other 40% negated it by saying that it is mostly the known information which is being sent to them, or the SMS ads are about the offers or packages they are already using. Around 40% (n=4) respondents have used the information in the SMS ads and have availed the opportunity in terms of either opting for that package or discount. Rest of the 60% (n=6) have never used any of the offers made to them or services promoted to them in the form of SMS ad. For the 20% who availed the SMS ads, have used the information in SMS ads either to buy SMS packages, voice minutes packages or internet bundles.

Except for two respondents, the rest of the all respondents wanted to receive SMS ads in the future but under certain conditions. These conditions were that the subscribers permission at first place should be obtained and the content sent to them in SMS ads should be related the services offered by MNO. The interesting element discussed by one of the respondents was that futuristic SMS ads would be accepted only if they are customized as per the needs of the subscriber. The inquiry regarding the suggestion of the particular MNO subscribers by the mobile user to their friends and family, 90% (n=9) of the respondents said they would except for one respondent.

4.2. Results of group G2 interviews. The transcribed interviews from group G2 member revealed that just like the G1 members, all of the subscribers in G2 also received SMS ads from their subscribed MNOs’. In G2, the subscribers of Ufone received the highest number of SMS ads on average (24 SMS/week), followed by Warid subscribers who receive 20 SMS/week on average. Telenor subscribers on the average received 17 SMS/week; Mobilink subscribers received 15 SMS/week and Zong subscribers received 11 SMS/week on average. In the end of the study, Table 2 and Figure 2 provide this comparison.

Similar to the results from G1 members, none of the subscribers interviewed in group G2 were asked for their consent by the MNO before sending them SMS ads. The concern over consent and seeking the permission of subscribers did make a difference for the whole group especially the academicians and the managers. The argument presented by them was that there is no time or frequency fixed for these SMS ads, and often you get to receive them at unwanted time and place, which irritates the subscriber and makes him lose the attention.

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<th>MNO</th>
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<td>Ufone</td>
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<td>Warid</td>
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<td>Telenor</td>
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<td>Mobilink</td>
<td>15</td>
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<tr>
<td>Zong</td>
<td>11</td>
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Table 2 & Figure 2: SMS/week sent by different MNOs

None of the group G2 members ever replied to SMS ads. This trend is also similar to that prevails amongst the student subscribers. As these ads were not sought by the subscribers, thus they did not ignite any interest in them to
either review it or utilize the information in it. The irritating element identified by the G2 group similar to the G1 group was the bombardment of the same SMS ad over and over again. In reference to this, the other point highlighted by G2 members was that they were not provided with any option with which they can unsubscribe themselves from the SMS ads list.

Of the interest was a point made by one of the respondent by mentioning that the numbers from which SMS ads are received have become so known that any message with that specific number is directly deleted without opening them. Again the reason for this was the impermissible SMS ads sent to them. When inquired about the forwarding of such messages to their friends and family, none of them had ever done so. It was due to unattractiveness of these messages which did not develop the interest in the subscriber at first place, so how come it could be forwarded to others.

The satisfaction of different MNO subscribers showed different results for each MNO. The highest levels of satisfaction in group G2 prevailed for the subscribers of Mobilink, and were not willing to switch. The subscribers of Telenor, Warid and Ufone were satisfied to some extent from their MNO but they were not willing to switch to another MNO as well. The low satisfaction level prevailed for Zong subscribers’ which made them eager to switch to another MNO.

In case of G2 respondents, the SMS ads did not create much of the brand awareness because such ads were not expected by them at first place. Even if these SMS ads were about the MNO firm, still they did not create much eagerness in the subscribers to review them. Majority of the respondents were of the opinion that the new offers and packages are not of their interest because they are mostly for the young generation with cheap SMS packages and internet offers. Their business needs are not targeted in these ads, and thus they are of little importance to them. Only 20% (n=2) respondents have used the information in the SMS ads and have availed the opportunity in terms of either opting for that package or discount. The remaining 80% (n=8) have never used any of the promotional services in SMS ads.

The group G2 respondents were not interested in receiving any kind of SMS ads in future. Of least if they had to receive SMS ads then it should be with a controlled frequency and time-frame, and as per the permission of the subscriber and tailored according to their preferences. Irrespective of the SMS ads, all the respondents of group G2 were willing to suggest their MNO to the members of their social circle.

5. Discussion. The study shows that all the interviewed mobile subscribers received SMS ads irrespective of the MNO they were registered to, and this shows that MNOs’ do bombard their subscribers with SMS ads. The MNO firms do not seek any consent from their subscribers before sending them these SMS ads. The results of the study concerning the importance of the subscribers’ consent validates the conjecture of the previous findings in the literature review that it is the consent of the subscribers which makes a user consider the SMS ad and ultimately make a transaction based on the information provided in that message (Wei et al., 2010: Carroll et al., 2007). The important point about which the subscribers have raised their concerns was the issue with the timings and the frequency of these SMS ads. There are no fixed timings at which these SMS ads are sent to the target market, and there is no controlled limit with which these SMS ads are being sent.

Application of different tools from the NVivo on the collected data shows that as per the results of word frequency query, the word SMS was used the most in the study followed by the words like: ads (advertisements) and subscribers. The text search query tool of the NVivo using the words SMS ads shows the linkages and branches of the associations with what the respondents have mentioned in their response to the particular questions raised. These associations are about the views, opinions, interests, consent, acceptance, actions taken and the forwarding of these SMS ads to family and friends.

The proposed model which was developed using the information processing in the NVivo shows that SMS marketing which is a parent node is associated with the following child nodes which are: consent, timings, frequency, content, acceptance, action taken, satisfaction from the MNO and the forwarding of these SMS ads to the family and friends. The earlier four nodes define the activities presented in the later four nodes that is the consent of subscribers, and the frequency, timings and the content of the SMS ad drives the acceptance, action taken, satisfaction and the forwarding of the SMS ads.
6. **Conclusion.** Mobile Network Operators (MNOs) in order to advertise or promote their services, packages and offers bombard their subscribers with high frequency push messages without the consent of the subscribers which makes them reluctant to SMS ads. The other striking concern for all the subscribers irrespective of the MNO they are registered with was of the consent and permission for SMS ads to be pushed onto to the users’ mobile phones. Marketers and advertisers try to implement the similar marketing strategies for mobile marketing which they adopted for internet marketing. Other than consent, the frequency with which these SMS ads are sent to the subscribers and the timing at which they are sent have made the subscribers skeptical and irritated about it. It is a true statement that *excess of everything is bad.* Although by adopting such marketing strategies the MNO firms are trying to promote their new products, services, launches, packages, bundle offers etc., but all this should be done in a controlled manner with prior consent of the subscribers, and monitored frequency, timing and content. Random bombardment of SMS ads to the mobile phones of the users can turn out to be a failure for the MNOs rather than gaining them brand awareness, loyalty and market share.

The study suggests that prior to sending SMS ads to any subscriber, his/her permission should be sought. This prior consent gives the company an ethical authority to send SMS ads to subscribers at their will. An optimal level of control mechanism should be developed with the help of which the SMS ads to a particular target market of potential customers could be sent. Reliable and valid information should be sent to the subscribers in the SMS ads, obsolete and incompatible information and updates should be avoided.

**Word Frequency Query Results**

| ad | ads | also | amongst | another | asked | availed | average | awareness | brand | comparison | concern | conditions | consent | create | different | discount | discounts | either | element | even | ever | except | family | figure | first | followed | forwarded | frequency | friends | future | g1 | g2 | get | group | highest | identified | information | inquired | interest | internet | interviewed | interviews | irrespective | known | level | low | made | make | messages | mno | mmos’ | mobile | mobilink | mostly | much | n | needs | never | new | none | number | offers | one | packages | permission | place | provided | reason | receive | received | replied | respondents | results | review | satisfaction | sent | services | similar | sms | subscriber | switch | telenor | terms | time | subscribers | ufone | used | warid | week | willing | zong | Text Search Query Result | 668 |
MobileLink subscribers received
subscribers received less than
on the average received
Ward subscribers who receive
and Zong subscribers received
for this was the impossible
content sent to them
have used the information
of the promotional services
block the excessive transmission
is receiving any kind
receive
the highest number
them in the form
on the average received
17
prior to bombarding them with
subscribers in G2 also
received
they were registered to,
had never
respondents had
MNO prior to
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services, offers, packages (voice calls,
SMS, ads) either to buy
SMS ads on average (24)
SMS ads on average (25)
that the numbers from which
that they mostly delete such
sent to them or
the 20% who wanted
their preferences. Irrespective of
used the information in
the respondents was that futuristic
subscribers would get
the bombardment of
the young generation with cheap
ads, they still received
Apart from this as
brand awareness created by
first place. Even if
or frequency fixed for
subscribers have ever forwarded
it was identified
the respondents said
to opt out of
G2 members ever replied
mobile phones. The reply
all respondents wanted
if they had
Ward subscribers who receive 22

internet), events and discounts. While
1) followed by Ward subscribers
MobileLink subscribers received 13
Telemor and Zong subscribers
and Zong subscribers received
on average
Table
Telemor subscribers
Ufone subscribers

ads

all the respondents of
and often you get
have used the information
they still received these
It has been identified
Most of the subscribers
concern over consent
group G2 respondents
subscribers of MobileLink

This trend is also
and have avoided the
are about the offers
from a particular
received have become
into their
not create much
either to buy SMS
even without opening it
from
the student subscribers
their subscribed MNOs
future. Of least
in terms of informing
the future but
list. Of the interest
on average
24 SMS /
25 SMS /

leads

voice minutes packages or
and internet offers. Their
REFERENCES


ABSTRACT Cryptography is an art and science of concealing messages. There are two categories of cryptography, one is called asymmetric key cryptography in which two different keys called private key and public key are used for encryption and decryption. Public key is used for encryption at sender side and private key is used at receiver side for decryption. Another one is called symmetric key encryption in which only one key is used for encryption and decryption on both ends. There are further two types of cryptography, one is called stream cipher in which one bit of data is encrypted and decrypted at a time and other one is called block cipher in which group of bits or block of data is encrypted and decrypted at a time. The algorithm developed in this research work uses block cipher technique in which 8 bits or one byte of data is encrypted and decrypted at a time with any 8 bits of 32 bits key through an XOR operation. The algorithm has been used for online website and the response time of site to each user has been recorded for about more than 100 users and then it was compared with an existing secure technique like HTTPS which uses bit by bit encryption scheme or stream cipher technique which takes more time to encrypt and decrypt each and every bit of data. From the comparison with HTTPS, it is clear that the site response time to each user is less than HTTPS response time.

Introduction As people become aware of the internet day-by-day, the number of users in the network increases considerably thereby, facing more challenges in terms of data storage and transmission over the internet, for example information like account number, password etc. Hence, in order to provide a better security mechanism, we have proposed a data encryption technique called byte oriented data encryption scheme.

There are two categories of cryptography one is called symmetric key cryptography which uses one key for both encryption and decryption process at sender and receiver side and the other one is called asymmetric key cryptography in which different keys are used for encryption and decryption at sender side and receiver side. There are further two types of cryptography one is called stream ciphers in which data is encrypted bitwise mean single bit is encrypted and decrypted while other one is called block cipher in which block of data or group of data is encrypted and decrypted at a time. The technique used in this research is based on block cipher encryption and decryption technique as there is lot of time required for bitwise encryption scheme. The HTTPs which is using stream cipher technique takes much time for encryption and decryption process of each and every bit.

Algorithm and formula for Securing HTTP: The algorithm and formula used for the encryption and decryption process of the secure technique is given below:

- **Algorithm:**
  1. Function(input or output http page contents)
  2. }
While (!eof())
{
    a. Take first byte
    b. Assign byte value to temp variable
       i. Temp = first byte
    c. Exclusive OR some predefined seed (64bits)
       i. Evalue = temp xor seed
       ii. Temp = Evalue
}
3. Repeat the process till last byte
4. }

- **Formula:**
  Data (8bits) Exclusive OR Seed Key (64bits) = Cipher
  Cipher Exclusive OR Seed = Data, (Seed = “324a3dc3e32fbdcb”) here the key is in hexadecimal format.
  The one byte or 8 bits of data was encrypted with first 8 bits of the predefined Seed Key through an
  Exclusive OR operation at sender side and the cipher was then decrypted to data through an Exclusive OR
  operation with Seed Key at receiver side.
  First of all the secure connection or channel was established between client and server through user name
  and password identification and verification by server and the necessary information were shared securely.
  The data which was submitted on the client side was transferred securely through the network in encrypted
  for to server using the encryption coding involved at server side. The actual data was displayed to the user
  after identification process and the data in the way was in encrypted form, so it was not possible for the
  intruder to understand the actual data submitted by the user.
  The encryption process was involved at back and the data was in normal form available to each user. As the
  coding for secure algorithm was in PHP so it was not visible as source code to user.

**Simulations In Packet Tracer:** The design for implementation of the security technique is mentioned in the below
figure 3.1, simulated in packet tracer. The site was situated at the web server, i.e. server 0, which was connected to
a 2620xM router, connecting it to the local devices as well as to WAN through router 3.

Router 3 was connected to one other generic router, which could be connected to other multiple servers, available
at the internet.

Router 3 was also connected to router 4 which was the local router, and was being connected to a switch 0. The
switch was connected to a wireless router with the capability of the connecting through wireless as well as through
cable,
PC0 and a series of other PC’s could be connected to this router so as the load cab was checked from the same location with multiple nodes.

**Results** The model designed here was tested in various environments, and at different instance of times, it tested the system against unsecure website, and it was found out that the designed strategy was comparatively slower than that of the non-secured websites; the data collected from the site [http://www.betfairtip.com](http://www.betfairtip.com) is as follows:

The different graphs designed on the basis of user data are shown below:
The chart shows that the secure technique takes about 98.96% time of total time while unsecure site takes about 95.63% time of the total time so net difference in percentage is 3.34%.

The chart represented that the technique which were adopted was running parallel with the unsecure web, so one could say that the technique was consuming more time due to mathematical complication of the secure algorithm as compared to an unsecured website.
Noting that above map and data was gathered on the real traffic upon the web server, and very possible that the server response at different time might be either higher or low, depending on the traffic or work load of other sites upon that server.

**Figure 4.3: Graph of Traffic Analysis of HTTPs against Non Secure site**

![Graph of Traffic Analysis of HTTPs against Non Secure site](image)

**Figure 4.4: Graph of Average Traffic Analysis of HTTPs against Non Secure Site**

The chart shows the average response time of the nonsecure site which is 96.02% of total time and the response time of HTTPs bad site which is 99.96% of total time and the net difference is 3.95%.
The chart shows that the average response time of secured algorithm is 66.87% of the total time and the average HTTPS based response time is 87.91% of the total time and the net difference is 21.05%.
Figure 4.7: Combined Graph for Comparing HTTPs, non secure HTTP and the proposed secure Algorithm.

Figure 4.8: Combined Average Graph of Comparing HTTPs, non secure HTTP and the proposed secure Algorithm.

The data in the chart shows the average response time of non-secured site which is 95.63% of the total time, the average response time of the secure site which is 98.96% of the total time and the average response time of the HTTPS based site which is 99.96% of the total time. The difference in response time also depends on the work load of the server and can increase or decrease respectively.

Conclusion: To summarize the research study, the main objective is to secure HTTP traffic in less time. The technique used in this research work shows that it is more secured than HTTP and faster than HTTPS. Cryptography is one of the important branches of computer science. Cryptography is used to secure the data of communication by transforming it into a form which is unreadable called cipher text. There are two categories of
cryptography one is called public key or asymmetric key cryptography in which two keys called public key and private key are used at sender and receiver side. The public key is used to encrypt the data on sender side and private key is used at receiver side to decrypt the data. The other category is called symmetric key cryptography in which single key is used both at sender side for encryption and receiver side for decryption. There are further two types of cryptography one is called stream cipher in which each and every bit of data is encrypted at a time and other one is called block cipher in which data is encrypted at sender side and decrypted at receiver side in the form of group of bits or blocks of various sizes. The technique used in the research work used block cipher technique in which data was encrypted in form of 8 bits or one byte at a time. In this technique 8 bit or one byte of data was encrypted with first 8 bits of 64 bits key through an Exclusive OR operation. When the security of the technique was compared with HTTP, it was found much secured. The performance was compared on the basis of different data gathered for more than 100 users of site. From the comparison with HTTPS it was found that it took less time because HTTPS uses stream cipher technique which encrypts each and every bit of data at a time and need more time. The time factor can be so important for large amount of data if needs to be encrypted and decrypted. The results showed that it is faster than HTTPS and secure than HTTP. The simulation software Packet Tracer has been used for graphical representation of the server and client based network environment and scripting languages like HTML, PHP, and Java Script have been used for coding and practical implementation. The main purpose was to get faster and secure technique for HTTP traffic between server to client and client to server data transfer.

REFERENCES

THE EFFECTS OF FDI ON HUMAN CAPITAL STOCK IN CENTRAL ASIAN INDEPENDENT TURKISH REPUBLICS

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ABSTRACT. Foreign direct investment contributes to the education level of a country through many channels. On the other hand, educated labor increases foreign direct investment inflows. The subject of this paper is to investigate the contribution of foreign direct investment to the level of education in Independent Turkish Republics. In this study, the contribution of FDI to level of education is examined by Panel OLS methodology for 1999-2011 periods in Azerbaijan, Uzbekistan, Kazakhstan and Kyrgyz Republic, except Turkmenistan. As a result of the study, there is not a significant relationship between FDI stock and level of education which is used as an indicator for human capital investment.

Keywords: Independent Turkish Republics, FDI, Human Capital Stock, Education, Panel OLS.

1. Introduction. The economic growth of a country is positively linked with the level of FDI inflows. The increasing FDI inflows leads to an increase in the demand for skilled labor and trained professionals for the management of technical, managerial and professional positions has increased. Then Human capital development is essential for sustainable social and economic development (Afza and Nazir, 2007: 173).

Foreign direct investment and human capital accumulation are considered as main sources of economic growth. While they both affect growth, they also affect each other through complementarity. Human capital of a country makes investment attractive for foreign investors. On the other hand, multinational enterprises can provide education and training actively, bring new skills, technology and knowledge with them (Miyamoto, 2003: 9).

Michie stated that there are three benefits of human capital accumulation for developing countries to be able to absorb new technologies. First, human capital accumulation leads to higher productivity and profitability as a direct effect. Second, employees are better qualified to absorb and use codified and tacit knowledge. And thirdly, human capital accumulation improves the willingness, commitment and motivation of employees (Michie, 2001: 4).

Foreign direct investment flows towards developing countries and transition economies increase enormously. The main reason for the large share of FDI going in those countries is their large investment in knowledge which developed skilled labor force that are capable of adopting technological innovations (Khan, 2007:6). FDI is perceived as an important source of capital by developing countries. Low skills and inadequate training...
level affects FDI negatively and so decreases the capital inflows to the host country. Countries with higher human capital stock attract more FDI inflows (Dutta and Osei-Yeboah, 2010: 1).

Due to the lack of skilled labor in developing countries, the increase in demand of that labor as a result of FDI inflows causes an increase in wages of skilled labor and individual’s incentive to acquire more education raises. However the causality relation may be from higher education to foreign direct investment (Zhuang, 2008: 206).

Dutta and Osei-Yeboah (2010) examined the relationship between human capital and FDI level for 76 developing countries over 1980-2003 period with pooled panel OLS. As a measure of human capital, literacy rate and enrolment rates in different education levels as a percentage in the total population are used along with the FDI/GDP ratio and some other determinants of FDI inflows. According to the results, literacy rate has a positive and significant effect on FDI inflows. As for the other levels of education high level primary school enrollment rate leads to higher FDI inflows. The relationship between secondary and tertiary education and FDI is non linear.

Heyuan and Teixeira (2010) tested the direct and indirect impacts of human capital on FDI on microeconomic level with data from a survey conducted for 78 firms in 2008 by logit model. According to the results human capital has no direct effect on FDI for Chinese case and R&D activities have negative impact on FDI when human capital is measured by academic qualifications. However, there is a positive indirect effect on FDI through R&D efforts. Also universities and transport network contribute to foreign direct investment.

Majeed and Ahmad (2008) investigated the effect of human capital on attracting FDI in 23 developing countries over 35 years period 1970-2004, by using fixed effects model. The results showed that health expenditure as measure of human capital has a positive and significant effect on FDI inflows, because the productivity of labor force depends on their health and good health improves the learning ability of workers (Majeed and Ahmad, 2008: 98). Also the impact of illiteracy on FDI inflows is negative but not significant, since higher illiteracy rate means labor force is unskilled.

Borensztein & De Gregorio and Lee (1995) studied the effect of FDI inflows on economic growth using FDI flows from industrial countries to 69 developing countries. The results stated that FDI is an important component for technology transfer. Also there is a strong effect between FDI and human capital; it is that the contribution of FDI to economic growth improves by its interaction with the level of human capital in host country.

The country experiences show that countries with strong human capital attract FDI in high value added products. Rasiah (2005) found out that in countries whose initial human capital endowments are low, FDI helped to raise human capital force to compensate the shortage. The result of this paper shows that for attracting high value added FDI, middle income countries must have the capacity to provide human capital.

Zhuang (2008) examined the effect of FDI flows on human capital accumulation in 29 provinces of China. The data covers between 1978 and 1999. The paper used the college education, professionals and technical education, high school education, middle school education as a percentage of population to capture the effect of FDI in Special export zones (SEZ) and economic and technological development zones (ETDZs) on different education levels. The results stated that the increase in average schooling is about 2.7 % after ETDZs in 1980s. This result is not statistically significant because it is a broad measure of human capital. In 1980s the estimation with the share of rural population with college education states that the relative increase in college education in ETDZs provinces is not greater than the provinces without it.

The estimation with the share of rural population with college education states that the relative increase in college education in ETDZs provinces is not greater than the provinces without it in 1980s. Also the impact of ETDZs on middle school education is larger than the high school education. The ETDZs cause 1.16 % relative decrease in rural population with high school education, but 2.65 % increase in rural population share with middle school education. Establishing further ETDZs increase the both college and professional and technical education in these provinces for 1990s. In this era FDI was from North America, EU and Japan

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whose firms are in capital and technology intensive sectors. So FDI in these sectors increases the demand for well educated labor and results in higher human capital stock for China.

According to Blomström and Kokko, there is two-way causality between FDI and human capital. FDI leads to potential knowledge spillover for host country’s labor force, and also the human capital level of the host country determine the amount of FDI that can be attracted (Blomström and Kokko, 2003: 4). As a result of the paper, even the effect of FDI on primary and secondary education is very small; its effect on tertiary (university) is significant. The demand of skilled labor in engineering, natural sciences and business sciences by multinational companies encourages students to complete their tertiary education and as result of this, governments invest more in higher education (Blomström and Kokko, 2003: 12).

Adefabi (2011) tested the interaction between FDI, human capital and economic growth for 25 countries of Sub-Saharan Africa. According to the results, the effect of FDI on economic growth is positive; however it is not through human capital accumulation. As a reason for this, the writer stated that type of education could be more important than the level.

Checchi, De Simone and Faini (2007) analyzed the relationship between FDI and education by using 112 countries for unbalanced panel data for secondary enrollment and 108 countries for tertiary enrollment. Secondary enrollment is related to the development level of the country. 10 percent increase in FDI stock decreases the secondary enrolment rate by 0.24 % and increases the tertiary enrolment rates by 0.17 %. If data regressed by fixed effect model, the results show that secondary enrolment is statistically significant and affects FDI inflows positively. Overall, the presence of foreign firms in the host country’s economy has a significant effect on tertiary enrollment, because FDI creates job opportunities for skilled labor.

Egger, et.al. (2005) studied the impact of capital market integration on higher education and economic growth by using FDI as capital inflows. Data of 87 countries for the period of 1960-2000 were regressed to put forward the impact of capital market integration on higher education and economic growth. As a result of this estimation for a given public education expenditure, capital market integration causes an increase in the share of high skilled labor. The effect of net capital inflows that is measured by FDI on higher school participation is significant and positive.

In the literature papers researching the relationship between FDI and education generally study the effects of education on FDI. The main contribution of this paper is researching the contribution of FDI on education in the developing Independent Turkish Republics. This paper constitutes from two parts. In the first part consists of data and methodology. Data set and methodology and estimated model are explained in details. The third part of the paper elaborates the results of the analysis.

2. Data And Methodology. Central Asian independent Turkic republics are Azerbaijan, Uzbekistan, Kazakhstan, Kyrgyz Republic and Turkmenistan. However there is not available data for Turkmenistan. Therefore the country is removed from the analysis. The data are annual and obtained from World Bank and Interstate Statistical Committee of The Commonwealth of Independent States for 1999-2011 periods.

This analysis focuses on the relationship between FDI and human capital series. In the literature studies examining this relationship use a variety of education indicators. In other words, education indicators are used as a proxy for human capital stock. Some of these generally are primary and secondary schools. However in this analysis tertiary school enrollment rate is thought to related with FDI investments much more than others. Tertiary school provides the necessary qualifications for students to enter professions or programs that are required high skills. The skilled human capital stock related with FDI is educated in tertiary school. Thus in this analysis the proxy indicator of human capital stock is chosen tertiary school enrollment rate. GDP per capita is one of the main determinants of education availability. GDP per capita has theoretically positive effects on education. Openness variable indicates the international trade regime of the country. Inflation rate represents the economic and socio-political stability of the country. Internet usage is a control variable represents the development level of the country. Population is a control variable represents demographic growth rate.
We followed the model that is developed by Mughal and Vecchiu (2009) and advanced this model. Firstly we use GDP per capita income differently from the original model. GNI per capita income includes citizens’ income of the country earned abroad. However our analysis focuses on the effects of FDI on the education level of citizens live in home country. Thus we decided to use GDP per capita. In the original model agriculture in the value-added of the GDP is used to analyze its significance in human capital growth. In the case of estimating FDI it can be used Agriculture in the value-added of the GDP. In other words this data related with FDI not education. We removed this data from the analysis. Thus our model can be seen in Equation (1).

\[ \text{Tertiary} = \text{GDP}_t + \text{Inflation}_t + \text{Openness}_t + \text{FDI}_{it-1} + \text{Population}_t + \text{Internet}_t + \epsilon_{it} \] (1)

In Equation (1), Tertiary: Tertiary enrolment rate includes public and private schools and full and part time education systems. This data is formed with the total number of students enrolled at public and private tertiary education institutions. Tertiary education is largely based on theoretical knowledge and is intended to provide sufficient qualifications for gaining entry into advanced research programs and profession with high skills requirements. Foreign Direct Investment, net inflows (%GDP): Foreign direct investment data are the net inflows of investment which is calculated as total of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. Openness indicates the difference between exports and imports of the countries as percentages of GDP. GDP consists of per capita Gross Domestic Income values. Data are in current US dollars. GDP series are transformed from domestic currencies using single year official exchange rates. Inflation: Inflation figures constitute of the consumer price index which reflects the annual percentage change in the cost of acquiring a basket of goods and services for an average consumer. Population is the population growth rate. Internet is referred to number of people with access to the worldwide network.

GDP, inflation, internet and tertiary series that are subject to analysis are in natural logarithm. The other series in the analysis are included as percentage ratios. Equation (1) will be used for investigation the relationship between series.

Panel data analysis method will be used to examine the relationship between series. Panel data method can be applied both for horizontal and vertical cross-sectional data sets.

Panel OLS model: \[ Y_{it} = \alpha_i + \beta_1 X_{1it} + ... + \beta_k X_{kit} + \epsilon_{it}, \] where \( i: 1,2,...,N; \ t:1,2,...,T. \)

Two different models can be used for investigating the relationships between series in panel OLS analysis. These models are fixed effect and random effect models.

Fixed effect model includes an individual effect which is constant over time and common across economic agents. This model can be estimated using Ordinary Least Squares estimator. Individuals’ state may be guiding for the selection of model while choosing among these models. For example, for members of a certain group of countries (OECD, EU, EMU, etc) fixed model should be applied. In fixed effect model:

- \( \alpha_i \) is possibly correlated with \( X_{it} \)
- Regressor of \( X_{it} \) can be endogenous
- can consistently estimate \( \beta \) for time-varying \( X_{it} \)
- cannot consistently estimate \( \alpha_i \) if short panel
- prediction is not possible
- \[ \beta = \partial E[y_{it} | \alpha_i, X_{it}] / \partial X_{it} \]
In random effect model $\alpha_i$ is random. Thus the errors: $\varepsilon_{it} = \alpha_i + u_{it}$. And OLS estimator is inefficient. In random effect model:

- $\alpha_i$ is purely random
- Regressor of $X_{it}$ must be exogenous
- Corrects standard errors for equi-correlated clustered errors
- Prediction is possible
- $\hat{\beta} = \partial E[y_{it} | X_{it}] / \partial X_{it}$

Because, countries examined in this study are not members of a group, random effect model can be estimated. However we estimated two models to be able to compare.

3. **Empirical Analysis.** The stationarity condition should be investigated before starting to examine the relationship between the series. Various tests can be run to study the stationarity of series. In this paper Levin, Lee and Chu (2002) test which is one of the stationarity tests in panel data analysis will be applied.

The estimation equation and hypothesis for LLC test are (Levin, Lin and Chu 2002: 1–24; Asteriou and Hall, 2007):

$$\Delta y_{it} = \delta y_{i,t-1} + \sum_{l=1}^{p_l} \theta_{il} \Delta y_{i,t-l} + \alpha_{im} d_{it} + \varepsilon_{it}, \quad m=1,2,3,.$$  

$H_0: \rho = \text{U}$ and $H_1: \rho < \text{U}$

Table 1 shows the test results of stationarity test.

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>LTER</td>
<td>2.832</td>
<td>0.997</td>
<td>-6.289</td>
<td>0.000</td>
<td>-0.476</td>
<td>0.317</td>
</tr>
<tr>
<td>FDI</td>
<td>1.069</td>
<td>0.857</td>
<td>-0.992</td>
<td>0.160</td>
<td>-0.972</td>
<td>0.000</td>
</tr>
<tr>
<td>LGDPCC</td>
<td>5.440</td>
<td>1.000</td>
<td>-0.328</td>
<td>0.371</td>
<td>-3.019</td>
<td>0.001</td>
</tr>
<tr>
<td>LINF</td>
<td>-2.318</td>
<td>0.010</td>
<td>-3.018</td>
<td>0.001</td>
<td>-6.928</td>
<td>0.000</td>
</tr>
<tr>
<td>POP</td>
<td>0.008</td>
<td>0.503</td>
<td>0.566</td>
<td>0.714</td>
<td>-2.544</td>
<td>0.005</td>
</tr>
<tr>
<td>OPEN</td>
<td>-0.354</td>
<td>0.361</td>
<td>-0.523</td>
<td>0.300</td>
<td>-2.363</td>
<td>0.009</td>
</tr>
<tr>
<td>LINT</td>
<td>-4.540</td>
<td>0.000</td>
<td>-12.921</td>
<td>0.000</td>
<td>-13.430</td>
<td>0.000</td>
</tr>
<tr>
<td>DTER</td>
<td>-6.643</td>
<td>0.000</td>
<td>-4.923</td>
<td>0.000</td>
<td>-4.158</td>
<td>0.000</td>
</tr>
</tbody>
</table>

* The lags are determined according to Schwarz information criterion.

The results of the analysis show that the series contain trend and fixed effects. For this reason, the model with trend and constant is taken into consideration while examining stationarity conditions. The results in Table 1 show that LTER series appear to be not stationary and other series are stationary at level values. LTER series becomes stationary at first difference.

The investigation of the relationship between series can be followed after the investigation of stationarity condition. Equation (1) will be estimated in order to study the relationship between series. Two different models will be used to estimate the equation: fixed effect and random effect. The countries included in the analysis have similar features even they are not member of a group. In this context the results of the two models will be examined without a preference between models. If different results obtained from different
models, the choice of model will be up to the readers. The results of relevant models are shown in Table 2 and Table 3.

Table 2: The Results of Fixed Effects Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.467261</td>
<td>0.164568</td>
<td>2.839317</td>
<td>0.0072</td>
</tr>
<tr>
<td>FDI(-1)</td>
<td>-0.000662</td>
<td>0.001131</td>
<td>-0.584733</td>
<td>0.5622</td>
</tr>
<tr>
<td>LGDPPC</td>
<td>-0.061241</td>
<td>0.028298</td>
<td>-2.164160</td>
<td>0.0368</td>
</tr>
<tr>
<td>LINF</td>
<td>0.027380</td>
<td>0.014884</td>
<td>1.839558</td>
<td>0.0737</td>
</tr>
<tr>
<td>LINT</td>
<td>-0.001649</td>
<td>0.010908</td>
<td>-0.151165</td>
<td>0.8806</td>
</tr>
<tr>
<td>POP</td>
<td>-0.041877</td>
<td>0.018969</td>
<td>-2.207629</td>
<td>0.0334</td>
</tr>
<tr>
<td>OPEN</td>
<td>0.001690</td>
<td>0.000571</td>
<td>2.958482</td>
<td>0.0053</td>
</tr>
</tbody>
</table>

R-squared 0.659660 Durbin-Watson stat 1.346737
Adjusted R-squared 0.579053

Table 3: The Results of Random Effects Model

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
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<td>FDI(-1)</td>
<td>-4.28E-06</td>
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<tr>
<td>LGDPPC</td>
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<td>0.015375</td>
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<td>LINF</td>
<td>0.010164</td>
<td>0.008300</td>
<td>1.224611</td>
<td>0.2277</td>
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<tr>
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R-squared 0.621546 Durbin-Watson stat 1.172388
Adjusted R-squared 0.566162

Table 2 and Table 3 show the test results of fixed effect and random effect models respectively. When the test results are analyzed, it can be seen that FDI series has no impact on DTERM series. In other words, foreign direct investment in independent Turkish Republics has no positive contribution to the level of quality education.

4. Conclusion. FDI and human capital are considered as main sources of economic growth. While affecting growth, they also affect each other. High level of human capital attracts foreign investment in a country. In return, multinational companies bring knowledge, technology and new skills with them and provide education and training. Also, FDI inflows provide a conduit for transferring technology from developed to developing countries. Alongside this, FDI is an important source of capital for developing countries without enough capital and is linked with human capital positively. For attracting high levels of FDI, a country should have high human capital stock. Skilled labor and trained professionals attract FDI inflows enormously. The spillover effects of FDI rely on human capital stock in the developing country. For these reasons, developing countries are trying to enhance foreign direct investment inflows.

In this study, the contribution of FDI to level of education was examined by Panel OLS methodology for 1999-2011 periods in Azerbaijan, Uzbekistan, Kazakhstan and Kyrgyz Republic. As a result, foreign direct investment does not promote the level of education in these countries.
The one of the reasons that FDI series has no statistically significant impact on tertiary school enrollment rate can be considered to be the structure of FDI initially made in independent Turkish Republics. Secondly, when investments do not require advanced technology and skilled labor, no impact of FDI on education is expected. Thirdly, the accumulation of human capital cannot be enough for the spillover effects of FDI on education in Independent Turkish Republics.

From the perspective of multinational companies (MNCs), they provide sponsorship or give scholarships to talented/gifted students in countries where they need to ensure a qualified workforce. MNCs support and promote the universities through many channels to meet the needs. MNCs especially support tertiary education. The contribution of MNCs to human resources can be through training organized by the company. However, according to the results of the analysis, the contribution of FDI to education level is not consistent with theoretical expectations in Independent Turkish Republics. The reason is that, MNCs may not contribute to the planning of education policies in the country or they may not invest in high technology production which needs skilled labor.

In this context, the country’s expectations from foreign investors may conflict with the actual contribution of the investor to the country. As a result, FDI towards these developing countries should be selected according to their willingness in investment on high technology sectors and contribution to social and economic development. Thus, human capital as one of the main sources of social and economic development can be maximized.

REFERENCES


COUNSELING AND SUPPORT SERVICES FOR DISTANCE LEARNERS AT ALLAMA IQBAL OPEN UNIVERSITY PAKISTAN

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ABSTRACT. In the system of distance education counselling and support services has great significance. Without proper support services and counseling to the students in their study difficulty distance education system cannot flourish. This paper indicates the growth and concept of counseling and support services provision at Allama Iqbal Open University, Islamabad. This article would certainly highlight the prose and coins of such services in the environmental situation of Pakistan. The process, procedure and elements of counseling are discussed in this paper.

Keywords: Counseling, Support Services, Distance Learner

1. Introduction: Counselling is very important aspect in teaching learning process of distance education system. Students counseling begins with the pre-admission period, continues through the duration of the programme or the course, and it is helpful even after the course is completed. Student counselors, by personal contact or through correspondence, help student to reach the right process at the right time. Counselling is a short cut for an otherwise long trip. The counselors help students to know their own minds. Even after getting enrolled, some students feel that they are in a blind alley, they are tempted to drop out. If someone will listen to the problems of students and suggest possible solutions, confused students are at least less confused. The counselor should devote sufficient time for advising students requiring it.

2. The Nature of Distance Education system. The term distance education is an educational process in which a significant proportion of teaching is conducted by someone removed in space and / or time from the learner. This means that an intermediary is always used in the contact between tutor and students. [10]

From the above definition it appears that the term distance education covers various forms of study at all levels which are not under the immediate supervision of tutors. Such education includes the use of books, radio, television and postal services.

With a view to impart education and training to the masses at large, Allama Iqbal Open University was established at Islamabad in 1974. According to Vice Chancellor Report, [1] the important aspect of the functioning of this university has been the fact that its system of distance education has proved itself a viable cost effective and highly successful in fighting illiteracy, thus bringing deprived and neglected sections of the society into the main stream of educational activity.

In 1984, the Student’s Advisory Cell was established at main campus. Later on, it was upgraded as Directorate of Student Affairs. The main job of Directorate of Student Affairs is to support solutions to the educational problems and provide the students advice on how to conduct successful performance in their educational activities. Such responsibilities are exercised by the counsellors because counseling is to show the students that they are being cared for.
“Counselling is personal and dynamic relationship between the two individuals one of whom is older or more experienced than the younger, who together approach a more or less well defined problem of the younger or less experienced or less wise, with neutral consideration for each to the end that the problem may be more clearly refined and that the one who has the problem may be helped to a self determined solution it” [6].

The Directorate of Students’ Affairs, which has the duties of counseling, has been functioning in the following subdivision since 1984: (1) Administration (2) Advisory and Counselling Division (3), Overseas Cell and (4) Inquiry/Information Section.

The main activities of counselors as pointed out in Vice-chancellor Annual Report [1] are:

- Providing clear, accurate and unbiased information.
- Helping individuals to evaluate their needs and the available options by offering suggestions based on knowledge and experience.
- Working with individuals in a non-directive way to help them explore and assess their needs and the available options.
- Structuring learning experiences for individuals to gain new skills and knowledge.
- Taking action on behalf of and with the agreement of individuals.
- Trying to find out solutions to the problems of the students.
- Coordination of overseas students from admission to examination.
- Altering organization to functions or problems experienced by students, which require changes in the system.
- To provide financial support to deserving students.

These counselors have been very helpful in solving the problems of the students through coordination with the campus. Hundreds of pending cases of Examinations and Admission have been solved through the assistance of these counselors.

The university has semester system; admission is advertised on 1st February (spring semester) and on 1st August (Autumn semester) every year in the leading newspapers as well as by radio and TV introductory programs. The admission to general nature courses is granted on the basis of pre-requisite qualification in the admission is granted on merit basis. The teaching methodology of Allama Iqbal Open University includes printed materials (books, study guides and allied material), radio and TV broadcasts, course assignments, face to face tutorials at approved study centres and course workshops.

3. **Students Characteristics.** The AIOU’s students are the adults from all over Pakistan including all rural and urban areas who are not able to continue their graduation or high level education due to numerous reasons. Some reasons include family responsibilities and occupation. In this respect, they can be benefited from such learning system.

Distance students are required to meet the entry requirements as laid down by AIOU. They are taught by the part time teachers (called tutors), and follow the same programs as offered in the formal system. Likewise, they take the examinations like formal students. This arrangement is intended to maintain parity of standards between formal education students and distance education students. The arrangement implies that distance education students may be provided with adequate tutoring, counseling and support facilities as (and probably more than) formal education students.

In the academic year 2012 as mentioned in AIOU Report [1], there were a total of 1312858 students pursuing either of the degree programs offered by distance education approach. About three quarters of the students were either teachers, civil servants or other government officers. There were more females than males. Only about 57 percent (745461) students were female. The male students were 43 percent (567397). The majority of the distance education

690
students (37%) live in the urban areas whereas the rest (63%) were scattered in the rural areas.

4. **Meaning and Concept of Counseling.** Counseling is a personal and dynamic relationship between two individuals (one of whom is order or more experienced wiser than the other), who altogether approaches a more or less well-defined problem of the younger or less experienced or less wise, with mutual consideration for each other to the end that the problem may be clearly defined and that one who has the problem may be helped to a self-determined solution of it, [12].

The consultant serves the student as a confidential counselor, professional advisor, well-informed resource and loyal advocate and supporter [9]. Moreover, numerous contacts with individuals can be used to provide him assistance in solving his issues. Whereas "Counseling is the application of the personnel resources of the school or other institutions to the solution of the problems of individuals."[5]

The counseling is vitally related to learning. As in learning we are concerned with the modification of behavior, so is counseling. The role of the counselor is to discover the dissatisfactions (may be called problems) of the counselee, help him set up some goals and guide him through difficulties and problems [7]. Anyhow, counseling is a process in which a counselor is approached by the pupil on an individual basis for arriving at a solution. Counselling comes in when emotions are at stake. Counselling can be done by interview or by post and even by telephone.

However, counseling relationship refers to the interactions which:

1. Occur between two individuals called "counselor" and "client".
2. Take place within a professional setting; and
3. Is initiated and maintained as a means of facilitating changes in the behavior of the client, [4].

The term counseling entails situations that helps individual to more appropriately settle himself in the environment, [11]. On the basis of above mentioned definitions, it can be concluded that the aim of counseling is self-realization. This involves helping the individual to understand what he can do and what he should do to strengthen his best qualities, to handle his difficulties rationally rather than being driven by unconscious forces to find suitable channels for his emotions, and to move toward his more acceptable self.

5. **Characteristics of Counseling.** There are five important characteristics of counseling and they are (1) it is a purposeful learning experience for the client or the subject or the counselee, (2) it is a private interview between the counselor and the client (3) it is a one-to-one relationship, a relationship based upon the mutual confidence of the parties concerned and growing out of the recognition of the subject of an existing need for help and presence in the school of an adult who is ready to assist, (4) the counseling process is structured round the felt needs of the counselee, (5) the main emphasis in the whole of the counseling process is on the counselee's self-direction and self-acceptance.

6. **Elements of Counseling.** The counseling has three elements [2] but Gladding, S.T. increases the elements of counseling to five which include:

   i. Rapport should be established with the counselee.
   
   ii. Counseling is communication between the counselor and the counselee.
      
   a. Tone of voice, facial expression, gestures and postures of both the counselor and counselee play an important role.
   
   iii. Counselor should have a thorough background of the counseling process.
   
   iv. Counselee expresses changes in feelings as counseling proceeds and progresses through various stages.
   
   v. The counseling interview must be structured i.e. properly planned, [3].

7. **Media of Communication for Counseling and Support Services.** For establishing a meaningful counseling
relationship with a distance student, it is very essential to find out a suitable means of communication. The means employed will be determined by a large number of factors like the residence of the students and density of numbers, the accessibility of counseling points, the number of counselors, the range of counseling skills available and the level of educational technology which the distance education system can invoke to support its program.

Following types of media may be used in counseling and support services:

a. Counseling and support Services through Correspondence. This is the most popular means of counseling and support service in distance education in Pakistan. For making the best use of this medium, it is necessary to have an efficient postal system. It may be stressed that postal delays are likely to cause a great deal of anxiety in the minds of learners who are in great need of counseling at the time of writing their assignments.

b. Counseling and support Services through Audio-Cassette. With the advances in the scientific and technological fields, it will be possible in the near future to make use of audio-cassette for counseling purposes. Three advantages are claimed (a) it appears to be more personalized than written comments, (b) students regard the information through it as being more complete and comprehensive and (c) this medium significantly improves the learner's level of academic achievement.

c. Counseling and support Services through Telephone. Counseling through telephone is regarded as the most effective tool of distance teaching and learning. It is capable of humanizing, individualizing, personalizing and optimizing instruction. It is a two-way communication system. It saves effort, money and time involved in traveling. Its additional advantage is that it avoids embarrassments in certain delicate situations which are caused in face-to-face counseling.

d. Face-to-Face Counseling. There are primarily three ways of providing face-to-face counseling:
   i. Counseling services located at the headquarters of the distance education institution itself.
   ii. Counseling services provided at resource centers.
   iii. Counseling services provided by itinerant counselors who travel from place to place to assist learners sort out their learning problems and assist them overcome their anxieties, [8].

Students in distance education system are particularly much more free to set their own learning goals. Many students of distance education are presumably proficient in setting realistic short-term and long-term educational goals. However, some may not be so proficient and may consistently set goals which are either impossible to achieve or far below their capability. Both types of behavior may be due to an exaggerated fear of failure along with an acquired tendency to ascribe outcomes as being due solely to a ability and look rather than personal effort. Both types of unrealistic goal-setting have a high probability of resulting in non-completion of a particular course or more drastically termination of all education endeavors.

The tutor of the distance education students can diagnose and help the learner change his self-defeating behavior. To do this, the tutor must have comprehensive information regarding the background of students. A student with a record of failures or incompletes needs special help in overcoming the adverse motivational effects of past failure. The tutor can guide him in selecting learning tasks etc. here the role of tutor will be of a counselor too.

Tutors go to the study centers and conduct tutorials to supplement the reading material. They also help the students to solve their educational problems and difficulties. Such practice also helps the tutors in having a deeper insight of students' problems. "Experience of the past few years has shown that students whose interest and otherwise waned and were on the verge of giving up their studies, have had their interest revived by such visits." [14]
Likewise, the AIOU has also arranged surprise visits to workshops for monitoring purpose. The academicians normally visit different regions of Pakistan and come up with certain proposals to improve not only the students' support services but also have the knowledge about other problems of students. Annual report [1]) said that, "Semester end workshops provide an opportunity to the learners to recapitulate what they have studied during the semester, which definitely help in the preparations for examinations”.

The facility of financial support to students is provided by student’s Affairs to deserving students via regional circle of AIOU. There are two categories of financial assistance, i.e. general students and AIOU’s employees. In Spring and Autumn 2012 Semester Rs.1,59,29,085/- were given to general students and during these semesters Rs.20,45,415/- were provided to university employees who enrolled in various courses, [1].

Counseling of distance learners at the Allama Iqbal Open University has not been adequate. The system has less course coordinators in each department. The academicians can effectively provide counseling facilities that the tutors. The tutoring by correspondence “... is exacting since it demands the ability to write full, fair thoughtful probing comments on the work of someone the tutor may possible never meet.” [13] Even the academicians of Allama Iqbal Open University did not take interest to guide the tutors on how to tutor in the system of distance education and to give comments on the students’ assignments. Although the Allama Iqbal Open University is trying its best to provide adequate counseling to the tutor through tutor briefing session, yet there is need to strengthen this aspect.

8. Conclusion. Open University must respond to a student as soon as possible. A friendly, responsive letter can claim ruffled nerves and soothe ragged spirits. If a question requires research and cannot be answered immediately, courtesy demands that the student be thanked for writing and informed that an answer will follow as soon as available. Then be sure to get that answer and send it.Great importance must be attached to the fact that local customs differ not only among countries, but also between provinces, regions, and even local neighborhoods with a city. Family relationships, the status of women, the choice of profession or job – each makes its own demands upon every student. The counsellor’s responsibility to assist the one in trouble whether that difficulty stems from physical, mental, social or emotional causes.

Often money is the problem. Surely it is far wiser to respond to a student by extending credit for a limited time or by counting a “leave of absence” from sending in work projects until the emergency has passed than to allow someone to drop out by default or from embarrassment. Students are more important than money. A counselor must be familiar with the aims and subject-matter of each course. Sometimes the counselor may be asked to restate passage in the study material in simpler language.

Finally, the counselor must enjoy dealing with people and their emotions. He/she must take the initiative in establishing a one-to-one relationship which can inspire a student to complete a difficult course, perhaps enroll in another course, and even eventually achieve a career goal. It is pleasant to note that the Allama Iqbal Open University has received its policy for tutor briefing. What will still lack is the inter library loan provision to coordinators and students. Moreover, two days of briefing sessions is too short. It should be increased upto one week. During such sessions tutors should been courageous to organize tutorial groups for students in their areas.

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ABSTRACT. Modern technology is akin to a double edged dagger, which helps when held right and hurts when tried razors side. Right technology in wrong hands becomes a dexter sinister complexity. Technology helps society to improve health, education, communication and prosperity but all at the expense of a high crime rate. Man is behind all innovatory technologies, which now have started to control the master himself. As being a victim of one’s own creation, technologists now have to look for intelligent ways that explain how we can use the same existing technology to control these rampant crimes. Technology has brought about an information revolution in our society at the expense of wreaking terrorism havoc. Security agencies use smart devices but criminals have access to smarter alternatives as well. It’s time to choose between personal freedom and collective security. We have to be cautious during public debates as media discourse creates more heat than light. Opportunities, social injustices and starvations create a vacuity for crime. Crime science explores the delinquencies persuading rampant social crimes. We live in a jinxed society taken over by inherited leaders, inherent intellectuals and fake saints (pir) sunk in black/white magic mores. This paper tries to investigate mind set of demoniac people using incantations to evict apparitions and apotropaic to protect from evil eyes. All the mystic, virtual and ritual myths explored were found wealth and women centric. It is difficult to forecast crime but exposing haunting magic and mapping hot spots helps increase awareness and take preventive measures.

Keywords: Write three to five key words related to your study separated by ; for example: 'Railway Interlocking System; Moving Block Control; Safety Properties; Formal Methods; Z-Specification.'
method (rather than social theory) to reduce crimes [1]. Crime science has variously been interpreted as situational crime prevention rather than actual physical intervention, which may include redesigning products, services and policies to remove opportunities, temptations and provocations and make detection more certain. A common feature between crime science and criminology may be the narrow focus on delivering immediate crime reduction in society. Crime data can provide only the statistical measures of crime rather than any cure to society. As the crime by its nature is secretive, therefore the measurements are likely to be inaccurate [2]. Crime pattern analysis sometimes helps identifying potential future targets and underlying masterminds who can have vested interests in specific type of crimes or terrorist activities. Terrorist attacks on hostile specific apparatus mirror the invisible hand behind the terrorists. When dust of doubt prevails high up the stake holders start social engineering.

Several methods like household surveys, hospital or insurance records, press reports and police or law enforcement agencies compilations can be used to measure the crime rate. Official crime statistics are the latter but some offences are likely to go unreported due to one or the other reason. Crime is committed to increase personal income by using public belief or faith and by defects in existing laws and procedures. We have to keep an eye on politicians, bureaucrats, officers, religious scholars (maulanas) and inherited saints (pirs) looking too ambitious to have specific official positions. In corrupt societies the system becomes plugged to a wrong matrix which designs out good and promotes the crime culture. When people start competing for positions with discretionary powers and crime opportunities then national establishment must take serious measures. A country has always the type of criminals it deserves. Experts believe the crime prevention is much easier than control after its inception. Crime prevention is a prior struggle to reduce or deter crime and criminals. It is applied specifically to efforts made by the governments in order to reduce crime, enforce law and maintain criminal justice. Several factors must come together for a crime to occur; for instance an individual or a group must have the desire or motivation to participate in a banned or prohibited behavior and at least some of the participants must have the skills and tools needed to commit the particular crime or an opportunity must have been acted upon; which can only deepthroat informers explain when interested to do so.

Terrorism is the worst form of callous offence which overlaps both crime and war. There are several definitions of terrorism phenomenon emerged at start of 21st century. Wikipedia defines terrorism as the systematic use of violent terror as a means of coercion. Terrorism is now a well known evil act and yet it has no legally binding criminal law definition in the international community [2-3]. Common terrorism definitions refer to those violent acts which are intended to create fear (terror) and are perpetrated for a religious, political or an ideological goal and deliberately target civilians to create a state of panic and chaos in society. Some definitions now also include acts of unlawful violence and war that give rise to anarchy. The use of similar tactics by criminal organizations for protecting rackets or to enforce a code of silence is usually not labeled as terrorism; though these same actions may be labeled as terrorism when done by any politically motivated group that is not supported by hostile countries [3]. Long hauled liberation movements against slavery or foreign occupation are generally not treated under terrorism. Any scholar trying to define terrorism must consider provoked, unprovoked, local and foreign supported politically motivated campaigns against the democratically elected governments. Car and suicide bomb attacks on civilians, shrines, mosques, churches and law enforcing agencies are acts of terrorism which amount to undeclared civil war against the state with help of invisible foreign forces. If the government decides to launch a counter terrorism campaign against the culprits that is not a violation of human rights as long as the war crimes are not committed by the police or military forces. Drone attacks on citizens of a sovereign state against the will of incumbents are also an act of terrorism by any state. Different countries have their own definitions of terrorism acts which need to be unified at highest level.

Police and security agencies control the crimes. Older security personnel have strong crime recognition experience but they are hardly familiar with modern information technology (IT) based crime control techniques. Officials in developing countries mostly belong to anyone of the national political parties so they usually fail to enforce law equally. When leaders of political parties are high rolling agents of powerful hostile states then the situation leads to a state of anarchy. Countries facing hi-tech crimes usually have no access to modern crime control technologies. If the crime is secretly supported by a hostile state then the desired control devices are declined to the victim states. Security agencies can trace terrorism targets to
potential masterminds in their own local contexts. Attack on the hostile countries specific military apparatus is one of the ways to determine the invisible hands behind terrorism. Energy conscious hostile states can advise the local veiled terrorists to attack the power pylons in sultry summers and gas pipelines in chilly winters further to exacerbate the extremism. We must use pattern classification using support vector machines and recognize the developing story using neural networks and genetic algorithms to identify the crime science in order to control it using modern information technology. To overcome rebellions the state may consider blocking ammunition and monetary supplies in addition to routine checks, surveillance, mobile monitoring and search operations. Bomb explosions are carried out by using remote controlled devices and suicide bombers. Parochial and social networks can trace the potential buyers of materials used in explosive devices [4]. A good command on electromagnetic spectrum can help locate criminal terrorists.

2. Crime Science. Ultimate goal of crime science is to study that how the local environment affects crime, aggression and disorder [2]. Crime approach continues changing with new developments in technology. CCTV cameras help identify criminals but modern bank robbers take away CCTV footings to delete their electronic signatures. Deployment of CCTV hardware on high up inaccessible points could be solution. Street crimes like purse snatching, child abuse or gunpoint looting and organized offences like bhatta, abductions, bank robberies, gang rapes, electronic intrusions, suicide attacks, intelligent electronic devices or remote controlled bomb explosions, ethnic or sectarian attacks have become a panic for society, headache for governments and a challenge for the security agencies. Crime studies challenge the traditional assumption that society is divided into good and bad people and that bad people are the cause of crime. The notion that crime is proportional to the number of “criminals” provides no more illumination than asserting that farm output is proportional to the number of “farmers”. In farming, the production depends on the weather, the means of production, market prices and a host of other factors. Similarly, crime depends on a lot of factors independent of the number of good and bad people [5]. Cases must be investigated without keeping in mind any prejudice for any ethnic community. Mobile forensic labs may be used to examine any deadly crime scene. IT can help to understand the complex web of criminals who hide away or stand by during criminal investigations [6].

Presence of corrupt and immoral officials in police and security agencies shatters public confidence. Security officials succumb to death fighting criminals and terrorists but one immoral incidence defames the whole community. Citizens know the crime scene but fear reporting the police as black sheeps (ewes) leak informant’s identity to lawbreakers and government provides no shelter to the witness and informers. Repeated murders on evidence and release of killers on account of lack of evidence has promoted crime rate in developing countries. Judges and advocates treat justice as commodity and charge heavy fees to obtain justice. Criminals and terrorists are freed by court on account of lack of evidence. Bureaucracy decides the service structures by giving themselves more privileges compared the professionals responsible for running the technical departments. Inherited leadership, bureaucracy and corrupt system are responsible for most crimes in society. What can be the mindset of an engineer or medic joining police? It is an administrative authority, discretional power and opportunities to avail corruption opportunities rather than controlling street crimes, which attract professionals to otherwise boring career. It depends on the matrix to which we are plugged to. Society knows police accepts sleet to ignore crime and judges take bribes to punish the victims. Misuse of position and discretional powers sows the seeds of crime in society. American spy Raymond Davis killed two civilians on road in front of tens of people but he was released and Afia Saddique did not kill anybody but sent to jail for ninety years. People look at the principles governing justice systems in society. Why authorities demand millions of rupees to appoint police officers to specific police stations? High crime rate police stations are sold to officials at high rates. When they join police for doing crime how they can control it? What about the politicians who spend millions of rupees on election to win? Do they come to serve or earn money? They use their position to strengthen their own business instead of having any soft corner for community. Young police officers try to find solutions from internet instead of using available resources to control the ongoing street crimes. Identifying suicide bombers, target killers and deprived killers is like following a black crow flight route at night in a jungle or searching a black cat in dark room at night. Differences between criminology and the crime science have been illustrated in Table 1 [7].
Table 1 Differences between criminology and crime science (After [7])

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<th>Mission</th>
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<td>Understand criminals</td>
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<td>Long-term social reform</td>
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<td>Help the criminal underdog</td>
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Criminology is concerned with the understanding and explaining of crime. Criminologist mission may firmly be focused on finding the different ways of controlling crime, but scholarly role becomes defensible when crime is an irritant to the society and regarded as the inevitable result of psychological and social disadvantage. A criminologist may be a crime scientist who can not be a criminologist. Doctors and engineers have no crime control mindset but they pass competition exams just to become powerful bureaucrats. They join services to have better service structure and discretionary powers with embed opportunities. A practicing advocate joined patwari (land clerk) profession just for corruption opportunities. They use means to secure more productive (bribery) posts by money or political references. When incumbents charge sell high earning posts then how one can expect automatic change in crime culture. Every rupee you earn is given to do hundred times higher losses to state. When incumbents come with a corrupt mind set they can never control crime. Most of government machinery is promoting crime rather than controlling it. Governance system is such the eligible technocrats can not come uphold rule of law. A judge who accepts property gifts can not do justice. A police officer recruited by politicians can not proceed against their crimes and similarly a journalist taking plots can not do justice with his profession. Unfortunately the whole fabric is based on corruption, bribery, commission and sleet. We have to invent new leadership which can govern by obeying.

3. Control Technology

Technology is a handmaiden of crime control agencies as well as criminal mafias. It is pal of police and cron of convict. Mobile phones used by criminals do leave electronic signatures for police and security agencies. It is easy to locate criminals if incumbents use information technology. Crime reporting using electronic devices is considered a good strategy [8]. Pakistan started accepting IT based proofs as evidence in terrorism cases in 2013. Police should spend time on criminology rather than fascinating crime science. Crime control was always difficult but it has become even more complex profession after diffusion of terrorism in conventional crimes. Burglary and suicide bomb attacks are both crimes but the latter fall the
regime of war against the state. Any intentional attempt to impose a specific constitution against the will of citizens is an act of war which must be dealt accordingly. We do not yet know what would be the public attitude towards crime in the next two decades but rampant criminal trend will seriously affect routine services and critical lifelines [9].

Terrorists kill about 50 to 100 people every week in Pakistan in addition to the daily 10 to 15 fatalities in Karachi. They kill people by car bombings or suicide attacks and follow the injured down to the emergency wards to kill medics and corpse to burial sites to kill the mourners. Militants have 50 to 60 ethnic groups committing terrorism without any central command often controlled by across border foreign agencies. NATO revealed collaboration between secret agencies of neighboring countries to fuel the terrorists. Those who do not accept the constitution and kill Law Ministers are deadly terrorists. Pakistan has been sandwiched between terrorists and hostile neighbors. Terrorism is a communal issue which must be handled collectively. Nations who try to use it as opportunity to take revenge sow the seeds of demolition. Incumbents must fight back on war footing or else it will cultivate a criminal environment for a wide range of social crimes. Information technology provides a variety of discrete devices and systems to forecast, prevent, and control individual and collective crimes. Forensic information data like DNA, shoe marks, images and finger prints are being used by few nations for effective crime control [10].

Technology has helped tribes to transform from dark stone-age into a modern society. Information technology should be given a chance as it is the ultimate solution to control complex crimes. Word “possible” is hidden within “impossible”, technology is used to commit crimes but same can be used to control criminals [11]. We must use technology to control the crime but remember the societies are normally run by social theories not by science. Europe defined hard work and frugality as basis of good in 14th century after renaissance of humanity which enlightened the western society. America ended slavery in 19th century which created harmony among ethnic groups, races and states. Islam banned the burial of animate female infants in name of honor which became basis of women rights in dark ages. People who quarrel in name of minor religious differences must keep in mind the true large picture without any law and order. There is hardly any law and order supremacy in terrorism hit cities of Pakistan especially Karachi but life thrives on inertial traditions of society. Once we overcome the wave of terror then we would have to go after pre-crime control mechanisms [12]. Pre-crime studies followed by pre-emptive strikes seem to be ultimate solution i.e. to kill evil in the bud rather than waiting it to knock at door to respond. It is time to move the work of criminal investigators towards crime control [13]. A list of available hard and soft technologies used for crime control and prevention is shown in Table 2 [14].

<table>
<thead>
<tr>
<th>Hard Technology</th>
<th>Soft Technology</th>
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<tbody>
<tr>
<td>Close Circuit TV</td>
<td>Threat assessment instruments</td>
</tr>
<tr>
<td>Street lighting (Cameras)</td>
<td>Risk assessment instruments</td>
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<tr>
<td>Mace, tasers, stun gun</td>
<td>Bullying ID protocol</td>
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<tr>
<td>Metal detectors, soft x-rays</td>
<td>Profile of potent offenders</td>
</tr>
<tr>
<td>Ignition interlock systems</td>
<td>CCTV plus facial recognition</td>
</tr>
<tr>
<td>Look, lock and leave</td>
<td>IP network cameras</td>
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Forecasting crime for policy and planning decisions to deploy limited tactical police resources is traditionally based on econometric and extrapolation methods. Crime forecasting was considered simply not useful until recently. Crime data and technology persuaded scientists and police to focus on places, races and regions of
criminal history. Crime culture creates crime ecology that spreads around like contagious disease. There are places where specific crime is committed in routine. Crime history points out hot spots nationwide. Police started mapping crimes using information technology in 1990s [15]. To prevent crime the police must focus on places where crime takes place. Crime cases are often random and scattered over vast regions. Crime data shows a double shah (doubles money) appeared in Wazirabad and a triple shah (triples money) emerged 300km away in Haripur after ten years. There is hardly any similarity except economic conditions of people. Media creates awareness as well as helps spread crime information. Jailbreaks, suicide and vehicle bombings patterns in Islamic countries follow sequence in Afghanistan, Pakistan, Iraq, Libya and Syria. Large jailbreaks have occurred in Afghanistan, Pakistan, Iraq and Libya now next would be Syria. Almost same style is followed in all terror hit countries so one can reasonably predict the next big terror incidence. Geospatial mapping of crime hot spots and terrorist activities can help optimum deployment of police force to cope with rampant crimes. Spatiotemporal data helps police and security agencies take preemptive measures to stop reoccurrence. TV channels telecast interviews of professional absconded criminals but police can not arrest due to information as well as capacity problems. When criminals possess more advanced weapons and technologies compared to police and security agencies the state fails to maintain its writ on its own territory.

4. White Collar Crimes

White collar crimes are committed by executives and officials using their discretionary powers and positions in government and private enterprises [16]. Development in information technology has assisted respectable nobles to safely conduct crime while maintaining their status in society. Politicians and elites borrow money from banks and then sit together to write it off officially. Thousands of bank defaulters got relief under national reconciliation ordinance (NRO) which people considered a white collar crime so the Supreme Court dismissed the ordinance. Government of Pakistan has passed laws to accept electronic signatures as proof and to conduct secret trials using video links to conceal identity of witnesses, judges and prosecutors. Officials in Pakistan allot public property among themselves in the form of residence plots which is worst form of white collar crime among government officials. Bureaucrats and politicians have obtained dual nationalities to escape after financial scandals. Nature of crime varies from place to place worldwide but generally a country has the criminals which it deserves. Crime naught has taken the form of land, drug and buttha (private tax) mafias in large cities of Pakistan. Kidnapping fuels begging and terrorism industries by supplying cheap manpower. A kidnapper confessed he sells a child at price of $4.5. Some madrussas supply children for suicide attacks. High rolling agents collect money and send to foreign nations. We want to know the truth but do not dare to tell the truth. Public surveys are sometimes necessary to estimate the amount of crime not reported to the police due to fear of honor. Media dares to talk about fake fiddle pirs, but what about the real ones? Member national assembly, an elite politician attending an Urs (pir’s birth or death celebration) said “Our links on basis of pirism are rife over political differences”. Our parliament is crowded with tax and bank defaulter fake syeds, shahs, pirs, khadums, makhdooms, nawabs, sardars, wadairas and chaudharies. They collect sleet using official positions and claim it income out of their agriculture business.

Global economic system is such that some win and others lose. Losers are likely to involve in crimes. Fiscal differences between winners and losers should not be so high that the losers are forced to think of their existence. Our salary structure ranges from Rs10, 000 ($100) per month to Rs1000, 000 ($10, 000) per month. Taxes and prices are fixed by elite politicians who do not know ground realities. Bureaucracy helps enforce these inhuman laws having privileged status themselves. The rich rob the poor and the poor rob one another. Landlords and capitalists do not permit agriculture and wealth taxes and try to minimize budget differences by enhancing general sales tax (GST), raising debts and multiplying energy prices. They impose general sales tax on people who already live below the poverty line and use the tax money to buy bullet proof jackets and vehicles for their own safety leaving the tax payers on mercy of mercenaries. White collar criminals are also believed to supply fighting fuels to terrorist agencies. They do not arrest elite power and gas thieves but instead impose line losses surcharges on utility bills of good paying consumers. Minister for Water and Power informed on TV over 90% CNG station owners steal gas and 90 to 95% electricity consumers on certain places where specific crime is committed in routine. Crime history points out hot spots nationwide. Police started mapping crimes using information technology in 1990s [15]. To prevent crime the police must focus on places where crime takes place. Crime cases are often random and scattered over vast regions. Crime data shows a double shah (doubles money) appeared in Wazirabad and a triple shah (triples money) emerged 300km away in Haripur after ten years. There is hardly any similarity except economic conditions of people. Media creates awareness as well as helps spread crime information. Jailbreaks, suicide and vehicle bombings patterns in Islamic countries follow sequence in Afghanistan, Pakistan, Iraq, Libya and Syria. Large jailbreaks have occurred in Afghanistan, Pakistan, Iraq and Libya now next would be Syria. Almost same style is followed in all terror hit countries so one can reasonably predict the next big terror incidence. Geospatial mapping of crime hot spots and terrorist activities can help optimum deployment of police force to cope with rampant crimes. Spatiotemporal data helps police and security agencies take preemptive measures to stop reoccurrence. TV channels telecast interviews of professional absconded criminals but police can not arrest due to information as well as capacity problems. When criminals possess more advanced weapons and technologies compared to police and security agencies the state fails to maintain its writ on its own territory.

White collar crimes include but not limited to bribe, kickbacks, sleet, cyber pornography, coupons, money doubling tricks, gold making frauds, insider trades, fake degree selling, immigration illusions, commodities
bootlegging, fake products, charity scams, credit card frauds, ID thefts and money laundering. The law enforcing agencies can cope with these culprits by better training, new laws, speedy courts and crime kill priorities [17]. Sustained injustice and continuous corruption by politicians, incumbents and elites have developed hatred among public. Society justifies corruption for survival which is the basis of all social crimes. Religious leaders use “Shariah Law” enforcement as a threat to gain their vested gains rather than practicing Islam. It has been common norm worldwide to use religion for fight not for practice as no religions persuades for white collar crimes. Economic indices like inflation, interest and investment are based on market forces where hoarding, speculation and money laundering is considered a punishable crime. Fasting means stopping eating; what about stopping foods, and continuing drinks. For instance, load shedding is done to control the consumption of energy but people shift their loads to UPS and gas or oil fired generators.

We have to look for information and honesty based design out crime policies [18]. New parking technologies can help law enforcing agencies manage traffic, generate revenues and control crimes. E-payment, automatic license plate recognition (LPR), radio frequency identification (RFID) tags, street lights and close-circuit television (CCTV) help manage traffic as well as control crime [19]. Police can catch the stolen cars to control crime rate and minimize car bomb attacks. Although criminals have developed transparent sprays capable of blinding electronic reading devices, yet smart devices can change reading mode to record car number plate with crime. Islam offers effective solutions to socioeconomic problems which we have unfortunately never tried. Frugality is better than austerity. Create awareness to use lesser energy instead of imposing load shedding. Reduce power generation costs to minimize inflation instead of using oil and gas as income sources. Arrest power and gas thieves to reduce line losses and relieve good users. Reduce reliance on foreign debts as we are paying Rs.1300 billions on payment of debts and interest out of Rs.2400 billion income tax every year.

Experts propose easy access and movement, structural design, surveillance, ownership spirit, physical protection, safe activity, management and maintenance skills to design out crime. Better look, lock and leave keeping in mind the weak doors of bank do not justify bank robberies. Minimizing the crime opportunities by design out crime policies is more effective than controlling the crime [20]. Let us create a social environment which minimizes crime opportunities and adapts us to global peace, mutual respect and love. Peace and food are the ultimate basics which are abundant in nature but we destroy it for our own greed. Extreme secularity is worse than religious fundamentalism. A man who hates good can not be good person. Extreme secularity is the threshold of crime career. Most of convicts in Pakistan preach secularism to seek western support to hide their fiscal crimes. Societies are run by religious theories not by science. We respect our constitution but do not act upon it. Articles 62 and 63 ban politicians of ill repute most of them are there. Officials of political parties are present in police stations to election commission to protect the vicious cycle. We must define good and bad in order to create love and harmony among people. It is far easier to harness believers than atheists. People agree to reduce energy consumption on basis of frugality, if properly inspired, instead of imposing austerity.

5. White Witch Crimes: The roots of these white witch crimes are entrenched in local rites, faiths and traditions. Some people fear demons or devils and others exorcise them. White witch crimes are committed by fake inherited pirs, amuls (practicing exorcism), black or white magic enchanters using incantations and apotropiac. To evict evil spirits the exorcism is performed by Catholic Christians with cross, Essene Jews by extracts of roots, Hindus by wild weeds smoke and Muslims by incantations. Christian, Muslims and Hindus believe in evil spirits. Christians claim to have got rid of it after renaissance of humanity, science and industrial revolutions from 14th to 17th centuries but mysterious fire incidence in Caronia (Italy) in 2004 showed the modern secular Christians returned back to religious exorcists. Biblical references confirm prophet Suleiman (Solomon) deployed demons to build the Bait-ul-Maqdus (mosque), which stands in Israel. Islam recommends reciting Surat Al-Ikhlas, Al-Falaq and Al-Nas when you feel fear of evil spirits. Muslims believe the demons are made of smokeless fire and angles of nur (light). Hindus use mantra and yajna in Vedic and Trantric traditions to cope with evil spirits. Public views on demons and evil spirits vary from culture to culture. Various cultures and civilizations with different beliefs use wide range of words like Aku, Amon, Ben, Tash, Vigo, Zed, Devi, Hex, Nero, Ravan, Oni, Alaster, Ethismus, Satan and iblis for the evil spirits. Pakistani Muslims and Indian Hindus have different religions but both believe in similar evil spirits. Charrail (ghost), blah (ghoul), budruh (zombie), dian (vampire), bhoot (ghost) and jin (giant) are few names
used to express invisible spirits in Pakistan (also northern India). Indian media exposed some 40 women (in last eight months) were declared diwani (evil spirit) and forced to walk naked in village as punishment in Jhar Khund State. In another incidence a 23 year old female student was raped by a gang in bus. Indian police registered 359 gang rape cases in 2012. A rich man teased a girl and killed her brother on resistance. In the presence of huge superstitious market some people have descended on pirism and exorcism professions to loot the people.

Media movies, myths, fictions and legends refer this entity to sudden appearance of a nebulous image. Movies and fictions on Dracula, werewolves, zombies, invisible man, xenomorph aliens, mermaids, hydra, godzilla, dragons, Seylla, Capricorn, faries, firebird, sphenix, phoenix and ariel have further confused societies. Publication of books like “The Demon Syndrome” by Nancy Osborn & Ann Haywood, “Possessions & Exorcism” by Sarah Ferber, “Christian Voodoo” by Eric Gibbons, “Demons, Possessions & Exorcism” by Robert Pelton, “Yehuda Fetaya” by Minchat Yahuda and “Frankenstein” by Marry Shelley have played the role of late night horror movies. My point is not to discuss the ways how the religious and inherited scholars evict evil spirits, rather to expose how the superstitions are used by criminals to cheat the innocent society. The culprits use modern science as well as religion to conduct moral and fiscal crimes. People claiming power to control demons for getting information and feedback often use the information provided by client on reception to tell the cause of problem. I often ask pirs claiming power to overwhelm on demons to use them to drive generators to produce electricity to solve power crisis but none to date could demonstrate this supernatural capability. Scientists believe demon possession is a disease [21].

Fake religious morons, inherited pirs and shrine custodians often misuse their social regard for moral and fiscal crimes. Western white collar crime may be called green turban crime in Pakistan, orange apparel crime in India and black magic crime in Africa. Atheists believe in evolution, so they do not fear from demons. Communists believe in “man behind every magic” so they do not fear any supernatural powers. Indus valley civilization believes in ethereal spirits, which is the cause of many social crimes. We live in a jinxed society which believes in white magic, high spiritual powers pirs, and inherited nobles who use sorcery or inherited acumen to solve our social problems. We believe in an invisible hand that does not exist in a physical world, we know today. Fake pir ravish women and blackmail simple men from jinx and curses. Fake highbrow maulanas defame religion by operating hahala centers in London. Marriage of woman with Quran (like nuns) is done to protect land and under age girls are placed in wedlock with old people to settle family disputes which must stop. Deputing children to serve pir or maulanas is injustice with infants. I know many pirs whose children go to good schools but they accept flunkey children to serve them. As adage goes that a country always has the type of criminals it deserves. Punitive deployment of children on pir services as token of devotion must be banned [22]. To inform people, in an ignorant society, is hard slugging. President Zardari slaughtered few black goats (why not white?) before entering President House. He stayed in Karachi for long time as his pir doubted danger from mountains. Prime Minister Benazir got education from west yet believed in black magic and had worn a black band on her arm the day she was murdered in bullet proof vehicle.

Information explosion and liberty of expression has led the humble public in a state of awe with eyes wide open. Civil society is astonished on inconsistent globalization and terrorism policies. Law makers leave flaws for their own use and people do not dare to change them. How can incumbents act the roll model when they come with mindset of churning out money? When leaders commit fiscal and moral crimes, how can they punish others for the same? Rich loot the poor and poor loot one another. Pirs use faith in supernatural beings to loot the illiterate society. There is a long way ahead to educate people and modify their beliefs. Old time jado (black magic), tona (necromancy) and tawiz (spells) business are crime hatcheries in Pakistan and India. People believe the angels are at their work and devils play. Hell is empty and devils are here. We know the faith has obscure hold on people lives and some criminals use their status to do crimes. They frighten their followers saying the vampires subsist on life so they suck living human blood. Fake white witch exorcists ask innocent people to bring bones out of graves to learn art of controlling ghosts. Once they learn the art they recruit new learners. Muslim scholars teach the jins are sentient beings with free will like us who can coexist with humans. Hindu concepts of reincarnation and transmigration of souls is often used to frighten people to pay money and distribute foods on Thursdays to feed hungry and thirsty souls lurking around you whom you can not see but they see you but can not speak. Exorcists use manpower and technology to harness victims mentally.
Youngsters are declared to have been possessed by evil spirits whom amuls (exorcists) treat by wild weeds smoke and private secret tactics behind the wall. Catholics also used to drive out demons and witches to show the power of church. Scientists believe the demon possession is a physical or mental illness like hysteria, mania, psychosis, epilepsy, schizophrenia or dissociative identity disorder. Many young women go to pirs for prayer to induce breeding capability, evict black magic impacts and write tawiz (holy words) to harness others. When women share their personal problems with pirs in isolation they use wide range of tricks to rob and impress them with their supernatural powers. Most of young women keep silent hardly a few percent dare to speak. A fake pir raped 300 women in his pirism crime career and finally fell prey to police as shown arrested in Fig.1.

Figure 1. The fake pir who cheated 300 women in his career (Express News, TV)

Several women loose their virginity whilst learning religious lessons and serving iniquitous pirs. ARY and Dawn channels often show cacodemon programs on how people remove parts out of graves to use it to teach or learn black magic. Society compels women to go to pir to get blessing to bear male children. Several women are murdered by husbands or burnt alive by mother in law for bearing daughters. The malediction, voodoo and hoodoo are basis of social crimes deeply rooted in our rites and rituals. Science education seems to be the ultimate solution to control superstition as fear springs out of ignorance. If we continue telling infants Caucasus pretty faire and somber demon tales then they will continue falling victim to witchery crimes. Concepts of curses and evil eyes are rooted deep into local culture. We listen to giants stories in childhood which help our brains create imaginary monsters. In response to question of drawing picture of demon 35% students focused on teeth, 30% on hairs, 15% on eyes, 12% on wings and 8% on horns. We have never seen any demon yet fear going to graveyard at night where criminals often get together. They themselves spread rumors of pucky (demonic) place to use it for various social crimes at night. Voodoo and hoodoo business are social crimes but how the incumbents can stop them when themselves believe them. We see well aware people using amulets to reflect, quench or drafact the evil eye. Business managers use precious metals and concentric circles to reflect or absorb the evil eye as apotropaic. Demonic men and women go to pirs for incantations to avert misfortunes or evict apparition. Western scholars used to investigate occult arts but after renaissance of humanism in 14th and 15th centuries they discontinued. Scientists do not believe in evil spirits yet they use old Roman and Greek divine name like Helios, Apollo, and Sol are used as prefixes in science. Return of Ra (also Re) is often touted as ultimate result of energy crisis.

William Blake said “prisons are built with stones of law, brothels with the bricks of religions”. The fox preys farthest from its home but fake pirs and amuls start their imp business in densely populated cities at their home. Faith and fashion based crimes are normal in east as well as west. A superstar Madonna confessed in her 80s that she was mistreated when young in New York at gun point [23]. There is huge crime in homes and streets but people fear to report as society hates victims not criminals. Young girls and women are psychologically harnessed during chillas (period) in graveyards at night, which further recruit others to serve
the wicked pir. Media has shown the evidence that fake pirs make videos of young women to black mail them. Media has reported rape of two sisters by officials when they approached police. Situation becomes worse when police starts harassing girls in their custody. Pirs ask ignorant young people to supply bones of dead teenagers and owl blood to learn voodoo to undo spirits possessions, treat sub-fertility, overcome hoodoo or soften the heart of spouse. New entrants can not dig old graves at night to get the human bone so they pay money to pir’s agents to do it on their behalf which is the ultimate goal behind this magic business. Pirs, we know today, have no supernatural powers, whole hoodwink is simply money centric. Pir and amuls use dark dresses, hairy and harpy outlook to harass and hound flunkeys. They often use some type of magic to show miraculous power which observers do not dare to concentrate under faith pressure. A scene of black or white magic practicing fake pir is shown in Fig.2.

Figure. 2 A scene of black magic practice (Source: Internet)

Public surveys are often more reliable for assessing the social crime trends in Islamic countries. Criminal mafias are strong so the public fears telling their crimes due to lack of official protection. Public surveys rarely encompass all crime, rarely procure statistics useful for local crime prevention, often ignore offences against children in Mosques, Madrassas and trucks and do not question the offenders brought before the criminal justice system. Public believes some of ill reputed Madrassas supply suicide bombers to terrorists just to earn money. Human bloodshed may be business for someone and holly task for others. All the three major political parties in Karachi are involved in land, drug and buttha crimes but none will speak for fear of targeted killing. In the presence of inherited political, abnormal and religious positions in society, it is impossible to overcome embedded cultural crimes. Society wants to ban the weird positions but parliament and senates are crowded by such inherited pirs. They have a false flag democratic fabric to justify their institutionalized corruption. They use discretionary powers and social positions to deprive public from their genuine rights. Saints like Sakhi Sarwar, Data Gunj Bux Hajvery, Shah Latif Bhatai and Bulle Shah were pious scholars who spread Islam in India. They had good moral behavior and character which attracted people to Islam. Everybody respects the saints for their scholarly contributions and piety.

Descendents of Sufi saints today do not reflect their forefather’s character. To be an inherited pir has become a respectable profession today which is often basis of social crimes. Saint’s descendents and intruders (self declared) have opted pirism as a commercial profession to accept donations from poor ignorant people for incanting to solve their social problems. This community has occupied top positions in politics, media, business and civil services. It has taken the form of a superior creed depriving others from their due rights. You can note Syed, Shah, Pir, Makhdoom, Sahab Zada and Pir Zada type names in politics, bureaucracy and media. These races have come from Arab, Iran and Caucasus literal states over 500 to 1000 years ago. These races can not mix up with aboriginal pakhtoons, Baluchis, Sindhis and Punjabis. They are converting democracy into a modern tribe system. They supported British armies in past and collaborate with foreign agencies today. They use electronic and print media coherently to impose their point of view without listening others. Public rights are often deprived by sardars, chaudaries, nawabs, wadaira, syed, shah and pirs. They are hardly 5 to 10% of population dominating others. It is my humble wish for their accelerated diffusion in society with desire to not use creed and race reflecting names to create disperse in society of diverse races. We
can use “being Pakistani” as a national slogan, unity, faith and discipline as national emblem, Islam as national religion and Urdu as national language. We speak local languages, read in Urdu and write in English. We listen in English translate into Urdu and ponder in local language. Better we stick to one language like Arabs, Germans, Japanese, Chinese, British, French and Americans.

6. Lifelines Security Challenge: Life and lifelines security challenges are constantly increasing worldwide. Life thrives on modern power, energy, water and social lifelines. Shut down of energy in extreme cold or hot weather amounts to act of war. Hostile armies attack enemy lifelines for subjugation. Pakistan is terror and power crisis hit country. Tribal people were given free electricity supply by WAPDA but it was discontinued during war on terror for power and gas crisis. Militants attack high voltage power transmission line pylons and grid stations in hot summer. Foreign agencies persuade local high rolling agents to oppose dams and pipelines. Hostile agencies supply explosive to cohorts to attack power and gas lifelines. Masked terrorists attacked 500kV grid station in Peshawar damaging transformer, switch gears and control room. Terrorists attack power lines in hot summer and gas pipelines in chilly winter to wreak havoc in power crisis hit nation. Militants attacks power transmission and distribution system in most of KPK, FATA and PATA regions but frequency of attacks is too high in Bannu, Safi, Peshawar, Swat, Mahmand, Matta and Bajour as shown in Fig.3.

![Geospatial hot spots spectrum of power lines attacks](image1.jpg)

**Figure 3. Geospatial hot spots spectrum of power lines attacks**

Attacks on power lines are carried out by militants but some civilian leaders like Haji Adil persuade civilians to not pay electricity bills. ANP leadership uses ethnic issues to misguide their followers on national dam policies. Baluch militants often attack on gas pipeline networks between Mustang, Pir Kho, Sui, Dera Bugti, Queta, Naseerabad and Mashmore districts as shown in Fig.4.

![Geospatial spectrum of gas pipelines attacks in one decade](image2.jpg)

**Figure 4. Geospatial spectrum of gas pipelines attacks in one decade**
Baluchistan region is too hot in summer and too cold in winter. FATA is also hot in summer and chilly in winter. FATA is a lawless region between Afghanistan and Pakistan spread over vast area along borderline inside Pakistan. It is true example of a house with broken windows which is sanctuary for militants and terrorists. Militants carry out terrorist attacks in Pakistan. Pakistan Institute of Peace Studies has been publishing reports on their terrorist activities in its annual security reports.

Veiled militants attack NATO oil and goods supplies from Karachi to Afghanistan take revenge of drone attacks. Electronic and print media reported on use of these tankers for distribution of explosives and ammunition to certain terrorist groups hidden in Pakistan. There are over 60 militant groups in Baluchistan, FATA and KPK. Attacks on NATO tankers increased from 2010 to 2011 and then gradually declined by start of 2013. Most of oil tanker and NATO supplies attacks were noted in remote locations in KPK, FATA and Baluchistan. No attack was reported in some period in 2012 for discontinuation of NATO supplies as shown in Fig.5.

![Figure 5. Attacks on NATO oil/goods supplies [26-28]](image)

No bloodshed was seen in FATA during ten years Russian occupation on Afghanistan. Federally administered tribal areas (FATA) of Pakistan have become a haunted house during war on terror. Multiple races militants have been locked there by green on blue politics. Old time Jihadi, Afghan Northern alliance spies, hostile nations agents use Taliban flag for their own missions. Veiled Tajek, Uzbek, Afghan, Arabs and multiple origins militants can not go anywhere as the area is surrounded my military forces. Local people are sandwiched between veiled mercenary killers on ground and drone attacks out of blue sky. Terrorists destroyed hundreds of schools in FATA to shutdown their learning lifelines. Terrorists obtain explosives and money from hostile agencies to carry out terrorist attacks on military bases, shrines and religious places in Pakistan. Attacks on schools started in Northern Afghanistan by end of Taliban regime in Afghanistan and continued smashing education institutes in Afghanistan, FATA, KPK and Baluchistan to invoke darkness in already less developed areas on hypothesis the crime springs out of ignorance. Government started rebuilding schools and colleges in affected regions then some contractors were also reported to build and smash to get new contracts to build the same schools and colleges. Human desire to earn out of the worst continues inspiring on crime. It is interesting to note the desire for education is relatively more in FATA, KPK, G&B and Kashmir compared to settled and developed areas in Pakistan. Government of Pakistan is very serious in educating the tribal people but terrorists have damaged thousands of the schools as shown in Fig.6.
Terrorists attack energy infrastructures, military installations, public places, shrines and worship places whatever comes their way to weaken the state. They enter in holy places to kill people by firing followed by suicide attacks. Drone attacks from sky in FATA and suicide attacks from ground throughout Pakistan wrought the havoc but security forces continued combating the evil. Militant attacks on shrines and worship places are shown in Fig. 7.

Most of attacks occurred on Muslim shrines and holy places and rarely a few on Christian churches and Hindu temples. Pakistan manages energy demand by power and gas load shedding. Power supply disruption remains for 10 to 15 hours and gas disconnection for days. PEPCO faces 4000 to 5000 MW power deficits in hot summer and SNGPL 1 to 1.5 BCF gas shortages in chilly winter. Good bill paying consumers protest load shedding and power thieves silently steal. Direct connections are root cause of unaccounted power pilferages and line losses which are reported to vary from 30 to 50% in HESCO, PESCO and QESCO. Water and Power Minister informed on TV the line losses on some 11kV distribution feeders in PESCO rise to over 90%. PEPCO plans to install smart meters to which public opposes. A smart meter simply tells the power use pattern but can not help in case of direct connections. What a smart meter can do to stop illegal extensions in premises which do not use any type of meter? Influential industrialists, retired bureaucrats and politicians steal electricity and gas which inspires common people as shown in Fig. 8.
Globalization and internationalization through collaboration, terrorism and pestering through social engineering are two opposite policies evolved same time. World aware communities know population explosion, climate change and energy crisis are the basis of whole evil. Terrorism and extremism are serious issues but war on terror is a green on blue politics. Water remain polluted until dead dog is in well. It is hard to eliminate crime without removing the embed reasons. As citizens of global village why we need visa to go from place to other places? Why some work and others do not? Why some are masters and others white slaves? Why a few are too rich and others too poor? Differences are essential but too much differences causes problems. Height difference causes river flows, pressure difference causes wind flows and potential difference causes electric flows. Too much level difference brings floods, too much pressure difference causes twisters and tornadoes, and electric shorts lead to explosions. Minor social and monetary differences help do daily business but too much difference brings bloody revolutions. Social engineers use color revolutions to reshuffle systems and regime change. World community is approaching the threshold of oil breakpoint, which may start anywhere any time. South Asian nations face long blackouts, flash floods and terrorism causing security problems [29]. Essential problem is not just that we are tapping the wrong type of the energy sources (though we are), or that we use the inefficient technologies (though we are), but that we are overpowered, and we are overpowering nature. If you can think, that you can do or not, then whatever you say you can do. Middle East is home of fossil fuels but it position is like a beautiful young woman without weapon. Western industries are energy black holes on earth. We have to get out of white and black holes politics.

World community does not know who invented 9/11 plot, yet the global terror wave has spring out of it. Terrorism and globalization are two opposite phenomena evolved almost same time. Foreign forces and masked mercenaries kill hundreds of innocent people in Pakistan, Iraq, Libya and Syria every day by similar suicide and car bombing attacks. They attack people and then follow injured to hospitals and dead to burial sites to kill the paramedics and mourners. American drone attacks on terrorists in FATA kill innocent civilians. They can not leave the place as there is I and U difference between soil and soul. Population of FATA region is over 10 million. Terrorists may be ambushed somewhere in caves and mountains, but there live ordinary people in thatched roof houses. American drones patrol the region in routine to search and kill terrorists. One can imagine the emotions of people who see drones and wait for lighting to strike. Amnesty International, Human Rights Groups and University of Law in New York have called unprovoked drone attacks are worst form of terrorism. Whenever incumbents try to start peace process drones fire missiles on militants to stop negotiations. They fuel terrorism by supplying explosives and weapons to militants. Americans have murdered 2500 to 2600 innocent people and injured even more civilians by 402 drone attacks in FATA from 2004 to 2013 as shown in Fig.9 [24-25]
Drone attacks act as bolt out of blue sky. Drone attacks from sky and bomb explosion on ground stop children going to field for play and school for learning. Tribal children fear from the blue sky as drone attacks can not be conducted in cloudy weathers. They are forced to stay inside as drones kill children playing outside. Imagine three 5, 7 and 8 year old blue eyed school girls who were injured by drone attacks whilst playing at green farm nearby their home. Incidence disabled girls for life and killed their 68 years old grand mother who used to tell them sweet stories. Drone attacks instill fear in hearts of children and create hatred against western society. Drone attacks kill hardly 2% terrorists and take life of 98% civilians. Tribal militants support attacks on incumbents for keeping silent on drone strikes. US drone operatives also confessed attacking child half a world away for no reason. It is left to readers to decide who threw innocent Pakistani Wazir children, women and men into blue funk chilling them to bone marrow? If there is a hope, dear readers, you are it. No doubt the drone attacks have incapacitated terrorists causing widespread collateral damages in terms of life and property losses.

We must stop oil and water mixing politics. A believer and atheist can not mix but coexist. When oil and water do not mix we must not use blood to break the diffusion barrier. It has become a norm to threaten owners to sell commodities at lower prices and make global laws to support friendly nations. A nation can bomb other but can not use power to win their hearts. Great Britain in 19th, Soviet Union in 20th and America in 21st century tried to occupy Afghanistan but all of them failed. A common man on street knows the energy resources are the raisin d’être behind the terror war. Global leadership preaches human rights but after all prattles come down on dirty goo. Unilateral policies on Kashmir and Palestine resolutions have created doubts in Muslim minds. Indian and Israeli occupation on their lands and waters are the root cause of extremism in Islamic countries. India and Pakistan can sit together to solve their mutual conflicts but remote controlled veritable hands on both sides do not let the leaders decide. Military supremacy has philosophically linked blood with oil and water. We are not the only living creature on earth there are animals and plants too. What are differences between plants, animals and humans? Plants do not think, animals think for their own survival but humans for others too. Life thrives on life. Energy is life but our lives must not thrive on fellow human lives. There are several common goods for coexistence. A holistic approach can certainly solve the problem. Light is good and dark is evil, light has to be lit but dark prevails at its own. Global terrorism has sprung out of 9/11 incidence. As result of so called war against terrorism, Pakistan suffered 50,000 lives and $100 billion property losses in addition to defame in international community. Hostile nations have left no stone unturned to use the opportunity to further worsen the already worse image. Suicide and car bombing incidences have promoted crime in society and war on terror has cast evil gun culture in Islamic countries. Globalization of gun culture has increased crime rate world wide [30]. Youngsters carrying weapons kill on trivial matters which otherwise may not lead to murder if they have no access to weapons.

7. Conclusions: Crime and terrorism are often linked through deprivations rooted deep in ethnic and political systems. Rightists argue if the bank door is weak that does not mean robbers be excused but leftists plead social equality on basic needs. Information technology will provide solution to crime culture tomorrow if not
today. Fake pirs use religious beliefs to instill fear of demons and evils. A poor man said blood pressure, sugar and apparitions are diseases of rich people. Human brain creates demon figures and then fears itself by imaging their physical nebulae. Forces behind crime and terrorism are often more powerful and smarter than security agencies in developing countries. Attacks on military installations and cricket players lead to neighboring hostile countries which try to sustain the crime culture to achieve their vested interests in affected country. If security agencies fail to recognize veiled local and foreign criminals then those barren remote hilly regions becomes labs for social engineers. Any declared lawless region like FATA may become a house with broken windows. Crime hatcheries produce convicts not noble laureates. Hostile countries do green on blue politics in name of human rights and monetary aids further to worsen the worst scenario. Those who accept enemy weapons against state must be crushed by force. If politicians and bureaucrats will continue violating their own constitution then criminals will also do the same as nation has criminals which it deserves. Global elimination of crime out of society needs infrastructural, social and moral changes. A social change can be brought only by inspiration not perspiration. Societies are run by social theories not by science. We can use science to promote truth but it hard to do in presence education and health business. We can not expect illiterates to know at own intuitively without enabling him/her to read, experience and assess to decide.

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PAKISTAN’S STAKES IN AFGHANISTAN IN THE REALM OF REGIONAL GEO POLITICAL DYNAMICS

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ABSTRACT. Foreign policy of any country does not function in isolation and is dependent upon certain non-tangible factors directly influencing national policies such as geography, demography, economy and overall socio-political environment in the region. Regions like ours having additional factors like terrorism emanating from instability in our neighboring country like Afghanistan having presence of two nuclear powers with a history of conflicts, further exacerbates the challenges. These factors combined put Pakistan in a catch twenty two position. Such challenges also portend opportunities if manipulated sensibly and countries like ours can still accrue benefits to safeguard its national interests. Afghanistan has assumed a paramount leverage on and pivotal position in the Central and South Asian region due to its undeniable geo-political uniqueness. In this region Pakistan being the immediate bordering country and its Khyber Pakhtunkhwa Province and Tribal Areas experience immediate fall out of any turmoil within Afghanistan. Scarlet thread in Pak-Afghan relationship is to have a friendly and stable Afghanistan or in the worst scenario at least a neutral Afghanistan would suit our national integrity and internal stability. Pakistan’s interests in Afghanistan have been undeniably stretched to political horizons where Pakistan not only wishes to have a favorable Afghan government but also desires to have peaceful western border, to counter Indian enhanced influence as well as to relegate Pashtunistan issue to the backburner. Similarly Pakistan can have access to the Central Asian Republics, rich in oil and gas reserves, through a safe land route via Afghanistan. Afghanistan has strategic significance for Pakistan who can benefit from our advanced defense industries and military training. It will not only stabilize our internal situation but in future enable Pakistan and India work together to improve bilateral relations ensuring a safe and secure eastern and western borders in the long run.

Keywords: National Interests, Strategic, Defence, Militants, Durand Line, Pashtunistan

1.Introduction Pakistan and Afghanistan are intertwined, whose sphere of relations is not only inclusive of neighborhood but encircling the longest border, same ideology, Pashtun ethnicity. Besides the protracted war in Afghanistan, most probably the Jihad against communist forces of Soviet in which Pakistan’s soil sorted out freedom fighters in order to exonerate Afghanistan from ruthless clutches of the Soviet. Afghanistan is connected with Pakistan in such a way that stability in Pakistan cannot prevail in case of insecurity inside Afghanistan. Peace and stability in Afghanistan is paramount for Pakistan national interest. Pakistan is dependent on Afghanistan for channeling its access to not only Central Asian Republics but cordial strategic
and economic relations with China are also possible only due to stable Afghanistan. (Haq, 2013) Moreover, the bilateral relations can take a significant turn by mutual cooperation regarding Gwadar sea Port, Durand Line and Pashtun issue. Furthermore, this ambit encompassed the regional interests and reservations of Pakistan against India while keeping balance of power notion in consideration, and is apprehensive about Iran’s for her instigation of Shia militia in Baluchistan. (Larry, 2012) Friendly and stable Afghanistan provides depth to Pakistan against India. (Amin, 2013)

2. Pakistan’s Stakes in Afghanistan: Pakistan’s stability is pervasively interlaced to Afghanistan because the ongoing turmoil across the western border has infested militancy and extremism inside Pakistan. Trans-border clientelism is the main obstacle in restoring peace and security in many countries like Pakistan, Central Asian Republics, Afghanistan and Iran. (Amin, 1998) Ethnic nationalism, ethnic strife and further its exploitation by the major powers have been the essence of regional geopolitics. Main reason of Pakistan insecurity is infiltration of militants across Durand Line. Pakistan has long border with Afghanistan, which is not well-managed and people sometimes move without visa. Some of that movement is healthy while other are unhealthy so the situation in Afghanistan has direct effect on Pakistan. (Khar, 2013) For example people after Swat operation were flee to Afghanistan and Pakistan government of PPP repeatedly asked Afghanistan to handed them over. (Ibid) Therefore Pakistan has always asked neighboring countries to play their role in this regard by fixing intelligence devices, deployment of military check posts on the Afghan side of Durand line so as to curb militant’s infiltration. (News, 2008)

Pakistan is apprehensive of the US goals in Afghanistan which are not only limited to Afghanistan but through Obama ‘Afpak strategy’ has taken Pakistan in its folds as well. One of the US main aim seems to watch Pakistan nukes and nuclear proliferation which are the only survival tools against India. (Felbab, 2012) Moreover, Pakistan is suspicious about the US motives in Afghanistan of building stable government which could ever favorable to Pakistan or at least not hostile to Pakistan’s interests. Contemplating historical political set ups in Afghanistan, the Taliban government has served Pakistan’s cause to the utmost but now due to intricate transformations it can only be damp squib. Furthermore, on the horns of a dilemma Pakistan is to comply with any of government coming to the forefront. The US is headstrong about her deep politics in Afghanistan and the obvious manifestation in this regard is the presence of troops beyond the exit. (Ibid)

Pakistan is unflinching for having cordial and peaceful relations with Afghanistan. But Afghan Taliban’s infiltration across Durand Line into Pakistan has ratcheted the parameter of stable bilateral relations by escalating militancy in tribal areas. This intricate security situation has been troubling to the country and demand exigency because resultantly it has doubted Pakistan’s role in war on terror. Pakistan has been accused by the US on more than one ground that ISI is backing, nourishing and harboring Taliban as according to Ahmad Rashid, Pakistan assisted Taliban with military and political aid envisaged that they would concede and legitimize Durand Line as boundary, which is capable of dismantling Pakistani state. Contrary to Pakistan’s expectation Taliban inflamed Pashtun nationalism by giving religious tinge to nationalism. (Rashid, 2010, p. 187)

If a realistic look is taking of Pakistan and Afghanistan relations, then it come to the surface that Pakistan and Afghanistan relations have been remained murky due to various reasons, among which Pashtunistan has been one of main troubling aspect since long. On Afghan side, Pashtunistan nationalism is based on argument that Pakistan’s Pashtun are integral part of Afghanistan, furthermore Baluchistan being an outlet of Afghanistan to the Indian Ocean is inevitable to merge with. Due to these factors Afghanistan had refuted the validity of 1947 referendum and its foreign policy till 1980s revolved around Pashtunistan. ( Shayeq, 2007, p. 72) The Afghanistan since long had been trying to change the Afghanistan-Pakistan border to greater extent. According to Lord Curzon, frontiers are sort of tension for all foreign offices in social and civilized world. It is a base on which matter of war and peace or life and death hinged on. (Curzon, 1907, p.1) There are myriad example of it, like Kashmir between Pakistan and India, tussle on Abkhazia between Russia and Georgia, Nagoro Karabagh has endangered terms of Armenia and Azerbaijan, border tussle of China and India, dispute of Cambodia and Thailand and most critical of all is Durand Line between Pakistan and Afghanistan. Pakistan is averse to the Afghanistan claim on Pashtun inhabitants of Pakistan. (Rashid, 2010, p. 87) in order to settle the issue of Pashtunistan, Pakistan wants client state in Afghanistan because this grave issue can bifurcate Pakistan on the basis of ethnic strife. (Weinbaum and Harder, 2008, p. 28)
Pakistan and Afghanistan have common religion, culture, customs and traditions but to the great dismay the superpower involvement in both minor states has upset the apple cart. Undoubtedly, in Pakistan the non-state actors with their external patrons have trembled national security with exacerbated extremism and sectarianism which are the direct fall out of Afghanistan turmoil. Pakistan’s foreign policy in war on terror decades is on head on not only for regional stability and peace but is neutralizing the immediate threats and leverages in Afghanistan from India. (Siddiq, 2010) Whereas, the US is also dependent on Pakistan’s role for degrading the momentum of Al-Qaeda and other terrorist networks.

3. **Indian influence**  India has envisaged Afghanistan pivotal significance in its foreign policy after 1990s at the demise of bipolar world structure. Both countries had instigated friendship treaty in 1950 with good pace of diplomatic terms. Her enhanced cordial relations with Afghanistan after 9/11 and special turn of relations have come to the forefront in October 2011 with signing of strategic partnership agreements. Basically, India carved to be most dominant power and player in South Asia and within Indian Ocean basin, to cater for its strategic interests and to grapple with all hurdles in this regard. (Fair, 2012, p.180)India is farsightedly investing in Afghanistan in order to foster her nexus with Afghanistan, which could make it powerful stake holder at the exit and beyond 2014. (Ghazzanfar, 2013) She is Afghanistan fifth largest bilateral donor, who has ventured so many infrastructure related construction projects.(Ibid) Moreover, she is contributing in development of Afghanistan and training Afghan integral security forces. Wherein India has disbursed more than $2 billion in Afghanistan and have strategic ties with Afghanistan, therefore Afghanistan looks up to India for her development. (Sherpao, 2013)

India has always remained averse to Talibin regime and sided along Iran, Tajikistan and Russia to Northern Alliance because Taliban are considered closely allied to Pakistan. As far as India role in Afghanistan is concerned then it can pose challenge to Pakistan’s foreign policy because both India and Afghanistan are boisterous to Pakistan throughout the history. Southern and South Eastern Afghanistan is known to the Pashtun dominating areas, these appears to be a majority of Pro-Pakistan population , whereas presence of considerable number of Indian councillets on Af-Pak border indicates a certain degree of Indian interests with availability of some liberty of action. India sought proactive statecraft and pro-Indian lobbies in Afghanistan and has been succeeded to the great extent in this regard. It has flourished diplomatic missions in strategically significant areas which are maximizing Indian influence at the expense of Pakistan. (Hussain, 2012, p. 93)

Apparently, Washington had its own priorities for this region as part of its China-driven larger Asian agenda and its ongoing post-9/11 Central Asia-focused ‘great game’ in pursuit of its worldwide political and economic power. In 2005, it signed a long-term multi-billion dollar military pact with India to keep its military industry running. It also entered into a country-specific discriminatory nuclear deal with India introducing an ominous dimension to the already volatile and unstable security environment of the region. Delhi is covetous to access Central Asia energy market and for an effective trade, transportation and infrastructure in Afghanistan. As China is nightmarish for US in this region but dominant role of India will curtail China influence in South and Central Asia which is desired by US and Delhi. (Pant, 2010, p. 147)

In 2012 Leon Panetta eulogized India role in Afghanistan economic and commercial sectors and Delhi assistance in training of integral Afghansthan armed forces. India pivotal role in Afghanistan’s security could sideline Pakistan role in war on terror. Furthermore, Afghanistan agreements with Russia and Central Asia for logistical support would relegate Pakistan to background. General McCrystal in 2009 expressed his apprehension about India hegemonic role that it could ignite Pakistan and as an aftermath violence would be escalated inside Afghanistan and India by Pakistan. (Larry, 2010, p. 23)

Pakistan was on tenterhooks by Karzai visit to India in2011 for contracting strategic ties as it will enhance Indian influence in Afghanistan. It is doubted that in order to balance the power of region, in retaliation of India covert activities in Afghanistan and Pakistan province Baluchistan, hence Pakistan will come to grips by allowing Jehadi and Talibin groups Lashkar-e Tayyiba, Jammat-ud Dawa, and Tahrir-e Talibin-e Pakistan for instigating instability in both India and Afghanistan. (Payind, 2013) On the other hand, Indian hegemonic status in Afghanistan is strategic defeat to Pakistan. (Gates, 2009, pp. 2-11) India reopened embassy in Kabul soon after Talibin was toppled. It has also opened four consulate offices in major Afghan cities of Qundahar, Mazar-e-Sharif, Herat and Jalalabad. Prior to that there were no consular offices.
Pakistan has doubted Indian consulates at Qandahar and Jalalabad that these are not for commercial purposes but are used by Indian intelligence agency, Research and Analytical Wing (RAW) for covert activities inside Pakistan. India has established its consulates on multi ethnic basis as two consulates in Pashtun region (Jalalabad, Quetta) and two in non-Pashtun (Mazar-e-sharif and Herat). Her reconstruction projects in Pashtun belt are pertinent to erase the label of anti-Pashtun from her. India has same position and standpoint as that of Afghanistan on all violent activities and treatment of militants. Both are high handed about Pakistan and set her responsible for all these insurgency rather than to contemplate the real root cause. (Qassem, 2009, p. 158)

There is mistrust between Pakistan and India and both are accusing each other.

Pakistan alleged Indian complicity in flourishing militants networks in Afghanistan various areas especially near Gereshk, in southern Helmand province; at army basis of Qushila Jadid, in the Panjshir Valley north of Kabul; northeast of Kabul; and at Kahak and Hassan Killies in western Nimruz province. (Frederic, 2006) Mushahid Hussain, Former Chairman of the Senate Standing Committee on Foreign Affairs stated in July 2006 that RAW had been involved in 600 Baluchi training inside Afghanistan and is igniting radicalism in Baluchistan. Moreover he emphasized on RAW covert agency inter-linkage with RAW. (Ibid) India is said to be providing funding to Baluch dissident groups for exerting pressure on Pakistan. (Rizvi, 2013) India is utilizing consulates in Jalalabad and Kandahar, cities closer to the border, in order to instigate anti-Pakistan feelings in Baluchistan and FATA. (Howard and Teresita, 2011, p. 20) Her interference and involvement in Baluchistan is a formidable threat. There is RAW, CIA, MOSSAD combined centre in Mazari Sharif which is very active in Baluchistan and had operated in Swat. This alliance is still playing in North and South Waziristan. It has been clearly manifested from the weapons recovered at Swat operation, which were labeled as ‘Made in Banaras’ (Ghazanfar, 2013) Pakistan military considered India role in Baluchistan’s turmoil which needs to be taken at exigency. (Musharraf, 2010) On the other hand there are reservations from India side that Lashkar e Tayyiba (LeT) is working in Kashmir in order to counter India there and considered it insidious. (Mujahid, 2010)

There have been resentment that militant groups are sided with Pakistan military as expert on military affairs Ayesha Siddiqas has depicted that Jaish e Muhammad (JeM) has linkages with Pakistan army which is working against India. JeM is aboded in Karachi, where they have relaxed living. Mullah Abdul Baradar was captured from Karachi in 2010. (Siddiq, 2010, p. 155) So if these grounds are to be contemplated than it is evident that militants are easing military cause, however, there is no concrete justification in this regard.

Pakistan is reinforcing the statements of security personnel that Pakistan is under strategic challenges by foreign powers who have conspired to decay Pakistan. Afghanistan is on cordial terms with India and is tying agreements, the decision for it has been taken in October 2011, and the ensuing May 2012 U.S.-Afghanistan tie-up, is apprehensive for Pakistan. Indian presence in Afghanistan is contributing towards internal situation of Pakistan. Pakistan cannot beat India in Afghanistan, it can just raise the costs of India active role in Afghanistan due to its geo-strategic location. Denial of ground transit to India is one step in this regard. (Newspaper, 2007)

As Afghanistan is landlocked and India has no direct transit route to Afghanistan, the more she has at her disposal in this regard comprised three air lines Indian Airline, Ariana Airlines, the Kam Air. (Shayeq, p. 158) So what Pakistan can do is to block the transit route in order to impede the trade. Pakistan, by blocking two way India-Afghan trade has allowed the commodities of Afghanistan through her territory to south while refuted the same facility to India to access north. (Mukerjee, 2007) No doubt, Pakistan wants bilateral favorable trade relations with India for which MFN status has been granted to India but blocking the transit trade to her is only due to reason that Indian enhanced influence in Afghanistan is despicable to Pakistan’s national interests. (Rodriguez and Magnier, 2011) Islamabad objective is to prevent India from strengthening its strategic interests in Afghanistan, and to establish pro-Pakistan political set up in Afghanistan. (Arnoldy, 2011) There is no doubt, that Indian presence in Afghanistan creates problems of many kinds in Pakistan. If India is hostile on Kashmir border, how can it be friendly on Afghanistan border?

Pakistan can adopt following policy options to counter India in Afghanistan. It can impede Afghanistan export to India through Pakistan, can abort pipeline construction project among Turkamanistan, Afghanistan and India, to foster bilateral pipeline project with Iran, further to invigorate military, commercial, infrastructure development with China and to the most constraining will be blocking the US convoy. (Fair, p.
25) Pakistan can render diplomatic offensive against Indian presence. Media campaign can be launched to expose India’s sinister designs in Afghanistan. Pressure on the Kabul government to control Indian activities can also be helpful. Furthermore, in case India deploys military forces in Afghanistan then Pakistan should have security options ready to deal with it. (Mir, 2013)

For any regional approach, India-Pakistan equation must be kept straight. The US must not ignore Pakistan’s legitimate concerns about India’s role in the region especially its overbearing strategic ascendancy in the region and its unprecedented leverage in Afghanistan with serious nuisance potential against Pakistan’s security interests. It is already involved in fueling subversion and instability in our tribal areas and Baluchistan. Any policies that create strategic imbalances in the region and fuel an arms race between the two nuclear-capable neighbors with an escalatory effect on their military budgets and arsenals are no service to the peoples of the region. The risk of a Pakistan-India proxy war in Afghanistan is fraught with perilous implications for regional and global peace, and must be averted at all cost. (Ahmad, 2013)

However there can be positive side of the picture as well. According to some of military officers and diplomats, Indian presence in Afghanistan poses no challenge to Pakistan’s foreign policy. In case of any ill will against India, Pakistan should submit reservations along evidences to the United Nations and to the India so that can be justified. (Munir, 2013) Afghanistan is known as a grave yard for super powers. India is too small a fly if it engages itself in Afghanistan. It shouldn’t make any difference to Pakistan. (Shah, 2013) India is assisting in reconstruction of Afghanistan and has contributed to Afghanistan’s development more than Pakistan. (Rizvi, 2013) India is biggest donor to Afghanistan which have civilization linkages and relations with Afghanistan. Afghanistan is a sovereign country so it can better decide about its interests. Pakistan can only ask that Afghanistan soil should not be used against any regional stake-holder. (Mohmand, 2013)

4. China factor: China presence in Afghanistan is to serve her national interests, which encompassed mining contracts in Afghanistan, economic activities and to deter from strategic relations such weapons supply. (Ibid) China sought narrow rather than broader interests in Afghanistan and Pakistan because of rising extremism and terrorism in both countries. Due to these narrow interests, Chinese workers have security threats in both Pakistan and Afghanistan, wherein both minor states are grappling with the US egregious designs and cannot secure Chinese interests at the costs of the US. (Small, 2009)

It is the utmost preference of China to take Pakistan and Afghanistan peace and stability head on in order to restore peaceful atmosphere in her Northwest province, where Chinese minority, the Uighur are of prime concern to Beijing. Because in that province, besides supply of weapons, militants and drugs, Pan ideological Pan-Islamic Jihadi groups are also exacerbating the security of Xinjiang and has activated pro-independence. China is with firm conviction that militants trained in FATA and Afghanistan East and Southern part are assaulting China. (Small, 2009) These militants are associated with across the border Islamic Movement of Uzbekistan, Turkmenistan Islamic party (TIP) East Turkmenistan Islamic Movement (ETIM) which are striving for an Islamic state in East Turkmenistan in Xinjiang. (Shishani, 2009) Keeping these threats in consideration, China is trying to develop economic relations with Afghanistan as in Afghanistan China metallurgical construction groups have contributed $3.2 billion Aynak Copper Mine investment in Eastern province of Logar, holding as much as third of China Coal Reserves. (Small, p. 3) China has supplied substantial aid to Afghanistan as $150 million in 2002 (Briefing, 2002)and $75 million from 2009 (Conference, 2009) Gwadar energy transshipment route if once get connected to expanded Karakuram Highway (KKH) then it can be utilized for naval purpose. China has started projects in Afghanistan, it has Aynak project and project on Amu Darya from where gas is to be exploited. (Ghazzanfar, 2013) China is covetous for access to Central Asian Republics and especially Kazakhstan where China have 22% oil reserves. (Ibid)

As consider the US response on China’s leverage in Afghanistan and Pakistan, then the US is comfortable with Chinese contribution to the region such as investment, civilian capacity and aid in Northern distribution network for NATO-Led ISAF. There is consideration that China can play a pivotal role in bringing Pakistan to the point of rendering headway in subjugating insurgency emanating from western border rather than confined only to India and eastern border. But this notion of the US has gone awry due to Chinese negligence.
It is palpable that China can exercise leverage by asking Pakistan to settle militancy and extremist threats, which have been arise from Central and South Asia. Pakistan will concede with it hence these threats are detrimental to both Pakistan and China internal security.

By taking comparison of the US and China foreign policies it is evident that China has different strategy than that of the US. She know better that Pakistan and Afghanistan’s trained groups are hitting China and pose threat to China security but the latter individually consult Pakistan military and other Islamic parties to curb these elements. Historically, China have contracted agreements with Taliban before 9/11 to deter militants and Uighur training on Afghanistan soil. China contemplated that the US objective in invading Afghanistan is not counterterrorism but is geopolitical because the US sought energy and mineral resources of the region and furthermore to counter China. (Ibid) As regarding the role of the US in Pakistan, China is desperately envisaging her curtailing leverage in trade aspects because the US and India would impede China’s way either by weakening Baluchistan stronghold in Indian Ocean or by capturing Pakistan’s nukes. In order to undermine India influence in South Asia, China is working on nuclear related programs with Pakistan, as Chashma III and IV plants are to be realized in coming time. (Dyer, Bokhari and Lament, 2010) China is so cautious about her interests as when militancy in Swat and Buner was alarming, China was apprehensive that may it not stretch to the Karakuran Highway (KKH), due to this fear China disbursed economic and military aid to Pakistan military to conclude this Operation successfully.

China is hungry for natural resources. Pakistan should cooperate with China because its natural resources are exploited in China. Pakistan will provide transit route for carrying it to china and Pakistan can assist in setting up natural resource extraction industries as well. (Noorani, 2013) The huge investment in Afghanistan has been carried out by China in order to be fully benefited by Afghanistan natural resources as Chirtian Le Miere, Jane’s Intelligence Review editor stated China is very interested in Cheap resources of neighbouring country and is already with lion investment $3.5 billion the project of Aynak, fields of copper which is situated in the province of Logar.

Glen Howard and Russell stated in January, 2012, The China Brief of institute of Jamestown that china is actively engaged in Wakhan strip which have so much strategic significance, in 2009 some infrastructure mobilization in that area has been undertaken. This infrastructure comprised 75 kilometers road which stretched up to 10 kilometer from Afghanistan-China border. Chinese ministry of defense has constructed this road which is so crucial for carrying military concerned equipment to frontiers guards of China. Moreover a depot has been built by China in order to ameliorate quality of food items for police. (Ghazzaanfar, 2013)

China does have its own regional and global concerns and is not oblivious of the challenges resulting from the US-led uni-polarity or its ‘pivotal’ ascendency in Asian regions. For this purpose the establishment of Shanghai Cooperation Organization (SCO) was a step towards creating a regional bloc to withstand American ascendency in this region. (Ahmad, 2013) Chinese economy is already nightmare for the US because the US economy has come to the shutdown.

5. Access to Central Asian Republics. Central Asia emerged on the global scene in 70s decade when Soviet Union intervened in Afghanistan and resultantly Tajikistan, Turkmenistan and Uzbekistan played pivotal role by providing bases in that turmoil. (McCauley, 2002, pp. 57-9) The demise of Soviet Union has given birth to Central Asian Republics (CARs). This was the entry of new strategic dimensions with resulting orientation of policies and objectives of great powers. No doubt, at initial stages myriad demographic, strategic, economic and political challenges were confronted by CARs. How much these states could be strong by other aspects but militarily they are weak.

Pakistan close and cooperative relations with CARs based on shared bonds of history, culture and traditions. Since their independence in 1992, Pakistan maintained close contact with CARs and have established resident diplomatic missions in all the six former Soviet Republics of Central Asia and Caucasus, namely, Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Also, we have exchanged frequent high-level visits with these countries and are pursuing collaboration with them bilaterally as well as within the framework of ECO in the fields of transit routes, credit facilities, banking, and training and technical assistance programs.
Russia has paramount influence and dominancy in this region to the extent that hitherto these independent states are firmly tied to the Russia. The US being a regional hegemon by Mearshiemer is longing for local great powers in order to curtail the aspirant hegemony of Russia by any strategy possible. (Ibid. pp. 160-162) The US has not been succeeded because there is effective inter-regional cooperation in the form of Shanghai Cooperation Organization (Originally Shanghai five of China, Kyrgyzstan and Tajikistan, Russia and Kazakhstan) but later on Uzbekistan joined this organization. This organization is with motive to settle boundary line conflicts and to trample Islamic terrorism and fanaticism. (Ibid. pp. 120-121) Moreover, this organization is a great pressure on the US due to China and Russia cooperation.

Regional countries are striving to have market in these countries. Pakistan is connected to CARs through channels of history, common tradition, religion and culture. Pakistan is in dire need of oil and natural gas and central Asian Repulics are abounds with mineral resources so Pakistan through trade agreement can import such commodities from these states. (Ibid) Pakistan can be shortest outlet for landlocked CARs to connect them to world economy and to Arabian Sea. CARs could provide its mineral treasure like gas, oil and electricity to Pakistan in order to recover this dearth to her. Pakistan throughout its history has grappled to have cordial political, economic and social relations with CARs on the basis of sovereign equality, non-interference in each other’s affairs and shared interests. (Javed, 2002)

India and CARs are closely connected in ties especially after 9/11 because both want to counter terrorism across the border and to flourish trade. India has put forwards proposal for energy supply line from Russia across Central Asia and China. Another gas pipeline of vital importance in this regard is that, which will connect India to Turkmenistan through Pakistan and Afghanistan. All this depend on Afghanistan better security and undoubtedly on Pakistan and India relations which have been remained uncertain for most of the time. India as strategic ally of Tajikistan has established military base at Farkhor. This has alarmed Pakistan regarding her strategic concerns in Central Asia. (Peace Studies, 2011, p. 5)

There are myriad hurdles in Pakistan access to CARs market as for instance economic factors like infirm industrial infrastructure, literacy lower ratio, no advance in science and technology and financial turbulence. There are other competitors in this region as India, Iran, Turkey who are trying to surpass each other. India is main hurdle in this background which is favorite to CARs than Pakistan. To cap it all, India is successful in creating strained atmosphere for Pakistan in this area. Pakistan has no railway link with CARs. Afghanistan’s imbroglio has hampered Pakistan economic agreements with CARs and still its fulfillments are connected with peace and stability in Afghanistan. (Javed, 2002). Our relations with CARs are not good due to many Uzbek and Tajik training inside Pakistan who are involved in terrorist activities. Even China is not happy over their training in North Waziristan. (Munir, 2013) Pakistan is passage to the sea and Afghanistan is pass to the CARs so both are complimentary. Trade is not flowing, air travel is costly, commerce and trade is not happening because logistics are awful. Unless and until Afghanistan is not calm we cannot have trade with these countries. For instance Tajikistan is rich in electricity but we cannot import electricity because transmission lines cannot pass through Afghanistan with prevalent turmoil. (Mohmand, 2013) With Afghanistan still in turmoil and India-Pakistan peace as elusive as ever, there is no prospect of an early breakthrough towards meaningful economic integration in this part of Asia. Peace in Afghanistan remains crucial for the success of our relations with CARs. One must also admit that on regional level, SCO and ECO, like SAARC, will also remain captive to the globally-driven geopolitics in our part of the world. (Ahmad, 2013)

One must acknowledge, however, that our opening to Central Asia is hindered by the continuing Afghan crisis. Unfortunately, our relations with these states could also not flourish as desired due to divergent views on Afghanistan and Pakistan’s relations with the Taliban regime. Therefore, despite many high level visits and agreements signed, we were not able to lay down a solid foundation to intensify our economic and political relationship.

The theory of national interests is of prime significance in aspect of foreign policy. “National interests is a concept which could be used to describe, explain and assess the foreign policies of nations.” (Rosenaus, 1964, p. 35) National interest is a basis for evaluating the appropriateness of foreign policy. “Each state plots the
course it thinks will best serve its interests.” (Waltz, 1979, p. 113)

There are two types of national interests, objective national interests are permanent and embodied factors as geography, ethnicity, history, neighbors, population size and resources. Subjective national interests are transient dealt with preferences of government and policy elites, comprised ideology, religion and class identity and get transform with change of government. (Frankel, 1970) Realists have attributed to the domain of national interests. For Morgenthau, national interests are legitimization of foreign policy while for Kenneth Waltz national interests are survival of state in anarchical world. Anarchy determined the national interests, if not power based but atleast to serve material ends. The states internal preferences run up against challenges of anarchy, which reshaped national interests. (Donnelly, 2000, p. 153)

Under anarchy, the primary national interest is security, to defend territorial integrity, protect citizen militarly, either by having adequate means to launch war or by cooperative defence and security arrangements.

Pakistan’s foreign policy stands for cordial relations with immediate neighbors, especially Afghanistan on western border, a country religiously, culturally and strategically connected to Pakistan. Pakistan’s interests in Afghanistan have been stretched to political interests, where Pakistan not only to have favorable Afghan government but to have peaceful western border, to counter Indian enhanced influence, to relegate Pashtunistan issue to the background. Economically, Pakistan wants to have trade and commercial agreements with Afghanistan, where Afghanistan is also dependent on Pakistan for transit route to the outside world. Through Afghanistan as channel Pakistan’s can access the Central Asian Republics, which are rich in oil and gas. Afghanistan has strategic significance for Pakistan by providing defense industries and military training.

When Pakistan and Afghanistan relations are contemplated then both countries national interests are inter-connected because stability of one is leading to stability of other. Both are minor states, where their main national interests are security, survival and to defend territorial integrity. Their foreign policies are to serve the same ideology, religion and culture and to strive against foreign threat to their states. As the national interest theorized by neo-realist conceded that international order is anarchical and national interests should serve material ends. Considering Pakistan-Afghanistan terms then its apparent that despite the host of opportunities, these bilateral relations are acrimonious. The US engagement in Afghanistan has instigated a series of mistrust and accusations by both the states for the sake of national interests. In this background across the border infiltration has muddled security in Pakistan tribal areas and her interests have been transformed into strategic challenges. National interest demand that for defense of territory and population a state has to wage war in case of having adequate means, Pakistan was with no other option than to launch military operation in FATA as these were militants hubs and imminent threat to the state. The use of military force is still continued with ongoing suicide blasts and extremism. Moreover, the turmoil in Afghanistan has led to the radicalization of Baluchistan, where segregation ideology is flourishing with regional and international conspiracy.

6. Conclusion: Pakistan’s stability is interconnected with that of Afghanistan. Afghanistan’s turmoil has affected Pakistan’s internal security, economy and foreign policy. Recently, our foreign policy is ‘Afghan centric’, where fall out from western border has triggered militancy and extremism in FATA. There is strategic stalemate and Pakistan interests in Afghanistan have been transformed into challenges which need to be grappled at exigency. The incomprehensive skepticism has halted various developmental aspects. Both minor states of Pakistan and Afghanistan have common problem of militancy and insurgency with is a palpable gnaw and can be fissiparous to their state structure.

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INSTITUTIONALIZATION BY SUPREME COURT OF PAKISTAN- A CASE STUDY OF ITS VERDICT ON NATIONAL RECONCILIATION ORDINANCE (NRO)

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ABSTRACT: Supreme Court of Pakistan (SCP) is one of the pillars of Government of Pakistan, which is not only a player in the game of governance but also has the capacity to rewrite the rules of game in favour of institutionalization. Erstwhile submissive and passive Supreme Court of Pakistan, when attempted to rewrite the rules of game, after the restoration of judges in March 2009, had attracted a blend of criticism and popular appreciation. National Reconciliation of Ordinance (NRO) 2007 was an ample example of extractive institutions aiming at reification of that institutional structure, whose beneficiary was old oligarchy. Through its courageous stance over NRO, SCP inter alia took a step to put the vehicle of governance on the path of rules and secured institutionalization to best possible extent. All contents of good governance including accountability, rule of law, Constitutionalism etc have been taken into consideration. Various organizations of the state started organizing themselves around rules and hence gave rise to an institutionalized form of constitutional governance. In case of NRO, SCP injected paramount supremacy into Constitution of Pakistan 1973, independent of political considerations. Emphasis on constitution has driven the process of governance in the country in the direction of institutionalization. This research aims to discover the institutional role of Supreme Court of Pakistan in good governance through its verdict(s) on National Reconciliation Ordinance (NRO). The way in which stability, coherence, adaptability, and autonomy have been achieved by Supreme Court of Pakistan in the said case will be traced and analysed.

Keywords: Supreme Court of Pakistan, Institutionalization, National Reconciliation Ordinance (NRO), Good Governance.

1. Introduction: Process of governance, if is observed in a simplest way, takes place between two actors: governors and governed. Great challenge lying in smooth sailing of governance, is about two elements. First is to create order through rational control over the governed and the second thing is to ensure the control over government by government itself. (Madison The Federalist No 51). Most of the global South is facing the same problem. The imbalance between two types of control is sharp enough to prevent it from attainment of public order. Cicero proposed solution for it by spotlighting two requirements for materialisation of smooth and good governance: Consensus juris and utilitatis communion. Consensus juris is long-term engagement and union of appreciable number of people over predefined rules, laws, rights and duties. Utilitatis communion is the other mean and way of union which is the mutual sharing of resultant advantages, which is created as incentives by system of rules and laws. In many modernizing countries governments are still unable to perform the first function, much less the second. These rules, laws, statutes, regulations are humanly devised constraints and can be both formal and informal, which are considered as institutions by North(1993). “Institutions are the rules of the game and organizations are the players” (North 1993: 12) Newton an van Deth (2010:9) highlight the importance of institutions as ‘structures of government’. Constitutions represent a set of fundamental laws that determines the central institutions and offices and powers and duties of the state’(2010:71) . Governance in a modern or modernizing society is contingent upon two dimensions. First dimension is scope of support which underscores the level, nature, form and extent of activities being taken place according to rules (which can be
constitution, statutes, legislative acts or in abstract terms rule of law) and through the channels carved out by political organizations. It simply means the intensity of engagement of society with its political organizations. Second dimension is the weight of institutionalization. The process in which organizations and procedures designed for function of organizations attains sustainability and value is known as institutionalization (Huntington 1968:12). The term value as the requirement for such process has also been mentioned by author writers as “value-infusion” (Selznick and Broom 1955, see also Levitsky 1998). Value or value infusion is problematic because it can’t be measured quantitatively as is the case with stability (cf. e.g. Panebianco 1988: 49-68, Lindberg 2007). Level or weight of institutionalization is determined by four major indicators of organizations and its procedures. That four major indicators are adaptability, complexity, autonomy, and coherence. Adaptability is functionalised by environmental challenges and age. More environmental challenges will increase the age of political organization which subsequently elevates the adaptability level of an organization. Unfolding the age element of adaptability he indicated that discovering new functions by a political organization boosts up the adaptability to new environment. (Mainwaring 1998, Kuenzi and Lambright 2001, Randall and Svåsand 2002, Basedau 2007,Huntington 1968 and Dix 1992)

Autonomy is the feature mentioned by him which further clarifies the concept of institutionalization. It means that players or organizations should work independently of other organization’s influence. Such organizations should not carry out their duties by subjecting their criterion of functioning to the wishes, whims and influences of other organizations (Huntington 1968, Dix 1992, Randall and Svåsand 2002, Bendel and Grotz 2001)

Complexity, the second indicator of institutionalization of political organization and of a political system pinpoints the diversity in functions carried out by an organization embodying bulk of multiple subunits and sub-organs. Huntington emphasised on this complexity which he opined that increases level of institutionalization. Furthermore he by referring to the example of United States where different organizations have played variety of roles in history, considers that if in a complex political system one political organization fails to deliver or demonstrates ineptness in deliverance of services then other organization should cover that vacuum. It seems that the principle of checks and balances is echoing in Huntington’s proposition. (Mainwaring 1998, Basedau 2007, Bendel and Grotz 2001,Huntington 1968 and Dix 1992). Last attribute of institutionalization is coherence in a political organization. Consensus among players belonging to same political organization will augment the level of institutionalization. Functional boundaries and procedures should be debated and differentiated by the players of same organization to the minimum extent in order to settle the disputes smoothly. (Mainwaring 1998, Kuenzi and Lambright 2001, Basedau 2007, Dix 1992)

Acemoglu and Robinson (2012) attempted to find out the reasons of inequality among nations. Some nations are developed, some nations are underdeveloped and some are in transition (Acemoglu and Robinson, 2012). They attribute such differences to historical path followed by the country in evolution of institutions. Linking economic institutions with political institutions they unearthed the reasons of disparities and prosperity in many fields of various countries. Institutions have been categorised in extractive institutions and inclusive institutions(Ibid). These institutions increase socio-political mobility, state’s penetration in social and political sphere of citizens and participation. Extractive institutions empower and benefit elites of society. Such institutions enhance economical, political and social power of these elites. Actors of change or people with innovative idea are observed as failed to bring sea change in structure and function of extractive institutions. On the other side pluralism in policy-making, interest articulation, aggregation, formulation and implementation and centralization in use of legitimate violence are two key features of inclusive institutions. These institutions are found as restraint in arbitrary exercise of power and introduce such polities which can distribute and decentralize the power. Politics in such scenario gives rule for the actors involved in the game to follow. There is continuous likelihood of imminent clash between extractive and inclusive institutions(Ibid). Position of Supreme Court of Pakistan will be located in this whole trajectory of institutional approach towards good governance.

In the light of Professor North’s theoretical framework of Institutions, Institutional Change, and Economic Performance and Huntington’s concept of governance/political order along with other authors holding variety of views, the research will conduct the critical analysis of the recent trend of institutional activism in the decisions of the Supreme Court of Pakistan and its impact on the future political discourse of Pakistan, the Supreme Court of Pakistan, rule of law, constitutionalism, and the informal norms of governance in Pakistan. The research will probe the institutional role of Supreme Court of Pakistan in fostering good governance through weighing the institutionalization attained by Supreme Court of Pakistan during its adjudication of National Reconciliation Ordinance (NRO).
Coming to the role of Supreme Court of Pakistan in institutionalization, good governance and strengthening of democratic setup, it is necessary to divide the its institutional role into two broad categories. One category contains those verdicts which upheld the dissolution of democratically elected assemblies in Pakistan by the non-representative institutions. Other category contains that verdicts which blocked such designs since 1947 till 2009. Former includes Maulvi Tameezudeen Khan, The State Vs Dosso and Others, Nasrat Bhutto Vs Chief of Army Staff and Another, Federation of Pakistan Vs Hajji Muhammad Saif Ullah Khan, Khwaja Tariq Rahim Vs Federation of Pakistan, Benazir Bhutto Vs President of Pakistan, Zafar Ali Shah and General Pervaz Musharraf Chief Executive of Pakistan, Pakistan Lawyers Forum case (2005). With respect to juxtaposition of democratic process and governance, it can be safely deduced that the institutional role of the apex court was not in favour of constitution and democracy. Later category includes Usif Patel and other VS Crown, Miss Asma Jilani Vs the Government of the Punjab, Nawaz Sharif Vs Federation of Pakistan. In these cases Court rejected the destabilization of political setup done by unconstitutional forces or through unconstitutional channel. But dichotomy of Supreme Court’s role till date in good governance will be tantamount to clouding of facts. Much more has yet to be unearthed. Structure and function changes with the changing institutional framework which is the web of many actors and institutions.

It can be said that slow movement towards the activism in judiciary came after the appointment of Justice Iftikhar Muhammad Chaudhary in 2005. But assertive judicial activism started in March 2009 after restoration of various judges of higher judiciary. One of the reasons for such vehement activism was the antecedents of post 2009 judiciary which include revolutionary movement and political turmoil on the national screen of country. Most of observers attribute such judicial activism pushed through judicial review to restoration of Iftikhar Mohammad Chaudhry along with other judges. As the result of restoration of judges, reckoning of era of judicial activism and centralising the institutional structure gave rise to an active, cohesive and autonomous judiciary. The judiciary surfaced as a cohesive institution having distinctive identity as an self-sufficient pillar of the State. Matters of public importance and human rights became centre of prompt attention of Supreme Court of Pakistan after his restoration. Nature and subject matter of the cases taken up by Supreme Court of Pakistan after March 200 made the difference between pre 2009 and post 2009 era. It included misappropriation of public funds; embezzlement in national treasury; killings without sanction of the state; cases relevant to social issues such as rape, child marriages, private militias, private prisons; cases pertaining to administrative structure of Pakistan such as out-of-turn promotions, illegal appointments, impermissible constructions, disposal of state-land very low rates, waiving off huge amount of bank loans and issues regarding environmental protection. All these cases have been decided within the purview of article 184(2).

2. Methodology: Qualitative methodology will be adopted to squeeze out the institutional behaviour and role of Supreme Court of Pakistan in mentioned era and sample cases for its generalization to the accumulative role played from 2009 to 2012. Secondary analysis will be the research tool to analyse the sample cases. Critical analysis of original text of details order of Supreme Court will be done which shed light on direct and indirect links, intervening and moderating factors guiding the process of good governance. Such relevant parts of verdict will be analyzed critically to look into the debated difference made after restoration of judges. Response towards/by other institutions to such verdicts which can determine its role in good governance will be taken into account. Specific verdicts on sample cases will be evolved into generalization to knit a broader context where new position with new structure and functions of Supreme Court of Pakistan can be located. Such data and its analysis will be significant because of its primary nature and easy access.

Newspaper articles and reports will also be used as auxiliary data which will bring various remarks of Justices of Supreme Court pertaining to issues of nation building, given during various hearings of sample cases. Opinion of members of intelligentsia associated to judicial and socio-political quarters of life will help to enrich the research with both perspective of nation building and role played in it by Supreme Court. It will endeavour to stem objective knowledge out of comparison between arguments against and in favor of Supreme Court of Pakistan.

Research is basically case study of verdict of Supreme Court of Pakistan on National Reconciliation Ordinance (NRO) delivered on 12 December 2009. Criteria on which this case has been selected in the sample of this research are specific indicators of good governance in general and level of institutionalization in particular. Level of institutionalization is also part and parcel of good governance. For example National Reconciliation Ordinance contains accountability and rule of law as two aspects of good governance. Through analysis of impacts of NRO case and its subsequent impacts on Executive-Judiciary relations in institutional framework of governance in Pakistan, research will be generalized from specific. It means that institutional role of Supreme Court of Pakistan in promoting good governance through lenses of four cases will be enquired by underlining different indicators and ingredients of good governance covered by these cases and then on the basis
of findings from analysis of four cases, a general coherent picture will be drawn. Here it is also necessary to mention that various indicators of governance or good governance have intertwined or geared link among one another. For an instance, rule of law, accountability, transparency are interlinked to one another. When one is determined then other is automatically affected. An efficient government and delivery of basic services can’t be determined without accountability, rule of law, transparency etc. Hence it doesn’t mean that if few indicators of good governance have been touched upon in analysis of verdicts then others are ignored. Others are taken into consideration of research through an indirect link. Cases selected for this research mainly involves institutions which serve the purpose of research i.e. following institutional approach towards analysis of good governance.

3. National Reconciliation Ordinance 2007 (NRO): The National Reconciliation Ordinance (NRO) was notified on October 5 2007. It is not the secret that various drafts of the proposed NRO were exchanged between the government and Pakistan People Party (PPP). Towards the end of this process the Muttahida Qaumi Movement (MQM) was also involved. In the negotiations between the government and the PPP the latter had purportedly raised number of demands which included the repeal of article 58(2)(b) relating to the president’s powers to dissolve the National Assembly, the removal of third term ban on prime minister which can be removed with the consent of President (because the law imposing the ban is included in the sixth schedule to the constitution) the resignation from the office of Chief of Army staff (COAS) by General Pervaiz Musharraf prior to his re-election and the withdrawal of all cases against Mohtharma Benazir Bhutto and other PPP leaders. Introduction of NRO accepted last of these proposals which actually accorded the whims of the then President Musharraf and his advisers. The members of National and Provincial assemblies belonging to Pakistan People’s Party (PPP) didn’t resign in order to extend the legitimacy and credibility to Presidential Elections held on October 6, 2007 which in other case would have been emptied of that credibility.

By means of Section 2 of the NRO, Section 494 of CrPC was amended. Section 2 which was inserted on the insistence of MQM amends section 494 of the Criminal Procedure Code(CrPC). Through insertion of this section Prosecutor-Generals were replaced by Boards at provincial and federal level whose mandate will be to review and discuss the criminal cases registered between January 1986 and October 12, 1999. The domain of the functions of these boards enabled them to probe into political nature of the criminal cases. If said boards found that accused was falsely implicated for settlement of political vendettas then they could recommend the withdrawal of such cases against the accused to the concerned governments and governments were enabled to cross out the same. Retired judge of Supreme Court will lead the federal review board and attorney general and federal secretary will assist him/her as a member of the board. In case of provincial board head will be a retired high court judge and advocate general/or prosecutor general in collaboration with provincial law secretaries will be his/her assisting members in carrying out the board’s assigned duties.

Sections 18, 24 and 31A of the National Accountability Bureau(NAB) Ordinance were altered through sections 4, 5 & 6 of the NRO respectively. Section 4 and 5 empowered a special committee on ethics to recommend arrest of any member of provincial assembly as well as of national assembly implicated in a NAB-related case. Arrest couldn’t be made without such recommendation.

The actual bone of contention before the Supreme Court of Pakistan was based on two sections: 6 & 7. Section 7 of NRO was aimed at withdrawal of cases lodged and pending in any court of the country against public office holders subject to the condition that initiation of case was made before 12 October 1999. There were exceptions to public office holders mentioned in this section. Such exceptions included cooperative societies and financial and investment companies. Exceptional clause to any status of legal case against public office holders was acceptance of plea bargain or voluntary return by Chairman NAB State Bank of Pakistan. After discussion of major articles of NRO, it is easier to shed light on various aspects and faces of NRO. It has three faces which require analysis. First it has constitutional aspects related to legality of NRO with reference to various articles of Constitution of Pakistan with which later on it was found contradictory by Supreme Court of Pakistan. Next Section will discuss it as that is the major focal point of this chapter in which the institutional role in context of judicial activism will be brought into the spotlight. Second angle from which it can be analysed is the political angle from which its effects on polity can be projected which is out of the scope of this research but will be touched upon in next paragraphs which include beneficiaries of NRO. Third angle is the societal aspect which opens our eyes towards overall impact on society in the form of evolving nature of governance. This second and third part will be implicitly discussed when brief analytical discussion on NRO implementation case and Contempt of Court case against Prime Minister Yousaf Raza Gilani will be opened.

List of beneficiaries of National Reconciliation Ordinance (NRO) released by Ministry of Law and Justice on Saturday took the top politicians of the state to task and perceived them as black sheep of the society. Old players of the political chessboard of Pakistan were nominated by Ministry of Law and Justice as beneficiaries
in the list made public by it. Most of them were serving parliamentarians during the proceedings of apex court in NRO. That list consisted of ex-Interior Minister Rehman Malik, Sindh ex-Home Minister Zulfiquar Mirza, who is also the husband of National Assembly ex-Speaker Dr Fehmida Mirza, president’s top bureaucratic aide Salman Faruqui, ex-Defence Minister Chaudhry Ahmad Mukhtar, Sindh ex-provincial minister Agha Siraj Durrani, PPP’s Secretary General Jehangir Badr president’s close friend Wajid Shams-ul-Hassan and many more. At the time of release of this list all of these persons were holding the legislative offices and supposed to follow the due process of law in order to save their skin from the consequent effect of NRO judgement (Noorani, 2009).

In the list comprising 8041 persons, 34 politicians were leading the list by being committing of crimes such as murders, attempted murders, balwa, embezzlement, corruption etc. The nature of their crimes and the extent of aggrandisement of money was considered as unbearable burden on the faltering economy of Pakistan (Gishkori, 2009). The person who surpassed President Asif Ali Zardari, Dr. Farooq Sattar and Madam Nusrat Bhutto-the spouse of Ex-Prime Minister of Pakistan late Zulfiquar Ali Bhutto in benefitting from NRO by getting his seventy-two cases dismissed out of which thirty-one were murder cases. Seven cases against President Asif Ali Zardari were ejected. Farooq Sattar was able to escape thirteen cases. Most of the politicians inhabiting the list were having one to two cases pending before different courts of law (Ibid). Among various cases to be closed as a result of NRO, Special court (bank offences) scrapped cases criminal in nature against Hussain Lawai and Haji Abdur Razzaq on Aug 19 2008 as a response to recommendation given on June 26 2008 by federal review board, constituted under the provisions of NRO (Ahmed, 2006). Follow up of NRO Judgement was supposed to unknot the case on November 28 2009 as a result of which both of said persons could be arrested (Ibid).

The loss suffered by the exchequer due to writing off the loans ratified by NRO was Rs 165 billion which was underscored by the official list once released by National Accountability Bureau (NAB) (Noorani, 2009). Moreover NAB virtually became defunct. But that loss seemed to me more than was claimed by NAB because 1000 billion rupees were lost as the result of closure of various corruption cases as per official sources (Ibid). In some cases individuals got able to preserve plunder of US$1.5 billion (Rs122 billion) and Rs310 million each which clearly shows the selective nature of NRO (Ibid).

In Tikka Iqbal Muhammad Khan vs General Pervez Musharraf Proclamation of emergency of 3rd November 2007 and other ordinances were challenged in Supreme Court of Pakistan where said proclamation along with other ordinances such as Provisional Constitution (Amendment) Order 2007, the Oath of Office (Judges) Order of 2007 and the President's Order No. 5 of 2007 got legal recognition of being validly enacted (Daily Times, 15 December 2007). Later on all of same constitutional instruments were struck down and had been declared as void ab initio coupled with deletion of Article 270AAA from the constitution by Chief Justice of Pakistan (CJP) Iftikhar Mohammad Chaudhry (PLD 2009 SC 879). As a consequence of that judgement question of legislative status of NRO and thirty-seven other ordinances was passed to Parliament by giving extension to 120 more days in case of Federal Legislation and 90 more days in case of Provincial legislation to life span of aforementioned number of ordinances(Ibid).

The Standing Committee of the National Assembly on Law & Justice took up the NRO matter in its meeting held on 29th and 30th October 2009 but the embattled members of the committee didn’t assent the decision, many of whom protested the proceedings of the committee pertaining to approval of NRO. Recommendations of the committee were made on 2nd November 2009, including amendments to the bill for enactment of NRO, saw a dead end because prior to its approval by the chairman of said committee, Federal Law Minister suddenly announced the withdrawal of the bill. The main reason for such a sudden withdrawal was lack of galvanization of required majority vote i.e. 51% from the parliamentarians in the treasury lot. Pakistan Muslim League Qaid-e-Azam Group ML(Q) and Some of PPP’s own members were against the approval of NRO let alone the stiff opposition meted out to its approval by opposition parties such as PML (N) and JI which organised the rallies in major cities. ANP was the only party which was ready to bet on the losing horse. As a result of range of quibbles in the National Assembly NRO was failed to be approved and met its natural legislative death on 28th November 2009-the date on which it lapsed.

NRO was challenged in Supreme Court of Pakistan. When Court started hearing the case, the then Attorney General’s Office gave a very clear message on the behalf of federation or in other words PPP’s government of not defending it. His statement on record in the form of his written submission in the apex court underlined the federation’s intention of believing in the ultimate supremacy of Constitution of Pakistan 1973 and attributed the NRO 2007 to the dictatorial regime of the then President General (rd) Pervaiz Musharraf. Later on his successor went one step further to advocate the proceedings against beneficiaries of NRO. Such reluctance to
defend the ordinance in which political future of many parliamentarians and politicians was at stake made easier for the apex court to decide it in a short time. Rather the federation pleaded for taking up of due legal action against the same.

The Supreme Court of Pakistan delivered the verdict in NRO case on 16th December in which it declared NRO as an instrument which is contravention and complete violation of various articles of constitution of Pakistan. That articles mentioned in the short order were 4, 8, 25, 62(f), 63(i)(p), 89, 175 and 227 of the Constitution. All judicial orders or any type of action made accruing any relief to any person as a resultant directive of NRO were declared null and void. All cases and proceedings against whosoever were reopened, which prior to judgement had been disposed off in one way or another under Section 2 and Section 7 of NRO had been ordered as revived and brought to its legal status existing before 5 October 2007.

NRO judgement sent a jolt throughout the judicial structure of Pakistan by ordering all types of courts to start hearing all cases from that point where it was called off under the said Ordinance. All echelons of government were directed to respond in best possible way to ensure the implementation of NRO judgement by assisting the competent courts efficiently. Moreover where the matter was in enquiry stage and had been closed under the NRO were also reopened. Similarly any judgment or decision of any type meted out under section 31-A of NAB ordinance and benefit of any type garnered under section 6 of NRO was declared null and void having no legal effect.

The Supreme Court found act of writing a letter of withdrawal of Government of Pakistan’s claims over laundered money of Asif Ali Zardari and others by the then Attorney General Malik M Qayyum as an individual unconstitutional and illegal act in contravention of Article 100(3) of Constitution of Pakistan for which directions to proceed against him were given. The apex court ordered the federal government to take due steps with immediate effect to rejuvenate its abandoned claims over the laundered money.

4. NRO Judgment And Institutional Role Of Supreme Court Of Pakistan: As it has already been mentioned that Douglass C. North, in his theory of institutions and institutional change, has underlined three main things institutions, organizations and game, in this section Supreme Court’s role through its NRO judgment will be analysed in the context of theories of institutions given by North and Samuel P. Huntington. According to him, institutions are rules and organizations are players of the game. Main objective of the rules is to determine the way in which game will be played. His book has highlighted organizations as main agents of institutional change linked to nature of experience between institutions and organizations. Chapter VI details the importance of formal rules and how they, in many cases, are complementary to informal rules. In some cases they actually superseded the informal rules in order to increase efficiencies of the institution and they will actually define behavioral constraints. Their function, generally, is to facilitate political or economic exchange in the face of uncertainty. Formal rules are particularly important for exchanges with numerous actors or variables where the risk of defection is highest.

On the other side Huntington has discussed particularly case of modernizing countries or “third world countries” and underscored the main reason of different status of governances in modernized countries and modernizing countries. He said that the political community or governance dependent upon development of political institutions and its stability. Supreme Court of Pakistan before 2009 never found the path of sustained development same is the case with Parliament. The reason for this development with snail speed is multiple coup detats which impeded the course of democracy. But Supreme Court of Pakistan before 2009 didn’t reign in the phase of evolution or development even in democratic regimes. Or if at some stages step were taken that were not continued by successor Chief Justices and other Justices. NRO judgment actually played the role of continual of development process which was started off in July 2009 in the shape of 31 July 2009 judgment. Such continued development provided stability to it. Before fixing NRO judgment in other elements of Huntington’s institutional framework it is imperative to mention what did development mean for Supreme Court of Pakistan after 2009. In case of SCP development meant the institutional change which North emphasised. In this institutional change Supreme Court realising the fain and hope pinned on it felt maximum ever independence from the stranglehold of executive. So popular sentiments-a guarantee for SCP emboldened the Justices of SCP to bring in an institutional change. They after their reinstatement didn’t adopt the course of succumbing to wishes of executive and hence laid the foundation of institutional development through their verdicts in July 31st 2009 and NRO case which was clearly an institutional change. Huntington posits that a level of governance can be gauged by finding status of relationship between political institutions and actors associated to it. In a complex society actors will be many in number and different in characteristics and with this there will be increased divergence of interests. Such divergent interests and likely conflict emanated out of
quibbling ways to attain opposed interests enhanced the contingency of governance on more number of political institutions entrusted with multiple tasks. There will be difference in the power held by various players and political institutions actually are mandated to moderate and balance the power in order to avoid the subjugation of one player or group by other which may cause instability. NRO judgment is the clear manifestation of such a role of referee by playing the mandated role of interpretation of law and protection of constitution. Such a judgment by SCP actually stopped the path of few individuals to trample upon the fundamental rights of others enshrined in constitution of Pakistan which shows the professional way of balancing the power between 8041 individuals and remaining population. Moreover it is also noteworthy that NRO case was filed by politicians belonging to other party such as Munawar Hassan associated to Jamat e Islami, to whom it would have been discrimination if beneficiaries of NRO had been exonerated scot-free. This very nature of Supreme Court to settle the disputes among various complex institutions and players at a time is considered as basic origin of political institution by Huntington in complex society. He has located the origins of political institutions or in other words the historical need of it in the discordance between these divergent interests, power and way of exercise of power. Having said this he stressed on the most important point that due to this very reason that power of one player over another or imbalance in the power of groups involved leads the development of institutions, modernizing society didn’t achieve the level of governance which modernized societies like the United Kingdom, United States and several European countries have achieved. So Supreme Court through earlier judgment of July 31 2009, and strand of judgments regarding NRO ushered in the new phase of institutional development where earlier Pak Army was the only institution which developed with stability and had the final say in determining the hold of power, through excessive use of coup detat. Here it is essential to mention specific players of the game among which balancing role was played by Supreme Court of Pakistan. Those players were ordinary citizens, political parties who didn’t sign NRO such as Jamaat Islami(JI), PML(N) etc, political parties who were direct beneficiaries such as PPP and MQM.

To him political community or governance depends upon strength of political organization which is further effected by the scope of support and level of institutionalization. Scope of support means the extent to which rules, procedures and behaviour demonstrated in that context of procedure is followed and regarded by more and more number of people. Institutionalization has been considered as a process which affords value and stability to organizations or players and weight of institutionalization can be measured by four main elements: adaptability, complexity, autonomy and coherence. After clear mention of attributes of institutionalization and how governance is dependent on it, it has become easy to peg institutional role of Supreme Court of Pakistan in Huntington’s framework of institutionalization. Governance in Pakistan depends upon strength and efficiency of political organizations or institutions such as Higher judiciary, Parliament, Pakistan Army, Political Parties, and other various institutions. Efficiency of Pakistan Army in form of organization, coherence, deliverance or relieving the common public in case of natural disaster has earned a good deal of fame and appreciation to it. Though Pak army’s role is out of the scope of this research but its example is essential to show the extent of deliverance and number of institutions standing up to the expectations of common people which effects governance to the great extent. Earlier Pakistan Army was the only institution which embodied relatively maximum stability and after 2009 the same thing happened to Supreme Court of Pakistan. Train of judgments whose start was taken from delivering the verdict of July 31 2009 brought stability to Supreme Court of Pakistan in term of its main function of protecting the constitution of Pakistan, as an institution. At least a perception was started being created about SCP that it can be another outlet for responding to people’s hopes and aspiration framed by the constitution of Pakistan and NRO judgment actually made such perception to penetrate its roots in the psyche of common people. Though interests of other institution and factions of society was also attached to NRO saga specially its implementation case to some extent but common people were pricked that now those who ruled you and being the chief executive were holding the maximum part of state’s monopolized power can be brought to book. It was akin to giving the feeling of equality to common citizen guarantee of whose rights are only inhibited by Constitution of Pakistan 1973 and from the same constitution SCP entails its power. So governance strengthened up by activism of another institution of state. Supreme Court in general and through its verdict of NRO in particular has done one additional things which is being unnoticed by critics that Supreme Court is not getting acting itself but through its judgments making other institutions such as parliament and executive active and rules-abiding. What north called rules i.e. institutions is embodied by the constitution of Pakistan in 1973 which determine how to play the game meaning there by the governance in the country, which if is good, speed of economic development will boost up. As far as the scope of support for Supreme Court of Pakistan is concerned this can be confirmed by finding out the increase in number of petitions and applications submitted to human right cell of Supreme Court of Pakistan after NRO.

NRO judgment will be a complicated case to gauge the level of adaptability held by Supreme Court. There is no denial of the fact that that after reinstatement of the judges in 2009 the environment was completely new. Supreme Court of Pakistan whose judges were reinstatement at the behest of popular protest symbolised by
Long march held on March 10, 2010, had to decide the fate of members of their own institution-judges took oath after November 2007. Another indicators of the new environment included politicized nature of reinstatement of judges issue trumped by opposition extending full support to apex court-stance held in statements matched by stance adopted in practical-leaving the coalition government; a high level of expectation from it by common citizens; judges who were deposed in Nov 3 emergency by the then President General Pervaiz Musharraf but in the presence of the key military office-holder Ashfaq Pervaiz Kiyani who later on played a totally different role by convincing PM Gilani and President Zardari on the night when Long March was carried out; a Pakistani society which is more urbanized and embodies a relatively greater chunk of middle class which not only played its active role in Lawyer’s movement but also in Judges restoration in 2009; lastly a democratically elected government which came into the power through relatively fair elections held in Feb 2008 and hence embodying representative voice of 180 million people(Viewpointonline, July 30 2010). After mentioning all these indicators of adaptability with reference to new challenging environment, it has become easier to answer the question: Did NRO judgment and its conclusive end made by SC increase the adaptability of SC? Answer of this question is open both to affirmation and negation. Negation part will be automatically covered by bringing in critical views in next section. Talking about affirmation, adaptability mentioned by Huntington should not be confused with succumbing to executive or parliament. He didn’t say that for increased adaptability an institution must succumb to those steps which violate the institutional interests of subjected institution. SC did the same to avoid this transgression of executive. In NRO judgment plea of the petitioner and other counsels argued that by exonerating so many individuals from charges being probed by the courts Parliament has crossed its limits and entered into the functional circle of Judiciary. Striking down NRO and bringing it to its conclusive end by sticking to stance of implementation changed its earlier historical practice of stamping parliamentary laws and executive orders contravening constitution and showed its adaptability by showing judicial activism in coping with environmental challenges among which one was to coming up to the expectations of common citizen in shape of protection of fundamental rights and constitution as a whole. In all this NRO saga comprising number of judgments from NRO verdict 2009 to writing of letter to Swiss authorities, one thing does not require bulky explanation and that is discovering and taking on of new functions which is other content of adaptability in Huntington’s indicators of institutionalization. Supreme Court not only delivered the verdict striking down a de-facto ordinance but ensure its implementation which is altogether an executive job. Compelling Prime Ministers to appear before the court; ordering constitution of monitoring cells to ensure the smooth proceedings of reopened cases as a result of NRO judgment; ordering arrest of those NRO beneficiaries officials who were elevated to higher ranks and getting the executive to come with that draft which it wanted to send were all new functions taken up by Supreme Court and hence increased the adaptability of SC. But the same taking up of new functions will be the centre of discussion in next section where NRO judgment will be put under the axe of its satirists. Satirical notes on NRO judgment are mainly based on overstepped role of Supreme Court of Pakistan but such an overstepped role embodied by NRO judgment in another way has increased the adaptability of Parliament-the other institution of state which also led to creation of new challenges for parliament and it has been clearly observed that at last acting upon the Court’s orders showed the increased level of adaptability. Parliament, earlier was used to with bending higher judiciary to executive. The new challenges for parliament were active judiciary and active media which North called as going of a game upside down. In new environment: parliament had no information about Supreme Court’s extent of its activism which made survival of cooperation between parliament and the court not sustainable. North indicated the need of institutions at this point of uneasy cooperation. Constitution was the formal part of rules followed by SC through which maximum gains of cooperation can be harnessed. These maximum gains interalia afforded new functions to SC. So by assuming new functions especially in NRO saga, SC increased its own adaptability and of parliament as well.

Such a complexity has been clearly manifested by SC in its NRO judgment by covering up that functions and incumencies which parliament was bound to follow. After coming up in power, PPP-led government was looking forward to old bending and submissive nature of judiciary which was reflected by the then government’s reluctance to restore the deposed pre-Nov 2007 judges. NRO’s ratification or its annulment was the role of parliament and time was given to do it but when parliament failed to do the job was done by Supreme Court. Its implementation had to be ensured by executive but when it didn’t then Supreme Court covered up the space and was adamant on implementing to the extent PM had to loose the seat and face contempt charges. Such variance in its institutional role clearly symbolised its increased complexity. Other indicators of having units and sub units can be observed in the establishment of monitoring cells as the result of NRO judgment. In an indirect way NRO laid the foundation for entrenchment of Superior judiciary which can be observed in the giving up big space to superior judiciary in 18th amendment and 19th amendment which afforded major say to judiciary in appointments. By implications in the far future one can also encircled increasing number of registries branch and branch benches. Though such increasing number of registries offices and branch benches has no direct link with NRO judgment but one can say that NRO judgment catalysed the process of tilting of balance of powers on
executive’s side which enabled SC to get hold of unprecedented powers. Hence its complexity both in its function and structure increased.

NRO judgment and its consequent judgments are the best example to reflect the attributes of autonomy mentioned by Huntington infused in Supreme Court of Pakistan. Decade old convention had been abandoned when Supreme Court went for playing active role in NRO saga. Independent judgment was delivered which took a sharp departure from line of executive. Boundaries of reference were drawn demonstrating clear domains of functions between SC and executive when NRO saga met its conclusive end. But critics objections can’t be ignored that many things happened during whole story of NRO was a step more than independent functioning because if for independent function executive should not have needed to keep judiciary-another organization succumbed which they had been doing for decades then same principle applies to Supreme Court after 2009 and during the course of adjudication of NRO case Supreme Court did not need to bend executive or parliament before it for confirmation of its autonomy and independence. Then the boost in independent role given by train of judgments on NRO was witnessed in later parliamentary amendment 19th amendment coupled with many other judgments made Supreme Court more and more autonomous.

NRO judgment was a unanimous judgment but the other judgments relevant to NRO were not. Shared institutional interest, shared institutional challenge: executive’s stranglehold, enhancement of Judges’ power and uphold of Constitution were the elements which have evolved coherence members of Supreme Court through NRO and NRO-relevant judgments.

In the end to underline the importance of an institution and he drew a trajectory between public interest, Individual interest and institutional interests. According to him when a single member of an institution tries to achieve his/her individual interests at the cost of institutional interests then institution is weakened. To the contrary, if institutional interests are preferred and accorded then such institutional interests can reflect public interest to the optimal level. He gave an example of a case Madison vs Murbury decided by American Supreme Court which augmented the institutional power of American Supreme Court to the extent that it could not have been challenged by President or congress. Institutional interests, just like in case of Madison and Murbury was preserved by SCP in NRO relevant judgment. Declaring a PM as contemptor and disqualified for the seat of PM was enough leverage necessitated by SCP gained over executive. No judge of SCP having sound mind would like to loose what SCP has afforded to him through train of judgments based on NRO. Having said this it is clear that coherence among judges of Supreme Court and institutional interests achieved through NRO verdict are interdependently linked to one another.

5. Conclusive Analysis: After looking into different aspects of NRO saga it has become easier to apply one’s mind to arguments and analysis of both sides and then to extract the relationship between two variables of research: institutional role of Supreme Court of Pakistan and Good Governance. But before analysing the relationship it is necessary to pass the satirical views through the contextual test of this research. It meant that it is essential to see whether objections made by persons in preceding section harmed governance or not. It is pertinent to remind here that though theoretical framework is institutional the main purpose of the research is not to probe into institutional role of Supreme Court of Pakistan in clash of institutions instead the question of the research is related to unearth the institutional role of SCP in fosterage of good governance. Having said this it is better to look whether objections have anything to do with good governance? Modification of power structure is not the sole function of SCP. First building up of structure of any polity takes time and is done by various institutions working in tandem at a time. Modification also takes time and any institution should not stop to deliver because of the reason that its activism will not bring an upside-down change. NRO judgment might not have brought major change in the power structure as per Sajjad’s views but it can be considered as a start towards change. North due o the same reason has called it institutional change because earlier rules of the game were ignored but now supremacy of the constitution i.e. formal rules is the hook on which SCP is anchoring legitimacy of its activism and slowly and gradually other political organizations have started bringing their performance with in the cage of constitution to escape the review of court.

The argument that article 2, 62, 63, and 227 are controversial articles and invoking it in such an important case has revived the legacy of dictator is an ideological argument which would have held water had it been analysed through ideological framework. But in context of governance and institutional context staged by Huntington and North one can say that invocation of these articles have increased diversity in functions of SCP and also gave fillip to strength of constitution. It diversified the functions of SCP by affording the power of determination of character of parliamentarians to SCP and hence further increased the institutional interest of SCP which enhanced the institutionalization upon which governance or political community depends.
In a simple and coherent way one can divide the role of Supreme Court of Pakistan into three categories: constructive, destructive, and obstructive. Constructive role here is defined as the institutional role which strengthened the institutions. The first category i.e. constructive role has already been discussed in preceding section but few more points are important to be discussed. Destructive role is the role played by Supreme Court of Pakistan in weakening of institutions. Junction on which powers had been overstepped to the extent that other political organizations or institutions were failed to carry out their due duties due to judicial activism is covered by destructive role. Obstructive role is defined as the role played in hampering the due role of other institutions in a political system of Pakistan. Such a role neither weakened nor strengthened the institutions but slowed the functions and performance of the various institutions of state of Pakistan.

As mentioned before constructive role has been discussed to its length in the preceding section but few more points are worth mentioning here. First, that SCP is the ultimate guardian of the constitution of Pakistan from which all other major organizations such as Army, Parliament and individuals entail their powers, rights and duties. NRO judgment actually strengthened the constitution and lessened the gap between theory and practice. As mentioned in criticism done by Asma Jehangir that article 62 and 63 of constitution of Pakistan being the production of a dictator were not relied upon by the courts earlier but have been invoked in NRO judgment which has taken the shape of precedent. So this criticism can also be argued as an attempt to lessen the theory-practice gap.

Secondly if supremacy of constitution has been prevailed through judgment of NRO then NRO judgment has enhanced not only the capabilities of one player-Supreme Court but also of other players. A verdict by SC relying upon constitutional articles means supremacy of constitution which ultimately means strengthening of powers given to and preservation/protection of other organizations’ jurisdiction. Therefore in other way other the direction of performance by other organization has been corrected.

Thirdly, if various indicators of the governance are observed then most of the contents have been touched positively by SC in its NRO judgment. Accountability, transparency, rule of law, an effective legal system, participation, absence of corruption and arbitrary power, has been ensured to the maximum possible extent through NRO judgement. It does not mean that NRO judgment brought an upside down change in the political system of Pakistan or to use Sajjad’s argument that brought a structural change but it jumpstarted the process in which structural change can be brought or at least a phase has been initiated where suitable and conducive environment is being created where other organs of the state are set on the right track to perform and carry out its institutional duties enshrined in the constitution. Bringing Prime Minister of Pakistan and President of Pakistan into the net of justice is enough to show that area and scope of accountability has been entrenched through NRO judgment. Transparency increased because of the subjection of top brass of the society in NRO case to SC’s ruling and media’s active and full coverage of the developments in NRO case. Participation is a key attribute which apparently does not seem to be afforded by SC through NRO verdict but if an attempt is made to locate the links between SC and participation then circle of political participation will be clearly found as widened up by SC because through invocation of article 62, 63 and article 2 can be considered as an endeavour to filter out the participation of old dynastic feudal elite of the society who had been given many opportunities in past but failed to deliver. Here it is noteworthy that reliance on article 62 and 63 has set a major precedent which will empower Supreme Court, other organs of the state, and individuals to question the ability of a candidate who intend to participate in elections which are part of both democracy and political process as well. Hence it has paved the way for future where at least old lot will be replaced by the new one but stranglehold of dynastic lot in the politics is still a challenge. Again articles 62 and 63 are important and these articles are not overridden by SC in future it will increased the space for those who fulfil the criteria envisaged by aforementioned constitutional articles. Therefore likelihood of coming up of new lot committed to bring a positive change and delivering of services to people in power has been augmented which will further enlarge the domain of political participation. An effective legal system can be determined by an independent judiciary. NRO judgment and 31st July 2009 judgment are interalia exemplary judgments which perpetuated the judicial independence. Corruption has been eradicated or not will be a far-fetched discussion because complete end of the corruption is not possible and no society in the world can escape the criticism when it comes to corruption depending upon the definitions and types of corruption. But there is no denial of the fact that NRO judgment has been proved as a major impediment in the way leading to corruption in future. Arguing the removal of arbitrary powers by SC through NRO can be witnessed by the way in which it dealt with the issue of immunity and interpretation of promulgation of ordinance by President. After NRO judgment it has become very difficult to exercise arbitrary powers. NRO judgment gave an implicit message that immunity given to the head of the state and chief executive of the state cannot be exercised arbitrarily let alone the use of arbitrary powers by other public representatives or officials.

Destructive role of Supreme Court can be described by referring to the implications of NRO judgment and its implementation on the other organs of the state and its freedom of performance. Though NRO judgment in itself
didn’t peep into the domain of executive or parliament as a whole but later the episode of implementation coupled with the proceedings of memo commission and PM Yousaf Raza Gilani’s declaration of submission of affidavits by ISI chief and Army chief as illegal characterised the picture of parliament as a cornered player in the game(PakTribune, January 12 2012; Khan,2012). Perception was gaining ground that judiciary and army had allied with one another against parliament and what army did in past constitutional history of Pakistan was being carried out by judiciary with the backing of army specially when voices of implementation of verdict through invocation of article 190 of constitution of Pakistan but in reality that perception was matter of analysis of other emergent issues which had nothing to do with SC nor were created by SC. But when the matter of immunity arose there Supreme Court daunted the institution of immunity given to head of states all over the world. Justice Katju’s comment holds water that president as a head of state is the symbol of federation and should not be brought to court if a political system has to work/function.

Obstructive role of SC can be discussed by looking into the magnitude of impediment created by SC in the way of PPP-led government. Regarding such obstructive role it can be said that NRO judgment and its implementation gave fillip to SC’s activism and number of bold decisions had been taken by SC after NRO judgment. Train of judgments put the executive in particular and parliament in general in such a situation where it remained busy most of the time in following the directions of Supreme Court and hence were not able to carry out any other duties in the realm of governance. On the other hand remaining stuck in responding to judiciary over legal grounds is no excuse to escape the allegations of bad governance overview of which is the constitutional mandate of Supreme Court of Pakistan.

But when it comes to implementation of Supreme Court rulings then scholars have underlined the irrefutable importance of public support for the actors (specially Supreme Court in this case) involved in rules of games mentioned in constitution of Pakistan 1973. In light of the implementation problem, scholars have emphasized the importance of public support for constitutional "rules of the game” in general and for high courts in particular(Caldeira 1986,1209-12;Murphy and Tannenhaus,985-1023;Weingast1997,245-263). As Gibson, Caldeira, and Baird have expressed it, "with limited institutional resources, courts are therefore uncommonly dependent upon the goodwill of their constituents for both support and compliance"(Gibson,Caldeira and Baird 1998,343-358). In country where there is a democratic setup public support is maximum for higher judiciary which compels parliamentarians to obey the court’s rulings to avoid the probable negative impact on voting behaviour of their voters and fear of loosing political support among voters compels them to implement the courts’ decisions. This point can be witnessed by the central position which obedience to Supreme Court had taken in political debates and media when NRO saga was going on. In democracies where a high court enjoys a high degree of public support, a legislative decision not to comply with judicial rulings may result in a negative public backlash(Vanberg, 1995;Leuchtenberg,1995). In nutshell, the "electoral connection” plays a role of implementing tool/instrument for implementation of judicial decision(Mayhew 1974).

We can divide the role of Supreme Court of Pakistan through NRO judgment in good governance in three similar categories discussed in preceding paragraphs. These three categories are assertive role, submissive role, and friendly role(Vanberg 2001,346-361). Assertive role means the role played by Supreme Court which does not care about the consequences of its verdict in the form of public confrontation with other organ of the state i.e. parliament or executive and strike down the legislations in contradiction to fundamental rights (Ibid, 350). A "friendly” court palys a friendly role by sharing the coalition's preferences for the bill or, in a more general interpretation, has no constitutional objections to the statute(Ibid). For this type of court, upholding the law is thus more preferred than any outcome that results if the court tries to annul the statute(Ibid). This type of role was never played by Supreme Court of Pakistan through its verdict on NRO in good governance. Instead, Supreme Court under the predecessor of Iftikhar Mohammad Chaudhry Chief Justice Abdul Hameed Dogar played friendly role or one can say that earlier than him Supreme Court played friendly role.

Submissive role of a court meant that prior-most option of court will be to strike down the enactment of legislative body or an act of executive but court will adopt the midway in the shape of sending back the controversial enactment to legislature, to avoid challenge to its institutional integrity in the case if legislature ignored the ruling of court(Ibid). In NRO saga it can be concluded that Supreme Court of Pakistan strike a balance between first and last type of institutional roles: Assertive and Submissive. Assertive role was reflected in Supreme Court’s sticky stance about question of fundamental rights, equality before law, integrity of parliamentarian and legislative judgment in NRO verdict and seriousness about the conclusiveness of NRO judgment’s implementation. On the other side, submissive role can be observed on three occasions. First, when Supreme Court in the beginning gave time to executive for approval by the parliament, which executive failed to get. Second, when six options were laid by Supreme Court itself showing full awareness of the court about the range of possibilities available to both the organs of the state: Executive and Highest Judiciary. Last, when court after due consultation with the Law Minister Farooq H Naek accepted the draft of letter and hence winded up the dispute. Institutional role was mixture or midway between the assertive role and submissive role.
6. **Recommendations:** Reconciliation must be adopted in the societies passing through wave of conflict and instability such as that of Pakistan. But its misuse to hammer out consensus among few individuals should be avoided and discouraged. Rather reconciliatory process in general and in political domain in particular should span expropriated class and expropriator class.

Money of tax-payers should be protected at any cost. Such protection increases trust among various stakeholders and encourages investment of all kinds. Active judiciary and effective legal structure are essentials of such protection and subsequent trust. Hence superior judiciary should focus on various tiers of judicial system and apply same assertion, demonstrated in NRO case, to all and sundry who are involved in funnelling trillion of rupees to foreign country.

Neither parliament nor judiciary is supreme. Constitution is supreme. It is a document which is an institution in itself. Implementation and compliance of constitution is determinant of the process of institutionalization. All organizations of any type must work in accordance with constitution which will ultimately lead to institutionalization of all the organizations for deliverance of services to people. Judicial activism is necessary for the governance structure of a country like Pakistan where institutional power structure is imbalanced. Hence logic and line of action adopted by Supreme Court of Pakistan in case of NRO should be applied in all of major cases and same legacy should be passed on lower tiers of judicial system to ensure accumulative constitutionalism, institutionalization and people-friendly governance.

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IMPACT OF PERFORMANCE APPRAISAL SYSTEM ON THE EXPECTATIONS OF EMPLOYEES AND EMPLOYERS: AN INDIVIDUALISTIC APPROACH

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ABSTRACT. Performance Management system motivate employee to attain the organizational goal as conventionally executed in organizations. So far, a few organizations are controlling on it - even conventional performance reviews - authorization, inspiring, and a significance tool for the business. The objective of this study was to get to know the impact of P.A.S (performance appraisal system) on the expectations of employees and employers in banking sector. Each bank has its own goals and objectives which they want to achieve from employees and in return employees have expectations from the employers. The overall purpose was to assess the gaps of performance appraisal system between the expectations of employee and employer according to psychological contract. The background of performance appraisal system, psychological contract and employee and employer expectation factors are discussed in the literature. Personal survey technique has been applied here as a method of data collection and opinion poll i.e survey has been used as an tool to collect the information. Sample dimension used for this study was 300 respondents (75 managers/supervisors, 225 employees). From the findings and hypothesis results, conclusion can be made over here that clear objectives defined to the employees help the organization to achieve the desired results and on the other hand clear reward and benefit system helps the employees to attain the desired motives and expectations.

Keywords: Performance appraisal, Psychological contracts and employee performance.

1. Introduction: Performance appraisal system was designed on theoretical foundation upon which the research has been going to be conducted. It explains what the expectations of employee & employer are & are these expectations being met through performance appraisal system. The chapter then considers how performance appraisal system has an impact on employee’s expectations & employer’s expectations. Many researchers like [9],[7],[26],[22] suggested that human resource follow those practices which are linked with employer & worker performance.

This research was based on three variables that include dependent & independent variables with respective
sub-variables. Dependent variables include performance appraisal which was measured by level of productivity, simplicity, quality, retention rate, reduces communication gap, provide room for training, alignment with business objectives & strategy. And independent variables include employees’ expectations which was measured by benefits, job enlargement, pay incentives, improved work conditions, enriched work design (employee participation & "ownership"), enhanced transparency and another independent variable was employer’s expectations which was measured by productivity, efficiency, performance, job enrichment, improved collaboration, increased customer satisfaction. This study focuses to determine the relationship between performance appraisal system and expectation of employee and employer. Performance appraisal system is very fundamental function of human resource, every year organization spend millions on their employees to seek excellence and increase the level of productivity.

1.2. Problem Statement. To evaluate the gap among the expectations from the employees and employers perspective of performance appraisal system, in order to form an enhanced structure.

1.3. Hypothesis.

- H1: There is positive impact of the employer’s expectations on the Performance Appraisal.
- H2: There is positive impact of the employee’s expectations on the Performance Appraisal.

1.4. Outline of the Study. This research has examined the impact of employers and employee expectations from the performance appraisal system. As you know that performance appraisal is very essential purpose of human resource, every year organization spend millions on their employees to improve the productivity level of their organization. This research is based on individualistic approach in order to analyze the differences in the perception of employer and the perception of employee about the impact of performance appraisal system by using psychological contract approach.

1.5. Definitions.

1. Performance appraisal. [8] explained that performance appraisal is an instrument used to recognize, monitor, determine and increase human resources in the organization. [2] contend that performance appraisal system is a dignified process of employee managing and is projected to be an organization tool to benefit the performance and efficiency of workforce. This on other hand would increase the organizational output.

2. Employee Performance. Effective and efficient performance of an employee is an important element for the success of an organization. Organizations always want to retain those employees who are performing really good at work because performance of an employee is very important in order to achieve goals of an organization. So management of an employee performance on the routine basis is the key to an effective performance management system in order to compete in the market effectively.

3. Psychological contracts. This contract highlights the contributions of an employee and the employer. Both depend on each other regarding their expectations. If employee give his time, loyalty, experience and competencies than in return he also wants rewards, benefits, salary and career opportunities from the organization.

2. Literature Review. Appraisal system is the most important part for any organization. As entire organizational goals and objectives are dependent on employee performance, if they achieve the objectives it will lead towards organization achievement. This process have different method and applications which may include goals, continuing learning & competencies, evaluating on a periodic reviews etc. Individual goals are linked with organizational goals in this system which leads towards controlling employees performance and correcting them through the year. The result of employees performance is evaluated at the last stage of appraisal system i.e. feedback. Best performer or achiever gets the rewards at the end. Employee assessment is an continuous process, taking place informally every day in the organization. Performance appraisal as according to some text books or encyclopedias refers to a technique which is applied on employee to appraise them. It is a part of career expansion [16].

2.1. Expectations of employee and employer by performance appraisal. Both the employer and employee expect following things to be evaluated in the performance appraisal: communication gap, decision, procedural and product awareness, time management, scheduling, resources allocation, exposureing, management, knowledge about products, ability to work under pressure, image, social awareness and ethical
considerations.
There are multiple expectations of employees from the employers after their performance has been evaluated such as benefits, Job enlargement, Pay incentives, Improved Work Conditions, Enriched Work Design (Employee Participation and "Ownership"), enhanced Transparency etc. On the other hand employer also exhibits various expectations from the employees regarding their performance such as increase in Productivity, Efficiency, Performance, Job Enrichment, Improved Collaboration, Increased Customer Satisfaction etc.

### 2.2. Outcomes of the system

#### 2.2.1. Rewards

[16] highlighted following criteria matching with rewards

- According to performance rewards will be given to employees.
- A standardized method is used to check employee performance
- SMART (specific, measurable, attainable, realistic and time bond) objectives are designed for the employees
- Online systems are developed to show the progress to both employee and employer regarding their goals and objectives.
- The expectancy theory approach is being used to reward the individuals
- Mutual agreement between employee and employer is conducted to develop this system
- The system is well organized that no one can get any reward without their best performance. Equality is seen and practiced in the organization.

There are multiple rewards which are intangible, that are valued by employees. [4] suggested these:

- Ceremonies should be organized for the best performers to appreciate them.
- Complimentary citation in company publications
- Flexibility in working hours and days
- Job enlargement or job enrichment
- Employee empowerment in setting goals and objectives.

#### 2.2.2. Motivation and Job Satisfaction

Motivation has a link with opportunities. Every employee has a clear approach towards psychological and emotional contracts. [14] explained psychological contract as shared expectations between employers and employees.

#### 2.3. Purpose of P.A.

Performance appraisal is conducted to know the employees' efforts towards their work and achieving organizational goals. According to [15] the most important aim of P.A. is to make sure that individual's performance will automatically enhance the organization's performance with their joint efforts. The two most important contingency factors of an organization i.e., its size and structure also bring a turning impact on the implementation of P.A. system. Which makes the management study the standards, goals and objectives and give away tasks and obligations. [25] highlight that job performance appraisals is a vital tool for managing the performance of people as well as organizations.

#### 2.4. Practices that establishes employer expectations

According to [5] the traditional approach of HRM exhibits the same criteria of recruiting and selecting the employees, training and developing them, appraising their performance and giving them compensation and in return workers contribute their skills and competencies to achieve organizational goals. We can see a simple example that in order to meet management expectations and decisions, written J.D (job description) are needed to be designed. In order to meet employee and employer expectations, the management should clearly define the KAA (Knowledge, Abilities and Aptitude) required from the job and then employer expectations can be informed by different ways such as academic direction programs, achievement evaluations, and by explicit strategy for assignment performance. For instance, direction programs advice advisers to affect ambiguity, to become accustomed with the organization, and to activate authoritative a absolute addition [21], and to begin making a positive contribution [24]. At last, expectations are the standard for employee evaluations [11] and can justify corrective procedures [20]. Progressive corrective actions assist to explain and highlight the legal constraints such as policies of organization as well as encourage its performance [9]. Employees can develop their own careers and performance if HRM practices are well implemented. It is observed that with realistic job tasks and targets both the aspect of an employee has improved. First his performance and secondly his job tenure. [17]. To increase the productivity, and reducing turnover along with
the cost factor, firm must provide appropriate trainings to the employees. It will also change their attitude towards the job. [6]. it is also observed that employee turnover and firm productivity had changed when employees have been provided with the chance to complain and correct problems. [13]. one of the study also depicts that best compensation and rewards too enhances a firm's overall performance and it also helps in attracting and retaining the employees [8].

On the above literature arguments and abstract it can easily be derived that employee and employer expectations are correlated and however it's need to be turn on in the banks of Pakistan.

3. Research Methods. Following are the steps used to collect the data.

3.1. Method of Data Collection. Interviews and questionnaire
3.2. Sampling Technique. Non probability
3.3. Sample Size. 300 respondents (75 managers/supervisors, 225 employees).

3.4. Instrument of Data Collection. Questionnaire has been used to collect the data. Questionnaire consists of two parts.
   i) part 1 comprised of responses that have been received from supervisor about the expectations, related to performance appraisal.
   ii) part 11 comprised of responses on the impact of employee expectations on the performance appraisal.

Dimensions in this questionnaire are as follows:
- Performance Appraisal
- Employer Expectations
- Employee Expectations

3.5 Research Model Developed

Employee's Expectations
- Benefits
- Job enlargement
- Pay incentives
- Improved work conditions
- Enriched work design
- Enhanced transparency

Employer's Expectations
- Productivity
- Efficiency
- Performance
- Job enrichment
- Improved collaboration
- Increased customer satisfaction

Theoretical model of the study

Figure 3.1 (Self Developed Research Model)
4.1. Findings and Interpretation of the Result

- H1: There is positive impact of the employer’s expectations on the Performance Appraisal
- H2: There is positive impact of the employee’s expectations on the Performance Appraisal.

Regression

Summary of Model

<table>
<thead>
<tr>
<th>model</th>
<th>R</th>
<th>Rsquare</th>
<th>Adjusted square</th>
<th>std.error of the estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.629*</td>
<td>.396</td>
<td>.388</td>
<td>.55694</td>
</tr>
</tbody>
</table>

Table 4.1a

ANOVA

<table>
<thead>
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<th>Df</th>
<th>Mean square</th>
<th>F</th>
<th>Sig.</th>
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</thead>
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<td>73</td>
<td>.310</td>
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</tr>
<tr>
<td>total</td>
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<td>74</td>
<td></td>
<td></td>
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</table>

Table 4.1b

coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized coefficients</th>
<th>Standardized coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>constant</td>
<td>.137</td>
<td>.454</td>
<td>.302</td>
<td>.763</td>
</tr>
<tr>
<td>Employer_expectation</td>
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<td>.132</td>
<td>.629</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 4.1c

The hypothesis that there is a positive impact of the employer’s expectations on the Performance Appraisal in the banking sector of Pakistan has been accepted. The F value increases indicated in Anova table, showing the model is significant. The P value is less than 0.05. This shows that the model is validated. The result of R2 is 0.396, which shows that the joined effect of the independent variable will cause the dependent variable to move by only 39.6%, which is an indication of good relationship. Future we have removed the constant from the model to make the model more significant. This is shown below:

Summary of Model

<table>
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<th>model</th>
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<th>std.error of the estimate</th>
</tr>
</thead>
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ANOVA
Table 4.1d

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<tr>
<th>Regression</th>
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<th>2636.409</th>
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<td>total</td>
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Table 4.1e

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</thead>
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<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
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<td>Std.error</td>
<td>Beta</td>
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<tr>
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<td>.019</td>
<td>.986</td>
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</table>

Table 4.1f

**H2:** There is positive impact of the employee’s expectations on the Performance Appraisal System.

Regression

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<th>Rsquare</th>
<th>Adjusted square</th>
<th>std.error of the estimate</th>
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</thead>
<tbody>
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<td>.155^a</td>
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</tbody>
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Table 4.1g

**ANOVA**

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<th>Df</th>
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<th>F</th>
<th>Sig.</th>
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</thead>
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<td>1.646</td>
<td>5.498</td>
<td>.020^a</td>
</tr>
<tr>
<td>Residual</td>
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<td>223</td>
<td>.299</td>
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<tr>
<td>total</td>
<td>68.411</td>
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<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Table 4.1h

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<th>t</th>
<th>Sig.</th>
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<tbody>
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<td>Model</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>B</td>
<td>Std.error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>constant</td>
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<td>.386</td>
<td>10.646</td>
<td>.000</td>
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<td>Employee_expectation</td>
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<td>.336</td>
<td>-.155</td>
<td>-2.345</td>
</tr>
</tbody>
</table>

Table 4.1i

The hypothesis that there is a positive impact of the employee’s expectations on the Performance Appraisal has been rejected. The value of F is greater than 0 which shows it is insignificant. Where as the P value is < 0.05 which shows the model is invalid. The value of R2 is 0.024, which shows the joint effect of the independent variable will cause the dependent variable to move by only 2.4%, which is not indication of strong association.

4.2. Hypothesis Assessment Summary.

H1: There is a positive impact of the employer’s expectations on the Performance Appraisal. H1 has been accepted, as the significant value is < 0.05. H2: There is a positive impact of the employees expectations on the Performance Appraisal since there a significant difference observed between the
expectations of employee on the performance appraisal outcomes. Therefore it does not have any positive impact on performance appraisal system. Hypothesis 2 is rejected.

5. Conclusion. This research was focused basically on the impact of P.A.S (performance appraisal system) in the organizations & its impact on employees & employers expectations. It was concluded after the research results that there is enormous difference between the expectations of employee’s on the performance appraisal system outcomes. Our first hypothesis validated that there was positive impact of the employers’ expectations on the Performance Appraisal system. Employees expect greater rewards, good opportunities, & relaxation in organizational rules & greater empowerment after evaluation of performance appraisal has been done, whereas, employer expectations were unrelated & stressing more on better performance. The results conclude that gap exists and mainly in the key areas of decision making, problem solving, leading, communication and participation. The major reason of the gap can be adaptation of new trends by the organization and not proviging appropriate trainings.

5.2. Future Research and Recommendations.

Following the suggested recommendations:

- Set clear objectives for the employees based on SMART approach.
- Objectives must be aligned with business/organization goals.
- Communication of both the parties that is employee and the supervisor for explaining their roles and responsibilities.
- Employer must designed job descriptions which clearly define job competencies and skills.
- Mutually discussion on career growth and career development by both the parties.
- Highlighting the obstacles faced in individual or team performance.
- Mutually with understanding design the PA system and conduct multi source feed back.

REFERENCES

THE RELATIONSHIP MARKETING ATTITUDES IN FAMILY BUSINESSES: AN IMPLEMENTATION IN AUTOMOTIVE SUBSIDIARY INDUSTRY

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Received June 2013

ABSTRACT. Family businesses which have critical role in every economy, also have some problems in new marketing methods and using new marketing tools in the changed market. Relationship marketing is an important method for marketers to reach customers and make them loyal to the firms in today's competitive market conditions. With usage of relationship marketing strategy, businesses can keep their market share and current customers in the long-term. Although the importance of relationship marketing is known generally, some family businesses can't use relationship marketing tools systematically or efficiently. In this context the purpose of this research is to outline the relationship marketing implementation of family businesses and find out attitudes of relationship marketing in family businesses in Turkey. To determine relationship marketing activities and attitudes, a questionnaire was developed from prior researches. With face-to-face survey method, data was collected from 105 family businesses that operated in automotive subsidiary industry in Ikitelli Organized Trade Zone in İstanbul, Turkey. This study will provide a useful perspective to understand relationship marketing attitudes of family businesses.

Keywords: Relationship marketing, family business, automotive subsidiary industry

1. Introduction. Family businesses is so important in every kinds of economy and country that the development and sustainability of family businesses can’t be ignored. For example, family businesses in Canada support the economy by creating a great workforce. In United States, family businesses includes %80 to %90 of all enterprises. Family-owned businesses comprise %70 of the largest business groups in Brazil. In Austria, %80 of businesses and In Belgium about %83 of businesses are family business. %73 of all Italian businesses are family-owned and In Turkey nearly %90 of businesses are family-owned (Family Firm Institute, 2013). Although family business term is in every economy, the general definition for family business can’t be given. But it can be said that family participation in management and family-ownership are the basic determination for family business in general(Chua et.al.,1999). The different definitions come from different perspectives of researches. Benght Karlöf defines family business as a private business that is established for keeping family fortune(Karlöf,1993:218). David Bork(1995:24) defines family business as one type of business that is established by members of family or people who join family with marriage. Dailey, Reusling and De Mong(1977) determined that family business is established or controlled by one significant family and/or family members(Dailey et.al.,1977). It is certain that in family business, family members have a great power but it is not enough. Some researches has emphasized the generation factor and defined family business as an enterprise that is established or controlled by family members and operated more than one generation by this significant family members(Donnelly,1994). Accordingly, family business can be determined by the
power of family members in business generally (Tagiuri and Davis, 1992). Hulshoff (2001:5) determined that family business combines family and business and this element makes family business different from others. Family businesses have some advantages and disadvantages because of being family owned enterprises. Especially, small and medium-sized family businesses have some troubles in planning management, institutionalization, growing and developing strategies etc. (Yıldırım, 2011). Family businesses are failed when they can’t adapt themselves for modern marketing approach and modern marketing strategies. With modern marketing approach, businesses organized their activities via consumer/customer focus (Uzunoğlu, 2007). Modern marketing approach aims to get long-term relationship with customer and provide customer satisfaction (Yükselen, 2010). In this context, relationship marketing strategy helps businesses to survive from the competition and to keep market share in the long-term. Hougaard and Bjørre (2002:40) said that relationship marketing is old in theory but also is new in practice. In theory, the first definition for relationship marketing came from Leonard L. Berry. According to Berry (1983), relationship marketing is a process of setting and keeping customer relationship in business (Berry, 1995:236). Morgan and Hunt (1994) determined that relationship marketing includes relationships with every kinds of buyers (consumers, retailers, wholesalers etc.) (Morgan and Hunt, 1994). It can be said that relationship marketing focuses on keeping available customers (Peppers and Rogers, 1999). Relationship marketing aims to create a healthy, productive and profitable long-term relationships with customers based on trust factor (OdaBaş, 2013). Researches about relationship marketing has presented that trust factor and commitment factor are so important and significant to determine relationship marketing activities (Morgan and Hunt, 1994; Gwinner et al., 1998; Sin et al., 2002; Ndubisi, 2007; Haciefendioğlu and Çalışlar, 2008). Trust is consist of reliable relationship between buyers and sellers. In other words, buyers and sellers set and sustain their commercial relationship that they will meet each other’s needs and they believe each other’s behavior as reliable (Morgan and Hunt, 1994; Moorman et al., 1992). Commitment factor supports relationship marketing and commitment presented that buyers and sellers want to keep their commercial relationship as soon as possible (Wilson, 1995). Business-to-business (B2B) marketing strategies mostly prefer to use trust factor and commitment factor as relationship marketing strategy (Gounaris, 2005). Businesses can develop great commercial relationship with other businesses such as supplier, retailers, wholesalers etc. to get warranted sales and nearly warranted profits. Keeping available customers became so crucial for small and medium-sized family businesses in the mortal competition. In this regard, this study aimed to find out family businesses’ attitudes of relationship marketing in Turkey. The sector of automotive subsidiary industry includes so many businesses and has a great importance for Turkey, that’s why this sector was chosen for the implementation area.

The automotive subsidiary industry includes a large proportion of family-owned businesses in Turkey. The automotive subsidiary industry is responsible to produce and provide components, spare parts, modules and systems for automotive industry. Components of engine/motor, brake systems, components of frame, cast parts, equipments of electricity, auto glass, clutch release cable etc. can be given as basic products of automotive subsidiary industry (Economy Ministry of Turkish Republic, 2012:5-6).

Automotive industry and automotive subsidiary industry have been growing since development policies and strategies in 1990s (Yaşar, 2013). The most of firms in automotive subsidiary industry are clustered in Marmara region and nearly %75 of them is located in Marmara region. The highest exporting sector of Eastern Marmara Region consisted of vehicles and automotive subsidiary industry (Bayrak, 2013). According to Automotive Industry Exporters’ Association, Turkish automotive subsidiary industry’s export was 8.2 billion dollars in 2012 (Bayar and Atesağaoğlu, 2013:13). In Turkey, there are 4000 firms that are operating for automotive subsidiary industry and Turkish automotive industry’s firms merchandise with 1120 automotive subsidiary industry’s firms (Economy Ministry of Turkish Republic, 2012:5). Automotive industry and automotive subsidiary industry have a great importance for Turkish economy. Accordingly, public and private sector should work together and develop sustainable policies and strategies for automotive and automotive subsidiary sector for the future (TEPAV, 2013:3).

2. Method and Material. In this study, a survey method was chosen for collecting data. The questionnaire was prepared based on prior researches (Ozgener, 2002; Girginer and Yılmaz, 2007) and the variables were set to find out family businesses’ relationship marketing attitudes. There were 2 parts in the survey. The first part included variables about relationship marketing attitudes and second one included variables about participants’ characteristics and businesses’ characteristics. The demographic of participants is thought so
important to determine attitudes of relationship marketing in family businesses. That’s why participants were chosen from marketing supervisors in sample family businesses. Because relationship marketing implementation is related mostly with marketing supervisors. Marketing supervisor is thought as a person who is responsible for marketing activities and implementations in family business. So this person can be owner of the business, general manager or marketing manager in family business in this study. Twenty-five statements were developed to determine attitudes of relationship marketing and these statements were evaluated by participants via five likert scale. Every statement about relationship marketing attitudes was evaluated from 5(strongly agree) to 1(strongly disagree). To understand and determine family businesses clearly, it was asked whether managers were related with owner of the business as a member of his family. And it was asked whether the business was owned and managed by significant family members.

The main research mass consisted of family businesses in automotive subsidiary industry in Istanbul, Turkey. In Istanbul, there are lots of Organized Trade Zone, that's why with usage of simple random sampling method Ikitelli Organized Trade Zone was selected for the population of this research. The data was collected from these employers by a survey method. The sample was determined by convenience sampling method and at total 105 family businesses joined our questionnaire forms. Being unable to obtain a long period for research from businesses caused to the limitation of the sampling with 105 businesses.

3. Findings and Results. The data which was collected by questionnaire forms, was analyzed in SPSS 16 packet program. In table 1, demographic characteristics of the participants in family businesses were presented. Most of participants were male(90) and married(87). The age of participants mostly changed from 46 to 55(34). Also most of participants were owner of the business and secondly manager(38). As being consistent with automotive subsidiary industry, most of participants graduated from vocational high school(56). Because this sector needs employers and employees who have a great technical information and technical skills. Lastly, it was seen in table 1, questionnaire forms was mostly answered by owner of the business(53) and managers(38). Participants shows us that marketing supervisors can be changed in family businesses. Sometimes owner of the business is responsible for marketing, sometimes general manager or marketing manager is responsible for marketing activities generally.

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Frequency</th>
<th>Percent(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>0,10</td>
</tr>
<tr>
<td>Male</td>
<td>94</td>
<td>0,90</td>
</tr>
<tr>
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<td></td>
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<tr>
<td>Single</td>
<td>14</td>
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<tr>
<td>Married</td>
<td>91</td>
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<tr>
<td>Age</td>
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<td>Position in businesses</td>
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<td>Owner of the business</td>
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<td>General Manager</td>
<td>40</td>
<td>0,38</td>
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<tr>
<td>Marketing manager</td>
<td>9</td>
<td>0,08</td>
</tr>
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</table>
Family businesses in automotive subsidiary industry traded mostly with wholesalers, retailers (54%) as organizational customers and secondly family businesses mostly traded with other businesses (40%) such as automotive manufacturers. According to number of employees, most of family businesses which were joined to our survey implementation, were small sized business. There were family businesses with between 11-50 employees (60%). Most of family businesses (36%) had activity time between 31-40 years. Also their generation situation was consistent with their activity time. 57% of family businesses were managed by second generation. 45% of them were still owned and managed by first generation.

Table 2. Characteristics of Family Businesses

<table>
<thead>
<tr>
<th>Types of buyers</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wholesalers, Retailers, etc.</td>
<td>57</td>
<td>0.54</td>
</tr>
<tr>
<td>Consumers</td>
<td>5</td>
<td>0.04</td>
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<tr>
<td>Other businesses</td>
<td>43</td>
<td>0.40</td>
</tr>
<tr>
<td>Number of employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 employees and less</td>
<td>27</td>
<td>0.25</td>
</tr>
<tr>
<td>11-50 employees</td>
<td>62</td>
<td>0.60</td>
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<td>51 -100 employees</td>
<td>16</td>
<td>0.15</td>
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<tr>
<td>Activity time for business</td>
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<td></td>
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<tr>
<td>10 year and the less</td>
<td>4</td>
<td>0.03</td>
</tr>
<tr>
<td>11-20</td>
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<td>0.17</td>
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<td>31-40</td>
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</tr>
<tr>
<td>Second generation</td>
<td>60</td>
<td>0.57</td>
</tr>
<tr>
<td>Total</td>
<td>105</td>
<td>100.0</td>
</tr>
</tbody>
</table>

It was determined that family businesses which joined to our survey implementation, were owned by a significant family and one or two managerial position were belonged to a significant family members. Especially, family businesses which were owned by first generation, were managed by second generation and most of these family businesses employed family members in every kinds of work. Family businesses with second generation have been operating about 30-40 years.

Table 3. Information About Internet Usage And We Usage Of Family Businesses

<table>
<thead>
<tr>
<th>Internet usage information</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having a web site</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>100</td>
<td>0.95</td>
</tr>
<tr>
<td>No</td>
<td>5</td>
<td>0.05</td>
</tr>
<tr>
<td>(If yes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uploading web sites</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57</td>
<td>0.60</td>
</tr>
<tr>
<td>No</td>
<td>38</td>
<td>0.40</td>
</tr>
<tr>
<td>Using e-commerce</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18</td>
<td>0.09</td>
</tr>
<tr>
<td>No</td>
<td>77</td>
<td>0.81</td>
</tr>
<tr>
<td>(If yes) Connecting with customers via internet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>50</td>
<td>0.52</td>
</tr>
<tr>
<td>No</td>
<td>45</td>
<td>0.48</td>
</tr>
</tbody>
</table>

According to table 3, it can be said that family businesses can’t use internet and their web sites efficiently. Although 95% of family businesses had a web site, 60% of them uploaded their web sites and 81% of them don’t use e-commerce. In addition, only 52% of family businesses which had a web site, preferred to connect with customers via internet. These results shows that most of family businesses especially small sized can’t use internet opportunities and still can’t adapt themselves for electronic commerce systems.
### Table 4. The Results of Factor Analyze

<table>
<thead>
<tr>
<th>Variables</th>
<th>Factor loadings</th>
<th>Eigenvalue</th>
<th>Variance percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factor 1: Customer-oriented</strong></td>
<td>7,532</td>
<td>28,301</td>
<td></td>
</tr>
<tr>
<td>The business always makes sales and production plans for customer’s expectations</td>
<td>0,650</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The business always should get profit from customer satisfaction</td>
<td>0,711</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The delivery of products should be planned where and when customer wants</td>
<td>0,565</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The changes of customer’s expectations is always observed</td>
<td>0,643</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 2: Keeping Traditional Marketing</strong></td>
<td>4,396</td>
<td>11,362</td>
<td></td>
</tr>
<tr>
<td>After sales, communication with customers is waste of time</td>
<td>0,676</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Only demand proportion of customers is important</td>
<td>0,590</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The communication with customers should be ended by sales</td>
<td>0,764</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular information exchange is waste of time</td>
<td>0,530</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer relationship management is only for service sector</td>
<td>0,587</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Growing production volume helps for competition</td>
<td>0,522</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 3: Information System</strong></td>
<td>2,891</td>
<td>6,985</td>
<td></td>
</tr>
<tr>
<td>Customer information systems should be set up and managed</td>
<td>0,820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer information systems are made by market research</td>
<td>0,451</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Customer information systems are uploaded regularly</td>
<td>0,670</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Factor 4: Customer Relationship Management</strong></td>
<td>2,109</td>
<td>3,655</td>
<td></td>
</tr>
<tr>
<td>It is crucial to keep current customers</td>
<td>0,560</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Every customer(buyer) is important for business</td>
<td>0,459</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The business should set great relationship with customers in a long-term</td>
<td>0,431</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The business should connect with customers regularly</td>
<td>0,508</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Answers which was collected by participants, was evaluated by Cronbach’s Alpha test to determine scales’ reliability. With Cronbach’s Alpha, the consistency of answers was evaluated. As a result, the scale of relationship marketing attitudes had 0,788 value in Cronbach’s Alpha test. This scale had 25 variables and exploratory factor analyze was implemented to determine significant variables for attitudes. Before application of factor analyze, KMO-Barlett Sphericity Test was conducted and a score of 0,709 was obtained. Factor analyze was conducted to eliminate insignificant and not informative variables that were in the scale. As seen in table 4, four factors were obtained in the scale by factor analyze and eight variables were eliminated. These factors were customer-oriented, keeping traditional marketing, information system and customer relationship management in sequence. The number of cumulative variance that values express equals to %50 of the total variance.
Table 5. The Results Of Correlation Analyze Between Factors And Demographic Characteristics Of Participants

<table>
<thead>
<tr>
<th></th>
<th>Education</th>
<th>Age</th>
<th>Responsible for marketing activities</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer-oriented</strong></td>
<td>Correlation coefficient</td>
<td>.367**</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sig(p)</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td><strong>Keeping Traditional Marketing</strong></td>
<td>Correlation coefficient</td>
<td>-.220**</td>
<td>.362**</td>
</tr>
<tr>
<td></td>
<td>Sig(p)</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td><strong>Information System</strong></td>
<td>Correlation coefficient</td>
<td>.315**</td>
<td>-.244*</td>
</tr>
<tr>
<td></td>
<td>Sig(p)</td>
<td>.000</td>
<td>.042</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td><strong>Customer relationship management</strong></td>
<td>Correlation coefficient</td>
<td>.206</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Sig(p)</td>
<td>.000</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>105</td>
<td>-</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (1-tailed)***

*Correlation is significant at the 0.05 level (1-tailed)*

Table 5 shows the results of correlation analyze between factors and demographic characteristics of participants. There were some significant relationships between factors of relationship marketing attitudes and participants’ demographic characteristics. In reference to Kendall tau-b correlation analyze results, it can be said that higher educated marketing supervisors focus on customers and make strategies to satisfy customers in family businesses. Higher educated marketing supervisors see information systems as important and they try to manage information systems more efficiently. They try to keep current customers and they connect with customers regularly in a long-term. In addition, higher educated marketing supervisors are care about customer relationship management much more. So higher educated marketing supervisors prefer to relationship marketing methods and they don’t keep traditional marketing methods anymore. But lower educated marketing supervisors still keep traditional marketing methods and see relationship marketing activities as waste of time. Age is seen as an effective factor to influence attitudes of relationship marketing. Because elder marketing supervisors still keep traditional marketing methods and don’t manage marketing activities based on customer-oriented as much as younger. Elders can’t manage information system in family business efficiently. In family businesses, it can be expected that younger marketing supervisors(owners of business or managers) will change business’ targets of short-term profit into long-term profit and customer satisfaction. Relationship marketing is understood by younger marketing supervisors in family businesses rather than elders. This study includes mostly micro and small sized family businesses and it is known that this kind of businesses generally don’t have departments for every business function and generally they are managed by owner of the business. That’s why new marketing technics and modern marketing approach can’t be followed efficiently in small sized family businesses. When there is marketing manager, relationship marketing activities is better implemented.
Table 6. The Results Of Correlation Analyze Between Factors And Characteristics Of Family Businesses

<table>
<thead>
<tr>
<th></th>
<th>Number of employees</th>
<th>Activity time for business</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Customer-oriented</strong></td>
<td>Correlation coefficient</td>
<td>.217**</td>
<td>-</td>
</tr>
<tr>
<td>Sig(p)</td>
<td>.006</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>N</td>
<td>105</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>Keeping Traditional Marketing</strong></td>
<td>Correlation coefficient</td>
<td>-.302**</td>
<td>-.222**</td>
</tr>
<tr>
<td>Sig(p)</td>
<td>.000</td>
<td>.007</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td><strong>Information System</strong></td>
<td>Correlation coefficient</td>
<td>.158*</td>
<td>.215**</td>
</tr>
<tr>
<td>Sig(p)</td>
<td>.035</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>105</td>
<td>105</td>
<td>105</td>
</tr>
<tr>
<td><strong>Customer relationship management</strong></td>
<td>Correlation coefficient</td>
<td>.324</td>
<td>-</td>
</tr>
<tr>
<td>Sig(p)</td>
<td>.000</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>N</td>
<td>105</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (1-tailed)**
*Correlation is significant at the 0.05 level (1-tailed)

It was determined that there were some significant relationships between characteristics of family businesses and relationship marketing attitudes according to Kendall tau b correlation analyze (Table 6). Number of employees, activity time for business and generation are effective factor on relationship marketing attitudes generally. Number of employees indicated size of businesses and size of businesses effects management structure of family businesses. Accordingly, larger sized family businesses focus on customer satisfaction and long-term profit rather than smaller ones. Larger sized family businesses don’t prefer to keep traditional marketing approach and try to adapt themselves for modern marketing approach. So larger sized family businesses have better attitude for relationship marketing. Also old generation (first generation) generally prefer to keep traditional marketing. On the other side, new generation (second generation) and more experienced family businesses in a sector manage their information system more efficiently. Lastly, it can be said that smaller sized family businesses can’t use customer relationship management system efficiently and larger sized businesses know the importance of customers better and they connect with customers regularly in a long-term.

4. Conclusion. Customers who are focus point of modern marketing approach, are also direct the competition greatly. Firms that realize the importance of customers, turn towards to new marketing strategies and technics to keep customers and their market share. In this context, relationship marketing strategy provides firms to get customer loyalty and long-term market share. Automotive and automotive subsidiary industry is so important sectors and have so much employers and employees in Turkey that businesses from this sectors should not be ignored and should not be left to fate. Family businesses which are one of basic dynamics in Turkey, mostly work in automotive and automotive subsidiary industry. With this study, family businesses from automotive subsidiary industry are investigated for relationship marketing attitudes.

Some of time and financial limits, this study includes only family businesses from Ikitelli Organized Trade
Zone in Istanbul, Turkey. The data was collected from 105 family businesses and people who were responsible for marketing activities in family businesses, answered questions in survey form.

Participants involved owners of the business, general managers and marketing managers as being marketing supervisors in family businesses. Owners of the business mostly are responsible for marketing activities in family business and there are a few marketing manager in family business generally. As it is expected, there are few women working in family business in automotive subsidiary industry. Mostly married, graduated from vocational high school men were working in automotive subsidiary industry. Micro and small sized family businesses generally work in automotive subsidiary industry and most of them trades with wholesalers, retailers or manufacturer firms. More than half of all family businesses have been active in automotive subsidiary sector for 20 years and upper. Businesses which have been active for 30 years and upper, is owned and managed by the second generation.

Usage of internet and managing web sites are also important elements for relationship marketing in today’s competition world. Because firms who adapt themselves for changing technology and communication systems, will reach customers more efficiently. Although almost all of family businesses have web sites, they don’t use it efficiently and they don’t upload their web sites and they don’t use e-commerce system. This means that micro and small sized family businesses can’t compete with larger businesses and international competitors. Lack of e-commerce or web site’s management will make some troubles for family businesses in the long-term. Without internet or mobile facilities, sustainable trade can’t be expected for micro or small sized businesses.

Attitudes of relationship marketing was measured by a survey that included 25 variables. These variables were evaluated by participants and the consistency of answers was tested by Cronbach’s Alpha test. Cronbach’s alpha coefficient determines the reliability of scales. In this case, the scale of relationship marketing attitudes has high reliability(0.788). Also the adequacy of sample size was tested by KMO-Barlett test and score was accepted to keep on exploratory factor analyze. With factor analyze 4 basic factors was determined and 8 variables were eliminated. This factors was used in Kendall tau b correlation analyze and then some significant relationships with participants’ demographic characteristics and family businesses’ characteristics were determined.

Higher educated marketing supervisors know the importance of customers and try to keep customer-oriented marketing activities. They care about managing information systems much more than lower educated marketing supervisors. Also they know the importance of customers better and try to connect with customers regularly. Lower educated marketing supervisors can’t understand relationship marketing activities and they prefer to manage marketing activities with traditional methods. Older marketing supervisors who are generally owner of business at the same time, don’t implement modern marketing strategies as relationship marketing and still see short-term profit enough to keep their market share. Owner of business can not manage every function efficiently in family business even though this business is micro or small sized. Younger marketing supervisors try to reach long-term profit with customer satisfaction and they believe that business should arrange marketing activities such as product development, price and distribution according to customer. Second generation is more careful to adapt the business for changing competition world. Maybe old generation can’t keep up with new generation because they don’t have enough competence in technology usage. They were not provident for the future’s competition and now they don’t know how they can reach new generation. Size of businesses also influence relationship marketing attitudes too. Smaller sized businesses can’t manage customer relationship system efficiently. On the other side, larger sized businesses realize the importance of customers and they try to keep current customers much more.

Setting systematic customer relationship management in family business will provide success in a long-term. Although every family business know that customer’s importance for sustainable profit, they have some problems in relationship marketing implementation. In this case, some corporations such as trade and industry chambers, universities etc. can support family businesses with projects or trainings.
REFERENCES


PSYCHOLOGICAL FACTORS OF WOMEN CONSUMER REGARDING SELECTION OF CONVENIENCE PRODUCTS

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biladurani@ymail.com

ABSTRACT: The psychological factors are associated with the sentiment and mind of a human being. They influence on the buying behavior of consumers at the time of selection of convenience products. Convenience products are related to consumer. The psychological factors are different from person to person according to their lifestyle and nurture. The psychological factors that have an influence on the buying behavior of consumers have been identified in this research paper. The psychological factors influence consumer judgment when he/she purchase a convenience product. The main psychological factors could be perception, learning, habits, self-concept, belief, attitude, personality and values. The outcomes achieved from this research paper that the women consumers’ personality is an important psychological factor regarding the selection of convenience products. Study also shows this factor play an important role in the women consumers buying behavior. This research paper tells us which media is used to buy convenience products and purchasing power of women consumers regarding convenience products. The investigational study of this research paper has been conducted on women consumers working in different universities of Peshawar. The hypothesis, methodology, result, findings suggestions and conclusions have been written in this research paper. 
Key Words: Psychological Factors, Convenience Products, Women Consumers.

Introduction Consumer psychology is a new specialized career field in the world that gradually builds sentiment or feeling in the owner and management of the organization to understand consumer needs and wants about the product. As per research paper topic, the focus is on, impact of psychological factors of women consumer regarding selection of convenience products with special reference to universities of Peshawar. The psychological factors influence consumer judgment when he/she purchase a convenience product. There are different products which the women consumers consume; they buy convenience products after receiving information. “Convenience products are consumer products and services that customers usually buy frequently, as soon as they feel the need for them, and with a minimum of comparison and buying effort. They require minimum or no planning before the purchase. Examples include soft drink, chocolates, pan masala, magazine and fast food”. (Philip Kotler)

3. Literature Review Geeta Sonkusare (2013) stated that research has reliably presented that Advertisement through television is very important sources of communicating message to the target customer viewers and
television advertisement has the capability to show visual and audio communication. The women consumers are selecting the FMCG products after receiving useful information. This research paper shows the outcome impact of television advertising and women consumers buying behavior. But in this research paper we want to investigate important psychological factor of women consumers that influence the choice regarding convenience products. The outcomes achieved from this research paper show that the women consumers’ personality is an important psychological factor regarding the selection of convenience products. Study also shows this factor play an important role in the women consumers buying behavior. This research paper study tells us which media is used for buy convenience products and purchasing power of women consumers regarding convenience products. (Zulfiqar Ali Anjum, 2014).

4. Psychological Factors The main psychological factors could be learning, personality, Values, Beliefs, Attitudes, Habits, Self-concept, and Perception.

4.1 Learning Learning is achieved through personal information and experience. Through learning process consumers change their buying behavior after gained information and experience about convenience products. It is the reason that consumers don’t buy bad products again.

4.2 Personality Personality defines a person’s mood, unique characters and shows why people are different. The personality traits forecast a person’s buying behavior.

4.3 Values In terms of selection of convenience products the values of consumers most possible to influence the buying behavior of consumers. Values define a person’s family and culture. Consumers buy product according to their family status and culture.

4.4 Beliefs The belief relates to religion and play significant role in the selection of convenience products. The belief describe about what is acceptable to eat according to religion.

4.5 Attitudes The attitudes describe the psychological position and emotional feeling, evaluation of favorable or unfavorable about products, services, company, ideas, issues and institutions.

4.6 Habits A lot of the selections of convenience products we make on regular basis. A habit defines something that we do regularly without thinking.

4.7 Self-concept The self-concept describes how to feel about ourselves and the approach under which we see our personal appearance including the body image such as colour, size, shape and weight. One person has a picture in one mind about one body image. The marketers must keep in mind the consumers self-concept to their buying behavior.

4.8 Perception Perception tell us that how we understand or interpret the surrounding you and make sense of it in our brain.

5. Objectives Of The Study

- To study the impact of psychological factors of women consumers on the selection of convenience products.
- To study women consumers purchasing power towards convenience products.
- To study which media influence the buying behavior of women consumers?
- To study the women consumer are satisfied with marketing of convenience products in Peshawar city.

5.1 Limitation Of The Study

- The investigational study of this research paper has been conducted on women consumers working in different universities of Peshawar.
- The investigational study of this research paper concentrated on selected convenience products.
5.2 **Hypothesis**

- There is significant relationship between learning and women consumers in selection of convenience products.
- There is significant relationship between personality and women consumers in selection of convenience products.
- There is significant relationship between habits and women consumers in selection of convenience products.
- There is significant relationship between self-concept and women consumers in selection of convenience products.
- There is significant relationship between attitude and women consumers in selection of convenience products.
- There is significant relationship between values and women consumers in selection of convenience products.
- There is significant relationship between perception and women consumers in selection of convenience products.
- There is significant relationship between belief and women consumers in selection of convenience products.

6. **Theoretical Framework** The following framework of this research paper shows the relationships between independent variables and dependent variable. The independent variables to be examined are learning, personality, habits, self-concept, attitude, values, perception and belief.

![Diagram showing relationships between variables]

7. **Methodology**

7.1 **Population Of The Study**: The population of the research study is based on women consumers working in different universities of Peshawar. The investigational study of this research paper concentrated on selected convenience products. The structured questionnaires are distributed to women consumers.

7.2 **Sample Size**: The sample size of study is based on 50 women consumers working in different universities of Peshawar.

7.3 **Response Rate**: The response rate was 100%.

7.4 **Data Collection**: The primary and secondary sources are used for collection of data. The data collected from primary source is structured questionnaires and the secondary data has been collected from various sources such as books and different websites.

7.5 **Statistical Technique**: The various statistical techniques like nominal scale and percentile method have been used for testing the hypothesis in this study.
8. Results

Q.1 Do you buy convenience product on the basis of Learning? (Information and Experience)

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>33</td>
<td>66</td>
</tr>
<tr>
<td>Disagree</td>
<td>17</td>
<td>34</td>
</tr>
</tbody>
</table>

Q.2 Do you buy convenience product on the basis of Personality? (Person mood and unique traits)

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>34</td>
<td>68</td>
</tr>
<tr>
<td>Disagree</td>
<td>16</td>
<td>32</td>
</tr>
</tbody>
</table>
Q.3 Do you buy convenience product on the basis of Values? (Family and cultural)

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Disagree</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

Q.4 Do you buy convenience product on the basis of Beliefs? (Related to religion)

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>27</td>
<td>54</td>
</tr>
<tr>
<td>Disagree</td>
<td>23</td>
<td>46</td>
</tr>
</tbody>
</table>

Q.5 Do you buy convenience product on the basis of Attitudes? (Favorable or unfavorable)
Q.6 Do you buy convenience product on the basis of Habits? (Something that we do regularly without thinking)

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>24</td>
<td>48</td>
</tr>
<tr>
<td>Disagree</td>
<td>26</td>
<td>52</td>
</tr>
</tbody>
</table>

Q.7 Do you buy convenience product on the basis of Self-concept? (How see yourself)

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>31</td>
<td>62</td>
</tr>
<tr>
<td>Disagree</td>
<td>19</td>
<td>38</td>
</tr>
</tbody>
</table>
Q.8 Do you buy convenience product on the basis of perception?

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>21</td>
<td>42</td>
</tr>
<tr>
<td>Disagree</td>
<td>29</td>
<td>58</td>
</tr>
</tbody>
</table>

Q.9 Are you happy with the publicity of convenience product on media?

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>30</td>
<td>60</td>
</tr>
<tr>
<td>Disagree</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>
Q.10 Which media advertising impact on your buying psychology?

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newspaper</td>
<td>01</td>
<td>2</td>
</tr>
<tr>
<td>Television</td>
<td>29</td>
<td>58</td>
</tr>
<tr>
<td>Internet</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Magazines</td>
<td>01</td>
<td>2</td>
</tr>
<tr>
<td>Mobile phone</td>
<td>04</td>
<td>8</td>
</tr>
</tbody>
</table>

Q.11 Are you satisfied with the marketing of products in Peshawar city?

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>Disagree</td>
<td>28</td>
<td>56</td>
</tr>
</tbody>
</table>
Q12: How much money spends monthly on purchase of convenience products?

<table>
<thead>
<tr>
<th>Particular</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000-2000</td>
<td>08</td>
<td>16</td>
</tr>
<tr>
<td>2001-3000</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>3001-4000</td>
<td>11</td>
<td>22</td>
</tr>
<tr>
<td>More than 4000</td>
<td>20</td>
<td>40</td>
</tr>
</tbody>
</table>

9. Findings

- The outcomes achieved from this research paper show that the women consumers’ personality is an important psychological factor regarding the selection of convenience products. Near about 68% of working women consumers buy convenience products by personality.
- Maximum working women consumers are satisfied with publicity of convenience product on media.
- Maximum working women consumers are satisfied with television advertisement of convenience product.
- Maximum working women consumers are not satisfied with the marketing of products in Peshawar city.
- Maximum number of working women consumers spends monthly more than Rs. 4000 on purchasing Convenience products.
10. Suggestions

- The organization should hire specialized consumer psychologist before marketing the product and service.
- The universities should start a bachelor’s degree program in psychology for initial level job in consumer psychology.
- Ph.D. program in consumer psychology are limited and therefore, very competitive, so universities should start the master and doctorate degree in an area related to consumer psychology such as general psychology, industrial organization psychology and marketing and consumer studies for those who are interested in high level management position in marketing, advertising or in teaching at the university level.
- Consumer psychologist may be working for an organization, an advertisement agency, marketing research firm and as a consultant.

11. Conclusion: Consumer psychology is a new specialized career field in the world that gradually builds sentiment or feeling in the owner and management of the organization to understand consumer needs and wants about the product. Consumer psychologist should study consumer emotions and behavioral response through trade promotion, advertisement, packaging, products and services. The consumer psychologist provides assistance to the decision makers to make any modification in the design of product, which will provide an improved consumer response and sale increase. The psychological factors influence consumer judgment when he/she purchase a convenience product. The main psychological factors are perception, learning, habits, self-concept, belief, attitude, personality and values. The outcomes achieved from this research paper show that the women consumers’ personality is an important psychological factor regarding the selection of convenience products.

REFERENCE

PAKHTUN ETHNICITY AS A VOTING DETERMINANT IN THE ELECTORAL POLITICS OF KHYBER PAKHTUNKHWA: A CASE STUDY OF 2008 GENERAL ELECTIONS

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ABSTRACT: This article tends to explore the application of theory of ethnicity (Pakhtun ethnicity) in Khyber Pakhtunkhwa with reference to 2008 general elections. The study argues that the Pakhtun ethnicity is applicable to some extent in the electoral politics of Khyber Pakhtunkhwa. A sample of 800 respondents has been selected through multistage random and systematic sampling from the voter list in NA-2 Peshawar. The quantitative data reveals that more than fifty percent respondents (53.76%) supported the view that the Pakhtun ethnic politics is applicable in the electoral politics of Khyber Pakhtunkhwa in 2008 general elections. The chi-square value mostly provides significant p-value which shows that there is close association between Pakhtun ethnic voting and the variables including urban/rural divisions, gender, age, profession, monthly income and literacy.

Keywords: Ethnicity, Ethnic Politics, Pakhtun ethnicity, General Elections 2008, Khyber Pakhtunkhwa, Electoral Politics.

Introduction: Ethnicity has been derived from a Greek word ‘ethnos’ which means ‘tribe’, ‘race’, ‘people’ or ‘nation’. It refers to the people living and acting collectively in a way that we can apply to a people or nation. Ethnicity is based on culture, language, ancestry notions, historical stories, location, physical attributes and religion. Ethnicity classifies and organizes individuals into various factions or strata. Each stratum has its own unique features. It has its own perceptions and its members are similar to each other but different from other ethnic groups.

There are two views regarding the emergence of ethnicity in society. The first one is the primordial view which claims that ethnicity is inherent in human being because they possess immutable traits. Its exponent supporters are Harold R. Isaacs, Clifford Geertz, Michael Novak and many others. This view of ethnicity has been rejected due to various flaws in it. The second one is the situation view of ethnicity which states that ethnicity is constructed in the society due to socio-economic and political situations. Its supporters are Kathleen Neils Conzen, Werner Sollors, Stephen Steinberg and many others. This theory is most acceptable in comparison to inherent theory of ethnicity. However, still controversies exist among the scholars regarding the application of these theories.

Ethnic voting plays an important role in electoral studies. Ethnic cleavages lead to the formation of various ethnic parties in a multi-ethnic and multi-race society which provide ground for the emergence of ethnic politics. Ethnic political parties exist both in developed and developing countries such as United Kingdom, Canada, South Africa, India and Sri Lanka etc. According to Robert Dahl, ethnic voting takes
place in those ethnic groups where the groups are subjected to homogenous socio-economic status. The ethnic voting will decline when members of an ethnic group attain different socio-economic status. Raymond Wolfinger also presents his theory on the basis of socio-economic status. The tendency of ethnic voting reaches at the top when the members of ethnic group achieve the middle class status. According to Robert Harmel and John D. Robertson, greater the ethnic groups in a society, greater will be the number of ethnic political parties in it. Keeping in view the ethnic demands of the people, the ethnic parties launch various ethnic programmes for getting electoral support. According to Donna Lee Van Cott, ethnic political parties do not emerge automatically. They are formed as a result of the institutional change which refers to the 'changes in constitutional provisions, laws, and rules that structure the political system, particularly the electoral system; and party system change that significantly lowers barriers to new entrants.' Kanchan Chandra rejects the point of view that ethnic divisions lead to the destabilization of democracy. He argues that ethnic parties cannot destroy the democracy if they are institutionally supported and backed. The institutions which are attributed with single ethnic identity structure must be replaced with a structure of multi-ethnic identities.

Pakistan is also a multi-cultural, multi-lingual, and multi-ethnic state having ethnic diversities in its four provinces. The ethnic landscape in Pakistan is that Punjabis constitute the largest ethnic group (48.2%) in Pakistan, followed by Pakhtuns (13.1%), Sindhis (11.8 %), Siraikis (9.8 %), Urdu-speaking (7.6 %), Baloch-Brahuis (4.2 %), and Hindko-speaking (2.4 %). The ethnic diversities transformed into polarized ethnic identities due to strong stress on policy of centralism, economic disparities, lack of provincial autonomy, lack of tolerance to promote local language and culture, suppression of an ethnic group at the name of national security and dominant posture of the Punjabis over small ethnic groups.

Pakhtun ethnic politics is practiced in Khyber Pakhtunkhwa. Khan Abdul Ghaffar Khan during the British rule in India struggled for reformation of Pakhtun society and end of British colonialism under the umbrella of Khudai Khidmatgar (Servants of God) Movement (KKM). It was a Pakhtun ethno-nationalist movement started in 1929. This movement also acted as a Pakhtun’s resistive force against the British in the pre-partition era. After the partition of India, KKM boycotted the referendum held in Khyber Pakhtunkhwa in July 1947 because it was in favour of independent Pakhtun state or joining with Afghanistan. However, in 1948, after the creation of Pakistan, Ghaffar Khan took oath of allegiance to Pakistan. After the creation of Pakistan, the Pakhtun nationalists of KKM started the demand of provincial autonomy for Khyber Pakhtunkhwa because it feared from the dominance of Punjabis.

Khan Abdula Ghaffar Khan, Abdul Hameed Khan Bashani, a Bengali political leader and G. M. Syed, a Sindhi nationalist formed the National Awami Party (NAP) in Dhaka in July 1957. It was a leftist and progressive party which spoke for the protection of the rights of the ethnic minorities and provincial autonomy. In 1967 the party split into two factions. One faction was pro-Soviet led by Muzaffar Ahmed along with Wali Khan and other faction was pro-Chinese headed by Bashani. NAP and JUI formed a coalition government in Khyber Pakhtunkhwa in 1972. When Z.A.Bhutto dissolved the provincial assembly of Balochistan in 1975, NAP started a protest movement against the Bhutto government for suppressing the provincial autonomy Pakhtun nationalists. The Pakhtun nationalists suffered a lot when Abdul Ghaffar Khan passed away in 1988.

ANP always tries to politicize ethnic issues. In 1997, ANP broke its alliance with PML-N when Nawaz Sharif refused to rename NWFP. Begum Naseem Wali Khan emotionally argued that Pakhtun should be given identity on the map of Pakistan. She added that Pakhtunkhwa was the 3000 years old name of NWFP. She argued that even this word of Pakhtunkhwa has been used by Ahmad Shah Abdali who once said that he could forget the throne of Delhi but not Pakhtunkhwa. In 2008 elections, ANP got majority in Khyber Pakhtunkhwa and established a coalition government with PPP both in the province and centre. The PPP accepted the demand of ANP for renaming NWFP as Khyber Pakhtunkhwa which was constitutionally accepted in 18th Amendment in 2010. The ANP is also giving ethnic touch to the project of Kalabagh Dam.

Regarding the application of theory of ethnic voting it is argued that ethnicity as a voting determinant is applicable to some extent in the electoral politics of Khyber Pakhtunkhwa. In 2008 elections, the voters voted to ANP because the protection of Pakhtuns’ rights has been presented in the form of issue voting.
The empirical data support the argument that ethnic voting is important to some extent in the electoral politics of Khyber Pakhtunkhwa.

**Hypothesis:** Pakhtun ethnicity does not constitute a primary determinant of voting behaviour in Khyber Pakhtunkhwa.

**Research Questions:**
1) What is the conceptual understanding of ethnicity and ethnic voting?
2) How far Pakhtun ethnic voting matter in determining voting behaviour in Khyber Pakhtunkhwa?
3) Do elections in Khyber Pakhtunkhwa represent an aberration from electoral behaviour based on ethnic voting?

**Criterion For Operational Measurement Of Electoral Variable:** Keeping in view the hypothesis and research questions, the study has been confined to the operational measurement of the variable of Pakhtun ethnic voting. Regarding the application of this variable, a number of questions have been asked. Each question has been analysed with the help of chi-square test, p-value and percentage method. In order to comprehend the extent of the application of theory of ethnic voting, the average percentage of all the questions pertaining to the determination of this variable, has been calculated. The following criterion has been followed for measuring the extent of application of variable of Pakhtun ethnic voting.

- The average percentage which is 40% and below has been termed as “Limited Extent.”
- The average percentage which is 60% and below has been termed as “Some Extent.”
- The average percentage which is above 60% has been termed as “Great Extent.”

**Methodology:** This is an empirical and applied nature of research based on quantitative and analytical methods. The respondents have been selected from the voter list through multistage random and systematic sampling. The data obtained through questionnaires have been classified, arranged and analyzed in various tables. Secondary data in form of journals and books have been studied and used for understanding the theoretical framework regarding the theory of party identification.

**Justification For The Selection Of Universe:** This present study tends to explore the extent of application of the variables of party identification, issue voting, clientelism, religious voting and ethnic voting in the rural and urban areas of Khyber Pakhtunkhwa. The rural areas in Khyber Pakhtunkhwa are homogenous in terms of economic, political and social conditions with slight variations. Similarly, all the urban areas in Khyber Pakhtunkhwa comparatively possess homogenous characteristics with regard to development and political consciousness. It is due to the homogenous characteristics of rural and urban areas that the universe has been confined to the rural and urban areas in Khyber Pakhtunkhwa. In order to represent both the rural and urban areas in the sampling, the respondents have been collected from the urban and rural areas in district Peshawar. Andrew R. Wilder in his work, *The Pakistani Voter: Electoral Politics and Voting Behaviour in the Punjab* determines the political and social determinants of voting behaviour in urban and rural areas by undertaking the case study of NA-97 in Lahore. Similarly, Muhammad Shakeel Ahmad in his Ph.D dissertation, *Electoral Politics in NWFP: 1988-1999* describes the political and social determinants of voting behaviour in urban and rural areas by undertaking the case study of NA-1 in Peshawar. In the light of these previous research works this study has been confined to the urban and rural areas of NA-2 in Peshawar.

**Sampling Method:** NA-2 Peshawar is the universe of the study which includes the registered voters in this constituency. The total number of the registered voters in 2007-08 was 314904 in which 192693 were male and 122211 female. There are twenty union councils in NA.2 constituency in which four councils are rural and sixteen are urban. A representative sampling was obtained through random and systematic sampling.

**Sample Size:** In order to get a representative sample size, an over 800 voters were selected on the basis of a multi stages sample techniques given below.

**Stage 1:** There are four national level constituencies in Peshawar i.e. NA-1, NA-2, NA-3 and NA-4. The constituency of NA-2 was randomly selected in this stage.
Stage 2: There are 20 Union Councils in NA-2 in all. In this stage, an overall 20% Union Councils were selected out of a 20 total which means 04 Union Councils in which 02 were from urban and 02 were from rural areas. These Union Councils were randomly selected. The names of the urban Union Councils are Shaheen Town and Tehkal Payan-2 and that of the rural Union Councils are Regi and Sufaid Dheri.

Stage 3: In this stage, 200 voters were randomly selected from each selected Union Council on equal basis. So the overall sample size comes to 800 respondents. These respondents were selected from each selected Union Council through voters’ lists on the basis of random and systematic techniques. At first, one voter was randomly selected and then every 4th voter was selected till 200 respondents completed. Out of 800 respondents, 400 were selected from urban and 400 from rural areas. A considerable number of the voters did not return the questionnaires. Among these respondents the prominent were females, aged, illiterate and rural respondents. There are many reasons which can be referred in this connection. Firstly, our society is not pro-research-oriented. Secondly, people usually frighten in giving data in black and white. People usually avoid to fill the questionnaire because they think that it waste their time. Out of a total 800 questionnaire administered, the researcher could get only 613 duly filled and returned.

Pakhtun Ethnicity And Its Operational Measurement (Data Analysis): This study tends to portray the operationalization of the theory of ethnicity (Pakhtun ethnicity) in light of the empirical data collected in NA-2 Peshawar. The Pakhtun ethnicity has been analysed and assessed in the light of various close ended questions. The Pakhtun ethnicity has been measured quantitatively by asking the following set of questions.

- To what extent you voted on the basis of assurance of protecting Pakhtuns’ rights in the 2008 elections?
- Changing the name of the province is a right step in the right direction. What is your opinion?
- Do you think Pakhtuns are faced with the problem of any discrimination?
- If yes, then what kind of discrimination?
- To what extent the Pakhtun ethnic parties have defended the rights of the Pakhtuns?
- To what extent the Pakhtun ethnic parties have succeeded in eradicating unemployment, price hike, load shedding and terrorism?

Frequencies and percentages for each question have been calculated. All these questions have been further analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy. Chi-square test and p-value has been determined for making analysis and conclusion.

The Protection Of Pakhtuns’ Rights As An Electoral Preference In 2008 Elections: The electoral preference for the protection of Pakhtuns’ rights is one of the important indicators of ethnic voting in 2008 elections. It is, therefore, important to measure ethnic voting in terms of preferring the protection of Pakhtuns’ rights in 2008 elections. In this connection, responses were collected with regard to the question, “To what extent you voted on the basis of assurance of protecting Pakhtuns’ rights in the 2008 elections?” It has been asked so that to know about the general perception of the voters regarding ethnic voting in 2008 elections. This question has been analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy.

Urban / Rural Consideration: Both the urban and rural respondents supported ethnic voting in 2008 elections. In this regard the lead has been taken by the rural respondents.

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>173 (52.0%)</td>
<td>88 (26.4%)</td>
<td>33 (9.9%)</td>
<td>39 (11.7%)</td>
<td>333</td>
</tr>
<tr>
<td>Rural</td>
<td>163 (58.2%)</td>
<td>83 (29.6%)</td>
<td>23 (8.2%)</td>
<td>11 (3.9%)</td>
<td>280</td>
</tr>
<tr>
<td>Total</td>
<td>336 (54.8%)</td>
<td>171 (27.9%)</td>
<td>56 (9.1%)</td>
<td>50 (8.2%)</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 13.428, P-value = 0.004
Majority of the rural respondents (58.2%), followed by urban respondents (52.0%), asserted that they voted on the basis of protection of Pakhtuns’ rights in 2008 elections. Since people in rural area are not politically more conscious therefore great support came from them regarding the protection of Pakhtuns’ rights in making electoral preferences. It means that Pakhtun ethnic voting can be seen more in rural respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between urban / rural stratification and the protection of Pakhtuns’ rights in making electoral choice in 2008 elections.

**Gender Consideration:** Both the male and female respondents supported ethnic voting in 2008 elections. In this regard the lead has been taken by the male respondents.

<table>
<thead>
<tr>
<th>Male</th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>225 (61.8%)</td>
<td>60 (16.5%)</td>
<td>45 (12.4%)</td>
<td>34 (9.3%)</td>
<td>364</td>
</tr>
<tr>
<td>Female</td>
<td>111 (44.6%)</td>
<td>111 (44.6%)</td>
<td>11 (4.4%)</td>
<td>16 (6.4%)</td>
<td>249</td>
</tr>
<tr>
<td>Total</td>
<td>336 (54.8%)</td>
<td>171 (27.9%)</td>
<td>56 (9.1%)</td>
<td>50 (8.2%)</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 61.606, P-value = 0.000

A large number of the male respondents (61.8%), followed by female respondents (44.6%), asserted that they voted on the basis of protection of Pakhtuns’ rights in 2008 elections. It shows that Pakhtun ethnic politics has been greatly supported by the male respondents in 2008 elections. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between gender and the protection of Pakhtuns’ rights in making electoral choice in 2008 elections.

**Age Consideration:** In 2008 elections all age groups supported ethnic voting. However, the younger respondents greatly supported in this regard.

<table>
<thead>
<tr>
<th>18-40</th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>228 (59.2%)</td>
<td>92 (23.9%)</td>
<td>34 (8.8%)</td>
<td>31 (8.1%)</td>
<td>385</td>
</tr>
<tr>
<td>Above 40</td>
<td>108 (47.4%)</td>
<td>79 (34.6%)</td>
<td>22 (9.6%)</td>
<td>19 (8.3%)</td>
<td>228</td>
</tr>
<tr>
<td>Total</td>
<td>336 (54.8%)</td>
<td>171 (27.9%)</td>
<td>56 (9.1%)</td>
<td>50 (8.2%)</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 9.724, P-value = 0.021

A significant number of the respondents whose age is 18—40 years (59.2%), claimed that they voted on the basis of protection of Pakhtuns’ rights in 2008 elections. The support of the respondents whose age is above 40 years (47.4%), was less in this regard. It shows that Pakhtun ethnic politics has been greatly supported by the younger respondents in 2008 elections. It means that Pakhtun ethnic voting can be seen more in younger respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between age and the protection of Pakhtuns’ rights in making electoral choice in 2008 elections.

**Professional Consideration:** In terms of profession, the government servants greatly supported ethnic voting in 2008 elections.
In terms of profession majority of the government servants (66.4%), followed by businessmen and shopkeepers (64.4%), asserted that they voted on the basis of protection of Pakhtuns’ rights in 2008 elections. It shows that Pakhtun ethnic politics has been greatly supported by the government servants in 2008 elections.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between profession and the protection of Pakhtuns’ rights in making electoral choice in 2008 elections.

**Income Group Consideration:** All kinds of monthly groups support ethnic voting in 2008 elections. The respondents with great monthly income greatly supported in this connection.

As far as the monthly income is concerned, majority of the respondents whose monthly income is above 20000 (64.4%), claimed that they voted on the basis of protection of Pakhtuns’ rights in 2008 elections. The support of the respondents whose age is 20000 and below (57.7%), was less in this regard. It shows that Pakhtun ethnic politics has been greatly supported by the respondents with great monthly income. It means that Pakhtun ethnic voting can be seen more in respondents with great monthly income.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the protection of Pakhtuns’ rights in making electoral choice in 2008 elections.
**Literacy-based Consideration:** Both the literate and illiterate respondents supported ethnic voting in 2008 elections. In this regard the lead has been taken by the literate respondents.

![Table No.286]

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Literate</strong></td>
<td>214 (57.4%)</td>
<td>85 (22.8%)</td>
<td>33 (8.8%)</td>
<td>41 (11.0%)</td>
<td>373</td>
</tr>
<tr>
<td><strong>Illiterate</strong></td>
<td>122 (50.8%)</td>
<td>86 (35.8%)</td>
<td>23 (9.6%)</td>
<td>9 (3.8%)</td>
<td>240</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>336 (54.8%)</td>
<td>171 (27.9%)</td>
<td>56 (9.1%)</td>
<td>50 (8.2%)</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 19.525, P-value = 0.000

In terms of literacy, majority of the literate respondents (57.4%), followed by illiterate respondents (50.8%), asserted that they voted on the basis of protection of Pakhtuns’ rights in 2008 elections. Since literate respondents are politically more conscious therefore great support came from them regarding the protection of Pakhtuns’ rights in making electoral preferences. It means that Pakhtun ethnic voting can be seen more in literate respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between literacy and the protection of Pakhtuns’ rights in making electoral choice in 2008 elections.

By concluding the result of this question, it is found that most of the respondents supported ethnic voting by supporting the protection of Pakhtuns’ rights in making electoral preferences in 2008 elections. In this connection, strong support came from the respondents belonging to rural area, male respondents, younger respondents, government servants, respondents with great monthly income and literate respondents.

**Pakhtun Ethnicity And Changing The Name Of The PROVINCE:** The electoral preference for changing the name of the province is the other important indicators of ethnic voting. It is, therefore, important to measure ethnic voting in terms of this indicator. In this connection, responses were collected with regard to the question, “Changing the name of the province is a right step in the right direction. What is your opinion?” It has been asked so that to know about the general perception of the voters regarding ethnic voting as an electoral choice. Majority of the respondents did not appreciate the changing the name of the province. They argued that this decision has neither improved their socio-economic status nor brought any development in the province. This question has been analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy.

**Urban / Rural Consideration:** Both the urban and rural respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the urban respondents.

![Table No.293]

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban</strong></td>
<td>38 (11.4%)</td>
<td>35 (10.5%)</td>
<td>39 (11.7%)</td>
<td>221 (66.4%)</td>
<td>333</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td>61 (21.8%)</td>
<td>23 (8.2%)</td>
<td>41 (14.6%)</td>
<td>155 (55.4%)</td>
<td>280</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>99 (16.2%)</td>
<td>58 (9.5%)</td>
<td>80 (13.1%)</td>
<td>376 (61.3%)</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 14.991, P-value = 0.002
A large number of the urban respondents (66.4%), followed by rural respondents (55.4%), maintained that the changing the name of the province is not a right step in the right direction. It means that the urban respondents do not appreciate the changing the name of the province. It also implies that Pakhtun ethnic voting can be seen more in rural area. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between urban / rural stratification and the changing the name of the province.

**Gender Consideration:** Both the male and female respondents rejected ethnic voting in elections. In this regard the lead has been taken by the male respondents.

### Table No.294

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>45</td>
<td>38</td>
<td>24</td>
<td>257</td>
<td>364</td>
</tr>
<tr>
<td></td>
<td>(12.4%)</td>
<td>(10.4%)</td>
<td>(6.6%)</td>
<td>(70.6%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Female</td>
<td>54</td>
<td>20</td>
<td>56</td>
<td>119</td>
<td>249</td>
</tr>
<tr>
<td></td>
<td>(21.7%)</td>
<td>(8.0%)</td>
<td>(22.5%)</td>
<td>(47.8%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>58</td>
<td>80</td>
<td>376</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(16.2%)</td>
<td>(9.5%)</td>
<td>(13.1%)</td>
<td>(61.3%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 50.040, P-value = 0.000

Maximum number of the male respondents (70.6%), followed by female respondents (47.8%), maintained that the changing the name of the province is not a right step in the right direction. It means that the male respondents do not appreciate the changing the name of the province. It also implies that Pakhtun ethnic voting can be seen more in female respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between gender and the changing the name of the province.

**Age Consideration:** All age groups discarded the idea of ethnic voting. However, the older respondents greatly rejected in this regard.

### Table No.295

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-40</td>
<td>68</td>
<td>35</td>
<td>59</td>
<td>223</td>
<td>385</td>
</tr>
<tr>
<td></td>
<td>(17.7%)</td>
<td>(9.1%)</td>
<td>(15.3%)</td>
<td>(57.9%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Above 40</td>
<td>31</td>
<td>23</td>
<td>21</td>
<td>153</td>
<td>228</td>
</tr>
<tr>
<td></td>
<td>(13.6%)</td>
<td>(10.1%)</td>
<td>(9.2%)</td>
<td>(67.1%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>58</td>
<td>80</td>
<td>376</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(16.2%)</td>
<td>(9.5%)</td>
<td>(13.1%)</td>
<td>(61.3%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 7.687, P-value = 0.053

In terms of age, maximum number of the respondents whose age is above 40 years (67.1%), followed by respondents whose age is 18—40 years (57.9%), maintained that the changing the name of the province is not a right step in the right direction. It means that the older respondents do not appreciate the changing the name of the province. It also implies that Pakhtun ethnic voting can be seen more in younger respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between age and the changing the name of the province.

**Professional Consideration:** In terms of profession, the category of ‘others’ greatly rejected ethnic voting in elections.
Table No.296

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt. Servant</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>79</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>(10.0%)</td>
<td>(10.9%)</td>
<td>(7.3%)</td>
<td>(71.8%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Non-Govt. Servant</td>
<td>13</td>
<td>13</td>
<td>5</td>
<td>54</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>(15.3%)</td>
<td>(15.3%)</td>
<td>(5.9%)</td>
<td>(63.5%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Businessman &amp; Shopkeeper</td>
<td>9</td>
<td>6</td>
<td>7</td>
<td>51</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>(12.3%)</td>
<td>(8.2%)</td>
<td>(9.6%)</td>
<td>(69.9%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Others</td>
<td>16</td>
<td>8</td>
<td>12</td>
<td>94</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>(12.3%)</td>
<td>(6.2%)</td>
<td>(9.2%)</td>
<td>(72.3%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>House Wife</td>
<td>50</td>
<td>19</td>
<td>48</td>
<td>98</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>(23.3%)</td>
<td>(8.8%)</td>
<td>(22.3%)</td>
<td>(45.6%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>58</td>
<td>80</td>
<td>376</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(16.2%)</td>
<td>(9.5%)</td>
<td>(13.1%)</td>
<td>(61.3%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 52.806, P-value = 0.000

In terms of profession, maximum number of the respondents belonging to the category of ‘others’ (72.3%), followed by government servants (71.8%), maintained that the changing the name of the province is not a right step in the right direction. It means that the category of ‘others’ do not appreciate the changing the name of the province. It also implies that Pakhtun ethnic voting can be seen more in house wives. The category of ‘others’ includes students, retired persons, unemployed, farmers and skill and unskilled labours. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between profession and the changing the name of the province.

Income Group Consideration: All kinds of monthly groups did not support ethnic voting. The respondents with less monthly income greatly rejected ethnicity as a voting determinant.

Table No.297

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20000 &amp; Below</td>
<td>33</td>
<td>29</td>
<td>19</td>
<td>186</td>
<td>267</td>
</tr>
<tr>
<td></td>
<td>(12.4%)</td>
<td>(10.9%)</td>
<td>(7.1%)</td>
<td>(69.7%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Above 20000</td>
<td>6</td>
<td>4</td>
<td>5</td>
<td>30</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>(13.3%)</td>
<td>(8.9%)</td>
<td>(11.1%)</td>
<td>(66.7%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Sorry</td>
<td>60</td>
<td>25</td>
<td>56</td>
<td>160</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>(19.9%)</td>
<td>(8.3%)</td>
<td>(18.6%)</td>
<td>(53.2%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>99</td>
<td>58</td>
<td>80</td>
<td>376</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(16.2%)</td>
<td>(9.5%)</td>
<td>(13.1%)</td>
<td>(61.3%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 27.218, P-value = 0.000

As far as the monthly income is concerned, maximum number of the respondents whose monthly income is 20000 and below (69.7%), followed by respondents whose monthly income is (66.7%), maintained that the changing the name of the province is not a right step in the right direction. It means that the respondents with less monthly income do not appreciate the changing the name of the province. It also implies that Pakhtun ethnic voting can be seen more in respondents with great monthly income. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the changing the name of the province.
**Literacy-based Consideration:** Both the literate and illiterate respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the illiterate respondents.

<table>
<thead>
<tr>
<th>Table No.298</th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Literate</strong></td>
<td>50</td>
<td>42</td>
<td>45</td>
<td>236</td>
<td>373</td>
</tr>
<tr>
<td></td>
<td>(13.4%)</td>
<td>(11.3%)</td>
<td>(12.1%)</td>
<td>(63.3%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Illiterate</strong></td>
<td>49</td>
<td>16</td>
<td>35</td>
<td>140</td>
<td>240</td>
</tr>
<tr>
<td></td>
<td>(20.4%)</td>
<td>(6.7%)</td>
<td>(14.6%)</td>
<td>(58.3%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>99</td>
<td>58</td>
<td>80</td>
<td>376</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(16.2%)</td>
<td>(9.5%)</td>
<td>(13.1%)</td>
<td>(61.3%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 8.993, P-value = 0.029

In terms of literacy maximum number of the literate respondents (63.3%), followed by illiterate respondents (58.3%), maintained that the changing the name of the province is not a right step in the right direction. It means that the literate respondents do not appreciate the changing the name of the province. It also implies that Pakhtun ethnic voting can be seen more in illiterate respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between literacy and the changing the name of the province.

By concluding the result of this question, it is found that most of the respondents rejected ethnic voting by rejecting the the changing the name of the province. They maintained that it is not a right step in the right direction. It has neither improved their economic status nor brought any development in the province. In this connection, strong opposition came from the respondents belonging to urban area, male respondents, older respondents, category of ‘others’, respondents with less monthly income and literate respondents.

**Discrimination Against Pakhtuns:** The electoral preference for believing in discrimination against Pakhtuns is the other important indicators of ethnic voting. It is, therefore, important to measure ethnic voting in terms of this indicator. In this connection, responses were collected with regard to the question, “Do you think Pakhtuns are faced with the problem of any discrimination?” It has been asked so that to know about the general perception of the voters regarding ethnic voting as an electoral choice. This question has been analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy.

**Urban / Rural Consideration:** Both the urban and rural respondents believed in discrimination against the Pakhtuns. In this regard the lead has been taken by the urban respondents.

<table>
<thead>
<tr>
<th>Table No.299</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban</strong></td>
<td>248</td>
<td>85</td>
<td>333</td>
</tr>
<tr>
<td></td>
<td>(74.5%)</td>
<td>(25.5%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
<td>188</td>
<td>92</td>
<td>280</td>
</tr>
<tr>
<td></td>
<td>(67.1%)</td>
<td>(32.9%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>436</td>
<td>177</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(71.1%)</td>
<td>(28.9%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 3.981, P-value = 0.046

Majority of the urban respondents (74.5%), followed by rural respondents (67.1%), asserted that Pakhtuns are faced with the problem of discrimination. Since people in urban area are politically more conscious therefore they greatly supported the problem of discrimination. It also implies that the traces of Pakhtun ethnic voting can be seen more in rural respondents.
The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between urban / rural stratification and the problem of discrimination faced by Pakhtuns.

**Gender Consideration:** Both the male and female respondents believed in discrimination against the Pakhtuns. In this regard the lead has been taken by the male respondents.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>287</td>
<td>77</td>
<td>364</td>
</tr>
<tr>
<td>Female</td>
<td>149</td>
<td>100</td>
<td>249</td>
</tr>
<tr>
<td>Total</td>
<td>436</td>
<td>177</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 26.009, P-value = 0.000

In terms of gender, majority of the male respondents (78.8%), followed by female respondents (59.8%), asserted that Pakhtuns are faced with the problem of discrimination. Since the male respondents are politically more conscious therefore they greatly supported the problem of discrimination. It also implies that the traces of Pakhtun ethnic voting can be seen more in female respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between gender and the problem of discrimination faced by Pakhtuns.

**Age Consideration:** Respondents of all age groups believed in discrimination against the Pakhtuns. In this regard the lead has been taken by the younger respondents.

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-40</td>
<td>274</td>
<td>111</td>
<td>385</td>
</tr>
<tr>
<td>Above 40</td>
<td>162</td>
<td>66</td>
<td>228</td>
</tr>
<tr>
<td>Total</td>
<td>436</td>
<td>177</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 0.001, P-value = 0.976

As far as the age is concerned, the respondents of all age groups asserted that Pakhtuns are faced with the problem of discrimination. The respondents of both the age groups supported almost equally the problem of discrimination.

The Chi-square test provides insignificant p-value. The p-value < 0.05 shows that there is no association between the age and the problem of discrimination faced by Pakhtuns.

**Professional Consideration:** Respondents of all professions believed in discrimination against the Pakhtuns. In this regard the lead has been taken by the government servants.
As regards the profession it was found that majority of the government servants (80.9%), followed by non-government servants (80.0%), asserted that Pakhtuns are faced with the problem of discrimination. Since the government servants are politically more conscious therefore they greatly supported the problem of discrimination. It also implies that the traces of Pakhtun ethnic voting can be seen more in house wives. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between profession and the problem of discrimination faced by Pakhtuns.

**Income Group Consideration:** Respondents of all income groups believed in discrimination against the Pakhtuns. In this regard the lead has been taken by the respondents with great monthly income.

A significant number of respondents whose monthly income is above 20000 (86.7%), followed by the respondents whose monthly income is 20000 and below (73.8%), asserted that Pakhtuns are faced with the problem of discrimination. It shows that the respondents with great monthly income supported the problem of discrimination. It also implies that the traces of Pakhtun ethnic voting can be seen more in the respondents with less monthly income. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the problem of discrimination faced by Pakhtuns.

<table>
<thead>
<tr>
<th>Table No.302</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt. Servant</td>
<td>89</td>
<td>21</td>
<td>110</td>
</tr>
<tr>
<td>(80.9%)</td>
<td>(19.1%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Non-Govt. Servant</td>
<td>68</td>
<td>17</td>
<td>85</td>
</tr>
<tr>
<td>(80.0%)</td>
<td>(20.0%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Businessman &amp; Shopkeeper</td>
<td>56</td>
<td>17</td>
<td>73</td>
</tr>
<tr>
<td>(76.7%)</td>
<td>(23.3%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>96</td>
<td>34</td>
<td>130</td>
</tr>
<tr>
<td>(73.8%)</td>
<td>(26.2%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>House Wife</td>
<td>127</td>
<td>88</td>
<td>215</td>
</tr>
<tr>
<td>(59.1%)</td>
<td>(40.9%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>436</td>
<td>177</td>
<td>613</td>
</tr>
<tr>
<td>(71.1%)</td>
<td>(28.9%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value = 25.180, P-value = 0.000

<table>
<thead>
<tr>
<th>Table No.303</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20000 &amp; Below</td>
<td>197</td>
<td>70</td>
<td>267</td>
</tr>
<tr>
<td>(73.8%)</td>
<td>(26.2%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Above 20000</td>
<td>39</td>
<td>6</td>
<td>45</td>
</tr>
<tr>
<td>(86.7%)</td>
<td>(13.3%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Sorry</td>
<td>200</td>
<td>101</td>
<td>301</td>
</tr>
<tr>
<td>(66.4%)</td>
<td>(33.6%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>436</td>
<td>177</td>
<td>613</td>
</tr>
<tr>
<td>(71.1%)</td>
<td>(28.9%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value = 9.421, P-value = 0.009

A significant number of respondents whose monthly income is above 20000 (86.7%), followed by the respondents whose monthly income is 20000 and below (73.8%), asserted that Pakhtuns are faced with the problem of discrimination. It shows that the respondents with great monthly income supported the problem of discrimination. It also implies that the traces of Pakhtun ethnic voting can be seen more in the respondents with less monthly income.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the problem of discrimination faced by Pakhtuns.
**Literacy-based Consideration:** Both the literate and illiterate respondents believed in discrimination against the Pakhtuns. In this regard the lead has been taken by the literate respondents.

<table>
<thead>
<tr>
<th>Table No.304</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Literate</strong></td>
</tr>
<tr>
<td><strong>Illiterate</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Chi-Square Value = 25.586, P-value = 0.000

In terms of literacy, majority of the literate respondents (78.6%), followed by illiterate respondents (59.6%), asserted that Pakhtuns are faced with the problem of discrimination. Since the literate respondents are politically more conscious therefore they greatly supported the problem of discrimination. It also implies that the traces of Pakhtun ethnic voting can be seen more in illiterate respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between literacy and the problem of discrimination faced by Pakhtuns. By concluding the result of this question, it is found that most of the respondents supported ethnic voting by supporting the view that Pakhtuns are faced with the problem of discrimination. In this connection, strong support came from the respondents belonging to urban area, male respondents, almost equally by both younger and older respondents, government servants, respondents with great monthly income and literate respondents.

**The Form Of Discrimination Against Pakhtuns:** Majority of the respondents believed in discrimination against Pakhtuns (71.1%). It is important to know that what kind of discrimination is favoured by the respondents against Pakhtuns. In this connection, responses were collected with regard to the question, “If yes, then what kind of discrimination?” It has been asked so that to know about the perception of the voters regarding ethnic voting as an electoral choice. This question has been analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy.

**Urban / Rural Consideration:** Both the urban and rural respondents believed that Pakhtuns have no control over their resources. In this regard the lead has been taken by the urban respondents.

<table>
<thead>
<tr>
<th>Table No.305</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Because Punjabis are more developed</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td><strong>Urban</strong></td>
</tr>
<tr>
<td><strong>Rural</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
</tbody>
</table>

Chi-Square Value = 17.123, P-value = 0.001
Majority of the urban respondents (63.7%), followed by rural respondents (45.7%), asserted that Pakhtuns have no control over their resources. Since people in urban area are politically more conscious therefore they greatly supported the view that Pakhtuns have no control over their resources. It also implies that the traces of Pakhtun ethnic voting can be seen more in rural area.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between urban / rural stratification and the kind of discrimination faced by Pakhtuns.

**Gender Consideration:** Both the male and female respondents believed that Pakhtuns have no control over their resources. In this regard the lead has been taken by the male respondents.

<table>
<thead>
<tr>
<th></th>
<th>Because Punjabis are more developed</th>
<th>There are Less Jobs for Pakhtuns</th>
<th>Pakhtuns have no control over their resources (electricity)</th>
<th>Other than these reasons</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>287</td>
</tr>
<tr>
<td></td>
<td>36 (12.5%)</td>
<td>57 (19.9%)</td>
<td>179 (62.4%)</td>
<td>15 (5.2%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>149</td>
</tr>
<tr>
<td></td>
<td>26 (17.4%)</td>
<td>53 (35.6%)</td>
<td>65 (43.6%)</td>
<td>5 (3.4%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>62 (14.2%)</td>
<td>110 (25.2%)</td>
<td>244 (56.0%)</td>
<td>20 (4.6%)</td>
<td>436</td>
</tr>
</tbody>
</table>

Chi-Square Value = 18.161, P-value = 0.000

Majority of the male respondents (62.4%), followed by female respondents (43.6%), asserted that Pakhtuns have no control over their resources. Since male respondents are politically more conscious therefore they greatly supported the view that Pakhtuns have no control over their resources. It also implies that the traces of Pakhtun ethnic voting can be seen more in female respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between gender and the kind of discrimination faced by Pakhtuns.

**Age Consideration:** Respondents of all age groups believed that Pakhtuns have no control over their resources. In this regard the lead has been taken by the younger respondents.

<table>
<thead>
<tr>
<th></th>
<th>Because Punjabis are more developed</th>
<th>There are Less Jobs for Pakhtuns</th>
<th>Pakhtuns have no control over their resources (electricity)</th>
<th>Other than these reasons</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-40</td>
<td>35 (12.8%)</td>
<td>62 (22.6%)</td>
<td>167 (60.9%)</td>
<td>10 (3.6%)</td>
<td>274</td>
</tr>
<tr>
<td></td>
<td>27 (16.7%)</td>
<td>48 (29.6%)</td>
<td>77 (47.5%)</td>
<td>10 (6.2%)</td>
<td>162</td>
</tr>
<tr>
<td>Above 40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>62 (14.2%)</td>
<td>110 (25.2%)</td>
<td>244 (56.0%)</td>
<td>20 (4.6%)</td>
<td>436</td>
</tr>
</tbody>
</table>

Chi-Square Value = 7.752, P-value = 0.051

Majority of the respondents whose age is 18—40 years (60.9%), followed by respondents whose age is above 40 years (47.5%), asserted that Pakhtuns have no control over their resources. It shows that the younger respondents greatly supported the view that Pakhtuns have no control over their resources. It also implies that the traces of Pakhtun ethnic voting can be seen more in older respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between age and the kind of discrimination faced by Pakhtuns.
**Professional Consideration:** Respondents of all professions believed that Pakhtuns have no control over their resources. In this regard the lead has been taken by the businessmen and shopkeepers.

<table>
<thead>
<tr>
<th>Table No.308</th>
<th>Because Punjabis are more developed</th>
<th>There are Less Jobs for Pakhtuns</th>
<th>Pakhtuns have no control over their resources (electricity)</th>
<th>Other than these reasons</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt. Servant</td>
<td>13 (14.6%)</td>
<td>23 (25.8%)</td>
<td>48 (53.9%)</td>
<td>5 (5.6%)</td>
<td>89</td>
</tr>
<tr>
<td>Non-Govt. Servant</td>
<td>13 (19.1%)</td>
<td>11 (16.2%)</td>
<td>41 (60.3%)</td>
<td>3 (4.4%)</td>
<td>68</td>
</tr>
<tr>
<td>Businessman &amp; Shopkeeper</td>
<td>3 (5.4%)</td>
<td>14 (25.0%)</td>
<td>37 (66.1%)</td>
<td>2 (3.6%)</td>
<td>56</td>
</tr>
<tr>
<td>Others</td>
<td>12 (12.5%)</td>
<td>19 (19.8%)</td>
<td>60 (62.5%)</td>
<td>5 (5.2%)</td>
<td>96</td>
</tr>
<tr>
<td>House Wife</td>
<td>21 (16.5%)</td>
<td>43 (33.9%)</td>
<td>58 (45.7%)</td>
<td>5 (3.9%)</td>
<td>127</td>
</tr>
<tr>
<td>Total</td>
<td>62 (14.2%)</td>
<td>110 (25.2%)</td>
<td>244 (56.0%)</td>
<td>20 (4.6%)</td>
<td>436</td>
</tr>
</tbody>
</table>

Chi-Square Value = 17.013, P-value = 0.149

Majority of businessmen and shopkeepers (66.1%), followed by respondents belonging to the category of ‘others’ (62.5%), asserted that Pakhtuns have no control over their resources. It shows that the businessmen and shopkeepers greatly supported the view that Pakhtuns have no control over their resources. It also implies that the traces of Pakhtun ethnic voting can be seen more in house wives.

The Chi-square test provides insignificant p-value. The p-value < 0.05 shows that there is no association between profession and the kind of discrimination faced by Pakhtuns.

**Income Group Consideration:** Respondents of all income groups believed that Pakhtuns have no control over their resources. In this regard the lead has been taken by the respondents with great monthly income.

<table>
<thead>
<tr>
<th>Table No.309</th>
<th>Because Punjabis are more developed</th>
<th>There are Less Jobs for Pakhtuns</th>
<th>Pakhtuns have no control over their resources (electricity)</th>
<th>Other than these reasons</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20000 &amp; Below</td>
<td>29 (14.7%)</td>
<td>45 (22.8%)</td>
<td>113 (57.4%)</td>
<td>10 (5.1%)</td>
<td>197</td>
</tr>
<tr>
<td>Above 20000</td>
<td>3 (7.7%)</td>
<td>3 (7.7%)</td>
<td>30 (76.9%)</td>
<td>3 (7.7%)</td>
<td>39</td>
</tr>
<tr>
<td>Sorry</td>
<td>30 (15.0%)</td>
<td>62 (31.0%)</td>
<td>101 (50.5%)</td>
<td>7 (3.5%)</td>
<td>200</td>
</tr>
<tr>
<td>Total</td>
<td>62 (14.2%)</td>
<td>110 (25.2%)</td>
<td>244 (56.0%)</td>
<td>20 (4.6%)</td>
<td>436</td>
</tr>
</tbody>
</table>

Chi-Square Value = 14.762, P-value = 0.022
Majority of the respondents whose monthly income is above 20000 (76.9%), followed by respondents whose monthly income is 20000 and below (57.4%), asserted that Pakhtuns have no control over their resources. It shows that the respondents with great monthly income supported highly the view that Pakhtuns have no control over their resources. It also implies that the traces of Pakhtun ethnic voting can be seen more in respondents with less monthly income. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the kind of discrimination faced by Pakhtuns.

**Literacy-based Consideration:** Both the literate and illiterate respondents believed that Pakhtuns have no control over their resources. In this regard the lead has been taken by the literate respondents.

<table>
<thead>
<tr>
<th>Literacy</th>
<th>Because Punjabis are more developed</th>
<th>There are Less Jobs for Pakhtuns</th>
<th>Pakhtuns have no control over their resources (electricity)</th>
<th>Other than these reasons</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literate</td>
<td>35 (11.9%)</td>
<td>68 (23.2%)</td>
<td>177 (60.4%)</td>
<td>13 (4.4%)</td>
<td>293 (100.0%)</td>
</tr>
<tr>
<td>Illiterate</td>
<td>27 (18.9%)</td>
<td>42 (29.4%)</td>
<td>67 (46.9%)</td>
<td>7 (4.9%)</td>
<td>143 (100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>62 (14.2%)</td>
<td>110 (25.2%)</td>
<td>244 (56.0%)</td>
<td>20 (4.6%)</td>
<td>436 (100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 7.897, P-value = 0.048

Majority of the literate respondents (60.4%), followed by illiterate respondents (46.9%), asserted that Pakhtuns have no control over their resources. Since literate respondents are politically more conscious therefore they greatly supported the view that Pakhtuns have no control over their resources. It also implies that the traces of Pakhtun ethnic voting can be seen more in illiterate respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between literacy and the kind of discrimination faced by Pakhtuns. By concluding the result of this question, it is found that most of the respondents supported ethnic voting by supporting the view that Pakhtuns are faced with the problem of discrimination. In this connection, the respondents greatly supported the view that Pakhtuns have no control over their resources. With regard to this point of view strong support came from the respondents belonging to urban area, male respondents, younger respondents, businessmen and shopkeepers, respondents with great monthly income and literate respondents.

**The Safeguard Of The Pakhtuns’ Rights By The Pakhtun Ethnic PARTIES:** The electoral preference for the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties is the other important indicators of ethnic voting. It is, therefore, important to measure ethnic voting in terms of this indicator. In this connection, responses were collected with regard to the question, “To what extent the Pakhtun ethnic parties have defended the rights of the Pakhtuns?” It has been asked so that to know about the perception of the voters regarding ethnic voting as an electoral choice. This question has been analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy.

**Urban / Rural Consideration:** Both the urban and rural respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the urban respondents.

<table>
<thead>
<tr>
<th>Urban</th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>15 (4.5%)</td>
<td>20 (6.0%)</td>
<td>41 (12.3%)</td>
<td>257 (77.2%)</td>
<td>333 (100.0%)</td>
</tr>
</tbody>
</table>
Majority of the urban respondents (77.2%), followed by rural respondents (56.4%), asserted that Pakhtun ethnic parties have not defended the rights of the Pakhtuns. Since people in urban area are politically more conscious therefore they greatly opposed the view that Pakhtun ethnic parties have defended the rights of the Pakhtuns. It also implies that the traces of Pakhtun ethnic voting can be seen more in rural area.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between urban / rural stratification and the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties.

**Gender Consideration:** Both the male and female respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the male respondents.

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Male</strong></td>
<td>27</td>
<td>30</td>
<td>54</td>
<td>253</td>
<td>364</td>
</tr>
<tr>
<td></td>
<td>(7.4%)</td>
<td>(8.2%)</td>
<td>(14.8%)</td>
<td>(69.5%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Female</strong></td>
<td>35</td>
<td>11</td>
<td>41</td>
<td>162</td>
<td>249</td>
</tr>
<tr>
<td></td>
<td>(14.1%)</td>
<td>(4.4%)</td>
<td>(16.5%)</td>
<td>(65.1%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>62</td>
<td>41</td>
<td>95</td>
<td>415</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(10.1%)</td>
<td>(6.7%)</td>
<td>(15.5%)</td>
<td>(67.7%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 10.361, P-value = 0.016

Majority of the male respondents (69.5%), followed by female respondents (65.1%), asserted that Pakhtun ethnic parties have not defended the rights of the Pakhtuns. Since male respondents are politically more conscious therefore they greatly opposed the view that Pakhtun ethnic parties have defended the rights of the Pakhtuns. It also implies that the traces of Pakhtun ethnic voting can be seen more in female respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between gender and the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties.

**Age Consideration:** Respondents of all age groups rejected ethnicity as a voting determinant. In this regard the lead has been taken by the older respondents.

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>18-40</strong></td>
<td>46</td>
<td>27</td>
<td>72</td>
<td>240</td>
<td>385</td>
</tr>
<tr>
<td></td>
<td>(11.9%)</td>
<td>(7.0%)</td>
<td>(18.7%)</td>
<td>(62.3%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Above 40</strong></td>
<td>16</td>
<td>14</td>
<td>23</td>
<td>175</td>
<td>228</td>
</tr>
<tr>
<td></td>
<td>(7.0%)</td>
<td>(6.1%)</td>
<td>(10.1%)</td>
<td>(76.8%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>62</td>
<td>41</td>
<td>95</td>
<td>415</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(10.1%)</td>
<td>(6.7%)</td>
<td>(15.5%)</td>
<td>(67.7%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 14.857, P-value = 0.002

Majority of the respondents whose age is above 40 years (76.8%), followed by respondents whose age is 18—40 years (62.3%), asserted that Pakhtun ethnic parties have not defended the rights of the Pakhtuns. Since older respondents are politically more conscious therefore they greatly opposed the view that
Pakhtun ethnic parties have defended the rights of the Pakhtuns. It also implies that the traces of Pakhtun ethnic voting can be seen more in younger respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between age and the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties.

**Professional Consideration:** Respondents belonging to all professions rejected ethnicity as a voting determinant. In this regard the lead has been taken by the businessmen and shopkeepers.

<table>
<thead>
<tr>
<th>Table No.314</th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt. Servant</td>
<td>6</td>
<td>15</td>
<td>11</td>
<td>78</td>
<td>110</td>
</tr>
<tr>
<td></td>
<td>(5.5%)</td>
<td>(13.6%)</td>
<td>(10.0%)</td>
<td>(70.9%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Non-Govt. Servant</td>
<td>7</td>
<td>7</td>
<td>14</td>
<td>57</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>(8.2%)</td>
<td>(8.2%)</td>
<td>(16.5%)</td>
<td>(67.1%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Businessman &amp; Shopkeeper</td>
<td>4</td>
<td>3</td>
<td>12</td>
<td>54</td>
<td>73</td>
</tr>
<tr>
<td></td>
<td>(5.5%)</td>
<td>(4.1%)</td>
<td>(16.4%)</td>
<td>(74.0%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>8</td>
<td>25</td>
<td>86</td>
<td>130</td>
</tr>
<tr>
<td></td>
<td>(8.5%)</td>
<td>(6.2%)</td>
<td>(19.2%)</td>
<td>(66.2%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>House Wife</td>
<td>34</td>
<td>8</td>
<td>33</td>
<td>140</td>
<td>215</td>
</tr>
<tr>
<td></td>
<td>(15.8%)</td>
<td>(3.7%)</td>
<td>(15.3%)</td>
<td>(65.1%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>41</td>
<td>95</td>
<td>415</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(10.1%)</td>
<td>(6.7%)</td>
<td>(15.5%)</td>
<td>(67.7%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 27.587, P-value = 0.006

Majority of the businessmen and shopkeepers (74.0%), followed by government servants (70.9%), asserted that Pakhtun ethnic parties have not defended the rights of the Pakhtuns. It shows that businessmen and shopkeepers have greatly opposed the view that Pakhtun ethnic parties have defended the rights of the Pakhtuns. It also implies that the traces of Pakhtun ethnic voting can be seen more in house wives. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between profession and the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties.

**Income Group Consideration:** Respondents of all income groups rejected ethnicity as a voting determinant. In this regard the lead has been taken by the respondents with less monthly income.

<table>
<thead>
<tr>
<th>Table No.315</th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>20000 &amp; Below</td>
<td>16</td>
<td>18</td>
<td>42</td>
<td>191</td>
<td>267</td>
</tr>
<tr>
<td></td>
<td>(6.0%)</td>
<td>(6.7%)</td>
<td>(15.7%)</td>
<td>(71.5%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Above 20000</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>32</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>(4.4%)</td>
<td>(13.3%)</td>
<td>(11.1%)</td>
<td>(71.1%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Sorry</td>
<td>44</td>
<td>17</td>
<td>48</td>
<td>192</td>
<td>301</td>
</tr>
<tr>
<td></td>
<td>(14.6%)</td>
<td>(5.6%)</td>
<td>(15.9%)</td>
<td>(63.8%)</td>
<td>(100.0%)</td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
<td>41</td>
<td>95</td>
<td>415</td>
<td>613</td>
</tr>
<tr>
<td></td>
<td>(10.1%)</td>
<td>(6.7%)</td>
<td>(15.5%)</td>
<td>(67.7%)</td>
<td>(100.0%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 17.356, P-value = 0.008

Majority of the both income groups asserted that Pakhtun ethnic parties have not defended the rights of the Pakhtuns. It shows that both categories of income groups have equally opposed the view that Pakhtun ethnic parties have defended the rights of the Pakhtuns. It also implies that the traces of Pakhtun ethnic voting can be seen in both categories of income groups.
The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties.

**Literacy-based Consideration:** Both the literate and illiterate respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the literate respondents.

<table>
<thead>
<tr>
<th>Table No.316</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Literate</strong></td>
</tr>
<tr>
<td>27</td>
</tr>
<tr>
<td>(7.2%)</td>
</tr>
<tr>
<td><strong>Illiterate</strong></td>
</tr>
<tr>
<td>(14.6%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>(10.1%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 17.122, P-value = 0.001

Majority of the literate respondents (69.2%), followed by illiterate respondents (65.4%), asserted that Pakhtun ethnic parties have not defended the rights of the Pakhtuns. Since literate respondents are politically more conscious therefore they greatly opposed the view that Pakhtun ethnic parties have defended the rights of the Pakhtuns. It also implies that the traces of Pakhtun ethnic voting can be seen more in illiterate respondents.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between literacy and the safeguard of the Pakhtuns’ rights by the Pakhtun ethnic parties.

By concluding the result of this question, it is found that most of the respondents rejected ethnic voting by rejecting the view that Pakhtun ethnic parties have defended the rights of the Pakhtuns. In this connection, strong opposition came from the respondents belonging to urban area, male respondents, older respondents, businessmen and shopkeepers, respondents with less monthly income and literate respondents.

**The Eradication Of National Issues By The Pakhtun Ethnic Parties:** The electoral preference for the eradication of national issues by the Pakhtun ethnic parties is the other important indicators of ethnic voting. It is, therefore, important to measure ethnic voting in terms of this indicator. In this connection, responses were collected with regard to the question, “To what extent the Pakhtun ethnic parties have succeeded in eradicating unemployment, price hike, load shedding and terrorism?” It has been asked so that to know about the perception of the voters regarding ethnic voting as an electoral choice. This question has been analysed in the light of several variables including, urban/rural divisions, gender, age, profession, monthly income and literacy.

**Urban / Rural Consideration:** Both the urban and rural respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the urban respondents.

<table>
<thead>
<tr>
<th>Table No.317</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Urban</strong></td>
</tr>
<tr>
<td>30</td>
</tr>
<tr>
<td>(9.0%)</td>
</tr>
<tr>
<td><strong>Rural</strong></td>
</tr>
<tr>
<td>(12.5%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
</tr>
<tr>
<td>(10.6%)</td>
</tr>
</tbody>
</table>

Chi-Square Value = 20.669, P-value = 0.000
Majority of the urban respondents (73.0%), followed by rural respondents (55.7%), asserted that Pakhtun ethnic parties have not succeeded in eradicating unemployment, price hike, load shedding and terrorism. Since people in urban area are politically more conscious therefore they greatly supported the view that Pakhtun ethnic parties have not been succeeded in eradicating these national issues. It also implies that the traces of Pakhtun ethnic voting can be seen more in rural area. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between urban / rural stratification and the eradication of national issues by the Pakhtun ethnic parties.

Gender Consideration: Both the male and female respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the male respondents.

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>27</td>
<td>23</td>
<td>71</td>
<td>243</td>
<td>364</td>
</tr>
<tr>
<td>(7.4%)</td>
<td>(6.3%)</td>
<td>(19.5%)</td>
<td>(66.8%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>38</td>
<td>22</td>
<td>33</td>
<td>156</td>
<td>249</td>
</tr>
<tr>
<td>(15.3%)</td>
<td>(8.8%)</td>
<td>(13.3%)</td>
<td>(62.7%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>45</td>
<td>104</td>
<td>399</td>
<td>613</td>
</tr>
<tr>
<td>(10.6%)</td>
<td>(7.3%)</td>
<td>(17.0%)</td>
<td>(65.1%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value = 13.644, P-value = 0.003

Majority of the male respondents (66.8%), followed by female respondents (62.7%), asserted that Pakhtun ethnic parties have not succeeded in eradicating unemployment, price hike, load shedding and terrorism. Since male respondents are politically more conscious therefore they greatly supported the view that Pakhtun ethnic parties have not been succeeded in eradicating these national issues. It also implies that the traces of Pakhtun ethnic voting can be seen more in female respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between gender and the eradication of national issues by the Pakhtun ethnic parties.

Age Consideration: Respondents of all age groups rejected ethnicity as a voting determinant. In this regard the lead has been taken by the older respondents.

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-40</td>
<td>40</td>
<td>23</td>
<td>76</td>
<td>246</td>
<td>385</td>
</tr>
<tr>
<td>(10.4%)</td>
<td>(6.0%)</td>
<td>(19.7%)</td>
<td>(63.9%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Above 40</td>
<td>25</td>
<td>22</td>
<td>28</td>
<td>153</td>
<td>228</td>
</tr>
<tr>
<td>(11.0%)</td>
<td>(9.6%)</td>
<td>(12.3%)</td>
<td>(67.1%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>65</td>
<td>45</td>
<td>104</td>
<td>399</td>
<td>613</td>
</tr>
<tr>
<td>(10.6%)</td>
<td>(7.3%)</td>
<td>(17.0%)</td>
<td>(65.1%)</td>
<td>(100.0%)</td>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value = 7.603, P-value = 0.055

Majority of the respondents whose age is above 40 years (67.1%), followed by respondents whose age is 18—40 years (63.9%), asserted that Pakhtun ethnic parties have not succeeded in eradicating unemployment, price hike, load shedding and terrorism. Since older respondents are politically more conscious therefore they greatly supported the view that Pakhtun ethnic parties have not been succeeded in eradicating these national issues. It also implies that the traces of Pakhtun ethnic voting can be seen more in younger respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between age and the eradication of national issues by the Pakhtun ethnic parties.
Professional Consideration: Respondents of all professions rejected ethnicity as a voting determinant. In this regard the lead has been taken by the businessmen and shopkeepers.

<table>
<thead>
<tr>
<th>Table No.320</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Profession</strong></td>
</tr>
<tr>
<td>----------------------------------</td>
</tr>
<tr>
<td>Govt. Servant</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Non-Govt. Servant</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Businessman &amp; Shopkeeper</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Others</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>House Wife</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value = 31.850, P-value = 0.001

Majority of the businessmen and shopkeepers (69.9%), followed by non-government servants (69.4%), asserted that Pakhtun ethnic parties have not succeeded in eradicating unemployment, price hike, load shedding and terrorism. It shows that businessmen and shopkeepers have greatly supported the view that Pakhtun ethnic parties have not been succeeded in eradicating these national issues. It also implies that the traces of Pakhtun ethnic voting can be seen more in the category of ‘others’ which includes students, retired persons, unemployed, farmers and skill and unskilled labours.

The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between profession and the eradication of national issues by the Pakhtun ethnic parties.

Income Group Consideration: Respondents of all income groups rejected ethnicity as a voting determinant.

<table>
<thead>
<tr>
<th>Table No.321</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Income Group</strong></td>
</tr>
<tr>
<td>---------------------------------</td>
</tr>
<tr>
<td>20000 &amp; Below</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Above 20000</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Sorry</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Chi-Square Value = 17.142, P-value = 0.009

An equal percentage of both income groups asserted that Pakhtun ethnic parties have not succeeded in eradicating unemployment, price hike, load shedding and terrorism. It shows that both categories of income groups have equally supported the view that Pakhtun ethnic parties have not been succeeded in eradicating these national issues. It also implies that the traces of Pakhtun ethnic voting can be seen in both categories of income groups.
The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between monthly income and the eradication of national issues by the Pakhtun ethnic parties.

**Literacy-based Consideration:** Both the literate and illiterate respondents rejected ethnicity as a voting determinant. In this regard the lead has been taken by the literate respondents.

<table>
<thead>
<tr>
<th></th>
<th>To a Greater Extent</th>
<th>To Some Extent</th>
<th>To a Limited Extent</th>
<th>Not at All</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Literate</strong></td>
<td>18 (4.8%)</td>
<td>21 (5.6%)</td>
<td>77 (20.6%)</td>
<td>257 (68.9%)</td>
<td>373</td>
</tr>
<tr>
<td><strong>Illiterate</strong></td>
<td>47 (19.6%)</td>
<td>24 (10.0%)</td>
<td>27 (11.3%)</td>
<td>142 (59.2%)</td>
<td>240</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>65 (10.6%)</td>
<td>45 (7.3%)</td>
<td>104 (17.0%)</td>
<td>399 (65.1%)</td>
<td>613</td>
</tr>
</tbody>
</table>

Chi-Square Value = 43.514, P-value = 0.000

Majority of the illiterate respondents (68.9%), followed by illiterate respondents (59.2%), asserted that Pakhtun ethnic parties have not succeeded in eradicating unemployment, price hike, load shedding and terrorism. Since literate respondents are politically more conscious therefore they greatly supported the view that Pakhtun ethnic parties have not been succeeded in eradicating these national issues. It also implies that the traces of Pakhtun ethnic voting can be seen more in illiterate respondents. The Chi-square test provides significant p-value. The p-value < 0.05 shows that there is association between literacy and the eradication of national issues by the Pakhtun ethnic parties.

By concluding the result of this question, it is found that most of the respondents rejected ethnic voting by rejecting the view that Pakhtun ethnic parties have succeeded in eradicating national issues. In this connection, strong opposition came from the respondents belonging to urban area, male respondents, older respondents, businessmen and shopkeepers, respondents with both less and great monthly income and literate respondents.

**Conclusion:** Pakhtun Ethnic voting is one of the determinants of voting behaviour in Khyber Pakhtunkhwa. However, it is not as important as the issue voting and clientelism. The empirical data collected regarding ethnic voting, support this argument of the study that Pakhtun ethnic voting is secondary in importance as compared to issue voting and clientelism. The study argues that Pakhtun ethnic voting is important to some extent in the electoral politics of Khyber Pakhtunkhwa. Regarding the Pakhtun ethnic voting more than fifty percent of the respondents (53.76%) supported the view that they voted on the basis of Pakhtun ethnicity in 2008 elections. The respondents maintained that they voted to ANP not because of its claim for protecting Pakhtuns’ rights. They voted to it because the protection of Pakhtuns’ rights had been presented in the form of issue voting. The voters maintained that they were not satisfied with the performance of ANP and they determined to replace it with PTI in 2013 elections. Thus, in the light of the primary data it is concluded that the electoral preference of the voters in 2008 elections was based on Pakhtun ethnicity to some extent in Khyber Pakhtunkhwa.

The findings regarding the theory of Pakhtun ethnicity is further explored in terms of variables including, urban/rural divisions, gender, age, profession, monthly income and literacy. In this regard, mostly the support for Pakhtun ethnic politics comes from the respondents belonging to rural area, female respondents, respondents hailing from age group of 18—40 years, government servants, respondents whose monthly income is above 20000 and illiterate respondents. Thus, Pakhtun ethnicity as a voting determinant is important to some extent in the electoral politics of Khyber Pakhtunkhwa in 2008 general elections.
REFERENCES

3 Ibid., p.1476.
4 McDonald, pp.6-8
10 Ibid., p.7
15 Ibid.
17 Ghufran, p.1100-1101
18 This is the average percentage which has been calculated by taking the average percentage of the percentages of all those questions which have been asked from the respondents in determining operationalisation of theory of Pakhtun ethnicity in Khyber Pakhtunkhwa in 2008 general elections.
A GENERALIZED ROBUST PERSON DETECTOR FOR OVERHEAD VIEWS

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ABSTRACT. In cluttered environments the overhead view is often preferred because looking down can afford better visibility and coverage. However detecting people in this or any other extreme view can be challenging as there are significant variation in a person’s appearances depending only on their position in the picture. The Histogram of Oriented Gradient (HOG) algorithm, a standard algorithm for pedestrian detection, does not perform well here, especially where the image quality is poor. In previous work we have shown that adapting the HOG algorithm to exploit the circular symmetry in wide angle cameras improves its performance reducing 9 spurious detections per image to less than 1 in 50. However this result is for a very constrained, limited environment.

In this work we show our algorithm’s potential for generalization across different scenes. We show that a classifier trained on the SCOVIS dataset achieves a detection rate of 96% when applied to new overhead data recorded at Southampton. Using the output from this stage to generate automatically labeled ‘true positives’ data we train a new model which achieves a detection rate of 98%. Both these results compared favorably with the performance of a model trained with manually labeled images which achieves a detection rate of greater than 99%.

Keywords: Person Detector; Overhead View; Wide angle camera.

1. Introduction. Many researchers [1] [2] have developed methods and techniques for detecting people in images, assuming that the person is mostly visible and is in an upright pose, Fig.1(a). This research is different and concerns the use of overhead cameras to detect people, Fig. 1(b). This is an example of an extreme viewpoint where the above assumptions about human appearance do not hold.

In previous work we proposed a novel algorithm [3] which transforms the region of the image containing the person with respect to the optical center of the image. This effectively moves the person to the center of the image, standardizing the shape of the region to be analyzed. The appearance of the averaged person with and without rotation is shown in Fig. 2. In this figure the first two images (before and after rotation) are based on an overhead view while the third is based on normal view. Without rotation (first image), the averaged appearance is circularly symmetric. It looks more like a background feature then a person as the characteristic human shape is missing. We cannot see the major parts of the human body like the shoulder, torso,
head, arms or legs. It can be seen that compared with the first image the second image has more structure, it looks like a person, and resembles to some extent the normal view averaged image (3rd image). We can also see evidence of legs and arms. The torso and upper body can be seen very clearly. However the head of the person in this averaged image is not prominent because there is too much variability in its appearance. In our overhead view images people wore uniforms with short-sleeved shirts. This is why we can see arms as a skin colour in this averaged image.

**Figure 1.** Conventional vs overhead view

A crucial difference between our work [3] and others [4] is that they took both positive and negative examples from a wide variety of scenes and sources. Where as our work is based on challenging video from one work station in an automobile plant. This is a significant weakness in our previous paper. Before this work the Rotated HOG Algorithm has not been tested on different people, wearing different clothing and in different environments. It is also based on a single camera type configured in a specific way.

**Figure 2.** Comparison of averaged images: This figure shows the average person image using overhead view (first two) and the normal view [4].
Table 1. Data sequences.

<table>
<thead>
<tr>
<th>Sequence</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Images</td>
<td>123</td>
<td>588</td>
<td>885</td>
<td>511</td>
<td>234</td>
<td>646</td>
<td>637</td>
<td>186</td>
<td>207</td>
<td>606</td>
<td>783</td>
<td>238</td>
<td>732</td>
<td>695</td>
</tr>
</tbody>
</table>

In this paper we seek to address this weakness by demonstrating the models trained on data generated for the SCOVIS project can be applied successfully to other environments. We discuss recording a new dataset and describe how we generalize the technique. We also describe an automatic labeling process that boosts person detection to within 1% of that achieved by training a classifier on labour intensive manually labeled examples.

The rest of this paper is organized as follow. Section 2 describes related work, the data used is described in Section 3 while Section 4 describes the process of generalizing the Rotated HOG Algorithm. Section 5 describes our experimental work while Section 6 concludes the paper.

2. Related Work. The literature contains descriptions of many methods for detecting people in images like those in Fig.1(a) and many of these are described in detail in the surveys by [2]. The use of Histogram of Oriented Gradient (HOG) was proposed as a pedestrian detector by Dalal and Triggs [4] and because of its excellent performance much of the later work is based on variations of the HOG algorithm. For example Zhu et al. [5] improved the performance of HOG at the cost of large computational training time, while Pang et al. [6] propose two new ways of quickly extracting HOG features.

There have been little work in detecting people from an overhead view. Most have been constrained to a narrow field of view when the person immediately below the camera. Cohen et al. [7] use a background subtraction method plus color and texture to detect the head of the person, but this was carried out in a highly constrained environment, only consider people directly under the camera. Pang et al. [6] used HOG features but again used only simple backgrounds, limited poses and the people were located centrally under the camera.

Recently Ahmed and Carter [3] used a wide angled lens and an overhead viewpoint to detect people in a cluttered industrial environment. With a standard HOG algorithm there were over 9 false detections per image. Using an enhanced variant of the HOG algorithm which exploits the properties of imaging system to improve classification and reduce false detections. They achieved a True Detection Rate (TDR) of 95% but with only .02 false detections per image.

3. Data Set. There are two sources of images used in this work. The first source is the images recorded by SCOVIS (Self-Configurable Cognitive Video Supervision) project [8]. This is a real-world industrial dataset which was recorded at the NISSAN car manufacturing factory in Spain. Images of size 640 by 480 pixels were captured at nominally 20 frames per second from an AXIS 212 PTZ camera. This was mounted about 5m. above the working area with a field of view of 80°. The images were recorded at a low light level with high gain and JPEG compression. The average
compression factor is 20. In these images people are observed performing different activities like carrying, handling, welding, walking and standing. In total 3685 images with and 3000 images without people were used. The positive instances were selected and labeled manually while the negative examples were chosen randomly. We refer to this collection as the SCOVIS dataset. For this work we recorded a new dataset at the University of Southampton. It comprises about 40 minutes recording at 15 frames per second. The camera used was a Point Grey Flea camera with a Fujinon zoom lens having a focal length of 1.4-3.1 mm. The size of the image is 1024 x 768 pixels. The height of the camera was approximately 4 meters from the floor. The manually measured field of view of the camera was approximately 132°. We used 10,000 images for training and testing. Seven thousand one hundred images contained one person while the remainder had no one in them. The positions of a person in these images are labeled manually and these were combined in 14 different sequences as the subject walked around the room. The total number of images in each sequence is shown in Table 1. Fig. 3 is a montage showing examples of the various positions, poses and clothing recorded in data. In the rest of our discussion, we refer to this dataset as the Southampton or SOTON dataset. Both of these datasets are split into training and testing subsets which do not overlap.

![Figure 3. A person at different positions, clothings, and body articulations.](image)

4. Generalizing the Rotated HOG Algorithm.

4.1. The Rotated HOG Algorithm. Like many others we have based our work on the HOG algorithm [4]. We use the steps described below to remove the effects of the circular symmetry and wide field of view of the camera, before using the HOG
algorithm to generate features and a linear Support Vector Machine [9] to learn the presence or absence of people.

Consider a person at position $P$ in an image, as shown on Fig. 4. We first determine the geometric transformation that will transform $P$ to the origin and orient it so that $\overrightarrow{OP}$ lies parallel to the vertical axis of the image. This has two components, translation and rotation and is given by

$$T = \begin{bmatrix} \cos \theta & -\sin \theta & 0 \\ \sin \theta & -\cos \theta & 0 \\ 0 & 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 0 & -\overrightarrow{OP}_x \\ 0 & 1 & -\overrightarrow{OP}_y \\ 0 & 0 & 1 \end{bmatrix}$$

where $\theta$ is the angle subtended by the line $\overrightarrow{OP}$ and the $x$ axis, Fig. 4a.

Depending on $|\overrightarrow{OP}|$ we chose an appropriately sized bounding box around $O$ and transform each of its vertexes by $T^{-1}$. A rectangular region of interest is then drawn around the bounding box $P$. This is rotated by $\theta$, Fig. 4b. The final bounding box is cropped from this region., Fig. 4c. The gradients and orientation histograms are calculated and used as feature vectors for the linear SVM used for training and testing. Here after we refer to these trained SVM’s as models.

![Figure 4. The rHOG algorithm in detail.](image)

4.2. **Bounding Box Size Estimation.** In our previous work [3] we split the image into separate bands. A circular band around the center and six annular bands outsides that. The size of the bands and the fixed size bounding box were chosen by optimizing the classification results. In each of the circular band we use different sized SVMs.

In this paper we extending that work by generalizing the choice of the bounding box size algorithmically.
Figure 5. Bounding box height as a function of distance from the center of the image. The straight lines are the best fit where the distance is less than and greater than 170 pixels.

We first manually measured the width and height (h) of the person at various positions in 1000 SCOVIS images. The height varied as shown in Fig. 5 while the width showed little variation. Where the radial distance is less than 60 pixels the average width and height was used to determine the size of the bounding box. Where the radial distance is between 60 and 170, the apparent height increases the front of the person becomes more visible. Beyond 170 pixels the height reduces due to distance and radial distortion effects.

We then fit a straight line to each of these two regions. This is shown on Fig. 5 and the equations are given below.

\[ h_1 = 0.3245r + 77.42, \quad 60 < r < 170 \]  
\[ h_2 = -0.3127r + 186.3, \quad r > 170 \]

The regions specified by the bounding boxes were then translated and rotated to the origin. The regions were then scaled to a standard size of 64 × 96 pixels. This size was used for all bands. When we built models for all circular bands of the image using the SVM and tested them on 200 person free test images the result was a little better than the method discussed in [3].

We apply the same methodology to our SOTON dataset. Taking 100 images, chosen randomly, with a person at different positions between the center and extending to the edge of the scene, we manually measured the height and width of the person at each of these locations and the radial distance from the center of the image. On average the width and height of the person are 90 and 140 pixels respectively. The real height of the person is 5.6 feet. Unlike the SCOVIS images there was significant variation in width (w) and there was no obvious segmentation of the height data into regions that could be approximated by straight lines. For these reasons we fitted
Table 2. Result of each individual sequence. TDR and FDR are shown as percentages.

<table>
<thead>
<tr>
<th>Seq</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>TDR</td>
<td>97.6</td>
<td>98.3</td>
<td>94.6</td>
<td>95</td>
<td>93.2</td>
<td>94</td>
<td>93.8</td>
<td>96.8</td>
<td>96.1</td>
<td>93</td>
<td>98.8</td>
<td>98</td>
<td>95</td>
<td>95</td>
<td>96</td>
</tr>
<tr>
<td>FDR</td>
<td>2.4</td>
<td>1.7</td>
<td>4.4</td>
<td>5</td>
<td>6.8</td>
<td>6</td>
<td>6.2</td>
<td>3.2</td>
<td>3.9</td>
<td>7</td>
<td>1.2</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>4</td>
</tr>
</tbody>
</table>

Table 3. Number of positive and negative samples in the training models.

<table>
<thead>
<tr>
<th>Radius</th>
<th>SCOVIS +ve</th>
<th>SCOVIS -ve</th>
<th>SOTON +ve</th>
<th>SOTON -ve</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-80</td>
<td>973</td>
<td>973</td>
<td>0</td>
<td>130</td>
</tr>
<tr>
<td>&gt; 80</td>
<td>2712</td>
<td>2712</td>
<td>0</td>
<td>1400</td>
</tr>
</tbody>
</table>

quadratic curves to both height and width, and the results are shown graphically in Fig. 6 and numerically below:

\[
h = 1.22 \times 10^{-3}r^2 + 0.68r + 81.6, \quad 80 < r < 300
\]  
\[
w = 3.05 \times 10^{-4}r^2 + 0.072r + 107.2, \quad r > 300
\]

As shown in Fig. 6(b) the width of the person decreases as he moves away from the center whereas the height of the person increases to a maximum at radial distance half way to the edge of the picture: this is shown in Fig. 6(a).

The central region is the special case when the person looks more circular; therefore for that region up to a radius of 80 pixels we use a square box of 120 x 120 pixels. This size accommodates all possible rotational movements of the person. Using equations 3 and 4 our algorithm calculates the width and height of the bounding box depending only on the distance to the center of the image. After translation and rotation the bounding box was scaled to a fixed size of 64 x 96 pixels, the same size as used for the SCOVIS models.

5. Experiments and results.

5.1. SCOVIS trained model with SOTON test set. The intention of this experiment is to investigate the behavior of the classification and detection results when the nature of data in the training and test set is completely different. Specifically how well does a model trained with data from the SCOVIS project perform when applied to Southampton images.

In our previous work [3], we used six classifiers or models to detect people in the outer region of the images. For this test we chose the SCOVIS model which has the best True Positive Rate (TPR) and the lowest False Positive Rate (FPR) per image. This model was used to scan those positions of the test image which are 80 pixels away from the image center. For the central region we use the SCOVIS central model. As shown in Table: 3 we used 2712 positive and negative training samples for the outer region and 973 for the core region.

To determine the spurious detections or FPR, we chose 1000 person-free test images at random from the SOTON dataset. The result was a FPR of 18% (about
3000 falsely classified positions per image). A new model was then built by adding 500 new background samples taken from the person free SOTON training images. We applied the same test and improved the FPR to 9%. From these falsely classified positions we randomly chose 900 samples and trained six new models. Each model was trained with the original SCOVIS training set, the initial 500 random samples from the SOTON data and differing amounts of the 900 false positive samples. Each of these models was then used to test 1000 person-free images. The results are shown in Fig. 7. This graph shows the FPR plotted against extra background training. In Fig. 7 the point at 0 additional samples corresponds to the original SCOVIS model. The point at 500 is the result with additional negative samples while the remaining
points show the effect of adding in false detections to reinforce the training. It can be seen that even this small amount of additional training is enough to reduce the FPR to almost 0% (specifically 0.2% or 40 false detections per image). The FPR as shown in Fig. 8 reduced from 96% to 92%.

As the only positive samples we are using from the SCOVIS dataset, therefore refer this model as the *SCOVIS trained model*.

![Figure 7](image_url)

**Figure 7.** Effect of extra background training. Additional background training reduced false positive rate to almost 0%.

![Figure 8](image_url)

**Figure 8.** Effect of extra background training on true positive rate.

We next determine how well the SCOVIS trained model performs as a person detector. We use the SCOVIS-trained model and test 7071 positive test images from the SOTON dataset. We scanned each image and gathered the results into
clusters. The largest cluster was assumed to coincide with the location of the person. The positions of each cluster was compared with labeled ground truth positions. To determine the efficacy of this metric we measure the disparity between ground truth and the cluster center. The result is shown in Fig. 9. We set a detection threshold of 40 pixels because in the SOTON dataset the average width and height of the person are 90 and 140 pixels respectively while 96% of detected positions are within a distance of 40 pixels from the actual positions while 98% of them are within a distance of 60 pixels. This is shown as a red vertical line, in Fig. 9. The True Detection Rate (TDR) and False Detections Rate (FDR) was determined for each of the 14 sequences, shown on Table: 2. The average TDR was 96% while the average FDR was 4%.

5.2. SOTON trained model with SOTON test set. We now seek to determine how well the cross training algorithm performs. To do so we will use only the SOTON data set for training and testing. We reserve sequence the best (sequence 11) and worst (sequence 7) performing sequences f Table 2 as a test set and and use all the remaining ones for. From the training set we randomly chose 2712 manually labeled samples of people, balanced with the same number of randomly chosen person-free samples from the background images. These numbers were chosen to make the model consistent with the SCOVIS model. Splitting this dataset in half we performed two fold cross-validation to measure the classification performance and achieved TPRs of 99% with a FPR of 0.6%. By way of comparison the SCOVIS model achieved a similar performance with a TPR of 95% and a FPR of 3%.

We then trained a model using all of the manually labeled data and used it to determine the detection rates for all the images in sequence 7 and 11 achieving a 99% detection rate for sequence 7 and a 100% detection rate for sequence 12.
SCOVIS model achieved detection rates of 94% and 98% for sequence 7 and 11 respectively.

5.3. **Automatic labelling of people positions in the images.** In the previous section saw that the SCOVIS trained model performed on average 3 percentage points worse than an optimally trained model. We seek to improve this performance without any further manual intervention.

We trained a new model, taking as positive samples those detections made when the SCOVIS model is applied to our Southampton training set. We refer to these as the *automatically* labeled set.

From these labeled positions, we chose 2712 as positive samples of people, including any false positives that might have occurred in the previous stage. The same number of negative samples was chosen from person-free images. We then performed 2-fold cross-validation to determine the classification rate. We achieved TPR of 97.6% and an FPR of 1.5%. This compares favorably with the previous results.

We next trained a new model using all of the automatically generated positive samples. The detection performance of the initial model was optimized by including approximately 200 extra background samples randomly from false detections in 10 empty images. This retrained model was then used to test two sequences 7 and 11, approximately 1400 images in total. The true detection rate was 97.2 for sequence 7 and 99.4 for sequence 11. These results shows that using automatic labeling can boost the person detection rate from 96% to 98% without manually filtering the data.

5.4. **Overall Comparison of Detection Results.** In this section discuss the results for person detection with respect to sequences 7 and 11. These are the worst and best performing sequences. The person detection results are summarized in Table 4. While these have been discussed earlier it is worth noting that overall using automatic labeling we come within one percentage point of the optimally labeled model. In addition we consider the disparity between detected positions and ground truth.

<table>
<thead>
<tr>
<th></th>
<th>Seq-7</th>
<th>Seq-11</th>
<th>Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>TDR</td>
<td>FDR</td>
<td>TDR</td>
</tr>
<tr>
<td>SCOVIS</td>
<td>93.8%</td>
<td>6.2%</td>
<td>98.8%</td>
</tr>
<tr>
<td>Automatic</td>
<td>97.2%</td>
<td>2.8%</td>
<td>99.4%</td>
</tr>
<tr>
<td>SOTON</td>
<td>99%</td>
<td>0.3%</td>
<td>100%</td>
</tr>
</tbody>
</table>

The disparity measurement of the sequence 11 using the three different models can be seen in Fig. 10.

While the results for the SOTON trained model are clearly closer to ground truth that the other, all three are will within the chosen threshold. The auto labeled result
is slightly tighter than the SCOVIS model results.

![Disparity](image1)

(a) Using SCOVIS trained.

(b) Using SOTON auto labeled

![Disparity](image2)

(c) Using SOTON trained.

**Figure 10.** Disparity using test sequence 11 (783 images). The red lines mark the threshold used in calculating detection rates.

6. **Conclusions.** Despite the challenging nature of the overhead view, this work suggests that the information contained in images is sufficiently generic that models from one environment may be moved to another with minimal effort. In this paper we have demonstrated by experiment that the Rotated HOG algorithm has an excellent generalization capability requiring only limited intervention. Specifically determine the relationship between bounding box width and height with the radial distance from the center of the image. In our example this involved manually determining the size for about one hundred positions in the scene. The other intervention is choosing some suitable background images, with out people in them.

In summary using a pre-trained model of the SCOVIS dataset and test images from the SOTON dataset, and achieved very attractive results. We also demonstrated that our algorithm has the capability to carry out automatic labeling of people when scanning test images containing people. We use two models trained with the SOTON dataset using manual and automatic labeling, respectively, and we attained excellent detection results for both of these models when tested with
positive images of the SOTON dataset. Finally, it is noteworthy that we used only one classifier in the in the whole outer region of the image as opposed to the six discussed in our previous work.

REFERENCES

THE RELATIONSHIP AND IMPACT OF MONEY GROWTH AND BUDGET DEFICIT ON INFLATION IN PAKISTAN

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ABSTRACT. This research study investigates the relationship and the effects of budget deficit and money growth on inflation in the case of Pakistan's economy. The data was gathered from different sectors in Pakistan. The data was collected from yahoo finance, ADB, KSE and State Bank of Pakistan. The period covered by this study is twenty six years starting from 1986-2011. The regression analysis test was used to examine/determine the results that were found/experienced during the research work. In regression analysis ANOVA, correlation of coefficients, and regression model test was used to analyze the results that were applied on the information gathered through secondary sources. The results show that there is a positive association of budget deficit and money growth on inflation. In general the key outcomes indicate that financing and government expenditures could have different effects. Therefore, it is very difficult to differentiate between current and capital expenditures. Budget deficit increase inflation in country and due to this there is decrease in money growth of a country.

Keywords: Inflation, Money Growth, Budget Deficit, Pakistan Economy

1. Introduction. The concerns about budget deficit and money growth on inflation have become global concern. Different studies have identified the causal relationships of different variables, either individually or collectively, which has its implications on the inflation in an economy. Although majority of the studies have indicated that budget deficit has been one of the major concerns regarding inflation, others have identified no empirical evidence to assure this fact. The coordinative relationship amongst money, budget deficit, and inflation has been at the core of monetary economics. It is argued that monetization of budget deficit has been the major initiator of inflation in developing countries. Considering the monetary phenomenon, it is argued that when growth rate of money tends to be more than growth of money than inflation takes place. In a given period, when the revenue tends to be lower than the total expenditures then budget deficit arises.
The popular view is that high interest rates are yielded by large deficits which have chronic effects on both the economic growth and productivity. Monetization of certain parts of the deficits is done by the monetary authorities in order to lower the money growth and inflation, which are caused by the high interest rate as a result of high deficits forces (Darrat & Suliman, 1991). In prior research, Sargent and Wallace (1984) have argued that higher inflation rates are negatively generated as a result of tight monetary policy due to large deficit. This has led the economists, practitioners and other government official to devise mechanisms through which they can control and lower the increasing budget deficit.

As identified by Haan and Zelhorst (1990) that the central bank in most developing countries in directly controlled by the central government, where the likelihood is that money creation finances the government deficits. This paper makes an attempt to empirically test the relationship of money growth and budget deficit on inflation within the context of Pakistan, along with determining the causal relationship amongst these variables.

The Section 1 of this paper provides the introduction to this study. It is followed by the literature review in Section 2, and methodology in Section 3. Analysis and discussion of the empirical findings is provided in Section 5. The last section, Section 6 concludes the study under the heading Conclusion.

2. Literature Review. Numerous studies were conducted on money growth, budget deficit and inflation. Saleh (2003) deliberates the relationship of macroeconomic variables like growth, interest rate, trade deficit with budget deficit. It is most widely debated topics among Policy makers and economist in developed and developing countries have been widely debating about the topics related to these concerns. Different effects of financing and government expenditures as methods with key outcomes could have different impositions in general. Therefore, when evaluating the impact of financial policy on investment in private sector and growth in output, it is not easy to differentiate between capital expenditures and current expenditures. The relationship between current account deficit and the budget deficit both in developed and developing countries has been the concern of major studies. Current account deficit is caused due to induction in domestic absorption and expansion in imports which leads the budget deficit to increase.

Effects have been evidenced on exchange rate by the budget deficit which is dependent on the deficit funding due to taxation or money growth. Lanzo (2008) on one hand determined a composite relationship between money growth and inflation, and fiscal deficit and money growth on the other hand. The size of long term parameters looks acceptable when compared what it seen in other countries using different techniques. With the help of statistical tests Sergeant and Wallace (1984) hypothesis would be the most appropriate approach to understand the dynamics of these variables.

Mukhtar and Zakaria (2010) argue that a rise in inflation is seen due to high budget deficits with persistency, which cannot be prevented by the monetary policy alone. However such hypothesis is not supported by the empirical evidence. On the contrary empirical findings show that in the long-run budget deficit is not associated with inflation. Rather it is related to money growth, and budget deficit has no relationship as a cause and effect with supply of money. Pollin and Zhu (2005) used the data sample of countries from 1961—2000, and the results showed that moderate increase in GDP is associated with higher inflation. Data arrangement in the groupings by decade, presents us with the results indicating that inflation and growth are highly correlated to the degree that the focus is on demand management as a stimulus to growth in macroeconomic policy.

Concerning the macroeconomic conditions in Pakistan, the fiscal deficit continues to deteriorate, creating issues and risks for sustainability and growth in the long run. In Pakistan a powerful effect has been shown by the fiscal deficit on inflation and in order to eradicate the adverse effects of inflation there is need of coordination between monetary and fiscal policy (Ammama, Mughal, & Khan, 2011).

Fatima, Ahmed, and Rehman (2011) have identified the macroeconomic management in an effective manner to be critical for the generation of growth-induced employment and reduction in poverty. So are the private investments needed to play their role in the economy to improve the living standard of the country. Macroeconomic imbalances in Pakistan are a serious threat for its economic growth and development. Adverse impact of serious nature has been implicated by the fiscal profligacy on physical and social infrastructure in the country. Khalid (2005) says that in order to retain price stability and exchange rate stability in the country, economic growth needs to be maintained. The macroeconomic imbalances in Pakistan is extremely high with foreign (as well as domestic) debt, high budget and current account deficits, extremely low international reserves, high inflation, high nominal interest rates and low
The average economic growth over 40 years is around 4 percent. Due to macroeconomic imbalances it is almost impossible to achieve a sustainable economic growth.

Agha and Khan (2006) argue that expansion in monetary terms is associated with inflation. As an Asian country, Pakistan has the same inflation experiences as other countries. As a matter of fact, when general price level arises then it can be mapped to growth in money supply. In Pakistan, it is generally argued that an important role is being played by fiscal imbalances in explaining the fluctuation in prices (Chaudhary & Ahmad, 1995). Inflation is burning issue in Pakistan. Public sector used mix of policies to control inflation. Inflation not affect the sectoral allocation, its create poverty. Budget deficit when backed by domestic financing is specifically from the banking sector in the long-run is inflationary. Government can control the inflation by cutting the size of budget deficit (Chimobi & Igwe, 2010). Through the results using the model of Vector Error Correction (VEC) points out that there is close relation between inflation and money supply.

Budget deficit is determined by the level of money supply as a macro factor of economy, and also estimates if there is or will be budget deficit. Anušić (1994) says that national budget deficit is the amount by which total government expenditures exceeds the total revenue. National economy can be observed by budget deficit. If economic activities in a country are high then budget revenue will grow without fiscal burden. Budget revenue decrease due to erosion of tax while expenditures increase due to population growth. It is common belief that budget deficit is harmful for economy (Sial, Hashmi, & Anwar, 2010).

In long run public and private investment showed a positive impact economic growth but growth is driven by private investment as compared to public investment. Government expenditures economic uncertainty is harmful for economic growth. In short period of time the private investment positively influence the growth and there positive relation between economic uncertainty and GDP (Fatima, Ahmed, & Ur Rehman, 2012). Budget is not important to achieve economic growth of a country but it is necessary. Regression analysis conducted to ascertain the impact of BD on the GDP, and explored a negative impact of budget deficit on the economic growth. Some policies are suggested for the government to avoid certain levels of the budget deficit to achieve desired level of growth.

Pekarski (2007) found that in the economies with extensive inflation there are persistent outbursts that can be analyzed by a particular hysteresis effect. But this analysis would be unjust if the regime shifts between moderate and high inflation economies happens with invisible corrosion in economic finance or sudden changes in monetary and financial policies. In the study of Harko and Fida (2009), the causality links of the deficit have been demonstrated through vector autoregressive model estimation that flows from budget deficits to interest rate to prices to exchange rate to capital flows and to trade deficits. There has been evidence concerning how the level of prices can be controlled with the help of reduction in the budget deficits.

Samimi and Jamshidbaygi (2011) state that in macroeconomics the important issue is the association between inflation and budget deficit. Using simultaneous equation model that includes on structural equation for monetary basis based on money growth, budget deficit and inflation. The result state that there is positive and significant impact on inflation by the budget deficit on monetary variables. Along with the finding of positive and significant impact o budget deficit by price index. Levin (1974) says that when few demanding goods are being chased by too much money then it is the basic cause of inflation. In order to increase or decrease the money circulation Federal Reserve as a tool are used. Money in the hands of general public increases with the rise in deficit.

Akcay, Alper and Ozmucur (1996) states that when there is difference in the rates at which money supply grows and the rate with which economy grows then inflation takes place if the rate is higher for the prior. Thus higher the deficit policies the higher are the inflation. If government borrowing requirements increase the net credit demands in the economy drive interest rate and private investment. The result is that the growth rate decrease and increase price level. The other channel through which deficits can lead to higher inflation when Central Banks do not monetize the debt is the private monetization of deficits. This occurs when the high interest rates induce the financial sector to develop new interest bearing assets that are almost as liquid as money and are risk free. Thus, the government debt not monetized by the Central Bank is monetized by the private sector and the inflationary effects of higher deficit policies prevail.

Saunders (1989) says that two closely related theoretical issues within the causality testing framework. First the direction of the causal flow in the deficit nominal interest rate relationship is analyzed. Second the effect of deficits
on the two components of nominal interest rate such as the real rate of interest and the inflationary rate are investigated. Taking deficit as an indicator for the presence of disequilibrium and inefficiencies in a country, we could think of it as a factor that could be reducing the effectiveness of time devoted to education and training. Following a simple growth model and allowing for slight changes in the law of human capital accumulation, we reach a point where deficit might sharply reduce human capital accumulation. On the other hand, a deficit reduction carried on for a long time, taking that reduction as a more efficient management of the economy, may prove useful in inducing endogenous growth Prunera (2003).

3. Methodology/Theoretical Framework. This research aims to check the both the relationship and the impact of budget deficit and money growth which has influenced the inflation in Pakistan for a period of twenty six years from 1986-2011. This study undertakes the issues that influence the budget deficit and money growth, the statistical tools and techniques are applied to the distributed data used in the study to investigate the relationship between budget deficit, money growth and inflation.

3.1 Data. The data for the study have been obtained from yahoo finance, Asian Development Bank (ADB), Karachi Stock Exchange (KSE) and State Bank of Pakistan (SBP). The period covered by this study is twenty six years starting from 1986-2011.

3.2 Variables. This study makes an attempt to check the influence of money growth and budget deficit on inflation in Pakistan. The variables used in the study have been given below classified on the basis of dependent and independent variables.

3.2.1 Inflation (Dependent variable). When in a given period of time, the general prices of goods and services fluctuate in a steep or rising manner then it is termed as inflation. With this increase in level of general prices, few goods and services can be bought for each unit of currency. The effects of inflation are reflected in the deterioration of money’s purchasing power which is classified as “a loss of real value in the internal medium of exchange and unit of account in the economy” (Saleem, et al., 2013). Inflation is normally measured using Consumer Price Index (CPI) in terms of inflation rate based on the annual percentage change in the index of general price.

3.2.2 Budget Deficit (independent variable). A government budget deficit is the amount by which some measure of government revenues falls short of some measure of government spending. If a government is running a positive budget deficit, it is also said to be running a negative budget surplus (and conversely, a positive budget surplus is a negative budget deficit). Debt differs from deficit in a way that debt is the annual deficit in accumulated form. Deficits in an economy take place when the revenue generated is less than the expenditures by the government. The deficit can be measured with or without including the interest payments on the debt as expenditures (Saleem, et al., 2013).

3.3 Money Growth (independent variable). The money growth is a policy variable that is controlled by fed. Money growth depends on economic situation of a country. If economic condition of a country will good then his economic growth will increase.

3.3 Theoretical Model

<table>
<thead>
<tr>
<th>Independent Variable</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budget Deficit</td>
<td></td>
</tr>
<tr>
<td>Money Growth</td>
<td>Inflation</td>
</tr>
</tbody>
</table>
3.4 **Hypothesis testing.** Based on the objective of this study, we examine the relationship and the impact of budget deficit and money growth on inflation. The study makes a set of testable hypotheses [the Null Hypothesis $H_0$ verses the Alternate $H_1$].

$H_0$: There is no relationship and impact of budget deficit and money growth on inflation in Pakistan.

$H_1$: There is possible positive relationship and impact of budget deficit and money growth on inflation in Pakistan.

3.5 **Model specifications.** Panel data is used in this study with the regression being run on the combination of time-series and cross-sectional data. Constant coefficient model is used in the study, with the values of coefficient being constant. The data from both the time-series and cross-section is pooled together into one column based on the view that there is no significant cross-sectional data.

In order to check for the relationship and impact of the independent variables on the dependent, procedure of regression analysis are employed. The dependent variable is that whose values we are trying to expect or estimate. The independent variables explain the change in the dependent variable therefore they are not considered to be explained by the model itself.

Simple linear regression in the equation form is given below: \[ Y = a + bX \]

Where “$a$” is the intercept of the line and “$b$” is the slope of the line.

The straight line regression model with respect to CPI (inflation proxy), budget deficit and money growth 0 $\beta_1$ can be given as

\[ CPI = \beta_1 + \beta_2X_2 + \beta_3X_3 \]

Where, CPI has been used as a proxy for inflation; $X_2$ refers to budget deficit and $X_3$ is the money growth. $\beta_1$ is the intercept coefficient referring to the coefficient of consumer price index representing the average value of the CPI when $X = 0$, $\beta_2$ is the slope of the regression line for Budget deficit indicating the averaged expected change in CPI due to change in budget deficit, whereas $\beta_3$ is the coefficient of money growth referring to the average expected change in CPI due to money growth.

4. **Data Analysis and Discussion.** Data analysis involves the use of statistical model to examine the relationship between the variables. The simple regression analysis fit best for our analysis which involves steps to confirm the accuracy of estimated relationship among the variables under study.

4.1 **Regression Equation**

\[ CPI = \beta_1 + \beta_2X_2 + \beta_3X_3 \]

The regression equation of the analysis is

\[ CPI = 5.180 + (0.756)X_2 + (0.06)X_3 \]

This result indicates that for each increase in $X_1$ and $X_2$ (budget deficit and money supply), $y$ (CPI) is affected by -0.756 and -0.006, on the averaged, due to budget deficit and money growth. $\beta_0$ of 5.180 shows the coefficient’s average value of the dependent variables CPI, when budget deficit and money growth is zero. This shows that there is positive relations with increase in CPI of .7656, .06 because of each unit of budget deficit and money growth respectively.
<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>5.180</td>
<td>3.981</td>
<td>1.301</td>
</tr>
<tr>
<td></td>
<td>Budget Deficit</td>
<td>.756</td>
<td>.553</td>
<td>.274</td>
</tr>
<tr>
<td></td>
<td>Money Growth</td>
<td>.06</td>
<td>.143</td>
<td>.009</td>
</tr>
</tbody>
</table>

This table shows that the fitted line has value of coefficient of constant CPI as 5.180 and coefficient of budget deficit and money growth as $\beta_1$ and $\beta_2$ to be 0.756 and 0.006, respectively. The standard error for $c$ is 3.981, for $B_1$ is 0.553, and for $B_2$ it is 0.143 which is the dispersion of variables estimates around their means. The p-values from the above table suggest that at 1% level of significance we have $\beta_2$’s p-value as 0.0001 and of $\beta_3$’s p-value as 0.009. This suggests that the coefficients of the independent variables do have significant impact on the dependent variable in the model.

### 4.2 Measure of variation

While mounting a regression model to forecast the dependent variable with the help of independent variable, focus will be on a few measures of variations. Total Sum of Square (TSS) can be partitioned into two parts: Variation which can be attributed to the relationship between x and y is referred to as explained variation or regression sum of square (ESS). The second part which is unexplained can be attributed to factors other than the relationship between x and y, and is referred to as error or residual sum of squares (RSS).

Total sum of squares (TSS) = Regression sum of squares (ESS) + error sum of squares (RSS).

#### ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>36.499</td>
<td>2</td>
<td>18.249</td>
<td>.933</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>449.851</td>
<td>23</td>
<td>19.559</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>486.350</td>
<td>25</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This table demonstrates the values of total sum of squares, regression sum of squares and error sum of squares according to the data. The TSS is the total deviations in the dependent variable consumer price index; the variation within the values of y is described by the ESS, and it shows the sum of the squared difference between y values and the mean value of y. The squares are taken to ‘remove’ the sign (+ or -) from the residual values. The RSS describes the variation within the values of y, and is the sum of the squared difference between each value of y and the mean of y.

F-statistics is used in the analysis to determine the overall significance of regression model in regression. The value of f statistic here is 0.933 which is significant.

### 4.3 Coefficient of Determination

Coefficient of Determination, denoted by $R^2$, for regression models is used to explain how much of the variation in the dependent variable is due to the independent variables in the model. It is the ratio of regression sum of squares (ESS) to total sum of squares (TSS), it’s values ranges from 0 to 1.
Regression Statistics

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.274</td>
<td>.75</td>
<td>-.743</td>
<td>4.42253</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Money Supply, Budget Deficit

This table of regression statistic shows that for consumer price index, budget deficit and money growth. The R-square’s value of .075 indicates that 75 percent variation in consumer price index is because of budget deficit and money growth. The only difference between R square and adjusted R square is that its values based on degree of freedom. The degree of freedom associated with confidence interval and level of significance testing for Linear Regression is n – 1 which is 449.851.

In general, the result of regression analysis shows that there is a positive relationship and impact of budget deficit and money growth on CPI in Pakistan.

Regression

Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumer Price Index</td>
<td>26</td>
<td>4.20</td>
<td>21.40</td>
<td>8.2089</td>
<td>5.23547</td>
</tr>
<tr>
<td>Budget Deficit</td>
<td>26</td>
<td>-.870</td>
<td>-.230</td>
<td>-5.8385</td>
<td>1.59977</td>
</tr>
<tr>
<td>Money Supply</td>
<td>26</td>
<td>4.30</td>
<td>35.20</td>
<td>16.1308</td>
<td>6.17815</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

5. Conclusions. The purpose of the study was to check the relationship and the impact of budget deficit and money growth on inflation in Pakistan. The results show that there is positive relationships and impact of budget deficit and money growth on inflation. When inflation rises in the country then money growth of a country decreases, showing an inverse relationship. The main concern of the paper is that if there is budget deficit and money growth in an economy then how does it affect the inflation in an economy, and the responsibility falls on the central bank and other financial institutions if they are not independent and do not make an attempt to curtail the budget deficits. The alternate hypothesis of the study is supported by the empirical findings of the study based on panel data.

REFERENCES


ENHANCED LAYER BASED MODEL IN SUPPORT OF WEB SERVICES INTEROPERABILITY

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ABSTRACT. Web services are the emerging technology used to perform complex tasks. Web services are available over the internet and different application can request a specific service to perform the required tasks. As web services are used by different type of applications having different models and protocols, maintaining the interoperability are very important. In this paper we consider the different techniques, standards and models used to maintain interoperability, i.e. WSDL-S, SOAP engine and UDDI (Universal Description Discovery and Integration)[5]. As web services are used commercially then main issue is the security. Integration layer Model is available that is used in support of interoperability in web services [1]. In this model, layers are divided in to low level (with more interaction) to high level (with less interaction). Main purpose of this paper is to propose the new enhanced based model. This model is based upon the layer architecture, to support message passing between services having different syntax, semantic and underlying platforms.

Keywords: UDDI, SOAP, WSDL-S, XML

1. Introduction. Web services are the application components that are available for open use. It provides the services that can be used by different applications. Services do not need any other information because these are self explanatory. If we see globally there are different protocols and techniques are used, so how these services are searched by the applications? Simple answer is UDDI. Universal Description, Discovery and Integration are a standard for services to be registered. It is a standard for creating, discovery and distribution of web services. Web services communicate through open protocols. Web services are self descriptive. It describes the data format and protocol used to coordinate with this web service. Understand the architecture of the web service in the form of layer is the best possible approach. Different layers are divided considering the level of interaction between systems.

Main purpose of the web services is to provide smooth communication between heterogeneous systems. This can’t be achieved simply. Heterogeneities can occur at any layer of communication. For example at the transport layer different systems must agree upon the underlying physical transport mechanism. We can’t expect Java Messaging Service to be invocated on non java platform. Our main focus in this paper is to identify the best possible approach to add loose coupling features between systems.

Following are the main points focused in this paper:

1. Using Layered approach adding an extensive feature in the web services to provide ability of heterogeneous system to interact with the web services.

2. Instead of using the same protocol for passing messages and using services making web service capable to interact with any heterogeneous system having different data model and different message syntax.
3. Adding loose coupling capability with the services consumer and services.

In this approach we propose model that helps in passing messages and using services of the service provider without conforming to the protocol and syntax required by the service. This is will increase the loose coupling and late binding allows the systems to interact with web services without conforming to the standards required by this specific service.

2. Related Work. Interoperability is the main concept in Web services. Main issue is the coordination or agreement on the one possible protocol that will be used in communication. Web service is the evolutionary technique in Services Oriented Architecture. Many researches are done in respect to message passing and using systems in between heterogeneous systems. Semantic Interoperability approach is used in message passing between different systems that are using same protocol to pass message [2]. In this technique one system can use the services if it agrees to the semantic used and provided to this specific web service. The developer of the system must understand the syntax and semantic provided by that service. Layered approach is the very good approach in understanding the web services at the different abstraction levels [1]. In this model layers are divided by considering the coordination made between integrated systems and the services. M Nezbad describes in his paper that we can easily understand the error by understanding this concept to the forms of layers. Audition Framework used for the web services interoperability testing was one step ahead to understand and test the services interoperability [3]. It uses Enterprise Application Integrations (EAI), main purpose of this technology to make different applications running to the different application domains to interact with each other. In this approach applications are running on different platforms but there applications are required to conform to the same communication model to interact with each other.

3. Problem and Solution. We can understand the layers, how these layers are divided in support of heterogeneous message passing between applications using different data models. We propose a new intermediate layer and all the communication is done through this layer. We will explain the purpose of this new layer using following diagram.

Fig 1: Enhanced Layered Model of Web services.

3.1. Intermediate Layer in Newly Proposed Model. Main Enhancement of this layered model is the addition of new layer between service and service consumer. As shown in fig 1, this layer is responsible for the late binding. This layer can be understand by subdivided this layer as follows:

Fig. 2 Intermediate Layer
As fig. 2 shows Intermediate layer is divided into three sub-parts to understand its functionality. First part is the understanding the protocol. This is responsible for understanding the protocol and conventions used by the system which is going to interact with this service. System that is requesting the service, need not to be in the format that is used by this specific service. This is the responsibility of the second part of the intermediate layer that is “Dynamic Binding”. Dynamic binding ensures in the runtime that the services that are requested are conforming to the requesting protocol. This will enable the heterogeneous systems to interact with each other easily. Third one the coordination part, it enables the error free message passing between different system and making enable to use services easily. This is increase dynamicity in the web services. We can understand the problem considering the C# example of the web services. In this example we have created a sample web service that includes the hello world webMethod. This method accepts the int argument and displays it.

```csharp
namespace WebService1
{
    /// <summary>
    /// Summary description for Service1
    /// </summary>
    [WebService(Namespace = "http://tempuri.org/" )]
    [WebServiceBinding( ConformsTo = WsiProfiles.BasicProfile1_1 )]
    [ToolboxItem(false)]
    {
        [WebMethod]
        public string HelloWorld(int id)
        {
            return "Hi, your ID is: " + id.ToString();
        }
    }
}
```

**Fig. 3 Creating Simple Web Service**
What will happen if a system calls the services of this web service without conforming the syntax? When we call this HelloWorld method to test this web service, it runs perfect when we provide it an integer argument. The main point is what will happen when we call this service providing it variable of any other type like string etc.

It generated an exception and operation was not completed. We can implement exception handling to avoid this message and do something else in this situation. But point is to understand the schema that is required and then convert the request according to the required Schema.

The following is a sample SOAP request and response.

```
POST /Service1.asmx HTTP/1.1
Host: localhost
Content-Type: text/xml; charset=utf-8
Content-Length: length
SOAPAction: "http://tempuri.org/HelloWorld"

<?xml version="1.0" encoding="utf-8"?>
  <soap:Body>
    <HelloWorld xmlns="http://tempuri.org/">
      <id>int</id>
    </HelloWorld>
  </soap:Body>
</soap:Envelope>

HTTP/1.1 200 OK
Content-Type: text/xml; charset=utf-8
Content-Length: length

<?xml version="1.0" encoding="utf-8"?>
  <soap:Body>
    <HelloWorldResponse xmlns="http://tempuri.org/">
      <HelloWorldResult>string</HelloWorldResult>
    </HelloWorldResponse>
  </soap:Body>
</soap:Envelope>
```

This XML shows the required parameters and their type (highlighted in above XML code). There is an external mechanism that can handle these heterogeneous issues. In the conceptual model (mentions above) adding a new layer between messaging layer allows to analyze the required interface and then act as a middleware to map the provided interface to the required one.

Proposed intermediate layer can be explained as middle layer between two services. Message first arrives in middle layer; this layer is capable for analyzing the message formats. Once message is understands then this layer converts this message into the format that receiving layer is expecting.

- Acting as a middleware for messaging
- Receive messages from the both web services
- Capable of manipulating the received messages
- Has knowledge of syntax and semantic used at the receiving end web service
- Converts the message into to format expected at the receiving end
Transmit the manipulated message to its final destination.

**Fig. 5. Intermediate Layer Structure**

Above figure shows the main structure of the intermediate layer. Here we will discuss each part in detail. This is divided into two parts. We can understand it in sequence of steps.

**Registering web services:**
1. Developers develop a web service and then send it to register in UDDI.
2. There is an intermediate step before registration of the web service. Semantic of this web services is snatched and analyzed.
3. This semantic is stored into semantic database.
4. Finally web service is registered into UDDI and it updates its WS Proxy, making it available for other clients or web services.

**Using web service:** When a web service wants to used the services of other web servicers, following steps are involved in this process.
1. Intermediate layer understand and analyze the semantic of the web service its and the other web service which is going to be used.
2. Based on the analysis, intermediate layer generates the matching syntax for providing heterogeneous web services to communicate with each other.
3. Ws proxy involves in discovering and communication between different services.

There are two data stores that are involved in intermediate layer.
1. Registered Services: This is responsible for storing the registered web services and making that those services available for use.
2. Semantic DB: This is responsible for storing the different semantics of the web services. Analyzer works on this data store, it matches the semantic of the web service with the data stored in it. And finally generates the suitable matching syntax, enabling the heterogeneous web services to communicate correctly.

We can understand the above concept by using a simple concept as: Web services of Invoice Payment consist of interface like payInvoice. This interface would be used for using its services; we can call it web service interface. Different rules that would be used for operating of Invoice Payment are the business rules of this specific domain. Specification may contain the meta-specification that helps in identification of web service.

**3.5. Web Services Approaches for Interoperability.** There are two main approaches that are available proving interoperability specifications: one is the WS family and the last but not the least is the ebXML [7]. These are the standard specification. WS family includes WS-Security, Ws-Reliability, WS-Coordination, WS-Addressing and WS-Federation etc. These standards are in web service architecture. We are proposing that it is the need of the new standard in the industry that helps heterogeneous system with different interfaces to communicate and use the web
services. We can call this specification as WS-homogeny. WS-homogeny should also be included into standard WS family. This would be responsible for accepting messages coming from any type of the system and provide that system a similar interface that matches to it. In the other hand this specification provides the interface that is required by the web service. We can say that this standard specification should be capable to act as intermediate layer between system requesting the service and web services [15].

ebXML is a specification providing business to business communication and was developed by United Nations Center for Trade Facilitation and Electronic Business. Once the specifications are developed, then we can not change this specification on run time nor can we add new specifications. Developer effort a lot to include all type of specification while developing web services but this is not enough. As we know that technology is enhancing day by day. There is possibility that specifications are changed and new specifications are introduced. Then any system having updated specification should require having an interface that would be used for common interaction or web services communication. This main issue can be resolved using our new standard specification approach. The intermediate type converter approach help to receive the request from any system and then covert its request to the technically matching with web service. Any system having any new or updated specification can now connect with web services without worrying about the interface that would be used for interaction. ebXML is responsible for document exchanging. Type converter can be based upon the ebXML specification; it manages the sequences of the message passing. Developers can use the combination of the above two approaches in defining the interoperation approaches between different services. This concept can be treated similar to WS-Trust, and WS-Federation combination, that provide features such as establishing trust and service federation on top of WS-Security [8].

Service provider defines the specification that is used in using the services provided by this specific web service. Heterogeneous systems can communicate and use the services if they agree upon the specification provided the developer of specific web service. But using the intermediate layer and converter enables any type of the heterogeneous system to communicate and use the services of specific system without agreed upon the specification. It leaves all the coordination tasks on the intermediate layer. This layer enables different systems to communicate and use web services effectively proving security and reliability.

4. Future Work. In intermediate layer we proposed the new analyzer component. It analyzes the web service from its XML description and stores it into semantic DB. This component is responsible for accessing the semantics of different web service and the generating the matching semantic. This is not too simple as different type of heterogeneities can occur that should be countered using this layer. Continuing this research it enables us developing the intelligent analyzer that access the web services and then automatically generate the matching syntax for effective communication between heterogeneous web services.

5. Conclusion. This paper includes our research in web service interoperability. Main issue is the heterogeneous web services communication [11]. In case any web services are not following proper standards for communication, they can’t communicate with each other. We based our research on layered based model proposed by Hamid and Fabio. They proposed the layered model for web services and we enhanced that model adding an intermediate layer. This intermediate is responsible for making the heterogeneous web services to communicate with each other. Heterogeneities can occur if web services are not conforming to the specific standards and using different syntax and semantics conforming to other standard.

We can summarize our discussion as main issue in the web services communication is heterogeneities. Our solution provides an adequate way to resolve this issue. Implementation of this solution will make it possible for heterogeneous web services to communicate and use services correctly. All the communication gaps are resolved in the powerful intermediate layer. Depending on the analyzer, identifying the syntax and semantics of different web services make it possible to automatically remove the differences and find an optimal way to make the different web services communicate with each other and use their services.

REFERENCES


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WEDDED TO GREED: BRIDE BURNING IN BANGLADESH

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ABSTRACT: Women’s access to education must be treated as their fundamental right. And it is only through education that they would get the chance to prepare themselves in order to play their roles in nation’s social, economic and political spheres as equal members of society. In Bangladesh, very few women can enjoy such rights and live a healthy and prestigious life. At present due to government initiatives, girl’s enrolment in primary and secondary education is little bit higher than the boys. Despite of such encouraging scenario, there is a dark side behind this. Due to prejudice, mistaken education from family and society, lack of security, dropout rate of girls is higher and their retention rate is low. Though there are facilities with free education till secondary education, lack of social motivation, mistaken education and increasing rate of violence against in different form, refrain them from education and encourage them in child marriage. Marriage is considered as the alternative to education, which ultimately leads to violence against women due to unpaid dowry. The article will analyse the issues of dowry from some case studies, which will give the indication of the real causes of dowry and how education in a real sense is lacking behind this evil.

Key Words: Formal Education, Family Mistaken Education, Child Marriage, Dowry and Death

Introduction: The lives of Bangladeshi women are so complex that no simple solution is possible to their problems. It is very much impractical in the present context of the Bangladesh scenario to suggest overnight and radical changes in the disparate relationship that exists between men and women in Bangladeshi society. One must, therefore, find ways that are acceptable, if not to all the people, at least to the majority of the population. Through education, one can become self-reliant, more aware of the changes in the surroundings, and have better self-esteem. The role of education in development is so vital that the UN, in its Universal Declaration of Human Rights in 1948, included right to education as one of the fundamental rights of human beings. Its importance is aptly reflected by the various forms of discrimination against women subjected to their social and economic dependence on men in a male-dominated society of Bangladesh. In order to improve their lot, they must have wider access to education. We believe that education as well as change of attitude can only play important roles in bringing about such transformation by enabling them to take the first entry into men’s sphere. Women’s access to education must be treated as their fundamental right. And it is only through education that they would get the chance to prepare themselves in order to play their roles in nation’s social, economic and political spheres as equal members of society. We know that attitudes are difficult to change, but changes are needed in those male attitudes that are derogatory to or patronizing of women, and equally in those attitudes of women that are self-denigrating. Change in attitudes can only be brought about by making the facts known through knowledge we can have of the outer world and of human factors.

Women are the vital contributor of most societies. Mothers is very influential person in children’s lives. Educating girls is one of the most important investments that any country can make its own future. Education has also a profound effect on girl and women’s ability to own status and dignity in the society, such as economic independence and political representation. In Bangladesh about 50% of the total population is female, but the literacy rate of female is much lower than that of male. Generally, in our culture where daughters are considered as economic liabilities, many parents are not willing to invest in their education. Because after marriage the girls will go to their in-laws house. Yet in most developing countries women are relatively less educated than men. Girls do not receive the same quality and level of education as do the boys. Generally, in our culture where daughters are considered economic liabilities many parents are
not willing to invest in their education. It is clear evidence that the economic and social rates of return to schooling are quite high, and on the whole, higher for women than for men. Yet in most developing countries women are relatively less educated than men. Girls do not receive the same quality and level of education, as do boys. The inequality in enrolment is worse at the secondary and tertiary level than at the primary level. This is happening because of the mistaken education of the family and predetermined mind set by the society.

Objectives: Here dowry related violence in our society has been focused. Some cases have been collected from daily papers and later it is analysed to find out the causes behind the cases and its impact in our society. Question rises whether mistaken education towards women is the real causes of burden of dowry which lead to bride death

- Whether formal education is enough for women empowerment
- Whether mistaken family education is an important barrier for girls education
- How child marriage is related with mistaken education
- How the pressure of dowry is enforcing the girls towards suicide and homicide
- How culture and positive attitude could minimize the pressure of dowry death

Methodology: The article is based on literature review. Newspaper clippings from several national dailies have been taken into account in analyzing the grave of dowry violence against women. Both qualitative and analytical methodology was used in this article

The Gender Gap in Education?

The question is, if women’s education is so beneficial why does the gender gap in education still persist? Poverty, early marriage, cultural norms, and religious orthodoxy are the major challenges to female education. The Government of Bangladesh and its people understand the value of an educated population. Bangladesh Government has already reached to its target in increasing the enrolment rate of girls. The target was set for 2005 to achieve gender parity in primary enrollment and it has been achieved. During the last 15 years, the primary school enrollment has increased 1.4 times from 11.9 million in 1990 to 16.2 million in 2005. Total primary education enrollment was 11.9 million in 1990 with 6.6 million boys and 5.4 million girls and it has reached 16.2 million in 2005, of whom half of the enrollment was girls. The gender parity of primary enrollment has been attained in 2005. Gender Gap in whole education system is still persisting and women are lagging far behind for empowerment.

Table: Primary education enrollment, 1990-2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Boys</th>
<th>Girls</th>
<th>Boys (%)</th>
<th>(Girls %)</th>
</tr>
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<tbody>
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<td>1990</td>
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<td>8134437</td>
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<td>50.13</td>
</tr>
</tbody>
</table>

Source: Ministry of primary and mass education

Secondary Education: The target to achieve gender parity in secondary enrollment was set for 2005; however reached desired goal by 1999. During the last 15 years, the secondary school enrollment (including junior, higher secondary and intermediate college combined) has increased 2.8 times from 2.9 million in 1991 to 8.2 million in 2005 (Table 4). During this 15 years period, the male enrollment has increased 2.1
times but girl as high as 4.2 times. This increase in girl’s enrollment during the past 15 years has been a significant phenomenon in Bangladesh.

### Education enrollment in Secondary Level (Junior+ Higher Secondary + Intermediate College) 1990-2005

<table>
<thead>
<tr>
<th>Year</th>
<th>Boys</th>
<th>Girls</th>
<th>Total</th>
<th>Boys(%)</th>
<th>Girl(%)</th>
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<td>NA</td>
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Source: Statistical Profile on Education in Bangladesh, BANBEIS 2006.

**Causes of Gender Gap in Education:** Lack of education is one of the major causes of backwardness of the women in Bangladesh. This lack helps to perpetuate the inequality between the sexes, both male and female, attends schools in urban areas. The overall female literacy rate is extremely low, and it is three times in the rural areas than in the urban. We can sort out various reasons behind the low literacy rate of women in the rural areas. These are lack of education amongst the adults of the family, distance of the schools, necessity of joining the household works and too many siblings. Early marriage and motherhood are among the most important factors. Both in the rural and urban areas therefore, there is a close but complex connection between education and marriage. Another important factor is to be found in the economic burden—the expenses involved in arranging marriages, giving of dowry and so on. So, it seems to the parents that the sooner they are married, the less money will be wasted on them. They do not want to invest for the education of their daughters who will leave home for her in-laws very soon.

Sometimes it is expected that being educated might make it difficult for her to adjust with the traditional society after marriage, and the parents have to pay more to get an appropriately educated husband. Parents are confronted with the dilemma as to whether the present educational system helps them in preparing the daughter for the domestic role, which they have to play in future. They are also unsure as to whether and how education will affect a girl’s value in the marriage market. Girls who are educated may thus be educated in order to make them more valuable in the marriage market.

**Islamic Attitude towards Girls Education:** If we consider the matter about women’s education from the Islamic point of view, we would see that Islam attaches great value to education, and prescribes it as the duty of a woman as well as that of men to acquire knowledge. The Holy Prophet said to his followers, “Knowledge enables its possessor to distinguish what is forbidden from what is not. It lights the way to heaven.” In actual practice, the injunctions of the holy Qu’ran in this respect were completely ignored. The Muslim community, as it had misinterpreted many other principles of Islam, considered education for girls also as an unnecessary step. On the other hand, religious education is considered indispensable for rural Muslim women. Social motivation for participation of girls in education is extremely poor and the dropout rate is alarmingly high.

**Mistaken Education and the status of women:** Despite of progress Bangladesh Government met in the enrolment in primary and secondary education, dropout and retention rate is very high. There are some social causes as well as some attitudinal; problem, girls are not continuing education or if continue not getting independence and empowerment. In order to explore the actual position of the women of Bangladesh, it is necessary to analyze the diverse forces in society which mould the lives of the women who are the focus of
the present thesis: “The dilemmas and directions of the women and society are not fortuitous. They are the
result of multiple factors which determine the drift of the whole cultural complex considered as a part of the
social realities of the period.” There is a need, therefore, before examining the real cause of women’s inferior
position, to know something about the modern contexts of their lives. We know that the factors, which
design women’s lives, actually lie within the patriarchal system. These factors combine to define the woman
in Bangladesh, and the complexities of her character, her reactions to society. That is why it is not possible to
make any simple definition about the status of women in Bangladesh.

The lives of Bangladeshi women are largely influenced by traditional and social norms that make them
economically dependent. Thus, gender gaps exist in all spheres of life, e.g. health, legal rights, economic
participation and decision-making. It seems that the root of all these disparities lies in a misconceived and
misapplied education. The neglected education of women is the grand source of the misery. The conducts
and manners of women in fact evidently prove that their minds are not in a healthy state. A Vindication of the
Rights of Women by Mary Wollstonecraft was a revolutionary book, which might have changed society’s
perception on women. She was the first woman who raised her voice against the unequal and unjust
treatment received by the women.

The most important cause responsible for women’s inferior position and identified by the liberal feminists is
that women are always judged first as women and second as human beings. On the other hand, men are
judged individually on their own merits. In Mary Wollstonecraft’s consideration, as member of the human
species the women should have the same opportunity in all the areas of life. After the French Revolution, it
became clear to Mary Wollstonecraft that women were the subjects to men, but not to the Republic. Women
as citizens and as individual beings were devoid of the right to vote, right to property. It became clear that
the status of woman as an independent person was still unchanged Wollstonecraft identified some main
causes responsible for discrimination against women and also put her suggestions to overcome these.
Generally, women like to consider marriage as the highest good or ultimate end of life. In this connection,
she suggested if women got proper education, they would be able to apply deliberate and rational choice
regarding marriage. The main thing that Wollstoncraft wanted to say is that through proper education,
women could acquire self-respect. Habitual slavery to first impressions which developed in childhood is
another reason due to which women are less rational than men. Domestic environment was identified as the
most significant cause responsible for discrimination against women both in society and at home.
Wollstonecraft suggested that women should be capable of performing duties within domestic sphere in a
self-reliant way. Domestic work will not be slavery if it is done willingly. And women would get rid of
ignorance and discard emotional aspects from their nature to a great extent. According to Mary
Wollstonecraft, unless women could achieve the art of coquetry, she would not be able to face any crisis.
Rousseau also had advocated the same opinion. She was very much confident that equality of women
would be possible if they could destroy their parasitic attitude and if women could forget all pre-conceptions
of pleasing men and withdraw herself from maternal duties. Women should consider themselves first as a
rational being, second, as a citizen and lastly as a mother. It should be expected by all that women and men
should receive equal protection from the state and civil law because both are citizens of a state.
Wollstonecraft also added that “It is justice, not charity that is wanting in the world.” The liberal feminists
believe that traditional social institutions like family trained women in a way that they became an integral
part of male persons’ identity. From the early life of childhood, girl learns to be submissive, to be emotional
and to take interest in personal and family affairs, whereas the boy learns to be competitive, unemotional and
outward-looking. The above-mentioned roles for male and female were socially created which ultimately
becomes the permanent structure of a society. In this connection, we can mention Simone de Beauvoir’s
famous phrase, “One is not born but rather becomes a woman.”

Regarding marriage, Mill emphasized on legal treatment. He thought that family is a voluntary association,
where it is not necessary for one to rule over another as in case of a business partnership. Mill believed that
power and privilege within a family and also in society are the result of potential voice, which comes from
the capability of earning subsistence. According to Mill, marriage should be recognized as any other
profession. In that case, any woman would be able to choose freely either to marry or to follow other
profession. Both Wollstonecraft and Mill are of the opinion that acquiring rationality similar to men is the
best way to acquire equal position with men in society. In that case, similar education should be received by
both male and female. Thus, according to the liberal creed, liberation of women is not only in favour of
women but also of society. Liberal feminism is based on a number of presuppositions. They are derived from
a more general theory of liberalism itself. These pre-suppositions may be summarized as follows:

These pre-suppositions may be summarized as follows
1. Essentially men and women are same.
2. Accordingly, both men and women should be treated equally, especially in public affairs.
Methodology: The article is based on secondary data collected from some newspaper clipping on violence against women. Both qualitative and analytical methodology was used in this article.

Analysis the pattern of Violence against Women and child marriage

Child Marriage: Cultural and Social Attitudes: The cause of early marriage in Bangladeshi society is first and foremost religious prejudices and social security. Actually, child marriage facilitates the continuation of patriarchy, since it depends on the authority of the male family members to arbitrarily decide the future of their children. Through the institution of child marriage, the parents seek to ensure the purity and chastity of the girl until she marries. In support of child marriage, many argue that prepubescent girls are at risk of rape, sexual abuse and molestation, any of which would render not only them but also their female siblings unmarriageable. Female child marriage therefore, is seen as a preventative measure and a proactive solution to the problem of child abuse. As well, both families benefit in that one reduces the number of children to be fed while the other acquires free domestic help. So long as girls remain unmarried they must continue to reside in the home of a male member of their family (father, uncle, brother, grandfather) and are viewed, therefore, as a burden both financially and in terms of the increased responsibility of ensuring that they remain “marriageable” as they get older.

In a poor rural family the economic burden of unmarried daughter who would not be a good investment for the future also means that girls are married as soon as possible. Therefore, economic considerations have an effect on the age of marriage. This can operate in another manner. Muslim weddings in Bangladesh involve a great amount of expenditure for the bride’s family which some families can ill afford, especially if they have a number of daughters. The presence of an unmarried girl over the age of 16 is often a sign of poverty.

It is a common picture that the parents of a daughter, unmarried beyond a certain age, face the criticism and ridicule of society. This is true both for urban and rural areas, although there may be differences as to what is considered the proper age. According to Therese Blanchet, “Unmarried adolescent girls spell danger. They are hidden, marginalized and teased. This is especially pronounced in rural society where they are still an anomaly.” Though there has been some change in the attitudes of the people, this change does not correspond to the minimum age set down by law. In Bangladesh, where the majority of the population is rural, child marriages below the age prescribed by the Act is still the rule, rather than the exception. Most of the child marriage leads to a pressure of dowry, in a result young bride are tortured, burnt and doe after beating and many type of torture.

Dowry: The Constitution of Bangladesh considered women as equal to men, but that become more theoretical and bookish issue rather than practical. Women in every class are receiving some form of violence, mild, moderate, verbal and extreme like killing, burning and beating. They are constantly exploited from their basic rights. The violation of women’s rights is the violation of human rights. There are many forms of domestic violence; dowry is the most important among them. Upper class, middle class and lower class all are facing the situation varies only in degree. It seems to them that they bring burden by marrying a women and women are considered as a money making machine to their husband. Once they failed, they become the subject to torture which turns to death or divorce.

The institution of dowry is responsible for many types of violence against and repression of women. Dowry or joutuk, as it is known in Bengali, is a type of marriage payment made in goods or property by the bride’s side to the groom and his family. This ranges from non-violent mental torture such as the constant threat of abandonment and divorce to physical acts of violence, such as beating or even murder. Suicides of young married women are also largely attributed to dowry demands. The sharpening of focus on women’s issues which followed the UN declaration of the Women’s Decade (1976-85) and the publicity given by newspapers and various women’s rights groups to the abuse of young married women due to non-payment of dowry, a very recent phenomenon among Bengali Muslims have been instrumental in bringing family violence against women to public attention. Even the limited news-coverage (in the words of one editor, “This is just the tip of the ice berg”) suggests that while men figure both as aggressors and victims in family violence, the overwhelming majority of women figure only as victim of family violence. The number of female victims’ abnormal death including homicide occurring at families is considerable and the number of women who suffer from beatings and torture inflicted by husbands and in-laws is likely to be much greater. These shocking facts has compelled Bangladeshi society to acknowledge that the most treacherous form of danger which threatens the safety of a Bangladeshi woman is hidden right in her home which is socially
regarded as the safest place for her to be in. Some grim items have become a regular feature in newspaper. The nerves of the reading public are jolted every morning by reports of such sensational and shocking cruelty committed by apparently sane people on their near and dear ones.

The presentation of reported incidents of family violence mentioned in the newspaper shows that statistically the most ‘dangerous’ and ‘unsafe’ relationship in the family from a woman’s point of view is the marital state. The demands for dowry often continue after marriage, and the wife may be forced to suffer physical and mental torture for the inavailability of her parents to fulfill her husband’s and his family’s additional and continuing demands. The inability of the wife’s family to pay dowry may cause the marriage to end in divorce or the husband to marry again in order to procure more dowry. According to Ananda Bazar Patrika, March 20, 1989, the institution of dowry was responsible for the breakup of 200,000 marriages in Bangladesh each year according to the National Association of Marriage Registrars. Actually, the practice of mahr has been replaced by dowry in the form of money, property and gifts given to the groom by the bride’s family in the last two decades. Dowry system is very much associated with women’s lower status. It is a significant source of violence against women and can have a powerful influence on a woman’s relationship with her original new one.” We have seen that mistreatment on account of dowry may be the result either of demands for additional dowry or on account of failure to pay the originally promised dowry.

We know that cats and other domestic animals are useful as long as they do what they are supposed to do and remain available at the pleasure of their master; even if that pleasure includes kicking, so be it. But woe to that cat who leaps away too quickly or bites or claws back. Woe to the wife whose family refuses or is unable to pay a dowry, the cause of a host of murders. Most men in our society look upon women as domestic animals placed on earth to serve or please them. Women have no more sensibilities, no more rights, and no more soul than a cat. They can be maltreated with much impunity, at least until the laws and courts provide the protection, which women need and deserve.

Dowry Prohibition Act of 1980: In Bangladesh, the percentage of marriages in which dowries are demanded and paid has increased in the rural areas in recent years. The institution has become so crucially important that the inability to pay dowry may mean that the daughter of the family remains unmarried. Bangladesh is the third country in this sub-continent (the first being India, the second Pakistan) that had to recognise the increase in this system and take heed of the problems caused. On March the 13th 1979, a female member of the parliament, Mrs. Deulat Nessa Khatoon M. P. introduced the Bangladesh Anti-dowry Bill as a Bill to safeguard the rights and status of women. She was an M. P. from the ruling party.

Dowry Prohibition Act of 1980, as amended by Dowry Prohibition Amendment Ordinance 1986. Sec. 3, states. “If any person, after the commencement of this Act, gives or takes or abets the giving or taking of dowry, he shall be punishable with imprisonment which may extend to five years and shall not be less than one year, or with fine or with both” (The Bangladesh Gazette, Extract, April 2, 1986). The maximum penalty for dowry was thus increased from one year to five years with the Additional Provision Act (since it came into effect from the end of 1981). Act of 1980 has failed to achieve its objectives of stopping the escalation of the practice. We can mention here that the practice of dowry is responsible to a great extent for the unequal treatment to daughters. Undeniably the costs involved in getting a daughter married have increased greatly with the rapid spread of the dowry system. According to Barbara Miller’s hypothesis, negligence to female folk and the costs involved in marriage are strongly connected.

Some Case Studies from Daily Newspaper

Housewife Beaten to Death for Dowry
Published; Tuesday, 08 January 2013, Financial Express

A housewife was beaten to death by her husband and in-laws for dowry at Bausia village hijla upazila of the district last night. The deceased was identified as Maksuda Begum, 20 daughter of late Abdul Kader of Baherchar village under the same upazilla. Family sources said Monir Hossain, 25, son of Shafiuddin used to torture Maksuda Begum over dowry after their marriage. Last night, Monir and his family members started torturing Maksuda indiscriminately in demand of Taka 50,000 as dowry from Matsudo’s father. Maksuda was rushed to a local hospital in a critical condition where on duty doctors declared her dead. The victim’s brother filed a case in this regard. Police arrested Monir and his father Shafiuddin , in this connection

Housewife killed for Dowry in Chuadanga
Published; Sunday, 16 December 2012, Financial Express


A housewife was killed by her husband for dowry in village Dottail under Chuadanga Sadar upazila of the district Thursday afternoon. The deceased was identified as Sathi Akhter (20), daughter of Abdul Aziz and wife of Hafizur Rahman of village Dottail of the upazila. Victim’s father Abdul Aziz said Sathi Akhter got married to with Hafizur Rahman four months back. During her marriage Hafizur was given TK 50,000 and other household furniture as dowry. Tk 100000 again and from time to time tortured her for the money.

Housewife Commits Suicide over Dowry in Chuadanga
Published: Wednesday, 30 January, 2013-02-02, Financial Express

A housewife committed suicide by hanging herself from a Bearn in village Faridpur school para under Amdanga upazila of the district on Monday evening. The deceased was identified as Shaina khatun (35) daughter pf late Nuru Sheikh, wife of Monjil ali also mother of two children of village Faridpur school para of the upazila. Police said that shahina Khatun was married to Monjil ali 15 years ago. Recently Monjil had demanded Tk 50,000 from Shahina’s family as dowry. But Shahina failed to bringthe demanded money. At one stage she went to the cow shed and committed suicide by hanging herself from a Bearn in the evening at 7 pm.

Teenaged Housewife Brutally Chained up for Payment of Dowry
Published: 07th June 2008, The Daily Prothom Alo

Shilpi (18) years old teenage housewife is punished in feudal way as she did not withdraw the case against dowry. She was been bitten in this way for almost 2 months by the members of her in laws family. She is now mentally ill due to chronic physical and mental torture. Shilpi is the daughter of farmer Abu of Baufal ‘char diyara kochuya’. She was married with Jahangir Farayez (25) son of Shamsul haque Farayez of the same Iceland almost one and a half year ago. Abu gave 20 thousand taka in cash and gold of 35 thousand taka price and other valuables cost 30 thousand taka for the happiness of her daughter. But only after the one and half month of the marriage Jahangir demand another 50 thousand taka from Shilpi’s parents. But as Abu failed to pay the dowry so Shilpi had been cruelly bitten. Shilpi sued against her husband under the child abuse law in patuakhali. After that her husband started brutal torture on shilpi. They put chili powder in her body sensitive parts of her body. Sometimes she would kept chained on ground or cot without any blanket. She did not get regular food and bath. In the mean time Jahangir married for second time and at 22 May Jahangir “I will not torture any more one my wife” gave this statement and get a relies from the child abuse law. But Jahangir still continued torturing Shilpi to withdraw the case against Jahangir. And they again chained her up for two days. The local journalists got news and inform the local police station. The inspector rescued Shilpi but she is still did not get relies from mental illness.

Wife is Killed by Beaten for Dowry in Dhaka
Published 14th January 2008, The Daily Janakantha

Rehana Begam(22) is killed by cruelly beaten by her husband in Badda of Dhaka city. Husband Roton Miya is missing after the incident. Jashimuddin brother of the killed woman informed us, Rehana Begam was married with Roton Miya 5 years ago. After some months of marriage Roton often would beat his wife for 1 lack taka dowry. For this demand they gave some money for several times to Roton Miya. But the their sister’s luck did not change and the brutality continued. It was 8am of Friday morning, Roton started his brutality in the ma-92 no holding of Merul Badda. Roton left their sister senseless. Jashimuddin got the news at 11am and rushed to her sister’s house and found Rehana senseless there. He took her to DMCH and filed a case under “nari o shisu domon ayin.” But at Saturday 11pm Rehana Begam took her last breath.

Wife is killed for dowry in Shampur
Published: 05th April 2008, The Daily Prothom Alo

Jannatul ferdous Jhinu (24) mysteriously died in Shampur of Dhaka city. Police took her body at last Thursday from Rasulpur. She is died for brutality of her husband Mirajul Islam, claimed her family. They claimed, Jannul is killed for dowry. Her husband is missing after the incident. They had two children Joy(7) and Raka(3). Jhinu’s cousin, A.K.M. Shohidul Islam said, Jhinu was married with shaon at 2000. They gave 10 ‘vori’ gold and 2 lack taka cash in the marriage. Recently Jhinu’s husband put presser on her for bringing another 6 lack taka cash. But as Jhinu’s family failed to pay the expected dowry, Jhinu was killed with active help of Shaon’s father,mother, and siblings, claimed victim’s family members. After the incident a case is filled in the shampur thana.

Search for the commonalities among the Dowry violence cases
There are many causes for dowry demand and violence against women. The causes are more or less common are identified from the case studies:

- **Mindset**-The predetermined mind set of the people of Bangladesh is that women are born to wed in other sense born to sell in terms of money, asset in the form of dowry. In most family girls are considered as liabilities, they are considered as a parasite, no value and recognition of child bearing and household work. As they are not earning money, someone else in the family has to spend money to secure her life in husband’s or in-laws house. She is considered as a money making machine. The scenario in upper class middle class and lower class are different. Both in middle class and lower class class dowry demand is high, because of economic insolvency. Upper class demand because of completion and status.

- **Poverty** is one of the main causes of dowry violence among middle class and lower class. Poverty makes people greedy, needy which enhance their expectation to get dowry from bride’s house. On the other hand in middle class and lower class family girls are considered as liabilities subject to criticism if not married, religious prejudice they are committed to give dowry in their daughter’s marry. In future due to economic crisis they cannot fulfil their promise, so their daughters become subject of dowry violence.

- **Ignorance**-knowledge makes people aware about their rights and laws against violence which leads them to raise voice against any injustice. As they are not aware about the guilt and punishment of dowry, they take it very normal issue to give dowry to the bridegroom. Sometimes they confused with dower and dowry and get a religious misinterpretation. Due to illiteracy, mistaken family education, lack of information, especially in remote areas electronic and print media do not work, the girls belong to these areas become the victim of dowry.

- **Mistaken Education**- Patriarchy is the main evil which makes the male person to think superior than women. They think that they are the caregiver of the wives, so they have every authority to take money in the form of dowry. Household works are not considered as work because it is unpaid work. As they are not earning money, men take the opportunity to blackmail them by claiming dowry. In case of educated dowry demand is very low or hidden in other forms.

**Modern Islamic Interpretation of Dowry:** Dowry and Dower are often misunderstood and misused concept in Bangladesh. Islam does not permit dowry, as it is practiced in most Muslim societies. Dowry is not the English translation of dower. Dower is the ‘bride gift’. At the time of the marriage, the groom commits to hand over and actually hands over to the bride a sum of money called dower which is a token of his willing acceptance of the responsibility of bearing all necessary expenses of his wife. This is the original meaning of dower. However, in real life, dower has taken a back seat and in its place, the bride groom party exacts money, fat gifts, even property, from the bridal side as a condition for the former’s willingness to enter into the marriage relationship.

Dowry is a totally un-Islamic practice. In Islam, women are not 'owned' by their families and should not be traded with in this manner. It is an insulting practice. In the jahiliyah society before Islam, this money was regarded as the property of the girl's guardian. The practice of dowry among ignorant Muslims is a result of the influence of the evil practices of the society they live in. Islam does not put any financial burden on the father of the girl. A Muslim father is told to get her daughter married away in a most simple Nikah ceremony solemnized by a Qazi/priest in a mosque, witnessed by his close relatives and friends. He is not even required to throw a luncheon to the handful of invitees assembled for this occasion. In fact, it is desirable on the part of the groom that he offers a reception/Walima to his near and dear ones without forgetting the poor people of his society.

Prophet Muhammad (SAW) shows the safest and the most reasonable way in this case in his tradition which is “The most advantageous nikah (marriage) is the one which is the easiest.” (Abu Daud, Nikah: 31) He advised a marriage that everyone can carry out and to spend a suitable amount of money. Islam teaches that the dowry should be reduced and made simple, and that this is in the interests of both the husband and the wife. In the first era of Islam marriage was a simple affair, without pomp or ceremony. Any expenditure incurred in its performance was quite minimal, and not a burden on either family. Indeed, the Prophet (SAW) stated: ‘the most blessed marriage is one in which the marriage partners place the least burden on each other.’ (al-Haythami, Kitabe Nikah, 4:255)

The example of such a simple marriage was set up by none other than the Prophet Muhammad (SAW) himself. He got his daughters married in the simplest possible manner.
Fatimah (RA.) was his favourite daughter, but he neither gave her a lavish dowry nor did he send things to her home after the wedding, and even when she made a request to him for something of a material nature, he only gave her the benefit of his counsel in line with taqwa and good a’mal.

Recommendations

- Dowry is a social evil and should be treated socially by developing awareness among the stakeholders.
- Punishment should be ensured, Gove should take a specific action plan to implement the laws.
- Adolescent girls should take vowed to resist early marriage and dowry.
- Family should value both son and daughter equally
- Islamic leaders should take initiatives to make the people understand the hatred of dowry in Islam
- Imam of the mosque should publicize the message that dowry demand will be resist and reported to the police
- Electronic media and printing media should play a preventive role through drama, talk show, dialogue and TV spots
- Educational institutions could arrange workshop, seminar to raise the voice of women and family against dowry
- Curriculum of the books from primary to tertiary level should reflect the harm of dowry and the strength to resist it socially
- Textbooks should avoid gender stereotyping role
- Civil Society should play a role model against dowry

Conclusion: The lives of Bangladeshi women are so complex that no simple solution is possible to their problems. It is very much impractical in the present context of the Bangladesh scenario to suggest overnight and radical changes in the disparate relationship that exists between men and women in Bangladeshi society. One must, therefore, find ways that are acceptable, if not to all the people, at least to the majority of the population.

Dowry related violence is now an everyday event in our country. The law against dowry is stringent enough to act as a deterrent. But the reality of the wretched lives of young women, particularly among the less educated sections of society, is that they still have to justify their presence in the husband’s family by bringing in money and other valuables from their parents’ home. So it’s the right time to take proper steps against Dowry. If failed to make proper solutions of the problems, then our next generation has to face more problems than we are having right now. This is a high time to resist both early marriage and dowry. The only way to resolve the problem is formal education as well family education in real sense. Misinterpretation of Islam and undue fatwa should be strongly protested. Islam is the most progressive religion, so any question regarding its mal practice should be resist.

If we consider the matter about women’s education from the Islamic point of view, we would see that Islam attaches great value to education, and prescribes it as the duty of a woman as well as that of men to acquire knowledge. The Holy Prophet said to his followers, “Knowledge enables its possessor to distinguish what is forbidden from what is not. It lights the way to heaven.” In actual practice, the injunctions of the holy Qu’ran in this respect were completely ignored. Usually, women’s minds are conditioned from their birth. They are forced to relate everything to the male, to their families and even to society. Women’s mind must be liberated, so that they can begin to think of themselves to be individual persons and, like the male, learn to think and to lead. Women can then, with their newly born consciousness, become more useful members of their families. A woman’s body belongs to her -- it does not belong to her race or community that can ostracize her, kill her, or murder her. Man-woman relationship should be on an equal level. And, it would be possible if both sexes act from the same principle. Women must be allowed to found their virtue on knowledge, which is possible through education by the same pursuit as men. For, they are now made so inferior by ignorance and low desires. Women must embark on a determined struggle to achieve liberation of the body, the intellect and the spirit of womanhood from fear, enslavement and oppression.

We believe that education as well as change of attitude can only play important roles in bringing about such transformation by enabling them to take the first entry into men’s sphere. Women’s access to education must be treated as their fundamental right. And it is only through education that they would get the chance to prepare themselves in order to play their roles in nation’s social, economic and political spheres as equal members of society. We know that attitudes are difficult to change, but changes are needed in those male attitudes that are derogatory to or patronizing of women, and equally in those attitudes of women that are
self-denigrating. Change in attitudes can only be brought about by making the facts known through knowledge we can have of the outer world and of human factors. Through education in a real sense from formal and informal family education, women and girls of Bangladesh could resist any injustice in the form violence especially dowry. Proper education makes one empowered from economical, social, and intellectual side which develops a power to understand which is right and wrong, ultimately strength to resist violence. Universally it is not desired any violence against women, it is hatred by Islam, Islam is a religion of peace and the person who are violating Islam in the name of Islam should be punished immediately. Bride burn is no more desirable, it is a right time to raise voice from national and international perspective.

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WORKPLACE FUN AS DETERMINANT OF TEACHERS’ PERFORMANCE IN PAKISTANI UNIVERSITIES

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ABSTRACT: Supporting environment provided to employees ensures high performance. This idea led researchers to examine workplace fun as a determinant of teacher’s performance in public and private sector universities imparting education in Pakistan. Data collection through questionnaires and appropriate statistical techniques helped in drawing viable conclusions. Workplace fun including congratulating one another and personal freedom helped in developing strong ties and performing well at universities. Moreover female teachers are more influenced with workplace fun as compared to male teachers. The results are beneficial for the university administrators and academicians equally.

Keywords: Workplace fun, faculty members, education, universities, Pakistan.

1. Introduction. In the current era there seems to be a blast of competition while as the organizations cannot afford to waste the abilities or potential of their work force. Different techniques and strategies are there in order to boost the abilities of their employees. Researchers, highlight different approaches to enhance employees performance, such as employees empowerment, employees involvement, employees self-efficacy (Baker, Cronin & Hopkins, 2009), and employees knowledge sharing (Reychav & Weisberg, 2009). There are other most important concepts, which contribute to raise the performance of employees such as workplace fun. Fun activities are not necessarily work related tasks, but it involves such activities that enhance performance e.g. socializing with coworkers, celebrating at work and personal freedom (Fluegge, 2008). Present study is on the universities of Pakistan. The responsibilities of university teachers are increased i.e. academics, pressure to publish research papers, increasing workloads; restructuring and short term contracts that are believed to raising many problems (Dickson-Swift, 2009; Houston, 2006; Jacobs & Winslow, 2004; Tytherleigh, 2005). These problems are not only damage employee’s quality of work but also effects organization performance (Collin & Smith, 2006).

1.1. Problem statement. The problem statement revolves around “examining the impact of workplace fun on teachers’ Performance working in various universities in Pakistan”.

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1.2. Objectives. The following objectives were set for the study:

- To examine the relationship of workplace fun and teachers performance working in universities of Pakistan.
- To differentiate the performance of male and female university teachers.
- To differentiate the performance of university teachers working in public and private sector universities.

2. Literature review

2.1. Workplace Fun and Employees Performance. Fun at work means engaging in activities not specifically related to the job that are enjoyable, amusing, or playful, and that enhance organizational performance (Fluegge, 2008), workplace fun is considered key element for enhancing organization performance and effectiveness. The concept of workplace fun can be found in the publications of Cook (2009), Patel and Desai (2013), Fluegge (2008) and other researchers, who worked to develop organization culture that promoted play, humor and fun. In today’s work environment workplace fun has been promoted as a key element for productive environment (Karl & Peluchette, 2006). Staff considers workplace fun as break in their working days; stress relief, which also provides them opportunity to groom their selves, they think that workplace fun gave them another reason to be at work (Owler & Morrison, 2012). Fluegge (2008) and McDowell (2005) discussed dimensions of workplace fun such as, celebrating at work, personal freedom, socializing with co-workers. Allameh, et al., (2012) recognized seven dimensions of job performance which includes ability, clarity, help, incentive, evaluation, validity and environment.

The social psychology researchers are of the opinion that when people are put in a good mood by an event, this result in more altruistic behavior, likely to help others (Karl & Peluchette, 2006). additionally, it may be because such altruistic and helping behaviors tend to prolong their good mood (Clark & Isen, 1982).

Choi, Kwon and Kim (2013)

In another study the researchers reported that workplace fun has positive as well as negative effects on employees in the hospitality industry. they found manager’s support for fun as negative predictor of employee’s performance. They recommended to investigate this relationship in other sectors for its generalizibility (Tews, Michel, & Stafford, 2013).

2.2. Framework for research

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>Dependent variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Workplace fun</td>
<td>Employee’s performance</td>
</tr>
<tr>
<td></td>
<td>Job clarity</td>
</tr>
<tr>
<td></td>
<td>Ability</td>
</tr>
<tr>
<td></td>
<td>Organization support</td>
</tr>
<tr>
<td></td>
<td>Motivation</td>
</tr>
<tr>
<td></td>
<td>Job feedback</td>
</tr>
<tr>
<td>Socializing with coworkers</td>
<td></td>
</tr>
<tr>
<td>Celebrating at work</td>
<td></td>
</tr>
<tr>
<td>Personal  freedom</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. framework for research.

2.3. Hypotheses. Following hypothesis are developed on the basis of relationship among variables.

H1: Workplace fun leads to high employee’s performance
H1a: Socializing with coworkers’ leads to high employee performance
H1b: Celebrating at work’ leads to high employee’s performance
H1c: Personal freedom’ leads to high employees performance
H2: Impact of workplace fun is different among male and female teachers working in universities of Pakistan.
H3: Impact of workplace fun is different among teachers of public and private sector universities in Pakistan.
3. Methodology. The target population is university teachers in management science department. According to the latest figure of Pakistan’s higher education commission (HEC), total management science faculty members are 2,500 (Higher Education Commission of Pakistan, 2013). For every population of 2500, there is sample size of 333 and is believed to be enough (Sekaran, 2006). Therefore for the purpose of analyzing and interpreting research problem and to test the hypothesis, total number of 333 respondents are chosen as sample size.

Stratified sampling method was employed and stratas were made on the basis of provinces of Pakistan. Additionally Islamabad Capital Territory was considered as a separate strata. Disproportionate stratified sampling technique is recommended when comparison among strata of different sizes is required. Equal allocation was done.

Questionnaire was used as a means to record responses for the variables including workplace fun and employees performance. All items of the questionnaire were reliable and valid with respect to the target variables. Reliability is checked by Cronbach’s alpha which resulted in the acceptable range. Adopted questionnaire (McDowell, 2005) was used including the dimensions socializing with co-workers, celebrating at workplace and personal freedom. Workplace fun, composed of 17 items ranging from strongly disagree =1 to strongly agree = 5. Moreover, 23 Statements to measure employee’s performance were selected from the study of Roathman (2003). The dimensions included were job clarity, ability, organizational support, motivation and job feedback. Five points Likert scale was used ranging from strongly disagree = 1 to strongly agree = 5.

4. Results. Regression analysis technique was employed by using ordinary least square method. It seems appropriate to analyze the effect of workplace fun with performance of university teachers.

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficient</th>
<th>Standardized coefficient</th>
<th>t</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>beta</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Std.error</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>1.116</td>
<td>.190</td>
<td>5.861</td>
<td>.000</td>
</tr>
<tr>
<td>WPF</td>
<td>.324</td>
<td>.068</td>
<td>4.752</td>
<td>.000</td>
</tr>
<tr>
<td>R</td>
<td></td>
<td></td>
<td>0.631</td>
<td></td>
</tr>
<tr>
<td>R-square</td>
<td></td>
<td>.398</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td></td>
<td>92.768 (.000)*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* a: dependent variable employees performance,  b: (*) shows significance

While interpreting results, (F=92.768, P<0.05) indicates that overall model is statistically significant. The regression coefficient received on WPF is (Beta=.324) which is statistically significant leads to increase in employees performance. It leads to acceptance of hypothesis 1. So it is better to say that workplace fun is accountable to bring 32% change in performance of university teachers working in Pakistan.

4.1. Multiple regressions. Multiple regressions is basically the extended form of simple liners regression. In this model we want to check the relationship of dependent variable employee’s performance with the dimensions of WPF such as socializing with co-workers, celebrating at work, personal freedom.
Table 4.2
Result of multiple regressions

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficient</th>
<th>Standardized coefficient</th>
<th>t</th>
<th>sig</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. error</td>
<td>Std.</td>
<td>beta</td>
</tr>
<tr>
<td>Constant</td>
<td>1.077</td>
<td>.032</td>
<td>.175</td>
<td>.134</td>
</tr>
<tr>
<td>Socializing with Coworkers</td>
<td>.032</td>
<td>.093</td>
<td>.093</td>
<td>.039</td>
</tr>
<tr>
<td>Celebrating at work</td>
<td>.134</td>
<td>.040</td>
<td>.040</td>
<td>.040</td>
</tr>
<tr>
<td>Personal freedom</td>
<td>.119</td>
<td>.033</td>
<td>.033</td>
<td>.033</td>
</tr>
</tbody>
</table>

R  0.731
R-square .535
F  39.158 (.000)*

Interpreting the results as (F=39.158) and p value is also significant which is less than 0.05. This show that overall model is statistically significant. Value of F statistics describes the overall fit of the model. The regression coefficient of socializing with coworkers beta is .032 and which is also non-significant, so hypothesis 1a and is therefore rejected. Hypothesis 1b is accepted, which states that celebrating at work would lead to greater employee’s performance; the regression coefficient of Celebrating at work is .134 that shows that celebrating at work is responsible for bringing 13% variations in employee’s performance. Hypothesis 1c is also acceptable having significant value is less than 0.05 regression coefficient of PF is .119 which indicates that one degree increase in Personal freedom leads to 12% increase in performance of university teachers among Pakistan.

4.2. Independent sample t-test

Table 4.3
Group statistics

<table>
<thead>
<tr>
<th>Frequency distribution of respondent Regarding male and female university teachers</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
<th>std. error</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPF Male</td>
<td>143</td>
<td>3.5932</td>
<td>.39715</td>
<td>.03321</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>141</td>
<td>3.6575</td>
<td>.35289</td>
</tr>
<tr>
<td>-------</td>
<td>--------</td>
<td>-----</td>
<td>--------</td>
<td>--------</td>
</tr>
<tr>
<td>EP</td>
<td>Male</td>
<td>143</td>
<td>3.5974</td>
<td>.45327</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>141</td>
<td>3.7077</td>
<td>.3487</td>
</tr>
</tbody>
</table>

*Source*: Survey data

**Table 4.4**

Independent sample t-test for gender

<table>
<thead>
<tr>
<th></th>
<th>Levene’s test for equality of variance</th>
<th>t-test for equality of mean</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>df (two Tailed)</td>
</tr>
<tr>
<td>Equal variance</td>
<td>3.840</td>
<td>282</td>
</tr>
<tr>
<td>WPD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variance</td>
<td>282</td>
<td>279.00</td>
</tr>
<tr>
<td>not assumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>equal variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>not assumed</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Information presented in table shows significant difference between male and female teachers working in management science department of universities in term of WPF and employees performance. It depicts that female’s are more influenced by their surroundings than male.
### Table 4.5
**Group statistics of public and private sector**

<table>
<thead>
<tr>
<th>Frequency distribution of respondent Regarding male and female university teachers</th>
<th>N</th>
<th>Mean</th>
<th>Std. deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>WPF Public</td>
<td>139</td>
<td>3.6335</td>
<td>.38860</td>
</tr>
<tr>
<td>Private</td>
<td>145</td>
<td>3.6170</td>
<td>.36579</td>
</tr>
<tr>
<td>EP Public</td>
<td>139</td>
<td>3.6612</td>
<td>.41593</td>
</tr>
<tr>
<td>Private</td>
<td>145</td>
<td>3.6435</td>
<td>.40113</td>
</tr>
</tbody>
</table>

### Table 4.6
**Independent sample t- test for sector**
This table shows the difference among the university teachers of public and private sector. According to the results, it is interpreted that impact of WPF is same in public as well as private sector universities of Pakistan, employee’s performance of public and private university teachers is approximately same.

<table>
<thead>
<tr>
<th>WPF</th>
<th>Equal variance assumed</th>
<th>Equal variance not assumed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levence’s test for Equality of Variance</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td></td>
<td>282</td>
<td>279.050</td>
</tr>
<tr>
<td>t- test for equality of mean</td>
<td>.121</td>
<td>.050</td>
</tr>
<tr>
<td></td>
<td>.729</td>
<td>.824</td>
</tr>
<tr>
<td></td>
<td>.713</td>
<td>.714</td>
</tr>
</tbody>
</table>

5. **Discussion and Conclusion.** As we are well aware of the employee’s performance is the most important subject for organization or organization’s reputation. There are many factors that are responsible to increase or decrease in performance of employees. Results of the current study are similar with study of Patel & Desai, 2013; Fluegge, 2008; Cook, 2008 showing that employees’ performance is positively related with workplace fun.

With respect to the workplace fun, results draw some conclusions. The first conclusion states that workplace fun has a positive impact on performance of university teachers, secondly, with three dimensions of workplace fun in this study, two dimensions of WPF such as celebrating at work and personal freedom leads to greater performance of university teachers, thirdly, activities of workplace fun is almost same in all provinces of Pakistan but performance differs among province of Punjab, Sindh and KPK. Fourthly, it is also concluded that WPF is same among public and private sector universities of Pakistan. Lastly results shows that female university teachers have more workplace fun than male university teachers.

Firstly, Workplace fun demonstrates similar results with previous research. Workplace fun was positively related to employees’ performance. Workplace fun is positive concept and spreads positive feelings, different studies had found the positive fallings of workplace fun such as increase in job satisfaction, employees engagement, positive employees behavior, increase in employees performance, loyalty and also leads to a positive organization culture (Fluegge, 2008; In & Ching, 2010; Patel & Desai, 2013). According to these results and in the light of previous researches, we can say that in this age of competition, if universities management focus on workplace fun activities and keep work environment happy, then they can enjoy the fruits of better employee’s performance. It is a fact that work environment is rapidly changing, due to which universities are now being more active and explosive (Stace & Dunphy, 2001).

In the study results of Fluegge (2008), it is interpreted that socializing with coworkers, celebrating at work and personal freedom are the important elements of WPF. But this study shows that celebrating at work and personal freedom are the important elements of workplace fun. Happiness theory supports the results, according to this theory some factors are responsible for individual happiness at work one of these factor is autonomy, and employees have autonomy to choose or set their time scale and also have autonomy to choose the technique of doing work. So we can say that it is important to organize such activities that promote
enthusiasm of celebrations at work and also allow employees freedom at work place, allow to take breaks from work to relax their mind for better employees performance Miller (2005), defines workplace fun as enjoyment of job, friendship with employees, autonomy from rigid culture.

Study also concluded that WPF almost remains same in public as well as private sector universities having same performance. All public and private universities are regulated by HEC, and mostly same practices are followed in universities of Pakistan.

Lastly according to the results, female university teachers are more influenced by WPF than male and their performance also increase than male teachers. Study found that females are more interested in profession of teaching than male because of flexibility of time and place, which results in greater performance as compared to male teachers (Nisar, 2005), this result shows the similarity with study of Miller (2005), workplace fun becomes the source of increase in productivity, greater job satisfaction and lowers the level of stress among female workers, so it is said that female employees are more influenced from workplace fun than male employees.

5.1. Conclusion. Current study is based on the relationship of independent and dependent variables and the purpose of study is to check the relationship of workplace fun with employee’s performance among university teachers of Pakistan. Different dimensions are found in literature and selected to explain the concept of workplace fun. Workplace fun contains the dimensions, which are socializing with coworkers, celebrating at work and personal freedom. In this study it is concluded that work place fun leads to high employees performance of university teachers in Pakistan therefore H1 is accepted. Then results shows that celebrating at work and personal freedom would leads to high employees’ performance, so H1b and H1c is accepted. Study found that female university teachers are more influenced by workplace fun than male, we can say that the performance of female university teachers are high than male university teachers of Pakistan, so H2 is accepted. At the end, study reveals that WPF is same among private sector universities than public sector universities of Pakistan so H3 is rejected.

5.2. Suggestions. According to the results of this study, workplace fun has positive impact on performance of teachers consequently, therefore it is suggested to management of universities to uphold such activities that are not exclusively associated to work but have strong impact on performance, place some informal activities at workplace, such as celebrating diverse occasions, parties at work and also provide them personal freedom to reduce their workloads, whereas the result will be healthier. It is also suggested to employees to get involve themselves or support fun activities at workplaces for superior performance.

5.3. Limitations and future research direction. Sample size for the current study was limited; responses are taken only from the university teachers of management science department, another limitation of the study is about the data collection tool adopted, questionnaire was used due to limited time period. On the other hand, study is specifically based on education sector of Pakistan; only one industry is catered because of limited time and budget.

Despite this in depth analysis of employees performance and workplace fun there are still some areas that need to be studied in more details. Teachers from other departments may have difference in their response regarding these concepts. Therefore the study can be extended to all other departments. Findings can be further enhanced by cross comparison among different industries on related concepts.

REFERENCES


GENDER DISCRIMINATION HAMPERING CAREER MOBILITY OF FEMALE BANK EMPLOYEES

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ABSTRACT: Progressing in work life is the fundamental right of an employee. Mostly normal career progression is hampered due to several reasons leading to under representation of women at top level positions. Identifying the reasons for such happening is the requirement of today’s work organizations. The current study focused on identifying the reasons of hampered career mobility of female bank employees working in the banks operating in Pakistan. Furthermore the influence of social norms, work-family balance and self-efficacy as mediating variables is examined. Adequate number of responses and use of appropriate statistical tests helped in data analysis. The results indicated that discrimination on the basis of gender discouraged female employees to continue their jobs and get hold of top positions in banks in Pakistan. It is found that societal factors, dual responsibility of work and family and confidence in one’s ability effect the advancement of females in their careers. The study stands beneficial for the bank managers and the employees working in banks to improve their overall performance.

Key words: Bank, Discrimination, Employees, Female, Career Mobility, Pakistan

Introduction: Pakistani labour market has experienced shift in female employment trends in the recent past. Johari, Mat, Mat, Othman and Mohamed (2013) reported that women workforce has increased tremendously in the labour market. Females have been found contributing in many sectors of economy including business and services. Same is true for the Pakistani labour market. On the other hand the problem is that their jobs are clustered at middle and lower income category jobs (Gayle, Golan & Miller, 2012).

Gayle, Golan and Miller (2012) stated that less number of women than men become executive managers. They earn less over their career, hold more junior positions, and exit the occupation at a faster rate. This women’s under-representation at top management level results from inadequate career opportunities, gender-based stereotypes and ‘old boy’s networks’ (Oakley 2000). The researchers are also of the view that managerial role is a male occupation, and the ‘think-manager-think male’ attitude remains prominent (Schein, 2007).

Employees perform important tasks for organizational survival regardless of being male or female while at work. Whereas discriminating attitude adopted by the management regarding male and female workers harms their productivity (Abbas, Hameed & Waheed, 2011). Gender gaps have been identified in the work places by the researchers (Bell, 2005; Albanesi & Selody, 2010). Subramaniam and Arumugam, (2013) found family related barriers the most important barriers towards female manager’s progression. Later they stated that besides family related barriers, negative stereotypes, glass ceiling and talent management also contributed to the same issue. Besides other factors affecting career mobility of female workers education is one. The theory of career mobility states that achieving more education leads to upward career mobility within and across organizations (Sicherman & Galor, 1990).

The researchers have explored attitudes toward mobility and perceptions of mobility opportunities in more depth than actual mobility itself. Several studies have examined the difference in pay of male and female workers.
working at the same level of job (Nopo, et al. 2011, and Selody, 2010). The mobility of female employees in organizations can not only be studied through pay. There is a need to identify other factors effecting female career mobility. Lack of legal structures has further deteriorated the situation in developing countries with respect to equality of male and female (Munyae, 2011).

Major gender inequalities observed in the labour market include less female participation rates (Mehak, 2007), earnings power (Eatzaz, 2007), mobility (or advancement) chances available to female employees (Maume, 1999), and further training (Chris, 2004). In the public service in particular, considerations other than those of merit are said to influence recruitment, placement and promotions, among others (Munyae, 2011).

Previous studies regarding gender gap have proved that occupations and organizations play a key role in generating differences among genders (Cardoso, Guimaraes & Portugal, 2013). In the light of these recommendations the researchers set to investigate the matter among working female employees in banks.

Typically Pakistan has a male dominated society and preference at home or at work is given to him. This paper makes contributions to the female career mobility literature by examining the relationship of discrimination with mobility. Additionally the direct and indirect effects of work family balance, self – efficacy and societal norms provide different dimensions for discussion.

Very little, if any, attention has been paid to career mobility of female bank employees, and discrimination. This research offers valuable insights into the factors effecting career mobility and to develop strategies that provoke implementation of equal advancement opportunities to male and female workers in banks operating in district Attock, Pakistan. The aim of the study is to examine the effect of gender discrimination on mobility of female employees to the top positions by looking at the role played by three other factors like work - family balance, self-efficacy and societal norms.

**Literature review**

**Gender discrimination and female career mobility**: Theory of career mobility and embeddedness (Feldman & Ng’s, 2007) stated that individuals interact with the environment and with other individuals. According to this view, career mobility is understood as experiencing changes in job, organization and occupation. Earlier view about career mobility (up gradation) stated that career advancement is a result of educational enhancement (Sicherman & Galor, 1990). But in Pakistani context many findings may not be held true. ADB (2002) reported regarding Pakistan that majority of women are concentrated in low paid jobs with limited opportunity for upward mobility (shah, et al, 2004).

Career mobility is employee’s upward, downward or lateral transfers in organizational hierarchy or to other organization. Sicherman and Galor (1990) emphasised that career mobility is the transferability of skills from one occupation to other in career path. It can be determined either of the parties that are employers or employees. Career mobility provides options like getting higher salary and better job. But this again depends upon level of education, experience and ability of employees.

Peterson and Saporta (2004) reported that men and women may come across different opportunities for advancement but it is evident that career path of men is longer than that of women (Cox & Harquail, 1991). Reskin and Beilby (2005) elaborated the association between gender and career outcomes from economic and sociological aspect. According to view point of economists, gender differences in career choices depend upon employee’s characteristics and employer’s choices. Male and female vary in level of energy, time and commitment demanded for a job. Similarly employers prefer one gender over other that they deem appropriate for their organization. Sociologists are of the opinion that sex stratification in society influences gender differentiation in organizations.

Stereotyping theory also supports the relationship between gender discrimination and career mobility. The perception of difference between men and women’s characteristics affect advancement of women in to managerial levels. Women are perceived as dependent, less ambitious, lack entrepreneurial spirit, avoid competition and do not wish to be in leadership position (Macarie & Moldovan, 2012).

Milkman and MacGinn (2012) noticed that demographic similarity between supervisors and young professional influence promotion and turnover decisions. Same sex and race of superiors and employees result in more chances of career mobility. Greater the proportion of female supervisors more will be the probability of junior-level female employee promotion.
Natalia (2000) studied the lower career advancement of female nurses. She analyzed that constraints to their career progression include biased management policies, inadequate training opportunities, lack of childcare facility and uncomfortable working conditions. Whereas Volart (2004) determined gender inequities in developing countries and reported that women were discouraged from being entered into the labour market or they were restricted to work, thus restricting their access to managerial positions. The reason can be differences in investment in education by male and females and acquisition of talent.

In exploring the role of gender in banking Beck, Behr and Guttler (2009) compared the performance of female and male loan officers. They found female loan officers having low default rate as compared to male loan officers. Women are mostly risk averse so they restrictively grant loan and closely monitor and screen borrowers. In this case women tend to have more promotions than men, but their study lack such information.

Siddique (2004) stated that every society had its own established norms for masculinity and femininity. In every society men and women are expected to work according to their own capacities, which are socially and culturally defined. According to Salwa (1998) gender does not mean physical differentiation between men and women but difference in socially accepted roles of men and women. Much legislation has been passed universally for equality between men and women (Chinnar 2010).

According to Chris (2004) discrimination is not only matter of legislations or policy but of attitude. It is commonly believe that women are less intelligent and capable than men and they contribute economically less than men. That’s why female have been specified to certain roles. Men are dominant in labour force, they perform more complex jobs, work more hours and earn more money than women (Reskin & Beilby, 2005). Additionally Reskin and Beilby have identified three types of gender discrimination such as ‘allocative’ discrimination -women are assigned lower level jobs through hiring and subsequent promotions, ‘with-in job’ discrimination - for same job, male and female workers are provided with different benefits, and ‘valuative’ discrimination -female having equal education and skills requirements as that of men, are paid less (Reskin and Beilby, 2005).

Research scholars have used sticky floor and glass ceiling metaphors to highlight gender discrimination in work place (Erik & Marita, 2006; Cotter, Herrson, Ovadia, Vannerman, 2001). Sticky floor is horizontal discrimination in which women are kept at the bottom of job scale and have less provision to training and assignment than men (Erik, et al 2006) whereas glass ceiling is vertical discrimination in which women are provided with fewer opportunities for career advancement. There is transparent barrier for women to climb up career ladder (Cotter et al 2001).

Human capital theory explains the reason for gender differentiation in labour market. Human capital is the accumulation of knowledge and skills. In view of researchers, women invest less in education and career than men due to their family responsibilities and maternity issues thus restricting their advancement to top management positions. (Powell and butterflyed, 1994).

**Role of work and family balance:** Working women have dual responsibility of job and their home. They are caretaker of their children. Women mostly prefer their families over work. They choose to work fewer hours than men and even leave their careers for bringing up their children. Such reasons withhold employers in promoting women higher up because women pay more value on relationships as compared to personal growth.(Akpinar-Sposito, 2012). In point of view of Nikala (2000) absence of family –friendly policies like inflexible working schedule, lack of childcare facility and negative management attitudes hinders women progress in their careers. Females also face problem of geographical movements and tend to avoid transfers for higher level of jobs. According to Zeenat et al (2006) working women also have to manage their marital relationships. When they became more successful in work life as compared to their life partners; their likeability as wife decreases.

While exploring women underrepresentation in upper management position, Hobbler et al (2011) emphasized on work- family conflict bias. Due to “think leader, think male” perception employers prefer male workers over female workers and believe that managerial positions require unstructured working schedule and presence in organization for longer hours. Women are unable to meet these schedule requirements because of their family responsibilities. That’s why employers hesitate in promoting women for managerial roles.

A study conducted by Kellog graduated school of management and Loyola University indicated that due to fewer acceptances of transfers, women have slow career advancement than their male counterparts. Initiatives like childcare facility, paid leaves and flexible work times are encouraging women to carry on their jobs and create work life balance. (Akpinar-sposito, 2012).
Provision of work-life benefits from employers has impact on career progress of women. They sacrifice their careers when they enjoy family friendly benefits. Because when women bring their children in organization’s day care centres or request for flexible working schedule. Their role as mother seems to be denominating or even conflicting with role of worker. So managers perceive them as less suitable for promotions as compared to men because men enjoy these benefits at low rate. (Hobbler et al, 2011)

**Role of self-efficacy:** Self-efficacy is the confidence on ones abilities to perform certain tasks. Level of self-efficacy impacts on how people think, feel and behave (Bandura, 1994). People that are high on self-efficacy tend to feel stronger, competent and perform more challenging tasks. While low efficacy creates anxiety, stress and causes people to withdraw their efforts (Bandura, 1997). Male and female differ in their level of self-efficacy. Females lack belief in their capabilities and their low confidence affects their career choices (Bandura, 1992).

According to Akpinar-Soposito (2012) women are unwilling to move up in hierarchy because they don’t feel they have talent and skills in managing challenging tasks. Female also avoid upper management positions because they do not want to engage in political conflicts.

In exploring the relationship between self-efficacy and organizational commitment, Arya et al (2012) found the moderating effect of gender role orientation on these two variables. They proposed that men and women differ in efficacy levels and thus show different organizational commitment towards their jobs. Results confirmed that females have less confidence on their abilities as compared to men. Men are usually considered assertive, goal oriented competitive and aggressive while female in nature are more emotional and pay more attention towards interpersonal relationships (Archer & Lloyd, 2002). Self-efficacy also has impact on career choices. Women tend to avoid mathematical related career because of they perceive themselves less competent in mathematics (Zeldin and Pajarees, 2000). However study conducted by Kumar and Lal (2006) found that females score higher on intelligence test than males but they also found no interaction between self-efficacy and gender.

**Role of societal norms:** Social norms are the set of beliefs and attitudes that represent a society. Such norms are interdependent and lead to formation of social stereotypes that result in domination of one group over other in society. One of the stereotypes is gender role (Kantar, 1997). Sex-role socialization theorists explain that every society has different standards for male and female which is reflected in people’s attitude, perceptions and behaviour. The cultural demands of society hinder utilization of talent inherent in women and keep them outside of economic stream (Volart, 2004). Social norms dictate what roles are appropriate for one gender than the other. According to social learning theory, people learn by observing that some behaviour are rewarding for males but not for females and tend to act accordingly (Connor, 2002). Such traditional sex roles cause difference in socialization and training process of girls and boys. They develop different skills and personality traits e.g. females are supposed to be passive and people oriented while males are encouraged to be dominating and achievement oriented. These social differences have bearing on labour market and influence employers to treat male and female employees differently (Corcoran and Courant, 1987). In explaining lack of females as leaders in sports organizations, Sartore and Cunningham (2007) has highlighted that low status and power of women in society reduces their self-concept and limit their behaviours. Such social inequities in power are also reflected in organizational settings where men dominate in higher level positions and women in lower level positions thus limiting career progress of women.

**Pakistani context:** Banks in Pakistan offer employment to female employees after completion of their Bachelors of Business Administration (Honors), Masters of Business Administration or Masters of Commerce. Generally the promotion is directly related to the time spent at the job. The constitution of Pakistan 1973, acknowledges equal rights for women of Pakistan. Article 25, 26 and 27 of law; enforces protection of women, and also enforces no discrimination on the basis of sex and allows equal access to employment opportunities in both public and private sector organizations (WDD, 2012).

Balanced population play a critical role in economic and social welfare of economy. The 180.71 million population of Pakistan has gender imbalance with 66.1% females and 64.3% males (Pakistan Economic Survey, 2011-12). According to labour force survey (LFS) 2010-11, 57.24 people make labour force of Pakistan. Female participation rate in labour force is less than men’s participation. The refined activity rate was 21.7% while 68.7% of men. The crude activity rate was 15.6% for women and 49.3% of men.

Traditionally, in Pakistan females are considered as the care takers for home and children, where as the male segment of the population is considered as the bread winners (Malik, Saif, Gomez, Khan & Hussain, 2010), but
the economic suppression motivated the females to enter the employment market and share burden with their male counterparts. Entrance of women in the employment market in Pakistan is a recent phenomenon. This phenomenon on one side has shared the economic burden of males and on the other has created an imbalance in the job market of the country.

Gender discrimination and career mobility are social issues in Pakistan. Islam emphasises equal rights of men and women. Instead of being an Islamic republic, teachings of equality are being ignored and women are deprived of education (Siddique, 2004) resulting in less role to play in boosting economic development.

About gender biasness and discrimination Peterson and Thea (2006) were of the view that various practices could be adopted by the organizations such as unfair actions of the employer; discrimination in job compensation package, hiring discrimination, favoritism related to job promotion, and biasness in wage setting for different type of job work.

**Hypotheses**

H1 - Gender discrimination affects career mobility of female bank employees.

![Figure 1. Hypothesized relationship.](image)

H2 - Work-life balance mediates the relationship between gender discrimination and career mobility of female bank employees.

H3 – Self efficacy mediates the relationship between gender discrimination and career mobility of female bank employees.

H4 – Societal norms mediates the relationship between gender discrimination and career mobility of female bank employees.

![Figure 2. Hypothesized relationships.](image)

**Methodology**: The sample of study comprised of female employees working in domestic banks of Attock city and the surrounding areas, previously known as Campbell Pur. Sample size was small because of limited number of bank branches available and still due to limited number of females working in those banks. Closed ended, self - administered questionnaires were used to obtain responses from female employees. Total of 200 questionnaires were distributed in 20 branches. Equal number of distributed questionnaires ensured equal representation from each selected branch. Out of distributed questionnaires 189 were received. Visits in person and development of understanding about the significance of research study resulted in high response rate.

Questionnaire was segregated into various sections for collecting the responses. Different set of statements were adopted from different studies, Table 2 provides the details. Only female employees were invited to participate. The age of respondents ranged from 18 years to 42 years with a mean age of 29 years.

The sources from which the scales were adopted are summarised in the table given below.
Table 2
Sources of statements derived for the questionnaire

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of items</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender mobility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Work life balance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self efficacy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Societal norms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Career discrimination</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Adopted from various research studies

**Dependent variable:** The dependent variable for the current study is career mobility of female employees. Career mobility means female employee’s upward movement across the bank hierarchy - intra organizational career mobility. The scale for measuring the female employee’s responses was developed by consulting most relevant research studies. Details are provided in table 2. The statements thus made were examined on a five point likert scale ranging from ‘1’ to ‘5’.

**Independent variable:** Gender discrimination was proved to be independent variable for the current study. Gender discrimination included with in job discrimination, that is, for the same job male and female employees are offered different benefits (Reskin & Beilby, 2005). Details for adoption of statements are provided in table 2. The statements were rated along five point likert scale ranging from ‘1’ to ‘5’. Three dimensions of gender discrimination identified by Abbas, Hameed & Waheed (2011) were hiring discrimination, promotion discrimination and facilities discrimination. For the current study only a single dimension that is promotion discrimination was considered.

**Mediating variables:** Work - family balance, self – efficacy and societal norms were treated as mediators in examining the mentioned relationship. Work - family balance is the

All variables in the study were measured using multiple item indices. To avoid response set bias, the items were distributed randomly throughout the questionnaire. Respondents were asked to rate each item on a likert-type scale ranging from "1 = strongly disagree" to “5 = strongly agree”. Various similar studies have adopted the same approach (Munyae, 2011; Channar, Abbasi, & Ujan, 2011). Additionally validity and reliability was judged and found acceptable results. To strengthen item accuracy, clarity, and ease of respondent completion of the questionnaire, the researchers explained the purpose of the study to the respondents before the distribution of questionnaires. Employee perceptions were tapped as there was no other source available for addressing issues related to gender differences and mobility, due to lack of research culture in Pakistan.

**Data Analysis:** Statistical tests employed resulted in generating meaningful results. Pearson’s Correlation was used to determine the overall relationship between variables. Additionally regression analysis helped in measuring dependency of variables.

**Correlation Results:** The value of Pearson’s correlation ranges between 1 to -1. Table 3 presents the bi-varie correlations among the variables.

Table 3
Bi-variate Correlation among Variables (N=100)

<table>
<thead>
<tr>
<th>Variables</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>GD</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CM</td>
<td>-.645**</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SN</td>
<td>-.667**</td>
<td>.573**</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>WLB</td>
<td>-.705**</td>
<td>.657**</td>
<td>.734**</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>-.546**</td>
<td>.523**</td>
<td>.478**</td>
<td>.633**</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: Results of Pearson’s correlation. *p < .05, **p < .01

The results show that gender discrimination is negatively correlated to career mobility (r= - 0.645, p<0.01), social norms (r= -.667, p<0.01), work life balance (r= -.705 p<0.01) and self-efficacy (r= -.546, p<0.01). Furthermore social norms(r= 0.573, p<0.01), work life balance (r= 0.657, p<0.01), and self-efficacy (r= 0.523, p<0.01), are positively correlated to career mobility. Results indicate that gender discrimination has negative
relationship with career mobility. This result support H1 and it is in line with previous research finding (Mirza & Jabeen, 2011). Results also provide support to H2, H3 and H4 which state that social norm, work life balance and self-efficacy influence career mobility (Mirza & Jabeen, 2011, Singh et al, 2012, Hoobler et al, 2011).

**Regression Results:** Results of regression are presented in table 4.

**Table 4**

Results of the Mediated Regression Approach

<table>
<thead>
<tr>
<th>No.</th>
<th>DV</th>
<th>IV</th>
<th>Beta</th>
<th>T</th>
<th>F</th>
<th>R²</th>
<th>Adjusted R²</th>
<th>Std. E. of Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SN</td>
<td>GD</td>
<td>-0.576</td>
<td>-46.381</td>
<td>140.718***</td>
<td>0.769</td>
<td>0.760</td>
<td>0.020</td>
</tr>
<tr>
<td>2</td>
<td>WLB</td>
<td>GD</td>
<td>-0.655</td>
<td>-75.515**</td>
<td>232.453***</td>
<td>0.845</td>
<td>0.840</td>
<td>0.016</td>
</tr>
<tr>
<td>3</td>
<td>SE</td>
<td>GD</td>
<td>-0.533</td>
<td>-54.305**</td>
<td>142.453***</td>
<td>0.651</td>
<td>0.650</td>
<td>0.042</td>
</tr>
<tr>
<td>4</td>
<td>CM</td>
<td>GD</td>
<td>-0.546</td>
<td>-63.400***</td>
<td>331.210***</td>
<td>0.555</td>
<td>0.550</td>
<td>0.025</td>
</tr>
<tr>
<td></td>
<td></td>
<td>GD</td>
<td>-0.873</td>
<td>-134.70*</td>
<td>330.565***</td>
<td>0.849</td>
<td>0.840</td>
<td>0.122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SN</td>
<td>-0.632</td>
<td>-43.324</td>
<td>330.565***</td>
<td>0.849</td>
<td>0.840</td>
<td>0.122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>WLB</td>
<td>-0.546</td>
<td>-25.401</td>
<td>330.565***</td>
<td>0.849</td>
<td>0.840</td>
<td>0.122</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SE</td>
<td>-0.610</td>
<td>-31.342</td>
<td>330.565***</td>
<td>0.849</td>
<td>0.840</td>
<td>0.122</td>
</tr>
</tbody>
</table>

**Source:** Regression results. Note: GD - gender discrimination, SN - social norms, WLB – work-life balance, SE - self-efficacy.

**Results of Mediated Regression Approach for SN, WLB & SE (GD – CM):** In the first equation while analysing the model summary, the value of adjusted R² indicates that about 76% of the variance in SN can be explained by the GD. The standard error of the estimate shows that the results have low built in error. ANOVA statistics (F=140.718, p<0.001) indicates that the overall model is statistically significant. The regression coefficient received on GD is (β = -0.576, p<0.001), which is statistically significant and explains that GD is responsible for generating 57.6% variation in SN.

In the second equation while analyzing the model summary, the value of adjusted R² indicates that about 84% of the variance in WLB can be explained by the GD. The standard error of the estimate shows that the results have low built in error. ANOVA statistics (F=232.453, p<0.001) indicates that the overall model is statistically significant. The regression coefficient received on GD is (β = -0.655, p<0.001), which is statistically significant and explains that GD reports 65% variations in WLB.

In the third equation, while analyzing the model summary, the value of adjusted R² indicates that about 65% of the variance in SE can be explained by GD. The standard error of the estimate shows that the results have low built in error. ANOVA statistics (F= 142.453, p<0.001) indicates that the overall model is statistically significant. The regression coefficient received on GD is (β = -0.533, p<0.05), which is statistically significant and explains that GD report 65% variations in WLB.

In the fourth equation, while analyzing the model summary, the value of adjusted R² indicates that about 55% of the variance in CM can be explained by GD. The standard error of estimate shows that the results have low built in error. ANOVA statistics (F= 142.453, p<0.001) indicates that the overall model is statistically significant. The regression coefficient received in GD is (β = -0.455, p<0.05) which is statistically significant and explains that GD reports 45.5% variation in CM.

In the fifth equation, while analyzing the model summary, the value of adjusted R² indicates that about 84% of the variance in CM can be explained by GD, SN, WLB and SE. The standard error of estimate shows that the results have low built in error. ANOVA statistics (F=330.565, p<0.001) indicates that the overall model is
statistically significant. The regression coefficient received in GD is ($\beta = -0.873$, p<0.05) which is statistically significant and explains that GD reports 87.3% variation in CM. The regression coefficient for SN is ($\beta = -0.632$, p<0.05) which is statistically significant and explains that SN reports 63.2% variation in CM. The regression coefficient for WLB is ($\beta = -0.546$, p<0.05) which is statistically significant and explains that WLB reports 54.6% variation in CM. The regression coefficient for SE is ($\beta = -0.610$, p<0.05) which is statistically significant and explains that SE reports 61% variation in CM.

**Results of Mediated Regression Approach for SN, WLB & SE:** The beta value of GD for the five steps are ($\beta = -0.576$, -0.655, -0.533 and -0.455) respectively (the total effect). The inclusion of SN, WLB and SE in the fifth step has reduced this beta value to ($\beta = -0.873$) (the direct effect). The indirect effect is equal to the difference of the total effect and the direct effect i.e. $-0.576 \times -0.873 = 0.502$. Since the total effect is greater than direct effect so it can be said that SN, WLB and SE are partially mediating the relationship between gender discrimination and career mobility.

**Discussion:** The results of the study after examining the direct relationship of gender discrimination and career mobility of female bank employees revealed that yes, female bank employees are discriminated on the basis of their gender when it comes to upward career mobility, generally known as job promotion. McGinn and Milkman (2013) are of the same view and they provided the reasons for such discrimination. According to them the reason identified for this discrimination is the same-sex superior within a work group. This factor decreased the likelihood of women existence in an organization and increased the likelihood of other sex promotions. Another reason for this discrimination identified by Chang (2003) is that the female workers prefer to work in the organizations with female bosses. This also hampers female promotions in the same organization.

The results are in accordance with stereotyping theory. The perception of difference between men and women’s characteristics affect advancement of women in to managerial levels. Same is true for Pakistani sample of bank employees due to the reason that women are perceived as dependent upon male – bread winners (Macarie & Moldovan, 2012).

Moreover theory of career mobility and embeddedness (Feldman & Ng’s, 2007) as promotion in jobs due to advancement in education seems to fail in case of female bank employees. Despite better/equivalent qualifications comparative to male employees does not support them to get top level jobs. Other findings of the study state that work family balance, self efficacy and social norms also have influence on female staff mobility.

**Conclusion:** The results of the empirical study provide new information on the relationship between discrimination experienced by female bank employees and their career mobility opportunities, and how this may be effected by work family balance, self – efficacy and societal norms.

Women differ from men in terms of their personal characteristics and life experiences which lead them to have different approach towards work. It has been observed that executive positions are supposed to be headed by men only because they are more assertive and can better control and lead employees than female executives. This disparity is due to the differences in perception of gender characteristics.

The societal factors are very important and cannot be neglected. Our social norms regarding women respect and safety has limited their careers to teaching and nursing profession only that have very limited career growth. However trend is changing now and females are encouraged to join workforce to contribute in the economic mainstream. But still women are mostly in operational or administrative positions and there are very few females in managerial and executive position.

Secondly some female employees themselves avoid managerial roles because it entails greater responsibility of work that can disturb their family and work balance. They don’t want to engage themselves in organizational politics.

So, when society encourages women employment, organizations facilitate them in balancing their family responsibility and professional role and women also believe in their abilities to cope with managerial role then female employees can also have progressive careers.
Limitations: Thematically the scope is limited to assessment of gender discrimination and career mobility with reference to banking sectors. Geographically the scope of this study is limited to banks of only Attock city. Sample size was small because limited no. females are working in banks here. As a result conclusions drawn from this study might not necessarily the real reflection of situation in the country’s banking sector as a whole.

Recommendations: In the light of the results drawn following recommendations may be made. There is a need to adopt healthy human resource management practices to form policies and procedures that promote merit based selection, recruitment, performance evaluation and promotion policies and their effective implementation. Scholars have suggested that an educated woman leads to an educated nation. So, positive attitude should be established towards education of women and their role in workforce. Organizational policies should be tailored to women friendly work practices. Flexible work timings, child care facilities and pick and drop services can help female employees in creating work life balance.

As women participation in labor force is increasing, government should also play an active role in maintaining representation of female employees. Equal employment opportunity laws should be enforced. Negative stereotypical attitude towards female employees should be avoided. Positive expectations about female employees as good managers and leaders can enhance their capability to move up career ladder. This Pygmalion effect enhances self-efficacy and leads to better performance. Establishing a quota system for females can be another alternative for preserving female representation. A quota for females should be established for training, assignments and administrative positions in each organization.

Effective management of employees helps achieving high organizational performance. For this it is necessary to achieve high performance form employees. Higher performance can be achieved by providing employees a caring management style to keep them motivated, developed and managed (Agarwal, 2011).

Taking care of employees in an effective manner helps increasing embeddedness instead of inter-organizational career mobility. More there is embeddedness, more inclination towards success for organization.

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REF


Material

Since mechanisms of behavior change are not always evaluated in physical activity interventions, current interventions are limited until these mechanisms are better understood (Bauman, Sallis, Dzewaltowski, & Owen,
Therefore, studies are needed that examine mediating variables, derived from theory, in the design, implementation, and evaluation of interventions. A mediator is a variable that must be included in an intervention in order for a specific change in a dependent variable or outcome to occur (MacKinnon, 2008). MacKinnon (2008) describes several methods of identifying mediators using statistical procedures, including the causal inference approach, difference in coefficients, product of coefficients, structural equation modelling and bootstrap estimates of the mediated effect.

Ref

Material

Balancing work obligations with obligations outside of work is increasingly seen as a core factor in reducing unhealthy situations for individuals and their families, and for employers seeking to increase productivity in the workplace.

References

Gender discrimination


~


Ref

Material
Female participation

Ref

Material
Earning power of females

Ref


Material
Female career mobility

Ref:


Material
Training


A REVIEW of QURANIC WEB PORTALS
THROUGH DATA MINING

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ABSTRACT : In the present era abundant web portals are available over the internet. In the proposed work we concentrate on data mining of Quranic web portals. To know and obtain awareness about Islam, numerous Quranic web portals are being accessed worldwide. Data mining is one of the emerging technologies which analyzes raw data using supervised and unsupervised techniques to find the hidden patterns. This paper is intended to study the access pattern of some of these websites region wise using classification based data mining under which ROC plots have been depicted. The AUC of depicted ROC of considered Islamic web portals are obtained and have been distinguished as to which portal’s prediction is more appropriate. Alexa’s web-site is an effective tool for obtaining the required data about each of these Quranic web portals regions wise. The study is focused to analyze this data and find the reasons for certain preferences.

Keywords-Islamic awareness; Quran research; data mining; Classification; ROC

Introduction : There has been an unprecedented increase in the amount of data (raw) everyday. Extracting desired and meaningful information from this data involves lot of efforts, and the technique that has been specifically used to extract knowledgeable information, is termed as Data Mining which is popularly known as Knowledge Discovery in Databases (KDD) refers to the nontrivial extraction of implicit, previously unknown and potentially useful information from data in databases. While data mining and knowledge discovery in databases (or KDD) are frequently treated as synonyms, data mining is actually part of the knowledge discovery process [1]. The usage of data mining is not limited to one field but extensively applied in different fields of human endeavor, including marketing, banking, engineering and various field of science.

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In the present research we use data mining for the review of Quranic web portals and their predictions. Islam is a religion being practiced by 23% (as of 2011) of the total world population with exponential growth rate day in day out. The followers of Islam are called Muslims who believe in one God (Allah) and blissfully follow the teachings of the final prophet Muhammad (PBUH). The Qur’an is the religious book for Muslims. According to Muslim faith Allah (SWT) revealed the Qur’an to the Prophet Muhammad (Peace Be Upon Him) 1444 years ago in classical Arabic language. The Qur’an contains valuable information and provides one stop solution for humanity. It is free from contradictions and discrepancies [6]. The World Wide Web contains various Quranic web portals which contain large amounts of information from the Quran and about the religion of Islam. Some of the websites are preferred over the other in various countries. We study the pattern of usage of some of these Quranic websites. The following are the websites taken into consideration in this research analysis:

www.islamicity.com: This website was launched in 1995 by Human Assistance & Development International (HADI). The website’s mission is to share with the world an understanding of Islam and Muslims and promote peace, justice and harmony for all people. It has evolved into one of the world’s leading online source of Islamic information and one of the largest Muslim e-Community, offering a wide range of information and services. The
website contains various sections such as Quran search which provides a search engine for the words from the Quran, Hadith (saying and acts of Prophet Mohammad (PBUH)) database. Various other sections which provide the original Arabic script and translation of the Quran in English helping Muslims and non-Muslims understand the Quran and its purpose in a simple and understandable manner. www.quran.com: The core competency of this website is to make the verses of Noble Qur'an easily accessible in many languages with features that allow users to browse, search and listen to recitations of the glorious Qur'an. The website provides the full text of the Quran along with the translation in English. The website also host a section which connects to other hyperlink for audio and translation.

www.tanzil.net: This website is a Quranic project launched in early 2007 to produce a highly verified Unicode Quran text to be used in Quranic websites and applications. The mission of this project was to produce a standard Unicode Quran text and serve as a reliable source for this standard text on the web. The website contains the full text of the Quran chapter wise and provides recitation by renowned Islamic scholars. www.quranexplorer.com: This website was started in 2005 by a group of Muslims living in USA with a goal to spread the message of Holy Quran in the whole world and advocate peace and tranquility by making people cognizant of the true message of Islam. The website has a strict policy of making sure that all the material comes from a reliable source and has been proof-read by a Muslim scholar ('alim). The website has a section for translation of the Quran in eight different languages with audio available for a few. Also various other sections with information of Hadith and Quran search along with translations from different scholars. Live Quran Tutoring is one the niche characteristic of this website to enable learner is taught by renowned Islamic scholars.

We use the Website of Alexa Web Information Company, which is a part of Amazon.com Company which provides website analytics for all websites country wise. The country traffic rank is a measure of how a website is doing among internet users in a particular country relative to other sites over the past month. The rank by country is calculated using a combination of the estimated average daily unique visitors to a site and the estimated number of page views on that site from users in that country over the past month. The dataset is formed by grouping the countries into Geographic regions.

Group 1: Asia
Asia is the largest of all the continents with around 59% of all the population of the world living here. Literacy rate on an average for this continent is around 65%. The World Wide Web is a part of life for around 28% population in this continent. All the four websites considered presently have nearly 50% visitors from this continent.

Group 2: Europe
The European Union is a group of developed nations with around 12% of the world population. This group has the least population and a high literacy rate of more than 95%. About 63% of the total population in this continent use internet.

Group 3: Africa
Africa is the second largest continent with 15% of the total world population. The continent has an average literacy of 45%. Though internet is not very prevalent with only 16% of the population using internet, all the four considered websites have a few visitors from this part of the world.

Group 4: Americas, Caribbean and Oceania
This group is the largest in terms of geographical area with Canada, North & South America and Australia. The countries in this group have around 14% of the total world population. These countries have a high literacy rate of above 75% and the highest internet usage of about 56% of the population using internet.

LITERATURE SURVEY: The literature reveals that, [2] author studied a range of Artificial Intelligence and Corpus Linguistics research at Leeds University on Arabic and the Quran, and saw a great potential impact of Artificial Intelligence modeling of the Quran, which has produced a range of software and corpus datasets for research on Modern Standard Arabic and more recently Quranic Arabic .The work on Quranic Arabic corpus linguistics has attracted widespread interest, not only from Arabic linguists but also from Quranic students, and the general public. In [3], Qur'an, AL-Sunnah and Islamic traditional books are the rich resources for Muslims that used as the sole authoritative source of knowledge, wisdom and law. The challenge for computer scientists is to extract and represent these knowledge, wisdom and law in computer systems, this knowledge is directed or underlying, therefore, to build an intelligent systems which can answer any question with knowledge from Quran, Al-Sunnah and other Islamic books, special techniques for mining data must be used to deal with this issue, which can help society, both Muslim and non-Muslim, to understand and appreciate the Islamic religion, this paper attempts to understand how the new techniques in data mining can extract Islamic knowledge from its resources, and represent these knowledge in meaningful form for the user. Moreover, this study concentrates on Hadith as
knowledge resource, and proposes approach to classify Hadith to its categories using supervised learning classification. The finding of this study shows that there are several ways to extract knowledge from Hadith depending on the goal of the knowledge. In [4], Information repositories containing text data of different languages are abundant on the World Wide Web. Digital corpora of sacred text of Islam related to Quran containing Arabic language are also publicly available. The availability of these corpora and intelligent application to analyze them are the vital to better comprehend the religious text of Islam, and propose a method of representing the Quranic text corpus as a graph, and apply a frequent sub-path mining algorithm on it to generate frequent patterns. The research shows that how the frequent patterns can be used for subjective indexing and clustering similar verses of Quran.

Data Collection: The data for the Quranic web portal dataset was collected from (http://www.alexa.com/) [5]. The website provides web traffic data and statistics of a particular website in various countries. The website's traffic data is based on a global panel of Toolbar users. This panel represents a sample of all internet users. The panel consists of millions of people using toolbars created by over 25,000 different publishers, including Alexa and Amazon [5]. The tables had been designed in oracle 10g database named as 'quran_mining' having four attributes (sr_no,name, no_hit,region) and five rows. Attribute ‘sr_no’ is defined as serial number it’s a primary key constraint, ‘name’ contains the name of quran webportals, ‘no_hit’ contains the percentage of visitors, and ‘region’ contains the name of the geographic area.

Tools and Techniques: Many types of data mining tools are available, such as ODM, Weka, SPSS, etc. every tool has its own pros and cons. In the present work we employed Oracle Data Miner 10.2.0.3.0.1; build 2007 for the prediction of data it act as client and Oracle 10g database served as a server.

Experimental Analysis
Classification: Classification technique is the prominent data mining technique to predict the discrete type values of dataset. The input data, also called the training set, consists of multiple records each having multiple attributes or features. The goal of classification is to accurately predict the target class for each case in the data. In present dataset the target attribute is ‘webportal_name’ attribute that includes the names of four distinct Islamic websites, it acts as discrete value.

Support Vector Machines (SVM): SVM is a powerful algorithm with strong theoretical foundations based on the Vapnik-Chervonenkis theory. SVM is implemented for classification, regression, and anomaly detection. It has strong regularization properties which refer to the generalization of the model to new data [7]. The Formula for linear SVM is stated as: u=wTxi + b, Where w is a normal vector (weight coefficient vector), xi is the input vector and b is the bias / intercept term. Based on that, we can get the class u where u is 1 or -1. The distance between a training vector xi and the boundary is called the margin. According to the original theory by [9], we want to find the margin m where wTx + b ≥ 1 for all x ∈ P wTx + b ≤ -1 for all x ∈ N and in order to separate the elements which are in a positive or a negative class.

Receiver Operating Characteristic (ROC): The ROC curve allows us to explore the relationship between the sensitivity and specificity, thus allowing the determination of an optimal value. It is often a test is to be carried out, which provides a result on a continuous measure. The vertical and horizontal axis of ROC curve represents the true positive rate and false positive rate respectively.

Area Under Curve (AUC): The area under curve measures the discriminating ability of a distinct classification model. The prediction can be based on AUC value. If the AUC value is larger the probability of positivity of the case is more compare to negativity of the case. The AUC is a portion of the area of the unit square whose value always lies between 0 and 1.0.

Area under Curve is calculated by mathematically:

Definition: A straight line on the coordinate plane can be described by the equation y = mx+b. where m is the slope of the line and b is the intercept. If a straight line on the coordinate plane can be described by the equation, y = m(x-Px) + Py, where m is the slope of the line and Px Py are the coordinates of a given point on the line.

Remark: An equation of a straight line passing through origin is y=mx.

Area formula: If f and g are continuous functions on the interval [a, b], and if f(x) ≥ g(x) for all x in [a, b], then the area of the region bounded above by y = f(x), below by y = g(x), on the left by the line x = a, and on the right by the line x = b is

\[ A = \int_{a}^{b} [f(x) - g(x)] dx \]
using above formulas, we can easily calculate the area under curve given in fig. 1 - fig. 4.

**Confusion Matrix:** The AUC works as efficiency measure of the unsupervised data produced by classification technique. During the testing we get correct and incorrect classification from each class. This result is formed as confusion matrix. A confusion matrix contains information about actual and predicted classifications done by a classification system. Performance of such systems is commonly evaluated using the data in the matrix [8].

**Accuracy**
The accuracy for the predictive model is obtained by using the following formula:

$$\text{Accuracy} = \frac{TP + TN}{TP + TN + FP + FN}$$

**RESULTS AND DISCUSSION**
After applying Classification to the datasets respectively the following results are obtained:

**www.islamicity.com**

<table>
<thead>
<tr>
<th>Predicted Class</th>
<th>Actual Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>1</td>
</tr>
<tr>
<td>O</td>
<td>0</td>
</tr>
<tr>
<td>i</td>
<td>2</td>
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**TABLE I: CONFUSION MATRIX FOR ISLAMICITY.COM**

<table>
<thead>
<tr>
<th>Predicted Class</th>
<th>Actual Class</th>
</tr>
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<tbody>
<tr>
<td>A</td>
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<td>O</td>
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<td>q</td>
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</table>

**Predictive Analysis**

$$\text{Predictive Analysis} = \frac{12 + 1}{12 + 0 + 3 + 1} = 0.81$$

**www.quran.com**

<table>
<thead>
<tr>
<th>Predicted Class</th>
<th>Actual Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>q</td>
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<tr>
<td>O</td>
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**TABLE II: CONFUSION MATRIX FOR QURAN.COM**

<table>
<thead>
<tr>
<th>Predicted Class</th>
<th>Actual Class</th>
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<tbody>
<tr>
<td>A</td>
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<tr>
<td>O</td>
<td>0</td>
</tr>
<tr>
<td>q</td>
<td>1</td>
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</tbody>
</table>

**Predictive Analysis**

$$\text{Predictive Analysis} = \frac{12 + 1}{12 + 0 + 3 + 1} = 0.81$$
Fig. 2 ROC Plot for www.quran.com
www.tanzil.net
TABLE III: CONFUSION MATRIX FOR TANZIL.NET

<table>
<thead>
<tr>
<th></th>
<th>Predicted Class</th>
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<tr>
<td>A</td>
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Predictive Analysis = \( \frac{12 + 1}{12 + 0 + 3 + 1} = 0.81 \)

Fig. 3 ROC Plot for www.tanzil.net
www.quranexplorer.com
TABLE IV: CONFUSION MATRIX FOR QURANEXPLORER.COM

<table>
<thead>
<tr>
<th></th>
<th>Predicted Class</th>
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Predictive Analysis = \( \frac{12 + 2}{12 + 0 + 2 + 2} = 0.87 \)
After applying classification to the dataset interesting results were obtained. The web portal islamicity.com has the highest AUC meaning the predictive model is accurate as it is closer to excellence rate. All the web portals have acceptable results except for tanzil.net which show astonishing result, in the predicted ROC plot AUC of 0.37 is above the threshold, rest of the curve below 0.5.

VII Conclusion

In this research paper, four Quranic web portals were taken into account to analyze the behavior of visitors. These websites are more prevalent and also the form of source of information pertaining towards the Islamic religion for the e-learners. A dataset was created by collecting the data from Alexa’s web analytics based on geographic regions. Each Geographic location has its own characteristics. Various factors affect the usage of these websites like population, literacy, internet usage, religion, language, the Islamic months, the popularity of the website among the people and many more.

The message of the Quran can be made more easily available to maximum number of users using the information from the predicted model.

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[7] e.111/b28129/algo_svm.htm
CODE SHIFTED REFERENCE BASED COOPERATIVE USING MULTIPLE RELAYS IN ULTRA WIDE BAND COMMUNICATION SYSTEM

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ABSTRACT. The technology of Ultra Wide band now a days is quite demanding due to characteristics like its simple architecture, low power consumption and cost reliability but still it faces some deficiencies in term of its design to achieve low complexity and low cost. UWB systems experience problems while using digital signal processing technology and require high sampling frequencies. In this paper, the performance of UWB system in the cooperative communication environment is evaluated in terms of its Bit Error Rate for different number of relays and different average distances from source to destination node. The simulations are performed for both line of sight (LOS) and non-line of sight (NLOS) environment. Results from simulation shows that the performance of the system decreases by increasing average source to destination distance. The simulation results also shows that the system performs better in LOS channel environment as compared to NLOS channel environment. In the end results, it shows that the performance of the system increases by increasing the number of relay nodes to adequately large number.

Keywords: Ultra Wide Band; Line Of Sight; Non-Line Of Sight; Code Shifted Reference.

1. INTRODUCTION

Impulse Radio UWB (IR-UWB) is capable of high speed information transmission, immense multipath resolution, low power expenditure and is highly cost efficient [1]. These features have made IR-UWB very popular in wireless communication. Federal Commission of communication (FCC) has set a standard according to which the average transmitted power of the UWB signal is pretty low [2]. The power of the received signal decreases after its transmission through multipath fading channel, which makes it difficult to detect and demodulate the UWB signals [1]. Therefore, cooperative communication technique has been introduced in UWB system for efficiently increasing the power at the receiver side and upgrades the performance of the UWB
Here, based on IEEE 802.15.4a channel model, we have implemented cooperative communication with CSR-UWB system using decode and forward (DF) relay method, and the performance of its BER in different scenarios which will be discussed later in the result part.

2. COOPERATIVE COMMUNICATION

The benefits of multiple-input multiple-output (MIMO) systems have been so largely recognized that certain transmit diversity techniques have become a very important part of wireless standards [4]. However, transmit diversity might not be a practical scheme for other scenarios, even though it is highly beneficial for cellular base stations [5]. Wireless agents might not be capable of supporting multiple transmit antennas because of certain factors like cost, size and limitations of hardware [5]. This is the reason why cooperative communication was introduced. Cooperative communication allows single-antenna mobiles to possess some of the advantages of MIMO communication systems [6]. The basic concept of cooperative communication is that single antenna systems within a multi-user set-up can share their antennas in such a style that a virtual MIMO system is created [7]. It has been observed that channels in a wireless scenario are subjected to fading which means that the signal strength can decay noticeably during the course of transmission [8]. Diversity can be generated by transmitting independent copies of the signal, and this can efficiently reduce the injurious effects of fading. Particularly, by the transmission of signals from different locations, spatial diversity is generated. This gives different independent faded copies of the signal at the receiver [9]. This diversity can be generated in a new and exciting fashion by cooperative communication.

The idea of cooperative communication is to promote the broadcast feature of wireless communication networks, in which the neighboring nodes “overhear” the signal from the source and then relay the information to the destination [10]. In Fig. 2.1, A third-party terminal acts as a relay by receiving the signals from the source and forwarding the overheard information to the destination to expand the capacity and upgrade the reliability of the direct communication. The end-to-end transmission is separated into two different phases in time domain which are: broadcasting and relaying [11]. In the broadcasting stage, all receiving terminals (i.e. relays) operate in the same channel (i.e. time or frequency). In the relaying stage, the transmitting terminals (relay nodes) may work in separate channels to dodge co-channel interference [11].
3. COOPERATIVE COMMUNICATION PROTOCOLS: PROCESSING MODES OF RELAYS

The basic concept of cooperative relaying is that the signal is transmitted by the source to both the relay and the destination [12]. The relay receives the same signal from the source and then retransmits it to the destination. The destination merges the received signal from both the relay and source to boost reliability. This whole process can be carried out by various methods of relaying protocols which are discussed in the following subsections.

3.1 Decode-and-Forward (DF)

In decode-and-forward scheme, using regenerative method, the relay node is going to decode the incoming signal from the source, and then re-encodes it prior to forwarding it to the destination [12]. Possibly wrongly decoded information at the relay can considerably lower the performance of the system because of error propagation [13]. Therefore, it is supposed that relays helps direct communication only if the source signal has been detected correctly. It is assumed that cyclic redundancy check (CRC) code to be capable of perfectly decoding the information. Such a relay using the approach of CRC can be called as adaptive DF [14]. Nevertheless, this approach is not always practical because the relay is sometimes not capable of correctly detecting the signal from the source. Hence, another approach called fixed DF mode is introduced where the relay always forwards the decoded information to the destination irrespective of the received signal quality. When the quality of the channel between the source and relay is very fine, the relay is capable of decoding very quickly and correctly.

3.2 Amplify-and-Forward (AF)

In amplify-and-forward scheme, using non-regenerative method, the relay node is going to amplify the signal from the source without decoding, and then puts forward to the destination [15]. The noisy form of the signal from the source is multiplied by the relay with the amplifying gain with a constraint (e.g. power constraint) and the resulting version of the signal is transmitted to the destination. The complexity of hardware is lower in AF than DF as the decoding section is excluded in AF. Even though the noise is amplified along with the signal, the destination can still make a
better detection of the information as it receives two independent faded versions of the signal [16]. AF relay can be further divided into two subcategories. If the relay has complete awareness about the channel state information (CSI), the amplify gain can be changed [7]. Such a relay is called variable-gain AF relay or CSI-assisted AF relay. Whereas, if the relay needs only the statistical characteristics of the channel in between source and relay, the relay is called fixed gain AF relay or semi-blind AF relay. The latter has less complexity, but lacks behind from the former with respect to performance regarding error-rate.

3.3 Compress-and-Forward (CF):
Compress-and-Forward is another technique of relaying which does not require decoding in the relay. In Compress-and-Forward relaying method, the signal received from the source is quantized and compressed by the relay with the aid of Wyner-Ziv lossy source coding [17]. The compressed version of the signal is then transmitted to the destination by the relay. The received information from the source and the quantized and compressed form of that information from the relay is merged by the destination. CF performs better than DF on the basis of achievable rate when the relay is near to the destination and vice versa [17].

3.3.1 Estimate-and-Forward (EF):
Estimate-and-Forward is also another relaying method where decoding is not needed in the relay. In Estimate-and-Forward, an analog estimate of the signal received from the source is forwarded by the relay to the destination [18]. This estimation is done by entropy constrained scalar quantization of the signal received from the source or with the help of an unconstrained minimum mean square error (MMSE) technique. DF performs better than EF with regards to achievable rate when the relay is far from the destination and vice versa [18].

3.4 CODED COOPERATION:
Coded cooperation is distinct from other relaying techniques because in this scheme, the channel coding is integrated into cooperation [7]. The data (codeword) of every user is divided into two parts. At first, every user transfers the former segment of its own codeword and tries to decode the other segment of its corresponding communication partner [19]. If the information is successfully decoded as verified by the Cyclic Redundancy Check (CRC) code, the user creates the left over portion of its partner’s codeword and sends it to the destination. Else, the user sends the left over portion of its own codeword. The user and its corresponding communication partner should work in an environment of orthogonal channels. In coded cooperation, various channel coding techniques can be assigned [19].

3.5 COOPERATIVE UWB SYSTEM MODEL
Cooperative Communication in UWB systems generally follows ad-hoc network structure and is used to reduce the system complexity [20]. In such structure, every node perform a special role which can either be a Source node (S), Destination node (D) or Relay node (R). However among
these, a node can only play a single role in such process of communication. A cooperative communication in UWB systems also consist of Source node, Destination node and some Relay nodes. Fig 2.2 shows a communication model for cooperative UWB system where “M” represents the number of relay nodes.

In cooperative UWB system model, process of communication is performed in the following three stages [21]:

i. At first, the source node transmits pilot symbol to all of the relays. At this phase, because of the obstructions in the links in between the source node and the relay nodes, the links aren’t confirmed.

ii. From among all the relay nodes, only the relay with the best bit error rate (BER) performance is chosen as the relay of that communication process. For the purpose of minimizing the power consumption of the network, only a single relay node is selected for each communication process.

iii. The communication in between the source node and the destination node takes place via the selected relay node.

The second step is of the highest significance among all the three steps of communication of cooperative UWB system model. It is essential to know the channel fading of the source to relay link and relay to destination link respectively to decide the route with the best BER performance [20].

In Fig.2.2, the channel fading of the source to relay link is represented by \( h_i(t) \), where \( i = 1, 2, \ldots, M \). The number of relays is represented by “M”. The channel fading can be calculated once the pilot symbols are received by the relays. The pilot symbols along with the achieved signal-to-noise ratio (SNR) are then retransmitted to the destination node from every relay node in separate time slots [21]. The pilot symbols from separate relay nodes are demodulated at the receiving side. At this point, the channel fading of the relay to destination link is evaluated. In Fig.2.2, the channel fading of the source to relay link is represented by \( g_i(t) \), where \( i = 1, 2, \ldots, M \).
Figure 2.2: Cooperative UWB system model

After the selection of the relay node with the best BER performance, the source node transmits the data signal to the destination node via this path [21]. Generally, RAKE receiver is implemented for the collection of multipath energy, and better performance is achieved at the expense of the complexity of hardware [20]. Generally to improve the performance of the system, the desired number of correlators is more than 10. Nevertheless, that large number of correlators simply enhances the complexity of the system extensively [21]. Because a UWB system requires to be simple and low in cost, RAKE receiver is hardly employed in the adoption of UWB systems. Energy detection receivers are capable of decreasing the complexity of the system [9]. However, in that case, UWB system’s performance is degraded. Hence, we have used Code-shifted reference (TR) receiver as it is capable of balancing system complexity with system performance.

If amplify-and-forward (AF) cooperative communication protocol is implemented, the multipath component at the source-relay link is amplified and forwarded towards the destination [15]. Several multipath components are resulted after passing via the dense multipath channel in between the relay nodes and the destination node. These multipath components interfere with each other and decrease the SNR at the destination node [16]. Therefore, taking the dense multipath feature of UWB channel under consideration, we have implemented decode-and-forward (DF) protocol in our cooperative UWB system model to transmit the data from the source node to the destination node through the relay nodes. This decreases the complexity of the system as well as avoids the distortion of waveform that results from multipath expansion.

3.6 RELAY POSITIONING

It has been said that the relay nodes are placed in between the source node and destination node with an aim to give better BER performance of the UWB system [7]. But it is important to know the particular position of a relay in between the source node and the destination node that gives the best BER performance [9]. By the term “position”, here we can relate to the distance at which a relay is located from the source and destination. Distance is an important factor in signal transmission. The signal quality decreases with the increase in distance because of factors like path-loss, power-loss, noise and interference. We have considered $D_{sx}$ as the distance between the source node and the relay node, and, $D_{xn}$ as the distance between the relay node and the destination node, where $i=1,2,\ldots,M$. The number of relays is represented as “$M$”. Let, $D$ be the distance between the source node and the relay node.

Fig. 3.1 shows the BER performance of the UWB system as a function of $E_b/N_0$ under the IEEE 802.15.4a office LOS channel environment with the relay node at different distances from the source and destination. The source node and the relay node are kept at a distance ($D$) of 10 meters. It
is assumed that the relays are kept at certain points over a straight line in between the source node and the relay node, so as to keep the overall transmission distance constant (10m) for all cases to ease performance comparison, i.e. \( D = D_{xi} + D_{yi} \). Simulations are done for the BER performances of 5 relays which are kept at a distance \( (D_{xi}) \) of 2m, 4m, 5m, 7m and 9m from the source node. Thus, the corresponding distances \( (D_{yi}) \) of these relays from the destination node are 8m, 6m, 5m and 1m respectively. It can be noted that the third relay is at an equal distance from the source node and destination node, i.e. \( D_{xi} = D_{yi} = 5m \). BER performance for a case with no relay is also simulated, i.e. the direct transmission of the data signal from the source node to the destination node without any relay. The fame duration the CSR-UWB is taken as \( T_f = 60 \text{ ns} \) with the number of frames as \( N_f = 8 \).

![Figure 3.1: BER performances with relays at different positions](image)

The simulation result clearly shows that the CSR-UWB system model performs better with the presence of relay than with the absence of relay. It can be observed that the BER performance of the cooperative UWB system model increases as the relay gets closer to the centre point in between the source node and the destination node. Thus, we can say that for a given channel model, the system performance for its BER depends on the distance between the source node and the relay node \( (D_{xi}) \) and the distance between the relay node and the destination node \( (D_{yi}) \). The BER performance of the cooperative CSR-UWB system model is the best when \( D_{xi} = D_{yi} = 5m \) at \( D = 10m \). Thus, we can say that the BER of the cooperative CSR-UWB system is the minimum when the relay is equidistant from the source node and the destination node.

4. PERFORMANCE COMPARISON OF COOPERATIVE CSR-UWB SYSTEMS UNDER DIFFERENT CHANNELS

In the earlier section, it has been assumed that the relay is positioned just anywhere over the straight
line in between the source and the destination for performance comparison purposes. However, in a practical situation, the relays may not exactly lie in the straight line between the source node and the destination node. Therefore, we can assume the angle made by that line with the line between the source node and relay node as $\theta$, that is evenly distributed from 0 to $\pi$ [21]. We have come to know from the previous section that the BER performance of the cooperative CSR-UWB system is the best when the relay is equidistant from the source node and the destination node. So, let us suppose that $D_i = D_{si} = D_{di}$ (where $i=1,2,\ldots,M$) is the distance between the source node and relay node as well as the distance between the relay node and the destination node. Hence, for a given value of $D_i$, the average distance between the source node and the destination node can be specified as the following [21]:

$$
\bar{D}_i = \frac{1}{\pi} \int_{0}^{\pi} \sqrt{D_i^2 + D_i^2 - 2D_i^2 \cos \theta} d\theta = \frac{4D_i}{\pi}
$$

(1)

We evaluated the performances of cooperative CSR-UWB system for different number of relays, in LOS (Line of Sight) and NLOS (Non-Line of Sight) environments and different average distance between source node and destination node. We have separated the simulations into two sections. The first section is concerned with the BER performances of cooperative CSR-UWB system for the number of relays $M=5$ and the second with number of relays $M=10$. We have taken the CM3 and CM4 with 100 channels from IEEE 802.15.4a channel model in our simulations. CM3 channels represent the LOS (Line of Sight) channels and CM4 channels represent the NLOS (Non-Line of Sight) channels. We have assumed two different values for the average distance between the source and the destination which are $\bar{D}_i = 4m$ and $7m$. The frame duration of CSR-UWB is taken as $T_f = 60\text{ns}$ with the number of frames as $N_f = 8$.

### 4.1 Simulation results with 5 relays

The simulation of the cooperative CSR-UWB system with 5 relays is performed under LOS and NLOS channel environments with 4m and 7m average distance between source and destination. Evaluation of the performances is given in the following subsections.

### 4.2 4m(LOS) vs. 7m (LOS) with 5 relays

First, the performance of the system is compared between scenarios of average source-destination distance 4m and 7m. Both simulations are performed with an IEEE 802.15.4a LOS channel CM3. From Fig. 4.1, we can observe that, in LOS channel environment, at a BER requirement of $10^{-3}$, the cooperative CSR-UWB system with average source-to-destination distance of 4m outperforms the one with average source-to-destination distance of 7m by 4dB.
The performance of the system with 4m average source-destination distance in an IEEE 802.15.4a NLOS channel CM4 is compared with the ones with 4m and 7m source-destination distance in an IEEE 802.15.4a LOS channel CM3. We can observe in Fig. 4.2 that, for the same distance of 4m, at a BER requirement of $10^{-3}$, the performance of the system in LOS channel environment is 9dB better than that in NLOS channel environment.
Figure 4.2: System BER performance at LOS (4m), LOS (7m) and NLOS (4m) for $M=5$

### 4.4 4m (LOS), 7m (LOS) and 4m (NLOS) vs. 7m (NLOS) with 5 relays

Simulations are done to compare the peak performance of the proposed system of an average source-destination distance using 4m and 7m for both LOS and NLOS channel environments. IEEE 802.15.4a CM3 channels are used for LOS environment and IEEE 802.15.4a CM4 channels are used for NLOS environment. Fig. 4.3 shows that the BER performance of the system is the worst at 7m average source-to-destination distance for NLOS channel environment.
5. SIMULATION RESULTS WITH 10 RELAYS

The simulation of the cooperative CSR-UWB system with 10 relays is done under LOS and NLOS channel environments with 4m and 7m average distance between source node and destination node. Assessment of the performances is given in the following subsections.

5.1 4m (LOS) vs. 7m (LOS) with 10 relays

The performance of the system is compared between scenarios of average source-destination distance 4m and 7m. Both simulations are performed with an IEEE 802.15.4a LOS channel CM3. We can observe that, Fig. 5.1 also shows similar results as in Fig. 4.1. Here also, at $10^{-3}$ BER requirement under LOS channel environment, the BER performance of the cooperative CSR-UWB system with average source-to-destination distance of 7m is 4dB less than the one with average source-to-destination distance of 4m.

5.2 4m (LOS) and 7m (LOS) vs. 4m (NLOS) with 10 relays

The performance of the system with 4m average source-destination distance in an IEEE 802.15.4a NLOS channel CM4 is compared with the ones with 4m and 7m source-destination distance in an IEEE 802.15.4a LOS channel CM3 with 10 relays. We can observe in Fig. 5.2 that, at the same average source-to-destination distance of 4m, the cooperative CSR-UWB system under LOS channel...
environment outperforms the one under NLOS channel environment by about 9dB at a BER requirement of $10^{-3}$.

![Graph showing BER performance comparison]

**Figure 5.2: System BER performance at LOS (4m), LOS (7m) and NLOS (4m) for $M=10$**

5.3 4m (LOS), 7m (LOS) and 4m (NLOS) vs. 7m (NLOS) with 10 relays

Simulations are done to compare the performance of the system with average source-destination distance 4m and 7m for both LOS and NLOS channel environments with 10 relays. IEEE 802.15.4a CM3 channels are used for LOS environment and IEEE 802.15.4a CM4 channels are used for NLOS environment. Fig. 5.3 shows that the channel with average source-to-destination distance of 7m under LOS channel environment gives the poorest performance.

![Graph showing BER performance comparison]

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Figure 5.3: System BER performance at LOS (4m), LOS (7m), NLOS (4m) and NLOS (7m) for $M=5$

By the comparison of Fig. 4.3 and Fig. 5.3, we can observe that the cooperative CSR-UWB system with 10 relays outperforms the cooperative CSR-UWB system with 5 relays by about 4dB under a BER requirement of $10^{-3}$ for both LOS and NLOS channel environments. This is because more number of relay nodes opens greater possibilities of getting the relay node with the highest BER performance. Mostly, the relay node lying nearest or just in the straight line between the source node and destination node gives the best BER performance for the system. Nevertheless, at a point when the number of relays ($M$) becomes adequately huge, adding more number of relay nodes does not make the BER performance of the system any better.

6. CONCLUSION

In this paper, a Code Shifted Reference impulse-based Cooperative UWB Communication System has been proposed. The BER performance comparison of the proposed cooperative CSR-UWB system has been analyzed for different number of relays under different channel environments using IEEE 802.15.4a channel model. The simulation results show that, under a LOS channel at a BER requirement of $10^{-3}$, the performance of the cooperative CSR-UWB system with 4m average source-to-destination distance is approximately 4dB better in SNR than the one with 7m. This is extracted from the results that the overall performance is degraded if the source-to-destination distance increases. We can also see that with the same average-to-destination distance of 4m, the performance of the system under a LOS channel environment is about 9dB better than that under a NLOS channel environment. Hence, it can be said that the system performs better under an environment of LOS channel than under an environment of NLOS channel. It can also be observed that the system with 10 relays outperforms the system with 5 relays. This means that Code Shifted Reference impulse-based Cooperative UWB Communication System performs better as the number of relay nodes increases until it reaches an adequately large number.

REFERENCE


A SUCCESS EVALUATION MODEL FOR CAMPUS MANAGEMENT SOLUTION (CMS) SYSTEMS

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ABSTRACT. Development, implementation, and post implementation success factors of ERP systems have been widely researched and numerous frameworks for determining the systems quality and success have been presented in the literature. However, whether the traditional ERP success models can be extended to the success of a Campus Management Solution (CMS) or Academic ERP system is to be explored. We propose an evaluation framework to assess the usefulness of systems and investigate the relationships among the elements of ‘Quality’ and ‘Impact’ of CMS systems in Higher Education Institutes (HEIs). We have verified by the analysis of data collected through a survey of the faculty and administrative in several renowned universities in Pakistan that success evaluation of a CMS is a multidimensional concept. Our results reinforce the findings of related research studies regarding ERP success. Eight out of nine hypothesized paths were found to statistically significant. Our data does not support relationship between ‘Service Quality’ and ‘Departmental Impact’. Our study not only offers nomological validity to an IS success theoretical background but also has valuable implications for the practitioners of CMS systems in HEIs.

Keywords: Campus Management Solution Systems, Information Systems Success, Quality of CMS Systems, CMS Systems Success Factors, Academic ERP Systems

1. Introduction. The use of information and communications technologies (ICTs) has contributed significantly in changing the teaching, learning, assessment, and administration paradigm worldwide. During the last few years, the practice of incorporating customized information systems in higher education institutions, generally named as Campus Management Solution (CMS) systems, Learning Management Systems (LMS) or Academic ERP (Enterprise Resource Planning) systems, has increased significantly in Pakistan. The Center for Digital Education’s Special Report on Campus Management Systems (2010) states, “CMS solutions include the broad class of Enterprise Resource Planning (ERP) systems as well as student information systems . . ., these systems track all business functions, including accounts payable, human resources, alumni support and student support services like attendance, course management and parental communications”. In higher education, CMS systems provide institutes more than an efficient technology tool. They are a way to strategically position the institute in a competitive environment. Vendors of the CMS systems claim to offer various opportunities for campus efficiencies, to encourage peer cooperation, and present the head of the academic unit the holistic view of student and instructor performance for analysis and quick decision making.

Most of the work related to CMS systems focuses on their development life cycle, adoption, implementation critical success factors and implementation methodologies. In some institutes, studies have been conducted to
examine the use and behavior of the users towards an already implemented Course Management System that is a significant part of a CMS system. An example is the study conducted at the University of Wisconsin System by Glenda Morgan. However, a comprehensive framework to measure the quality and post implementation success of CMS systems has still not been studied and discussed in the literature. IS development, implementation and post implementation success factors have been widely researched and numerous frameworks for determining IS quality and IS success have been presented in the literature. Delone and McLean IS success model is perhaps the most recognized framework that has been referenced in various IS research studies especially related to traditional ERP systems success models. For example: Sedera et al. and Ifinedo et al. However, whether the traditional ERP success models can be extended to investigate the success of CMS systems is yet to be explored. The scarcity of research in the CMS systems success evaluation area has been the primary motivator of this research work. Organizations are generally quite poor in the area of evaluation of the information systems they use, because many companies do not even employ any formal mechanism to assess the benefits of their investments in the IT infrastructure and personnel. Same is the case with educational institutes regarding the measurement of success for their CMS systems. Higher education institutes do not employ any systematic approach to evaluate the success of systems they deploy. Our proposed model is based on the ERP success model proposed by Ifinedo et al. The purpose of this research was to re-specify it for the CMS systems by keeping in view the unique nature of higher education institutes that differentiate them from other organizations. We believe that we are the first to have proposed a success evaluation model for CMS systems. 2. Research Context and Theoretical Background. Along with some similarities with manufacturing organizations, universities have specific and unique administrative needs; and these unique needs differentiate the Higher Education Institutes (HEIs) from other organizations. Traditional ERP systems address basic business administrative functions such as HR (Human Resource), Finance, Operations and Logistics, and Sales and Marketing applications. Yet, the Higher Education sector requires unique systems for: Student Administration, Course Administration, Facilities (Timetabling / Scheduling) requirements, and other applications, not part of a traditional ERP system. Because of these reasons, success evaluation models used for traditional ERP systems may not be adequate for measuring the success of a CMS system. Thus, it can be argued that a specific, more comprehensive framework is required to evaluate the usefulness of a CMS system. The “effectiveness” and “success” terminologies have been used interchangeably in the IS literature. Effectiveness of an information system is defined by its degree to which it actually contributes in realizing organizational goals. Some studies used financial indicators to discuss the success of information systems, for example, Stefanou. However, MIS researchers tend to avoid this approach because it is difficult to isolate the effects of IS efforts from other efforts which impact organizational performance. Our study did not operationalize the CMS system success with such financial indicators. Also, our model does not include the technical success parameters of such systems that may embrace cost overrun and time estimates etc. The model proposed and evaluated in this research study primarily used subjective and perceptual measures. It is worth mentioning that we studied CMS systems at a generic level, i.e., focusing on the system’s basic functionality instead of differentiating among the various brands of CMS systems. In fact, empirical evidence suggests that we can compare the benefits of ERP brands even if system types may differ. 2.1 Theoretical background. IS researchers and practitioners are continuously struggling for a consensus on how to measure the value and the benefits of the IS for an organization. One ideology emphasizes the use of subjective and perceptual measures and the other uses the financial and objective measures. In both cases, the assessment of effectiveness and success cannot be achieved completely when the measures of success are restrictive. These two extremes directed Delone and McLean to develop a multidimensional IS success model that has become the leading and widely accepted framework for IS success measurement. Sedera et al. designed another framework that redefined the original Delone and McLean IS success model. This new model eliminates the ‘Use’ and ‘User Satisfaction’ constructs from the original IS success model. Their model contains ‘System Quality’, ‘Information Quality’, ‘Individual Impact’ and ‘Organizational
Impact’ as the success dimensions for an ERP system (Figure 2.1). In an article, Delone et al. mention that the multidimensional success instrument developed by Sedera[3] provides higher content validity[17].

Ifinedo et al.[4][18][19], who used Sedera[3] model as a base, introduced ‘Workgroup Impact’ as a new dimension in their model to measure the effectiveness of an ERP system. According to them, in an organization, a subunit or functional department can be considered as a workgroup. Rousseau[20] believes that it would be worthwhile if individual, subunit and organizational levels are focused separately as these three are highly interdependent. Myers et al.[13] argue that IS success measurement models must not undermine the impacts at workgroup level. Klein et al.[21] says that Delone and McLean’s IS success model indicates the existence of individual and organizational impact as well as the prospective intermediate levels in between.

In 2003, Delone and McLean re-specified their IS success model and included the dimension of ‘Service Quality’ in it. Several other researchers have tested the new model and found that it is valuable to include the ‘Service Quality’ as a separate dimension for IS success measurement[4][22][23]. The ERP success model re-specified by Ifinedo et al.[4] has six inter-related dimensions: ‘System Quality’, ‘Information Quality’, ‘Service Quality’, ‘Individual Impact’, ‘Workgroup Impact’ and ‘Organizational Impact’ (Figure 2.2).

3. Our proposed model. We propose a new success evaluation model for a CMS system, shown in Figure 2.4, is based on the Ifinedo et al.[4] ERP system success model. Figure 2.3 also shows the nine hypothesized paths listed and discussed under “Hypothesis Formulation” in Section 4.

Although, our proposed CMS success model contains the same six dimensions as are used in Ifinedo et al.’s ERP model, yet the model is different from it. First, all of the six dimensions are redefined to cater specialized aspects of a CMS system by keeping in view the unique nature of HEIs. The elements as well as the instrument items used to operationalize the dimensions for CMS success are more relevant to the academic
institutes than that of any other organization using a traditional ERP. A comparison of the elements used in our CMS system success model and ERP success model by Ifinedo et al. \cite{4} can be seen in Table 2.1 and the instrument used in this research to test the model can be seen in Appendix B.

Second, unlike the Ifinedo et al.’s model, our model tries to test the direct relationship between three quality dimensions and departmental impact, and a direct relationship between three quality dimensions and organizational impact; resulting in nine hypothesized paths. The theoretical articulation for these relationships is discussed in Section 4: Hypotheses Formulation.

| Table 2.1 CMS Success Dimensions – Comparison with Ifinedo et al.’s \cite{4} ERP Success Dimensions |
|---|---|---|
| Dimensions | Elements – ERP Success Model by Ifinedo et al. \cite{4} | Elements – Our CMS Success Model |
| System Quality (SysQ) | Ease of use, Accuracy, Reliability, Efficiency, Flexibility | Reliability, Completeness, Flexibility, User Interface, Documentation Quality |
| Information Quality (IQ) | Timeliness, Relevance, Availability, and Understandability | Accuracy, Completeness, Timeliness, Usefulness, Understandability |
| Service Quality (ServQ) | Reliability, Dependability, Quality of expertise, up to date facilities | Reliability, Responsiveness, Assurance, Empathy (based on SERVQUAL by Parasuraman et al.\cite{48})* |
| Individual Impact (II) | Increased individual’s productivity, improved decision-making capability, enhanced individual creativity | Productivity, Efficiency, Decision making effectiveness, Value |
| Departmental Impact (DI) | improved inter-departmental coordination, communication, and productivity | Efficiency, Productivity, Responsiveness, Inter-departmental coordination |
| Organizational Impact (OI) | customer service, decision-making processes, competitive advantage | Efficiency, Responsiveness, Competitive Advantage |

* Measurement items related to “Tangibles” (SERVQUAL) is already handled in System Quality

4. Hypotheses formulation. This section contains the details along with the associated discussion about our hypotheses that have been formulated to analyze various paths in our proposed CMS success model.
Hypothesis 1 (H1): In the context of CMS system, ‘System Quality’, ‘Information Quality’ and ‘Service Quality’ are positively associated with ‘Individual Impact’.

According to Delone and McLean [1] IS success model, there is a correlation between the system quality elements of an IS and the benefits gained by the individual using that system. The IS success model advocates that the benefits perceived by using an IS system are also high when the perceived quality elements of that system are high [24]. Other researchers also confirmed the positive relationship between system quality and usefulness [25][14][16][26][27]. So, in the context of CMS system, we hypothesized:

H1.1: ‘System Quality’ is positively associated with the ‘Individual Impact’.

The Delone and McLean [1] IS success model was first examined by Seddon and Kiew [50] and found that increase in information quality led to the more usefulness of an IS. Some studies did not find relationship information quality and individual impact [28][4], while other studies reported positive relationship between information quality and the perceived usefulness [29][17][26][27]. So, our second sub-hypothesis is:

H1.2: ‘Information Quality’ is positively associated with the ‘Individual Impact’.

Quality of service that IS vendors and consultants provide make the use of complex IS (e.g. ERP) an easy one for the adopting organizations [30][8][3]. Petter [17] found moderate support for the relationship between service quality and benefits of IS. While other studies reported that benefits gained from the IS service support can be increased if service provider personnel have required knowledge and expertise [31][9]. Same are the findings of Seder et al. [4] with respect to ERP system success; they specified that benefits for employees are higher when service provider of ERP software are perceived to be expert and helpful. Ifinedo et al. [4] also found significant, positive relationship between service quality and individual impact (β = 0.25). we hypothesized:

H1.3: ‘Service Quality’ is positively associated with the ‘Individual Impact’.

Hypothesis Two (H2): In the context of CMS system, ‘System Quality’, ‘Information Quality’ and ‘Service Quality’ are positively associated with ‘Departmental Impact’.

Most of the IS success related research studies have dealt with Individual benefits instead of dealing with other levels of benefits [17][32]. Instead of testing a direct relationship between IS quality dimensions and departmental impact, some research studies tested and verified the relationship between individual impact and workgroup impact [4]. On the contrary, we believe that three quality constructs are directly associated with departmental impact. A high quality IS will result in higher productivity and efficiency not only at individual level but at departmental level as well. Poor information quality of an IS lead to adverse effects for an organization at operational, tactical and strategic levels [33]. Moreover, reliable service quality of an IS will improve efficient decision making that consequently lead to higher level efficiency [34]. The above discussion allows us to formulate following set of sub-hypotheses:

H2.1: ‘System Quality’ is positively associated with the ‘Departmental Impact’.
H2.2: ‘Information Quality’ is positively associated with the ‘Departmental Impact’.
H2.3: ‘Service Quality’ is positively associated with the ‘Departmental Impact’.

Hypothesis Three (H3): In the context of CMS system, ‘System Quality’, ‘Information Quality’ and ‘Service Quality’ are positively associated with ‘Organizational Impact’.

There is a positive relationship between system quality and organizational impact [35]. Moreover, in order to achieve a competitive advantage, the software for an organization must be of high quality. Other research studies also suggest this sort of relationship between system quality and organizational impact. For example, it was stated that a highly sophisticated system will result in increased profitability for an organization [36]. So, we hypothesize:

H3.1: ‘System Quality’ is positively associated with the ‘Organizational Impact’.

Information quality is positively related to the organizational impact (β = 0.27)[34]. As discussed earlier, poor information quality leads to adverse effects for an organization at operational, tactical and strategic levels [33]. On the other hand, high information quality can lead to high organizational impact and internal organizational efficiency [34]. Thus, we hypothesize:

H3.2: ‘Information Quality’ is positively associated with the ‘Organizational Impact’.

There was reported a positive relationship between service quality and organizational impact (β=0.30)[34]. Reliable service quality of an IS will result in effective decision making that consequently leads to organizational efficiency [34]. Other research studies also support this sort of relationship between service quality and organizational impact. For example, Bharadwaj [33] states that human IT resources that provide technical and managerial services related to an IS, serve as the sources of competitive advantage. Therefore,
our next sub-hypothesis is:

**H3.3:** ‘Service Quality’ is positively associated with the ‘Organizational Impact’

5. Research Methodology

5.1 Sample. Our sample consisted of employees (i.e. faculty and administrative staff) from the renowned academic institutes of Pakistan. To make the results of our research work more general, we included both public and private sector institutes in our sample. Moreover, the institutes in our sample are using different brands of CMS software: LogiCampus (Open Source), PeopleSoft Campus Solution, Radix, and some in-house developed systems.

5.2 Instrument development. Six dimensions of information systems success have been operationalized in many different ways. With the help of our literature review, we operationalized the dimensions for the CMS success measures. It is worth mentioning that the dimensions used to test the proposed model discussed in our research study are primarily measured through subjective and perceptual items. All of the six dimensions are initially split into different related elements and then various items are prepared to measure the impact of each element comprehensively. Table 5.1 highlights the success dimensions of CMS systems with the elements and their sources. The complete 50-item questionnaire can be seen in Appendix B.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Elements</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Quality: the performance characteristics of the CMS system itself</td>
<td>Reliability, Completeness, Flexibility, User Interface, Documentation Quality</td>
<td>DeLone and McLean [1], Gable et al. [12], Hamilton and Chervany [38], Ifinedo et al. [4], Sadera et al. [3], Seddon [5]</td>
</tr>
<tr>
<td>Information Quality: the characteristics of the output produced by the CMS system</td>
<td>Accuracy, Completeness, Timeliness, Usefulness, Understandability</td>
<td>Ifinedo et al. [4], Gable et al. [12], Sadera et al. [3], Seddon [5], DeLone and McLean [1]</td>
</tr>
<tr>
<td>Service Quality: the support that the users receive from the CMS maintenance and Technical Support Service (TSS) personnel</td>
<td>Reliability, Responsiveness, Assurance, Empathy (based on SERVQUAL by Parasuraman, Zeithaml and Berry, 1988)*</td>
<td>Ifinedo et al. [4], Ko et al. [31], Kettinger and Lee [23], Pitt et al. [39], Thong et al. [9]</td>
</tr>
<tr>
<td>Individual impact: the effects of a CMS on the individual users</td>
<td>Productivity, Efficiency, Decision making effectiveness, Value</td>
<td>DeLone and McLean [1], Gable et al. [12], Ifinedo et al. [4], Myers et al. [13], Sadera et al. [3]</td>
</tr>
<tr>
<td>Departmental impact: the impact of the CMS system on the departments within the institute</td>
<td>Efficiency, Productivity, Responsiveness, Inter-departmental coordination</td>
<td>Ifinedo et al. [4], Ifinedo and Nahar [18], Myers et al. [13]</td>
</tr>
<tr>
<td>Organizational impact: the benefits that the institute gains from its CMS system.</td>
<td>Efficiency, Responsiveness, Competitive Advantage</td>
<td>DeLone and McLean [1], Gable et al. [12], Ifinedo et al. [4], Sadera et al. [3]</td>
</tr>
</tbody>
</table>

* Measurement items related to “Tangibles” (SERVQUAL) is already handled in System Quality

The survey instrument required from participants to specify their agreement on the various statements about the CMS system they are using. Each statement is anchored on a 5-points Likert scale that ranges from “Strongly Agree” to “Strongly Disagree”. The questionnaire also asks participant’s information such as job title, education and some other profile related fields.
5.3 Data collection. To collect the data for our study, we used a cross-sectional field survey. As discussed earlier, our sample consists of the CMS users from some of the most famous and mostly top-notch public and private universities of Pakistan. In these HEIs, the use of CMS systems is mandatory for all stakeholders; so the respondents are experienced CMS users. The questionnaire along with the cover letter were sent to around 300 potential participants from eight academic institutes via email through an online survey tool titled as Kwik Surveys (www.kwiksurveys.com). After two rounds of reminders through emails, 108 questionnaires were filled out and returned (response rate of 36%) in which the useable responses for the research were 102. Six returned responses were not included in the analysis due to incomplete questionnaires.

Our sample space had 72% male and 28% female respondents. 88.3% of the respondents were academics (teachers and/or researchers) and 11.7% were from administration. 78.4% of the respondents were under 40 years and 28.4% had PhD degrees, mostly from technologically advanced countries. 45.1% of the respondents were 30-39 years old and had 18-year (MS or MPhil) education. Most of the respondents were fairly experienced: 54.9% had 6-20 years professional experience and 39.2% had up to 5-year experience. The complete demographic profile of the respondents is shown in Appendix A.

6. Data Analysis. We analyzed our model in two steps. During the first step we assessed the measurement model and during the second step we assessed the structural model. The tools used for analysis were SPSS 16.0 and SmartPLS 2.0. For the assessment of measurement model, reliability and validity of instrument items are examined while the structural model assessment presents the information about the strengths of paths in the model and the variance explained by independent constructs.

6.1 Reliability and validity of measurement items. For validation of the measurement model, internal consistency can usually be confirmed when for each item in the scale, the reliability is of greater than 0.70 [40][41]. In our research, we used Cronbach’s α as the reliability indicator and factor analysis as the convergent validity indicator. Each of the six measurement dimensions has Cronbach’s α greater than the recommended value of 0.70, ranging from 0.887 (Information Quality) to 0.966 (Service Quality) indicating ample internal consistency. Moreover, we performed factor analysis for all 50 items included in our instrument. It is generally recommended that to demonstrate convergent validity, the factor loadings should go above 0.60 for all items in a measuring scale [42]. In our case, the factor loadings of all items are greater than the recommended level; demonstrating convergent validity of the instrument. The values of Cronbach’s α for six dimensions are presented in Table 6.1 and the factor loadings of 50 questionnaire items are presented in Appendix B.

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Number of Items</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Quality</td>
<td>14</td>
<td>0.925</td>
</tr>
<tr>
<td>Information Quality</td>
<td>6</td>
<td>0.887</td>
</tr>
<tr>
<td>Service Quality</td>
<td>11</td>
<td>0.966</td>
</tr>
<tr>
<td>Individual Impact</td>
<td>7</td>
<td>0.921</td>
</tr>
<tr>
<td>Departmental Impact</td>
<td>6</td>
<td>0.911</td>
</tr>
<tr>
<td>Organizational Impact</td>
<td>6</td>
<td>0.917</td>
</tr>
</tbody>
</table>

We also performed the tests for Discriminant validity, i.e., the extent to which each latent construct discriminates from other latent constructs. For constructs with reflective measures, a method of comparing Average Variance Extracted (AVE) for each construct with the square of correlation between those constructs has been suggested [44]. Table 6.2 shows the AVE values for all constructs, the square roots of AVE values on the diagonal (Bold Faced) and the correlation values between the constructs. For all constructs, the square root values of AVE are greater than the correlation between the constructs; implying adequate discriminant validity.
Table 6.2 AVE, the square root of AVE and inter-construct correlations

<table>
<thead>
<tr>
<th></th>
<th>AVE</th>
<th>System Quality</th>
<th>Information Quality</th>
<th>Service Quality</th>
<th>Individual Impact</th>
<th>Departmental Impact</th>
<th>Organizational Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Quality</td>
<td>0.6427</td>
<td>0.8017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information Quality</td>
<td>0.6453</td>
<td>0.7484</td>
<td>0.8033</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service Quality</td>
<td>0.8156</td>
<td>0.7048</td>
<td>0.6616</td>
<td>0.9031</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Individual Impact</td>
<td>0.7720</td>
<td>0.8114</td>
<td>0.7422</td>
<td>0.7046</td>
<td>0.8786</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Departmental Impact</td>
<td>0.7721</td>
<td>0.7415</td>
<td>0.6817</td>
<td>0.6116</td>
<td>0.7844</td>
<td>0.8787</td>
<td></td>
</tr>
<tr>
<td>Organizational Impact</td>
<td>0.7972</td>
<td>0.7786</td>
<td>0.6497</td>
<td>0.5931</td>
<td>0.7888</td>
<td>0.8356</td>
<td>0.8929</td>
</tr>
</tbody>
</table>

6.2 Hypothesis testing results. For hypothesis testing, we used the squared multiple correlations ($R^2$) for each dimension in the proposed model as well as the path coefficients ($\beta$) with other dimensions for each path of the model. SPSS 16.0 generates the path coefficients for each path in the model separately rather than generating the single goodness-of-fit for entire model. $R^2$ and $\beta$ are sufficient for analysis, and $\beta$ values between 0.20 and 0.30 yield meaningful interpretations\(^{[45]}\).

The t-statistics are used to test the significance of corresponding regressor, the larger the absolute value of t, the more likely that the actual value of the parameter could be non-zero. The t values produce meaningful interpretations when combined with the p values; where p is significance level of the result.

Testing results of hypothesis 1. All sub hypotheses (H1.1, H1.2 and H1.3) are supported by our data, i.e., all three paths are confirmed. System Quality has significant, positive relationship with Individual Impact having $\beta = 0.403$ with significance level of < .001 to provide support for H1.1. Information Quality as well as Service Quality have significant, positive relationships with Individual Impact having $\beta = 0.246$ and 0.257 respectively with significance level of < .01 to provide support for H1.2 and H1.3. Using three constructs simultaneously, $R^2 = 0.615$. It shows that the three constructs together explained 61.5% of the variance in the Individual Impact.

Testing results of hypothesis 2. All except one of the three sub hypotheses are supported by our data, i.e., one path is not confirmed. Contrary to our expectation, H2.3 is not supported by our data, i.e., Service Quality is not found to be associated with Departmental Impact having $\beta = 0.041$. Rest of the two sub hypothesis are supported by our data, i.e., System Quality as well as Information Quality have significant, positive relationships with Departmental Impact having $\beta = 0.384$ and 0.369, respectively, with significance level of < .01 to provide support for H2.1 and H2.2. Using three constructs simultaneously, $R^2 = 0.490$. It shows that the three constructs together explained 49% of the variance in the Departmental Impact.

Testing results of hypothesis 3. All sub hypotheses (H3.1, H3.2 and H3.3) are supported by our data, i.e., all three paths are confirmed. System Quality as well as Service Quality have significant, positive relationships with Organizational Impact having $\beta = 0.414$ and 0.252, respectively, to provide support for H3.1 and H3.3. For H3.2, though $\beta$ value is slightly higher than cutoff level (0.20) but still it provides support for our prediction. That is, Information Quality has significant, positive relationship with Organizational Impact having $\beta = 0.207$ with significance level of < .1 to provide support for H3.2. Using three constructs simultaneously, $R^2 = 0.575$. It shows that the three constructs together explained 57.5% of the variance in the Organizational Impact. Summary of the results can be seen in Table 6.3.
Table 6.3 Summary of the results

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Path</th>
<th>β</th>
<th>t</th>
<th>p</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1.1</td>
<td>System Quality -&gt; Individual Impact</td>
<td>0.403</td>
<td>4.615</td>
<td>&lt;.001</td>
<td>Strongly Supported</td>
</tr>
<tr>
<td>H1.2</td>
<td>Information Quality -&gt; Individual Impact</td>
<td>0.246</td>
<td>2.876</td>
<td>&lt;.01</td>
<td>Supported</td>
</tr>
<tr>
<td>H1.3</td>
<td>Service Quality -&gt; Individual Impact</td>
<td>0.257</td>
<td>2.954</td>
<td>&lt;.01</td>
<td>Supported</td>
</tr>
<tr>
<td>H2.1</td>
<td>System Quality -&gt; Departmental Impact</td>
<td>0.384</td>
<td>3.821</td>
<td>&lt;.001</td>
<td>Strongly Supported</td>
</tr>
<tr>
<td>H2.2</td>
<td>Information Quality -&gt; Departmental Impact</td>
<td>0.369</td>
<td>3.746</td>
<td>&lt;.001</td>
<td>Strongly Supported</td>
</tr>
<tr>
<td>H2.3</td>
<td>Service Quality -&gt; Departmental Impact</td>
<td>0.041</td>
<td>0.415</td>
<td>=.679</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H3.1</td>
<td>System Quality -&gt; Organizational Impact</td>
<td>0.414</td>
<td>4.513</td>
<td>&lt;.001</td>
<td>Strongly Supported</td>
</tr>
<tr>
<td>H3.2</td>
<td>Information Quality -&gt; Organizational Impact</td>
<td>0.207</td>
<td>2.304</td>
<td>&lt;.1</td>
<td>Supported</td>
</tr>
<tr>
<td>H3.3</td>
<td>Service Quality -&gt; Organizational Impact</td>
<td>0.252</td>
<td>2.763</td>
<td>&lt;.01</td>
<td>Supported</td>
</tr>
</tbody>
</table>

7. Discussions. This research was conducted to propose a CMS Success Model and examine the relationships among the dimensions of this model. Our proposed model contains six dimensions, exclusively defined for the CMS system success based on the recently proposed ERP success model by Ifinedo et al.\cite{4}. The results of our data analysis indicate that our proposed framework has ample predictive power. Results of our research provide support to all of our hypothesized paths (except one sub-hypothesis) and our findings are in agreement with prior studies of IS in various other contexts. Our first hypothesis (H1) anticipated that three quality dimensions are positively associated with Individual Impact. H1.1, that predicted a positive relationship between ‘System Quality’ and ‘Individual Impact’, is supported by the findings of our research. This finding indicates that such relationship also exists for the CMS system success, which were previously tested and supported by various other studies for the success of IS and ERP systems\cite{4,14,25,26,27}.

H1.2, that anticipated a positive relationship between ‘Information Quality’ and ‘Individual Impact’, is also supported by the analysis of our data. Although some previous research studies did not find such a relation in the context of IS and ERP system success\cite{4,28} but other studies for IS and ERP system success provided support for this relationship\cite{14,27,29}. Thus, on the basis of our results, we can safely say that in the context of a CMS system, the quality of information produced by the system has a significant, positive relationship with the impact of that system.

Results of our data analysis provide support for the positive relationship between ‘Service Quality’ and the ‘Individual Impact’, i.e., H1.3. So, in the context of a CMS system, the higher the quality of service delivered by the system vendor and consultant, the higher the effectiveness of that system is. This result too is consistent with similar results of earlier studies in the IS and traditional ERP system success context\cite{3,4,30,31}.

Our second hypothesis (H2) predicted that three quality dimensions are positively associated with Departmental Impact. H2.1, that predicted a positive relationship between ‘System Quality’ and ‘Departmental Impact’, is supported by the findings of our research. Similarly, H2.2, that anticipated a positive relationship between ‘Information Quality’ and ‘Departmental Impact’, is also supported by the findings of our research. However, contrary to our expectation, H2.3, that anticipated a positive relationship between ‘Service Quality’ and ‘Departmental Impact’, is not supported by our data. Other studies did not directly hypothesize and test quality dimensions with departmental/workgroup impact\cite{4}.

Our third hypothesis (H3) anticipated that three quality dimensions are positively associated with Organizational Impact. All of three sub-hypotheses are supported by the analysis of our data. Support for information quality and service quality was also found to be positively associated with organizational impact with $\beta = 0.27$ and $0.30$ respectively\cite{34} but did not find any support for the relationship between system quality and organizational impact.

The findings of our research offer some worthwhile implications not only for the researchers but also for practitioners. We present the discussion about the implication of our research in the following section.
7.1 Research implications. Our research has several implications for the field of CMS systems success. To the best of our knowledge, our work is perhaps among the first to have proposed and investigated a model specifically designed to assess the post-implementation success of the CMS systems. We believe that findings of our research would motivate other IS researchers to work in the field of CMS systems. Our research endeavor strives to deepen our understanding of the theory of evaluation of ERP systems success. It supports the findings of other related research studies with respect to the systems success dimensions’ relationships. Such correlated findings strengthen the very domain of IS success evaluation as well. Moreover, our data provide empirical support that a CMS system in higher education institutes will be more effective and successful if the system quality, the quality of information and the quality of service extended by the vendor and consultant are perceived to be high. Thus, these three quality parameters positively impact the work of individuals in an institute, departments of the institute, and, eventually, the whole institute. Thus, by improving these quality parameters of a CMS system, institutes can maximize the effectiveness of all three aforementioned levels. Our research work also offers nomological validity to the systems success model’s theoretical context. When a model or an instrument works as expected in terms of other theoretically related constructs, it means the model or an instrument has nomological validity [47].

The important aspect of these kinds of research studies is to update and guide the adopting institutes about how to improve the effectiveness of their CMS systems. The results of our research also have valuable implications for the practitioners. First, as one of the stimuli for this study was the need to provide the higher education institutes with guidelines on how to evaluate the usefulness of their CMS systems. Our simple yet comprehensive framework will serve as an evaluation mechanism for the higher education institutes to evaluate the usefulness of their CMS systems. Second, our instrument has clearly separated measurement items designed to capture the perceived quality of three dimensions (System Quality, Information Quality and Service Quality) related to a CMS system. Thus, it is very easy for practitioners to noticeably assess the actual issue of deficiency regarding the quality of a CMS system. Third, our CMS success evaluation framework allows the educational institutes to evaluate the usefulness of their CMS systems on several levels of analysis, including individual level, departmental level and the organizational level. Furthermore, this research draws the attention of practitioners to the issues related to post-implementation phase of the CMS systems success, which should not be jumbled with the critical success factors related to the implementation of the system.

7.2 Limitations and future research directions. Our research has some inherent limitations. First, we employed perceptual and subjective procedures in our research work. It might be possible that objective measures (such as financial indicators) of CMS success may produce different results. Also, the combination of objective and subjective measures of the success of a CMS system may produce more meaningful results. Second, although we believe that the results of our study may be generalized because the CMS systems under study included some of the world-renowned systems (PeopleSoft Campus Solution and LogiCampus), it may or may not be true as we collected data from one region of the globe, i.e. Pakistan. It is probable that data collected from other regions of the globe, especially from technologically advanced world, may produce different results from ours. Also, different cultural parameters may have an impact on the results discussed in this research.

Future research should address the limitations mentioned in this research. A single study cannot validate the findings of a research. So, to establish the validity of our research findings, the proposed model must be tested in other contexts as well. The data collected for our study is cross-sectional; longitudinal data can be collected for future studies to measure the success and effectiveness of a CMS system in the adopting institutes. Moreover, future research can incorporate various stakeholders’ perspectives regarding the success of a CMS system. For example, students are one of the major stakeholders. We did not include them as respondents because we had specifically designed our questionnaire for employees to assess the impact of CMS especially for ‘Departmental’ and ‘Organizational’ Impact. Future research can compare the viewpoints of students, administrators and faculty members concerning CMS systems. Other research areas that may be pursued are comparative impact of CMS systems based on academic institutions (public, private), gender and/or age of the user etc.
8. Conclusion. We proposed an evaluation framework to evaluate the usefulness of the CMS systems (also known as Academic ERPs) for HEIs. Our framework was primarily derived from previous schemas related to the IS success literature. With sufficient explanatory and predictive power, our research tried to verify that the success evaluation of a CMS system is a multi-dimensional concept. The results of our research study reinforces the findings of related research studies regarding the relationships of the dimensions of IS success. In this regard, eight out of nine hypothesized paths were found to be statistically significant. Thus, our study not only offers nomological validity to an IS success theoretical background but also has valuable implications for the practitioners of CMS systems in higher education institutes. To the best of our knowledge, our work is perhaps the first to have proposed a model to assess the post implementation success of a CMS system. We believe that our findings will motivate other IS researchers to work in the field of CMS systems.

APPENDIX A

Profile of respondents (number = 102)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Institute</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>50</td>
<td>49.0</td>
</tr>
<tr>
<td>Private</td>
<td>52</td>
<td>51.0</td>
</tr>
<tr>
<td><strong>Job title</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lecturer</td>
<td>37</td>
<td>36.3</td>
</tr>
<tr>
<td>Assistant Professor</td>
<td>38</td>
<td>37.3</td>
</tr>
<tr>
<td>Associate Professor</td>
<td>7</td>
<td>6.9</td>
</tr>
<tr>
<td>Professor</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>Coordinator/Program Advisor</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>Dean/Registrar</td>
<td>4</td>
<td>3.9</td>
</tr>
<tr>
<td>Chairman/Principal</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Research Scholar</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>73</td>
<td>71.6</td>
</tr>
<tr>
<td>Female</td>
<td>28</td>
<td>27.5</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>34</td>
<td>33.3</td>
</tr>
<tr>
<td>30 – 39</td>
<td>46</td>
<td>45.1</td>
</tr>
<tr>
<td>40 – 49</td>
<td>12</td>
<td>11.8</td>
</tr>
<tr>
<td>50 – 59</td>
<td>6</td>
<td>5.9</td>
</tr>
<tr>
<td>60 and above</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Masters (16 yrs. Education)</td>
<td>26</td>
<td>25.5</td>
</tr>
<tr>
<td>MS/MPhil (18 yrs. Education)</td>
<td>46</td>
<td>45.1</td>
</tr>
<tr>
<td>PhD</td>
<td>26</td>
<td>25.5</td>
</tr>
<tr>
<td>Post Doc</td>
<td>3</td>
<td>2.9</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Experience (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 5</td>
<td>40</td>
<td>39.2</td>
</tr>
<tr>
<td>6 – 10</td>
<td>31</td>
<td>30.4</td>
</tr>
<tr>
<td>11 – 20</td>
<td>25</td>
<td>24.5</td>
</tr>
<tr>
<td>more than 20</td>
<td>5</td>
<td>4.9</td>
</tr>
<tr>
<td>Missing data</td>
<td>1</td>
<td>1.0</td>
</tr>
</tbody>
</table>
## APPENDIX B

### Questionnaire

<table>
<thead>
<tr>
<th>Measurement item</th>
<th>Cronbach’s $\alpha =$ 0.925</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>System Quality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System reliability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS is reliable; it works well with right Inputs.</td>
<td>0.806</td>
<td></td>
</tr>
<tr>
<td>Our CMS is “Bug Free”; It handles incorrect inputs appropriately.</td>
<td>0.730</td>
<td></td>
</tr>
<tr>
<td>Whenever I try to access CMS, it is always available.</td>
<td>0.722</td>
<td></td>
</tr>
<tr>
<td>Completeness</td>
<td></td>
<td>0.864</td>
</tr>
<tr>
<td>Our CMS is a complete IT solution; it helps me automate my work completely.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS contains all sub systems to manage the campus i.e. course management, attendance management, document management, student financials etc.</td>
<td>0.755</td>
<td></td>
</tr>
<tr>
<td>System flexibility</td>
<td></td>
<td>0.836</td>
</tr>
<tr>
<td>Our CMS is flexible; it allows me to add new classes, evaluation instruments and sub instruments as per my work requirement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS allows for customization such as customized interface and/or customized reports.</td>
<td>0.715</td>
<td></td>
</tr>
<tr>
<td>User interface</td>
<td></td>
<td>0.875</td>
</tr>
<tr>
<td>The interface of our CMS is user friendly.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS is easy to use.</td>
<td>0.877</td>
<td></td>
</tr>
<tr>
<td>Our CMS is easy to learn.</td>
<td>0.814</td>
<td></td>
</tr>
<tr>
<td>Our CMS has online help and tutorials.</td>
<td>0.737</td>
<td></td>
</tr>
<tr>
<td>Documentation quality</td>
<td></td>
<td>0.865</td>
</tr>
<tr>
<td>User Manual of our CMS is available.</td>
<td>0.891</td>
<td></td>
</tr>
<tr>
<td>User Manual of our CMS is easily understandable.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>User Manual of our CMS is comprehensive; it contains complete information about each and every feature of our CMS.</td>
<td>0.818</td>
<td></td>
</tr>
<tr>
<td>Information Quality</td>
<td>Cronbach’s $\alpha =$ 0.887</td>
<td>Factor Loadings</td>
</tr>
<tr>
<td>Accuracy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information generated by our CMS is always accurate.</td>
<td>0.772</td>
<td></td>
</tr>
<tr>
<td>Completeness</td>
<td></td>
<td>0.812</td>
</tr>
<tr>
<td>The reports generated by our CMS contain complete information, as per my work requirements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Timeliness</td>
<td></td>
<td>0.763</td>
</tr>
<tr>
<td>Our CMS has timely information.</td>
<td>0.915</td>
<td></td>
</tr>
<tr>
<td>Usefulness</td>
<td></td>
<td>0.886</td>
</tr>
<tr>
<td>The information on our CMS is useful.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The information on our CMS is important.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Understandability</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The information on our CMS is understandable.

<table>
<thead>
<tr>
<th>Service Quality</th>
<th>Cronbach’s α = 0.966</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Reliability</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>When I have a problem or a need, the TSS shows genuine interest in solving them.</td>
<td></td>
<td>0.870</td>
</tr>
<tr>
<td>The TSS is known for generating information without errors.</td>
<td></td>
<td>0.879</td>
</tr>
<tr>
<td>The TSS employees provide the right solution to requests and reported problems.</td>
<td></td>
<td>0.890</td>
</tr>
<tr>
<td><strong>Responsiveness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>If I have an urgent need, the TSS employees immediately address it.</td>
<td></td>
<td>0.871</td>
</tr>
<tr>
<td>The TSS employees resolve my questions at the appropriate time, even if they are busy.</td>
<td></td>
<td>0.845</td>
</tr>
<tr>
<td><strong>Assurance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The behavior of the TSS employees is trustworthy.</td>
<td></td>
<td>0.879</td>
</tr>
<tr>
<td>I have confidence on responses of the TSS employees to my questions.</td>
<td></td>
<td>0.921</td>
</tr>
<tr>
<td>The TSS employees have the required knowledge and training to resolve my questions.</td>
<td></td>
<td>0.838</td>
</tr>
<tr>
<td><strong>Empathy</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The TSS has employees who give proper attention to my needs.</td>
<td></td>
<td>0.942</td>
</tr>
<tr>
<td>The TSS employees understand my specific needs.</td>
<td></td>
<td>0.850</td>
</tr>
<tr>
<td>The TSS employees show real importance to my essential needs.</td>
<td></td>
<td>0.883</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Individual Impact</th>
<th>Cronbach’s α = 0.921</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity and efficiency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS improves individual productivity.</td>
<td></td>
<td>0.912</td>
</tr>
<tr>
<td>Our CMS saves time for individual tasks and duties.</td>
<td></td>
<td>0.919</td>
</tr>
<tr>
<td>Our CMS enhances organizational learning and recall for individual worker.</td>
<td></td>
<td>0.876</td>
</tr>
<tr>
<td><strong>Decision making effectiveness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS enhances quality of decision making.</td>
<td></td>
<td>0.812</td>
</tr>
<tr>
<td>Our CMS enhances individual creativity.</td>
<td></td>
<td>0.856</td>
</tr>
<tr>
<td><strong>Value</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS is beneficial for an individual’s tasks.</td>
<td></td>
<td>0.868</td>
</tr>
<tr>
<td>The value our CMS generates for me is … (5 for Max., 1 for Min.)</td>
<td></td>
<td>0.720</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Departmental Impact</th>
<th>Cronbach’s α = 0.911</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity and efficiency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS improves departments’ productivity.</td>
<td></td>
<td>0.824</td>
</tr>
<tr>
<td>Our CMS improves the efficiency of departments in the institute.</td>
<td></td>
<td>0.930</td>
</tr>
<tr>
<td><strong>Responsiveness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS helps to improve workers’ participation in organization’s activities.</td>
<td></td>
<td>0.822</td>
</tr>
<tr>
<td>Our CMS creates a sense of responsibility.</td>
<td></td>
<td>0.759</td>
</tr>
<tr>
<td><strong>Inter departmental coordination</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Our CMS improves organizational-wide communication. 
Our CMS improves inter-departmental coordination.

<table>
<thead>
<tr>
<th>Organizational Impact</th>
<th>Cronbach’s α = 0.917</th>
<th>Factor Loadings</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Productivity and efficiency</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS reduces organizational costs.</td>
<td>0.796</td>
<td></td>
</tr>
<tr>
<td>Our CMS improves overall productivity of the institute.</td>
<td>0.923</td>
<td></td>
</tr>
<tr>
<td>Our CMS allows for better use of institute’s data resource.</td>
<td>0.885</td>
<td></td>
</tr>
<tr>
<td><strong>Responsiveness</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS supports decision making at all levels.</td>
<td>0.816</td>
<td></td>
</tr>
<tr>
<td>Our CMS allows our institute to respond to the market needs in a timely manner.</td>
<td>0.805</td>
<td></td>
</tr>
<tr>
<td><strong>Competitive advantage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Our CMS provides us with a competitive advantage over other institutes.</td>
<td>0.846</td>
<td></td>
</tr>
</tbody>
</table>

REFERENCES


IMPACT OF ELECTRICITY SHORTAGES ON EMPLOYEES’ PERFORMANCE: A CASE STUDY OF BANKS IN ATTOCK CITY

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ABSTRACT. Limited resources have adverse effect on the organizational functioning. This research study looks at the impact of electricity shortage (08-18 hours load-shedding) on the performance of bank employees in Attock city. Total 113 respondents responded to the adopted questionnaires of electricity shortage and employees performance for which the Cronbach’s Alpha was calculated were 0.703 and 0.709 respectively. The findings show a positive link between long hours load shedding and decreased employee performance resulting in pending tasks and crowded customers in summer season. Additionally, as the load shedding increases the employee performance decreases. It is suggested that more the alternate sources of electricity are available, the more is employee productivity in banks and the more satisfied are the employee. The study is supported by the findings of the previous researches conducted by different researchers.

Keywords: Electricity Shortage; Employee Performance, Unscheduled Load Shedding.

1. Introduction. Electricity, a unique resource has the potential to make organizations sustainable. It has become important part of our daily lives and without its availability it seems to be “stone age”. Miraculous effects of electricity lead human beings to robotic and automated life. Most importantly, it has saved human effort and wastage of time [1]. Currently, due to ease provided by electricity its demand is increasing day by day. The increase in electricity demand around the world may be because of population growth or to increase standard of living. World population is increasing twice about every thirty-five years [2]. The developed countries have become dependent on electricity for its life style, its security and its prosperity [3]. However, the increase in demand for electricity and dependency of countries to fulfill energy demands may be the biggest problem in coming years [4]. Pakistan also faces energy shortage since 1965 and this supply-demand gap in electricity increases day by day with increase in population and standard of living [5]. Pakistan still has scarce energy resources, where most of the population may not have access to energy services like electricity [6]. Electricity shortage may have serious impact especially for the electronic banking system in Pakistan. To cope with the electricity shortage and for smooth operations, banks makes alternative arrangements. However, existing alternate energy sources may not be enough to cope with electricity shortfall. Hence, banks may face various problems in electronic banking transactions. However the issue of electricity shortage may be a hurdle to the use of all automated processes, employee performance and customer satisfaction. Electricity shortage may also lead to mismanagement in bank processes due to more customer density despite the provision of
alternate sources like uninterruptable power supply (UPS), Generators etc. These alternative sources may not work in Peak load shedding hours. Alternative sources may also have capacity problem due to unscheduled 20-22 hours load shedding. However; the above issues may have impact on employee performance due to improper working climate mainly due to load shedding. These issues may further lead to client dissatisfaction.

2. Literature Review. Globally the requirement for energy is constantly rising. The use of energy round the world is doubling every fourteen years [2]. South Asia has grasped much importance to the world energy markets due to its increased energy demands. On the primary level the demand for energy has rose to 64% between 1992-2002 in South Asia [7]. Pakistan is also facing its worst electricity shortage especially during the month of May to September. Currently the power cuts in the form of 8-18 hours load shedding have destroyed the economic output [7]. These power cuts may have severe effects in automated businesses.

Currently Pakistan is progressing in the way of development stages and most of the businesses are automated. This is mainly done to improve quality of products and services. This has improved standard of living of people. But on the other side the population is growing day by day. This has influence demand supply equilibrium of Pakistan. However, in the way of development and more use of automated processes the demand for electricity has mainly increased. The demand supply gap of electricity may have main influence on economic growth of Pakistan [8]. However, despite the issue of electricity shortage; automation has become the key for success in every organization. Investment in IT infrastructure may be considered a vital feature of progress in current competitive setting [9]. A very useful and valuable asset of an organization is its employees. Employees could be more valuable if they engage in right job at right time. Number of factor are analyzed that greatly affect employees performance but customer satisfaction is a very important factor [10]. These two factors Employee performance and satisfaction; and customer satisfaction and employee performance are interlinked and have effect on each other [11].

Employee performance is widely affected by its environment. The better workplace environment produces the better results. Employee faces both mental and physical stress during job. It is the prime responsibility of the policy makers to set the organizational environment in a manner that promotes employees performance and satisfaction [12]. Employee performance may be a core factor for the success of an organization in the competitive business world. There are many factors that affect the employees’ performance like motivation, empowerment, attitudes and behavior, level of involvement, climate of the organization and many more [10]. It is observed that employees may become depressed due to long hours load shedding, pending work and crowded environment due to waiting clients. Employees may not be able to work properly and their performance may decline in such circumstances. Fear of lay off and loss of job due to less productivity may lead to more dissatisfaction of employees [11]. The following hypotheses are developed on the basis of literature review;

\( H_1 \): Electricity shortage has impact on employee’s satisfaction.
\( H_2 \): Electricity shortage has impact on employee’s productivity.

3. Methodology.

3.1. Sample. Sample consisted of 113 bank employees. Adopted questionnaire helped in gathering responses. A simple random sampling technique was used for selecting sample form banks of Attock city. Maximum responses were tried to capture.

3.2. Data collection. The data collection for the current study was taken from well adopted questionnaire. The instrument for electricity shortage was adopted from the research work of Kallas et. al. (1991). The same way instrument of employee performance was adopted from the research work of Wangenheim et. al. (2007). The questionnaire was having 10 items related to electricity shortage and employee performance on Likert type scale having 1= strongly disagree, 2= disagree, 3= not sure, 4= agree, 5= strongly agree.

3.3. Procedure. The responses from employees were collected by means of adopted questionnaire as discussed earlier. The questionnaires were distributed personally and the responses were collected. All the
data was put into and processed through SPSS. Regression analysis was used in the research study. Electricity shortage was taken as independent variable while employee performance was taken as dependent variable.

4. Results and Discussion. Cronbach Alpha for the questionnaire of electricity shortage and employee performance is given in the Table 5.1. It was 0.703 for electricity shortage and 0.719 for employee performance; which is an ideal figure. Alpha in this case is greater than 0.7, thus the scale can be considered reliable.

<table>
<thead>
<tr>
<th>Reliability Statistics</th>
<th>Cronbach's Alpha</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity Shortage</td>
<td>0.703</td>
<td>10</td>
</tr>
<tr>
<td>Employee Performance</td>
<td>0.719</td>
<td>10</td>
</tr>
</tbody>
</table>

Regression analysis helped in establishing the dependency of the variables. The results presented in table 5.2 indicate that if electricity shortage is increased by by 1 unit, employee satisfaction will decrease by 2.923 units. Value of $R^2$ is 0.553 which shows that about more than half the variation in electricity shortage is explained by the model. Also $R^2$ value (0.553) shows that electricity shortage explains 55.3% of the variability in employee satisfaction.

Standard error of estimates is considerably lower, about 0.000. Thus the first hypothesis is accepted. And the results show that electricity shortage has impact on employee satisfaction.

<table>
<thead>
<tr>
<th>Table 5.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
</tr>
<tr>
<td>Electricity Shortage</td>
</tr>
<tr>
<td>Dependent Variable: Employees’ satisfaction</td>
</tr>
</tbody>
</table>

The results of the Table 5.3 indicate that if we increase electricity shortage by 1 unit, employee satisfaction will decrease by 0.6981 units. Value of $R^2$ is 0.686 which shows that about more than half the variation in electricity shortage is explained by the model. Also $R^2$ value (0.686) shows that electricity shortage explains 68.6% of the variability in employee satisfaction. Standard error of estimates is considerably lower, about 0.000. Thus the second hypothesis is also accepted. And the results illustrate that electricity shortage has impact on employee productivity.
<table>
<thead>
<tr>
<th>Model</th>
<th>R Square</th>
<th>Unstandardized Coefficients</th>
<th>Sig.</th>
<th>Hypothesis 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Accepted</td>
</tr>
<tr>
<td>(Constant)</td>
<td>.686</td>
<td>17.276</td>
<td>.079</td>
<td>.000</td>
</tr>
<tr>
<td>Electricity Shortage</td>
<td></td>
<td>-6.981</td>
<td>.079</td>
<td>.000</td>
</tr>
</tbody>
</table>

Dependent Variable: Employees’ productivity

5. **Conclusions.** The conclusions from the results of the current study are that electricity shortage has a significant effect on employee performance. It has also significant impact on employee productivity. The more better the workplace environment; the better are the results. Private sector banks are more equipped with alternate electricity sources and provide more comfortable environment to their employees as compared to Public sector banks.

6. **Future research.** Firstly; only banks of Attock city are considered in this research study because being female it was difficult to approach all the banks of different areas. However, the study could be expanded to banks of all big cities or from all over Pakistan.

Secondly; sample are taken from banking sector only in this research study. However; the study could be extended to education, medicine and even industrial sector as well.

Thirdly; during data collection process it was observed much difficulty in taking accurate responses due to unscheduled load shedding. Respondents were not providing responses due to the suffocation and heat of June and July. Thus it was a big issue. Thus whenever data be collected in future research studies time matters a lot.

**REFERENCES**


ATTENTIVE MUSLIM REFLECTIONS ON ORIENTALISTS’ CONCEPTION OF SĪRA

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ABSTRACT: There has been a chronic tendency among the various religious researchers to highlight pros of their own religious founders and neglect the veracity of others. Particularly, this approach and phenomenon has been perpetually observed during the last fourteen years history of Judo-Christian antagonism against Islam and Prophet of Islam. In this background the Sīra of Prophet of Islam has obtained extraordinary attraction and became a spotlight not only in Muslim intellectuals but in Western literary circles as well. However, Muslim scholars have always been vigilant and attentive in responding and evaluating the absurdities propagated by Orientalists. In this paper an exclusive study has been focused in reference to highlight the paramount contribution of Muslim researchers and historiographers in the field of research in Sīra Studies.

Keywords: Seerat Studies, Sīra Studies, Muslims, Orientalists

Introduction: After Muir’s work¹ in the second half of the nineteenth century, Muslim historiographers have paid attention towards orientalists’ approaches about the Sīrah of the Prophet Muhammad (PBUH). Consequently, Sir Syed Ahmad Khan has refuted the questions raised by William Muir on the life of the Holy Prophet in this work. Sir Syed expressed his views in the preface of his book, “When this work appeared, the curiosity it excited among the reading public was only equalled by their impatience to peruse it, but no sooner was it found that simplest and plainest facts connected with Islam and Muhammad (PBUH) had been strained and twisted and distorted in short, subjected to the vigorous process in order to make them the indices or exponents of the author’s prepossessions and prejudices, then the interest created by the announcement of the work fell to zero. As the young Mohammadans who were pursuing their study of the English literature, and were perfectly ignorant of their own theology the perusal of the work under consideration raised in their youthful mind the question, if what Sir William Muir has written is a misrepresentation of plain and simple facts, what are those facts in reality?”²

Sir Syed Ahmad Khan has refuted the questions raised by William Muir on the life of Prophet Muhammad (PBUH) at Mecca. He has briefly discussed about the ‘Historical Geography of Arabia, Various religions of pre-Islamic Arabians, History of Holy Mecca, Pedigree of Muhammad, manners and customs of Pre-Islamic Arabians, Birth and Childhood of Muhammad, the Holy Qur’ān, Muhammadan theological literature, Muhammadan Tradition, Ḥaqq al-Ma‘ṣūr and M‘ir–f, Prophecies respecting Mohammad and whether Islam has been beneficial.’³Syed Ahmad Khan has given new dimension of research to Muslim writers through this work. In this work he has refuted raised the questions by Muir on Prophet Muhammad (PBUH) thoroughly and logically. He has also presented careful and exhaustive analysis of various aspects and pointed out the serious errors of Muir’s judgment and interpretation. In this work he has rejected the tradition upon which Muir and other orientalists have built their stories about the life of the Prophet. His work is a good addition for understanding the approaches of Muir and other orientalists.

Shibli⁴ Nu‘mān⁵ in his famous work “Sirat al-Nabi” which is a well-known source comprehensively describing the biography of Prophet Muhammad (PBUH), critically analyzed the views of European scholars on the life of Prophet Muhammad (PBUH). He emphasizes to examine Western general trend, common
mistakes, sources of information and the reason for the common errors which they commit while delving into
the study of Sīra. In this way, we shall try to judge to what extent malice and prejudice consequently. Shibli-J has
discussed the approaches of orientalists in seventeenth to nineteenth century about S-rah of Prophet Muhammed (PBUH), while giving a list of books written by orientalists on the life of Prophet and divided European scholars into three different groups. Pointing out the faults of orientalists’ methodology in studying Islam, Shibli-J has discussed the common views expressed by orientalists about Prophet Muhammad (PBUH). In short, he has refuted Western objections applying logical and historical arguments and presented comprehensively an appropriate and immaculate image of Prophet’s life.

Syed Amr Al-J another Muslim thinker in his book titled “The Life and Teachings of Muhammad” a work which has been applauded round the globe for his critical rethinking the Western mind in respect of S-rah scholarship. In this book, he has discussed in detail, the approaches of orientalists like Maurice, Stanley, Carlyle, Emerson, Parker, Channing, Draper, Weil, Springer, Noldeke, Caussinde Perceval, William Muir, Dozy and some other western scholars. Shibli-J has also presented the names of French orientalists like Oelsner, Deutsch, Barthelemy St. Hilair, Davenport, Higgins and Carlyle. Most popular subjects of Prophetic biography like ascension (mi’raj), Tradition, Jihad, Prophet’s response towards Jews and Christians Polygamy and some other aspects of S-rah of Prophet’s life have been the central focusing themes. Hence, this volume got a huge recognition in understanding the case of orientalists, especially towards S-rah. However, one must keep one thing in mind that the author (Syed Amr Al-J) has taken up a view which differ the majority of ummah on the same issues.

Another eminent Muslim scholar, Q-Zz-J Muammad Salmn Man Pur-J has written a valuable book on the biography of Prophet titled “Muhammad, Mercy for the World” focusing different topics like Tafsir, History and S-rah of Prophet. In his book, he has critically evaluated the negative approach of the Western scholars towards Sīra while refuting the queries made by orientalists on Prophet’s Life, applying logical reasoning and statistics related to Polygamy. Man Pur-J has also presented the concept and status of polygamy in Hinduism, and at the end of this discussion gives a detailed chart about prophet wives that elaborates the purpose behind polygamous aspect of Prophet’s life. In the second part of the book, he has presented a brief introduction of Holy wars analyzing the aspects statistically, rebuffing thus, their objectives. Man Pur-J has given a comparison chart of Holy war with other World Wars. This volume has been considered as an excellent work in understanding the case of orientalists’ objections on the subject.

In the continuation of this chain of Muslim historiographers, Sayyed Sulaimn Nadv-J is one the eminent scholars who presented eight lectures on Sīra in November 1992 at Madr (India) on the invitation of “Muslim Educational Association of Southern India” to counter the efforts of Christian scholars in order to avert Muslim social circles to take up eccentric ideology or to get mixed up with their creeds. These lectures have widely been appreciated among all the Muslim communities throughout the world. The focus of these lectures remained the life of Prophet Muhammad while taking an evaluation of Western scholars’ methodology and historical fallacies in addition. In the third lecture he discussed the approach of German orientalist Dr. Springer history and evaluated the views of some other orientalists like Sir William Muir, Goldziher, attitude of Bosworth Smith and John Davenport about the biography of the Prophet of Islam.

Syed Abul Al-Maud-ld-J’s work on Islam has not been obscured in both Muslim and non-Muslim circles, on biography of Prophet, “S-rah-e-Sarwar-e- 4am” is a work which has been attributed to him where he flatly refutes all allegations propagated by western scholars on the authenticity of revelation of Qur’an, the status of Sunnah of Prophet. In critically analyses the negative approach of orientalists about three different Qa’-a (Stories) of Qur’an like journey made by M-ls-gh, Pharaoh’s plans of killing Prophet M-ls-gh and the story of the men of cave. He has also drawn authentic maps for illustration. Hence, the book is of extreme importance in understanding the true picture of Prophet’s life. Dr. M-ulh a famous researcher of Sīra and Islamic sciences, exceptionally, writes meticulously on original themes in relevance with biography of Prophet. A volume titled “The battle field of the Prophet Muhammad” is the most important work which presents various aspects of Prophetic life and refutes misleading questions of orientalists in a logical way. Firstly he presented the system of Islamic State of Madina in the period of Holy Prophet Muhammad (PBUH), while highlighting the role of prophet in establishing peace among pluralist society. Whereas, in the second part of the book he has given a detail about Holy wars separately one by one and their status and justification, applying maps for better understanding about the wars. His book “Muammad Rasull-gh” is also a useful addition in the study of S-rah. It is a matter of fact, late Dr. M-ulh received an esteem appreciation by his contemporaries like Dr. M-ls- A Ghz-J who declared him ‘Imm of Sīra’ in the modern era and Mujaddid of ‘Ul-im-e-S-rah’. Justice P-J Karam Shah al-Azhari work titled “Zia al-Nab” is a very famous peace of work among Muslim literary circles. An important feature of this book is that justice Karam Shah has
specifically focused the case of orientalists in volume VI and VII. In volume VI, he has introduced the orientalists' historical background of this movement, its objectives and orientalist methodology, and their baseless approach towards the Qur'an by rebuting the objections raised in this regard.

He has also refuted the questions raised on the adth and Sunnah literature in a very sophisticated way. At the same time, all other objections related to the Prophet-hood, polygamy, Holy wars and epilepsy have been counter-argued very logically. In fact the contribution of Justice Karam Shah is of immense importance that helps in understanding the place of Western scholarship on Islam and Sira. He has presented a critical evaluation of the works of Sir William Muir, Tor Andre, Watt, and Arthur Jeffery etc. Zafar 'Ali Qurash-j is a contemporary Muslim writer of Sira whose work under the title, “Prophet Muhammad and his western critics” is well known. This book contains thirteen chapters in two volumes which refutes most of the objections raised by William Montgomery Watt. The first and second chapter focuses on the objections regarding the battle of Mubah, and the third chapter discusses Mubah, the “Northern Policy” of Prophet Muhammad. In the subsequent chapter, his tribal policy has been discussed, while doing so, he writes on his “Hypothesis of the Prophet Muhammad being “moved” by material consideration. Quraishi discusses alleged general lines of Prophet’s “Tribal Policies”, “Hijrah to Abyssinia”, “rise of opposition of the Prophet and persecution of Muslims”; Prophet’s preaching mission; spread of Islam in Madina, the beginning of Prophet’s wars with Quraysh and other enemies. The author has countered critically the views of W. Montgomery Watt on the life of Prophet Muhammad (PBUH) highlighting the main reasons of their biasness and prejudice. He comments:

“One of the main reasons for the wild attacks of western writers on the person on the Prophet Muhammad has been for many a century their stupendous ignorance about Islam and its prophet. Although the middle ages down to the eighteenth century they had most fantastic, puerile and absurd notion about the Prophet. Tales were spin round his person whose ingenuity was surpassed only by their absurdity. The reality and gullibility of the westerners in this respect were the most astounding and staggering. And all connections and fabrication about Islam were made by Christian priests in the name of religion and greater glory of Christendom.”

In short we can say that Zafar ‘Ali-j Qurash-j has comprehensively examined and analyzed the case of orientalists and their criticism on Sira. Dr. Zia al-Umr-j is another contemporary Muslim historiographer who has compiled many books but one of his important books is “Madinan Society at the time of the Prophet” that has been beautifully translated in to Urdu language by Dr. ‘A r i N-as-m F-q-s-j. Dr. Zia al-Umr-j expressed his views on orientalists’ methodology towards history of Islam. He has aptly analyzed the work of orientalists and concluded that they have always adopted materialistic approach in their research work. Muhammad Asad (formerly Leopold Weiss, d. 1992) was a famous Muslim writer, who wrote many books as “Islam at the crossroads” “My discovery of Islam” and “The road to Mecca”. In these books he has critically analyzed the approach of western scholars towards Islam and Sira. He has presented his views in a succinct and logical manner. He has aptly countered anti-Islam propaganda. It has been witnessed that his book “Islam at the Crossroads” is a valuable work in understanding the case of orientalism. This book has seven chapters. Chapter one portrays the real theme of Islam and also the importance of religion in social structure. Here, the ethical values have also been discussed. The second chapter focuses on the basic theme of western civilization, and comments on the modern phase of western civilization. The third chapter explains the basic causes behind the orientalists’ biasness. The western attitude is not one of indifferent dislike as in the case of deep-rooted and almost fanatical aversion, not only intellectual, but bears an intensely emotional tint. Chapter four discusses the approach of Muslims towards western education. Muhammad Asad has also pointed out in chapter five that “the imitation – individually and socially of the western mode of life by Muslims is undoubtedly the greatest danger for the existence or rather the revival of Islamic civilization.” Chapter six and seven deal with Hadith and Sunnah. In these last two chapters he has flatly refuted all the objections raised by the western scholars about Sunnah of the Holy Prophet. Maryam Jam-jah is well known contemporary Muslim scholar. She has done her work on the theme of orientalists’ works. In this regard her book “Islam and Orientalism” is a very valuable work in understanding the basic concepts of Orientalism. Her book covers different dimensions of Orientalism like, “Islamic history through the lens of Orientalism.” “The Christian view” “The Jewish view,” “The secular view,” “The humanist view,” and “The conspiracy of orientalists.” In these discussions, Maryam Jam-jah has critically evaluated the approach of Dr. Philip K. Hitti, Dr Kenneth Cragg, S.D. Goitein, Dr Wilfred Cantwell Smith, Nadav Safran and Freeland Abbott. She has also presented the criteria by which the orientalists judge our faith, that are:

i. The uncritical acceptance of Charles Darwin’s theory of evolution that mankind emerged from very lowly animal origins, that when life first appeared on earth, it was of the simplest and lowliest which
over the ages evolved into more and more complex and highly developed creatures at the apex of which stands the human race.

ii. That Darwin’s theory of biology is equally valid when applied to human society which has emerged from the most primitive level such as that of the Australian and South African Bushman into cover more and more complex and highly developed cultures at the apex of which stand modern western civilization.

iii. Therefore to defy modern western culture is tantamount to defying the law of evaluation to rebel against progress, against the very law of nature itself the progress from the low, primitive culture to ever more and more highly advanced civilization is not only desirable but an inevitable and immutable law of nature. Since every change is an improvement along the road to progress, the newest is always the best and any attempt to defined order or previously established standards means retrogression to a more primitive and constricted existence.

iv. Modern scientific knowledge has rendered religions based upon divine revelation and transcendental values obsolete. A society whose members regulate all aspects of their lives according to a divinely revealed law equally valid for all times and all places inevitably results in cultural stagnation and backwardness for once the truth is known, it cannot be changed and without changed, no “progress” is possible.38

The work of Maryam Jam-lalah, “Islam and Orientalism,” is an authentic source in this context. Khurram Mur-yl-d, a prominent preacher and scholar of Islam, who also observed the Western methods of studying the Islam and the life of Prophet. He contributed valuable points in his book “West and Islamic world”, where he critically evaluated their approaches. In the first part of his work, he has pointed out the basic source of confrontation between Islam and the West.39 He also discussed the negative approach of the West towards blasphemy laws.40 Moreover, he has discussed new crusade and the role of the religious institutions. He identified the real face of terrorism.41 In the third part, the case of Bosnia has been discussed and the related western response in this context.42 In the third and forth parts, his has focused on the relations between Pakistan and the Muslims and the Christians43 and in the last part, discussed the contemporary challenges faced by the Muslim community. He has also tried to point out the responsibilities of Muslims in these circumstances. At the end he logically discussed the future of the world and the status of Islam. The approach of Mur-yl-d is so beneficial in understanding the objectives laid down by Orientalists regarding Islam and Muslims.

Jabal Muhammad Buaben is presently a lecturer in Islamic Studies, University of Birmingham (UK). His famous work “Image of the Prophet Muhammad in the West: A Study of Muir, Margoliouth and Watt” in which he has critically analyzed the three most influential English writers of our times as are William Muir, David S. Margoliouth and William Montgomery Watt. This work is consisting of two parts and six chapters, focuses initially on “The Medieval European View of Muhammad”, whose underlying hypothesis is that the negative approach of Orientalists in modern era deriving their roots from the medieval war propaganda.44 In the second chapter, the work of Sir William Muir has been examined very critically with special emphasis on his biographical work on Muhammad (PBUH). Muir’s methodology and some selected themes like Pre-Muhammadan Makkah – birth and childhood of Muhammad, from youth to Prophethood, Prophethood in Makkah and Muhammad in Madinah have been examined very critically. Muhammad Jabal Buaben has presented his views after long discussion, “Muir had the original source before him, much as a blacksmith with a peace of iron in front of him, however, his defective ness is not that he could not read the Arabic but in insisting that he reads it in a particular way.”55

Chapter three focuses the work done by David Samuel Margoliouth where Jabal has also evaluated the book of Margoliouth, “Muhammad and the rise of Islam”. Some selected themes of this book have been examined like “the pathological theory”. Revelation of the Holy Qur’ān”, “Prophet-hood” Superstitions and Idolatry, “The Stanic Verses,” “Borrowing,” “Morality”, “Sexuality/Sensuality”, “Violence”, “Bribery,” “The Madinan charter” “the Jewish Questions”, “The Christians” The uudaibiyah Treaty, Muhammad Letters, and “Muhammad Personality”. He has presented conclusion about Marogoliouth’s methodology, whose style is fundamentally different from that of Muir probably because Muir was an imperial officer, the quality which allowed him to be more blunt. Thus, it appears that he has failed to function critically in a disciplined way. This is not to question his use of sources but rather his interpretation.56 In the fourth chapter, a survey of twentieth century literature has been presented thoroughly. In chapter five, the work of W. Montgomery Watt has been examined.57 Jabal Muhammad Buaben has critically examined all themes presented by Watt in these books. In the last chapter he has presented the conclusion of his work. In modern era Jabal Muhammad Buaben’s work is unique and important in understanding the image of the Prophet Muhammad in the West.

Professor Muhammad Mohar ‘Al-l is a scholar of S-lrah and ‘ad-th who served as lecturer in Islamic History at the Islamic Universities of Madinah and Riyādh for long time. He has written many books and his work
“Qur’ān and the orientalists” and “S-rat-un-Nabā” and the orientalists” have been appreciated through width and breadth. The book “S-rat-un-Nabā” and the orientalists” has two volumes and seven different sections. In this book the work of William Muir and D.S. Margoliouth and W. Montgomery watt were examined very critically. In first section the sources and the background of S-rah have been discussed. In section II, the family background, birth and childhood, the orientalists on the Prophet & family status, name and childhood, adolescence and youth, the allegation of ambitions, the theme of Judeo – Christian influence and the alleged contemporary errors in the Qur’ān are discussed. In section III, various topics have been discussed, “On the Eve of the call to Prophethood,” “The orientalists and the ṭan-lfs (the Jeffery – Bell theory)” and in this context Watt views. In section IV, “Divine communication (WAHY) and inception of this mission,” “Watt and the orientalists (Watt views)”, have been critically examined. In section V, “The early phase of the mission”, Margoliouth “Theory of Islam as a secret society”, “The Bell – Watt Theory about the context of early revelations”, and “The early phase of the mission and Watt’s socioeconomic interpretation” have been contemplated upon. In section VI, “The Makkah opposition: nature, causes, and the immediate allegation”, “The migration to Abyssinia”, “The spurious story of the “Satanic Verses” the climax of opposition and calality”, “Watt Theory about the causes of opposition”, “The unbelievers, objections vis-à-vis the orientalists” have been brought under discussion. In section VII, the late Makkah Phase and migration to Madina, and “The orientalists on the migration to Madina” have been discussed critically. In volume II, the writer has discussed Madinan period. It is beyond doubt that this book is a very good addition in Sīra literature.

Dr Muhammad Sana Ullah Nadvi, Professor of Arabic in Muslim University ‘Aligarh Garh, has translated and compiled a book under the title “Arabī Islāmī-ī Uli-ī-m aur Mustashriq-īn” which gives an academic touch to the subject of Islam in addition to Prophetic status towards Orientalism. It contains fifteen topics like, Qur’ān, Hadith, Sīra of Prophet Muhammad (PBUH), Theology, Law, Philosophy, History and Literature etc. The third article of this book is comprised of S-rah of the Prophet Muhammad (PBUH). Basically this article written by Dr. Imtīd al-Dīnah Khalīlī is in Arabic language and Dr. Sana Ullah Nadvi has translated into Urdu language. In this article, the case of W. Montgomery Watt has especially been critically examined. The approach of some other orientalists has also been refuted in this article. Orientalists’ methodology has been questioned and it has been observed that they have used materialistic approach for getting desired results. Without having proper knowledge of Islamic traditions, they have come up with limited ideas. They have a vague concept of Divine communication (waḥy), and status of Prophethood. They always rely on human experiences. For understanding of Orientalism, this book is of immense value both for students and teachers. All types of intellectual approaches have been presented in this book and generally this book a good example of critical analysis.

Dr. Ya‘qūb Murzūqī has written a book under the title “Iftīr-ī ʿul-Mustashriq-īn al-Īslām wal Raddu ʿalaiḥ-ī”. In this book Dr. Ya‘qūb Murzūqī has refuted the misconceptions created by orientalists about the Qur’ān, and the S-rah of the Prophet Muhammad (PBUH). In first chapter of this book, he has given the basic theme of Orientalism, its history and its evolution. He has also explained the philosophy of Orientalism. In the second part he has refuted the negative approaches of the western scholars towards the Sīra of the Prophet Muhammad (PBUH), Islamic law, History of Islam and its political, social, economic system of Islam. He has also discussed the research methodology adopted by orientalists in their studies. Actually Dr. Ya‘qūb Murzūqī has evaluated orientalists’ works very critically. Dr. Imtīd al-Dīnah Khalīlī has written a book under the title “Al-Mustashriq-īn wal- S-rat un Nabawiyya”. In this book, he has discussed approaches of the orientalists towards the S-rah of the Prophet Muhammad (PBUH) and methodologies adopted by them have been refuted. Basically Dr. Imtīd al-Dīnah Khalīlī has critically analysed the work done by Watt, Margoliouth, William Muir, Velhozen and some other orientalists. This book is a very good addition in literature on Orientalism.

Dr. S. Muqaddas Nasiruddīn Muhammad Sana Ullah Nadvi is another eminent researcher and historian. In his book “Muhammad life and Times” he gives direct references from the holy Qur’ān and the Sunnah of the Prophet Muhammad (PBUH). He has criticized the orientalists’ approaches towards the Prophet’s life on the basis of solid arguments. He has briefly discussed the case of A.J. Wensinck, William Muir, Goldziher, Prof. J. Harovitz, Bosworth Smith and Tor Andrae in the first chapter. In the next chapter, he has critically discussed the misleading remarks of Watt about the conquest of Khayber. Here he has discussed questions and objections made in a highly scholarly manner. This book has been appreciated by erudite. Dr. Muqaddas Nasiruddīn Muhammad Sana Ullah Nadvi in his book “S-rat-e-Rasīl” has described all major events of Prophet’s life and has refuted the questions raised by western scholars on Prophet’s life especially on Holy wars, and wives of the Prophet’s Muhammad (PBUH). He has also defined the basic objectives of marriages in Prophet’s life, for example educational, religious, social and political etc.
The work of some other eminent scholars has been widely appreciated, for example the scholarly works of Dr. Muhammad Fatimah al-Ziyady. He has written a book “Al-Istahshraq Ahl-fuhul-Wa Waslahuhul-Mu” by Dr. Muhammad al-Sibai, “Al-Mustashriqin al-wal Islami”, a critical work translated by Sayyed Sulaiman Nadvi into Urdu from Arabic. In these critical works many dimensions of Orientalism have been discussed. They have covered historical background, objectives, resources, research methodology, efforts and contribution of Orientalists, and some other aspects of this movement as well. Dr. Mustafa has countered the allegations or misconception of Orientalists eruditely. Naseer Ahmad, a member of the first Constituent Assembly of Pakistan, compiled a book under title “Islam and its Holy Prophet as judged by the non-Muslims world”. This book has two volumes and forty chapters. The writer has critically and analytically examined the approaches adopted by the western scholars about the Prophet Muhammad (PBUH). An important thing is that he has quoted so many statements of western scholars about the personality of the Prophet Muhammad (PBUH) and his status.

Similarly, Dr. Sayyed ‘Abdul Qadir Gilani has done his Ph.D research work on “Islam, Prophet of Islam and the approaches of Western Orientalists”. His work comprises six chapters. Fourth and fifth chapters focus on orientalist endeavours and objections on Islam, Qur’an, and the life of the Prophet Muhammad (PBUH). He has examined the theory and history of Orientalism very critically. This work has been completed in a scholarly manner and gives a thorough analysis of various aspects of Orientalism. ‘Abdulrahman al-Amri has written a book on Srah of Prophet Muhammad and orientalism. The title of his book is “Al-Istahshraqah al-Nabawiyyah”, that critically analyses the case of M. Montgomery Watt, Brakman and Velhozen. He has pointed out the drawbacks of Orientalists in a logical manner. Similarly, Abdul Muttaqir Muhammed Al-Jabri is another eminent scholar who has done his research on misconception of Orientalists towards the Sira of the Prophet Muhammad (PBUH). He has also pointed out the basic causes of their negative approaches. He has critically judged and evaluated methodology adopted by orientalists in the study of Sira. He has also refuted all the objections made by orientalists on the Prophet’s life at Makkah and Medina. This book is of greater significance due to its critical evaluation of research methodology of Orientalists.

Dr. Ahmad Ghorab, a graduate of Cairo University and a Ph.D in Islamic philosophy from Oxford University, has written so many books on various topics but his work, “Subverting Islam: The Role of Orientalists Centers” is a wonderful attempt towards understanding current Euro – American crusade against Islam; it also elaborates the purpose behind the formation of an anti-Muslim network of institutions and scholars marching under the banner of Islamic studies. Dr. Muhammad Arshad, another contemporary Muslim scholar, has critically analysed the work done by Bernard Lewis, S.P Huntington, Fred Holliday and John L. Esposito in a different style. This book is very helpful in understanding the theory of fundamentalism, clash of civilizations and some other misconceptions created by Western scholars. He has challenged the concepts of these Orientalists with authority.

D. al-Mu’ammal Shibli Academy A’lam Garh has compiled different articles on “Islam and Orientalists”. The work has made available the most important literature for understanding the nature of Orientalist works on Islam and the Prophet Muhammad (PBUH). “Islam and Orientalists” compiled by D. al-Mu’ammal Shibli Academy has seven volumes. First volume covers proceedings of seminar, held on 21 to 23 February 1986. Islam aur Mustashriqin Vol. II focuses on different articles related to orientalists’ approaches about Islam. Islam aur Mustashriqin Vol. III includes six research papers. These papers are related to “Russian Orientalism” presented by Muhammad Asad, “Islam and Mustashriqin” by Prof. Syed zb-bul Nadv, “Study of Seerah and Mustahriqeen” by Dr. Nisar Ahmad, “Sarazat Ibr-ajm al-Mu’ammal Shibli” presented by Maulana ‘Abdul Rehman, “Arz-al-Qur’an” by Maulvi ‘Umar ‘Abd-ajq Nadvi and “Sir Syed Ahmad Khan aur Mustashriqin” presented by Maulvi ‘Ubaid Ullah Kotaj Nadvi. These are very important articles in the context of Islam and Orientalism. Islam and Mustashriqin volume IV focuses on different topics like, status of compilation of Qur’an, Srah of Prophet Muhammad (PBUH), Islamic Law, School of thought, Religion and Science, Islamic culture, minorities rights, etc. These articles are worth of greater scholarly value.

Islam aur Mustashriqin Vol V contains “The interests of orientalists in Islamic literature and arts”. The basic causes of their interests and efforts in Islamic literature and arts have been discussed very briefly. The objections alleged by orientalists on Islam, the Prophet Muhammad (PBUH) and Islamic History have been refuted very logically. Islam and Mustashriqin Vol VI comprises seven different research articles like, “Qur’an and Mustashriqin” presented by Dr. Al-Taher-m, “Schacht aurindividual Nabi” by Dr. Muhammad Mu’tamir Al-A’zam, “Shakat and Fiqh” by Dr. Muhammad Anas Zarqa, “Seerah of Prophet Muhammad and critical analysis of wato approaches” by Dr. ‘Imad-ud-Din Khalil, “Social Structure of Islam in the perspective of orientalists approaches” by Dr. Abdul Wahab and “The Islamic culture of Spain in the
perspective of Orientalists approaches” presented by Dr. Mufaf Al-Shk a. These articles are a valuable contribution which could help understand Orientalism in its context of Islam. “Islam aur Mustashriq-n”, Vol. VII, contains different research articles. These articles have presented the critical analysis on different approaches of orientalists towards Islam, Qur’ān, Divine commandment, prophethood and Islamic literature and arts.

Zafar Isq and John L. Esposito have jointly compiled a book under title “Muslims and the West: Encounter and Dialogue” which contains twelve research papers presented by various eminent scholars. First paper “Muslim and the West in history” presented by Ismail Ibrāhīm al-Nawb, second paper “Beyond pride and prejudice: western perceptions of Islam and the Muslims” by Muṣṣa‘īn Mu‘allib, “Civilizational self-perception and Pluralistic coexistence: A examination of the image of the ‘other’” by Aμmad Davutoglu, “Naming the other: Names for Muslims and Europeans in European and Muslim languages” by Muhammad Khālid Mas‘d, “Christian Missionary views of Islam in the 19th – 20th centuries” by Jane I. Smith, “The Jewish and Christian encounter with modernity relevance for Muslims” by Mustanīr, “Muslim perception of the other” by Riaz Hassan, “Modernity, Islam and west” by Tamara Sonn, “Islam and the Emerging world order” by Muzzaffar Iqbāl, “Islamism: A Designer Ideology for Resistance Change and Empower” by Yuonne Yazbeck Haddad, and the last paper “Status and Islamization” has been presented by Sayyed Vali Reza Nīr. The compilation of these articles is of immense value in understanding the basic causes of confrontation between Islam and the West.

Conclusion: This survey of Muslim historiographers throws the light on twofold facts, first the vigilance Muslim eye on the literature of Western academicians extended in view of deteriorating the sacred face of the biography of the Prophet of Islam, while on the other hand Muslim historiographers specially, Arab and sub-continental scholars have dedicatedly delved themselves into the matter seriously and they evaluated Orientalists’ work regarding Sira of Prophet (PBUH) in such a meticulous way that all the absurdities have been vigorously detected and eradicated.

Notes:

1 Muir, William, Life of Mohamet (London: Smith, Elder And co, 1861).
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5 Ibid, p. 85.
6 Ibid, p. 86.
13 Ibid, PP. 43-44.
14 Ibid, P. 47.
16 Ibid, PP. 478-481.
18 Ibid, P. 483.
20 Dr. amīd Ullāh, The Battle field of the Prophet Muhammad (Karachi: udhaifa Publications, 1979) P.13
22 Ibid, P. 129.
23 Ibid, P. 233.
Ibid, P. 321.


Ibid., P. 239.

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Ibid., P. 58.

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Ibid., PP.15-38.

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BEHAVIOR ANALYSIS OF USERS ON FACEBOOK

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ABSTRACT. Behavior in social media is defined as the way users interact with each other. These interactions include: content creation and posting by individuals and sharing it with friends, re-sharing content shared by others, submit comments or just click on like on what is posted by friends.
The analysis of this behavior may allow us to predict the next actions that can make users and their influence on others.
The aim of our work is to analyze the behavior of users on Facebook. Analyzing the activities of these users and emphasizing the participation and the sharing of information are two important characteristics that will enable us to achieve our analysis.
In this paper we present a study conducted on a sample of 60 individuals of different age and sex. We used a survey that includes different activities which allowed us to obtain highly relevant information that tells us the nature of the activities of Internet users on Facebook by gender and age group.
Keywords: Behavioral Analysis, Social Media, Users Activities.

1. Introduction. Facebook created a parallel world where people are forced to spend time. Some of them use it just to update their profile, others to add the most recent photos of them and their families. Each individual may find in Facebook a useful tool for himself [1][2].

On the other hand, with the growing phenomenon of Facebook there are advantages but also several drawbacks. We must ensure that the content we put on it is decent, the information not too personal, and if that is not the case we must be aware that Facebook owns all the content that we put on our pages. In summary Facebook enables its users to talk, play, read, listen to music, study and everything behind a screen and through the net, that’s why we should study and analyze the activities of the users and draw the right insights. Social network analysis [3]

[4] is applied to study human relationships and connections by providing systematic methods for an efficient evaluation of social media efforts based on scientific evidence. It is also used for purposes other than scientific research, especially by consultant in professional relationships or for commercial purposes. Research topics in network analysis are multiple, and vary from family ties, to labor relations, to companionship, etc...

In this paper we want to analyze the user behavior on Facebook, in order to identify what brings together different users from different environments. It is important here to note that the participation and sharing of information from different users are two important features in this analysis.
The following is a non exhaustive list of activities of users on Facebook [5][6):

- Submit and share photos and videos.
- Participate in events.
- Play on Facebook.
- Access to applications on Facebook.
- Browse Friends list messages, invitations.
- Join groups.
- Exchange messages (instant discussing).
- Participate in groups, forums....
- Browse friends' profiles.
- Comment on interests of friends (on their videos, photos ....).
- Make universal search (profile, forums, another person ...).
- Exchange information with your friends.
- Expand your personal network with new people.
- Submit a status.
- Make comments.
- Click on like

2. Methodology and sampling. Random sampling is the most preferred mode of investigation [7]. Here the sample is a subset taken from a universe from which we want to study certain characteristics. To be valid, a sample must be representative of the population studied. This requirement arises firstly, the problem of the size of the sample, and on the other hand the problem of choosing individuals.

3. Internet Surveys (Online Surveys). In recent years, online surveys [8] have taken an ever more important place on the World Wide Web essentially because of these advantages:
- The questionnaire is available from a large number of respondents simultaneously around the world at any time of the day and night.
- Treatment of the results can be achieved in almost real time.

This is why we have chosen this method to accomplish our survey and in the following sub-paragraphs we will describe the survey content and identity.

3.1. Survey Content. Short questions were proposed, they are easily understood by all users. We used closed single choice questions (QCS), as they are simple and rapidly administrated and treated.

Each question is numbered (Q1, Q2, etc...) in order to facilitate the understanding of the responses during the processing of the questionnaire, Figure 1.

The questionnaire consists of 14 multiple-choice questions. The Survey respondents will give basic information regarding to their Facebook activities [9], they will also specify their sex and age. Based on the literature and theories the following questionnaire, Figure 1. was proposed to guide users respond correctly:
Figure 1. Online Questionnaire
3.2. **Survey Identity.** Our survey was conducted on a random sample of 60 users gathered in the Cyberspace of Setif (Setif is a city situated in the east of Algeria). This Cyberspace is located in the down town on a three-storey building. It is equipped with high quality equipment and it has a high speed internet connection. It has a capacity of 200 seats and uses Wi-Fi technology. It contains spaces reserved to children, supervised by fire walls, and others for professionals as well as for blind people whose computers are equipped with speech synthesis software. It also has a library with a direct link to the city of Paris and other cities in USA. It is a unique achievement in the region and it gives the users the opportunity to surf over the world in a very comfortable way.

4. **Findings.**
4.1. **Graphical representations by gender and age.**
4.1.2 **Graphical representation by gender.**

![Figure 2. Graphical representation by gender](image)

**Findings:**
After analyzing the data collected in the cyberspace and regarding to Figure 2. we noticed the following:
- 56.67% of the Facebook users were women (34 women).
- 43.33% were men (26 men).

4.1.3 **Graphical representation by age.**

![Figure 3. Graphical representation by age](image)
Findings: Regarding Figure 3, we noticed the following:
- 63.33% were young adults.
- 26.67% were mature adults.
- While 10.00% were teenagers.

4.2. Graphical representations for the different activities on Facebook.
4.2.1 Graphical representation for sharing videos and photos.

Findings: Regarding Figure 4, we noticed the following:
- 100% of teenagers (6/6 teenager) share videos and photos.
- 92.10% of Young adults (35/38) share videos and photos.
- 68.75% of mature adults (11/16) share videos and photos.

4.2.2 Graphical representation for playing.
Findings: Regarding Figure 5, we noticed the following:

- 100% of youth (6/6) play on Facebook.
- 52.63% of young adults (20/38) play on Facebook.
- 25% of mature Adults (4/16) play on Facebook.

4.2.3 Graphical representation for posting comments on Facebook.

![Figure 6. Posting comments on Facebook](image)

Findings: Regarding Figure 6, we noticed the following:

- 83.33% of youth (5/6) make comments on Facebook.
- 65.78% of young adults (25/38) make comments on Facebook.
- 18.75% of mature Adults (3/16) make comments on Facebook.

4.2.4 Graphical representation for access to applications from Facebook.

![Figure 7. Access to applications from Facebook](image)
Findings: Regarding Figure 7, we noticed the following:
- 83.33% of youth (5/6) make comments on Facebook.
- 71.05% of young adults (27/38) make comments on Facebook.
- 31.25% of mature Adults (5/16) make comments on Facebook.

4.2.5 Graphical representation for browsing for information from Facebook.

Findings: Regarding Figure 8, we noticed the following:
- 83.33% of youth (5/6) browse daily on Facebook.
- 71.05% of young adults (27/38) browse daily on Facebook.
- 31.25% of mature Adults (5/16) browse daily on Facebook.

4.2.6 Graphical representation for attending events.
**Findings:** Regarding Figure 9, we noticed the following:

- The majority of users responded by no to the question do they attend events on Facebook?

Finally we can state the following based on the activities above:
Teenagers and young adults take the first place with respect to the activities on Facebook (share, play, comment…) because they spend a lot of time on the net, unlike adults who have other interests.

5. **Conclusion.** The social network Facebook is a new way of communication free and easy to use. It seems that users from age range (13 years to 34 years old) which corresponds to teenagers and young adults are more active compared to mature users. Teenagers and young adults have more activities on Facebook (games, sharing photos videos consultation etc..) which gives them the opportunity to be more open to the world and meet a multitude of points of view; while mature adults are more interested by the professional side (job ad, research and contact with customers, advertisement for a business … etc.).

**REFERENCES**

AN ADVANCED AVR-PSS BASED H∞ OPTIMIZATION IMPLEMENTED WITH GUI / MATLAB

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ABSTRACT. This article presents a study of the advanced frequency control techniques based on loop-shaping H∞ optimization method applied on automatic excitation control of powerful synchronous generators (AVR and PSS), to improve transient stability and its robustness of a single machine-infinite bus system (SMIB). The computer simulation results (static and dynamic stability), with test of robustness against machine parameters uncertainty (electric and mechanic), have proved that good dynamic performances, showing a stable system responses almost insensitive to large parameters variations, and more robustness using the robust H-infinity controller, in comparison with the classical Russian PID power system stabilizer. The present study was performed using our GUI realized under MATLAB in this work.

Keywords: powerful synchronous generators and control Excitation, H∞ optimization, AVR and PSS, stability and robustness, GUI-Matlab.

1. Introduction. Power system stability continues to be the subject of great interest for utility engineers and consumers alike and remains one of the most challenging problems facing the power community. Power system oscillations are damped by the introduction of a supplementary signal to the excitation system of a power system. This is done through a regulator called power system stabilizer. Classical PSS rely on mathematical models that evolve quasi-continuously as load conditions vary. This inadequacy is somewhat countered by the use of fuzzy logic in modeling of the power system. Fuzzy logic power system stabilizer is a technique of incorporating expert knowledge to design controller [1].

The Power System Stabilizer (PSS) is a device that improves the damping of generator electromechanical oscillations. Stabilizers have been employed on large generators for several decades; permitting utilities to improve stability constrained operating limits. The input signal of conventional PSS is filtered to provide phase lead at the electromechanical frequencies of interest (ie, 0.1 Hz to 5.0 Hz). The phase lead requirement is site-specific, and is required to compensate for phase lag introduced by the closed-loop voltage regulator.

The PSS conventional and the PSS control based on root locus and eigenvalue assignment design techniques have been widely used in power systems. Such PSS ensure optimal performance only at a nominal operating point and do not guarantee good performance over the entire range of the system operating conditions due to exogenous disturbances such as changes of load and fluctuations of the mechanical power. In practical power system networks, a priori information on these external disturbances is always in the form of a certain frequency band in which their energy is concentrated. Remarkable efforts have been devoted to design appropriate PSS with improved performance and robustness. These have led to a variety of design methods using optimal control [2] and adaptive control [3]. The shortcoming of these model-based control strategies is that uncertainties cannot be considered explicitly in the design stage. More recently, robust control theory has been introduced into PSS design which allows control system designers to deal more effectively with model uncertainties [4, 5, 6 and 7]. H-based control approach is particularly appropriate for plants with unstructured uncertainty.

In this paper, a PSS based on H-robust control techniques is introduced and results are displayed in time response approach for studying stability of electric power system under different conditions.
Simulation results shown the evaluation of the proposed linear control methods based on this advanced frequency techniques applied in the automatic excitation regulator of powerful synchronous generators: the robust $H_{\infty}$ linear stabilizer and conventional PID control schemes against system variation in the SMIB power system, with a test of robustness against parametric uncertainties of the synchronous machines (electric and mechanic), and make a comparative study between these two control techniques for AVR – PSS systems.

2. Dynamic Power System Model

2.1. Power System description. In this paper the dynamic model of an IEEE standard of power system, namely, a single machine connected to an infinite bus system (SMIB) was considered [8]. It consists of a single synchronous generator (turbo-Alternator) connected through a parallel transmission line to a very large network approximated by an infinite bus as shown in figure 1.

![Figure 1. Standard system IEEE type SMIB with excitation controller](image1)

2.2. The permeances networks modeling (Park-Gariov) of powerful synchronous generators. In this paper we based on the permeances networks modeling of powerful synchronous generators for eliminating simplifying hypotheses and testing the control algorithm. The PSG model is defined by equations and Figure 2 and 3 below [8]:

![Figure 2. PARK Transformation of the synchronous machine](image2)

![Figure 3. Equivalent diagrams simplifies of the synchronous machine with damping circuits (PARK-GARIOV model)](image3)
A. Currents equations:

\[ I_{sl} = \left( \frac{U_s - E_s'}{X_{sl}} \right) \]
\[ I_{qe} = \left( \frac{U_q - E_q'}{X_{qe}} \right) \]
\[ I_{td} = \left( \frac{\Phi_{td} - \Phi_{ad}}{X_{td}} \right) \]
\[ I_{qg} = \left( \frac{\Phi_{qg} - \Phi_{aq}}{X_{qg}} \right) \]
\[ E_q' = \frac{1}{X_{sd}} \frac{X_{sl}}{X_{ad}} E_s + \frac{1}{X_{sd}} \frac{X_{qe}}{X_{ad}} E_{qg} \]
\[ E_s' = \frac{1}{X_{sd}} \frac{X_{sl}}{X_{ad}} E_s + \frac{1}{X_{sd}} \frac{X_{qe}}{X_{ad}} E_{qg} \]

B. Flow equations:

\[ \Phi_{ad} = E_s' (X_s - X_l) \]
\[ \Phi_{ae} = E_q' (X_q - X_l) \]
\[ \Phi_{ie} = \omega_0 \int \left( -R_s I_{is} + \Phi_{is} \right) dt \]
\[ \Phi_{ie} = \omega_0 \int \left( -R_s I_{is} \right) dt \]
\[ \Phi_{ie} = \omega_0 \int \left( -R_q I_{iq} + \Phi_{iq} \right) dt \]
\[ \Phi_{ie} = \omega_0 \int \left( -R_q I_{iq} \right) dt \]

C. Mechanical equations:

\[ d\delta = (\omega - \omega_0) dt \quad s = \frac{\omega - \omega_0}{\omega_0} \]
\[ M_s M_q M_r = 0 \quad \text{avec } M_j \text{ moment d'inertie} \]
\[ j \frac{d\alpha}{dt} + P_r \frac{\alpha}{\omega_0} = M_r \]

2.3. Models of regulators AVR and PSS:

The AVR (Automatic Voltage Regulator), is a controller of the PSG voltage that acts to control this voltage, through the exciter. Furthermore, the PSS was developed to absorb the generator output voltage oscillations [9].

In our study, the synchronous machine is equipped by a voltage regulator model "IEEE" type – 5 [10, 11], as is shown in figure 4.

![Figure 4. A simplified IEEE type-5 AVR](image)

\[ V_s = \frac{K_v V_e - V_e}{T_s} \quad V_e = V_{ref} - V_F \]

About the PSS, considerable’s efforts were expended for the development of the system. The main function of a PSS is to modulate the SG excitation to [9, 12, 8].

![Figure 5. A functional diagram of the PSS [8]](image)
In this paper the PSS signal used, is given by: [13]

\[
\begin{align*}
V_p &= V_1 + V_2 + V_3 ; \\
&= V_1 + V_2 + V_3 + \Delta P \cdot [p] \\
&= V_1 + V_2 + V_3 + \Delta \omega \cdot [\omega] \\
&= V_1 + V_2 + V_3 + \Delta I_c \cdot [I_c] \\
&= V_1 + V_2 + V_3 + \Delta U_i \cdot [U_i]
\end{align*}
\]

2.4. Simplified model of system studied SMIB

We consider the system of figure 6. The synchronous machine is connected by a transmission line to infinite bus type SMIB. The transmission line with a resistance Re, and an inductance Le [8].

![Figure 6. Synchronous machine connected to an infinite bus network](image)

We define the following equation of SMIB system

\[
V_{in} = P_{in} = \sqrt{3} V \cdot \begin{bmatrix} 0 & -\sin(\delta - \alpha) \\
\cos(\delta - \alpha) & 0 \end{bmatrix} \cdot L \cdot I_{in} + X \cdot \begin{bmatrix} 0 \\
i \end{bmatrix}
\]

3. The Robust PSS Based on Loop–Shaping H\(_\infty\) Optimization

3.1. The H\(_\infty\) theory. Advanced control techniques have been proposed for stabilizing the voltage and frequency of power generation systems. These include output and state feedback control, variable structure and neural network control, fuzzy logic control [14,15, 16], Robust H\(_2\) (linear quadratic Gaussian with KALMAN filter) and robust H\(_\infty\) control [17,18].

H\(_\infty\) approach is particularly appropriate for the stabilization of plants with unstructured uncertainty [18]. In which case the only information required in the initial design stage is an upper band on the magnitude of the modeling error. Whenever the disturbance lies in a particular frequency range but is otherwise unknown, then the well known LQG (Linear Quadratic Gaussian) method would require knowledge of the disturbance model [17]. However, H\(_\infty\) controller could be constructed through, the maximum gain of the frequency response characteristic without a need to approximate the disturbance model. The design of robust loop–shaping H\(_\infty\) controllers based on a polynomial system philosophy has been introduced by Kwaerknaak and Grimble [19, 20].

H\(_\infty\) synthesis is carried out in two phases. The first phase is the H\(_\infty\) formulation procedure. The robustness to modelling errors and weighting the appropriate input–output transfer functions reflects usually the performance requirements. The weights and the dynamic model of the power system are then augmented into an H\(_\infty\) standard plant. The second phase is the H\(_\infty\) solution. In this phase the standard plant is programmed by computer design software such as MATLAB [21-22], and then the weights are iteratively modified until an optimal controller that satisfies the H\(_\infty\) optimization problem is found [23].

Time response simulations are used to validate the results obtained and illustrate the dynamic system response to state disturbances. The effectiveness of such controllers is examined and compared with using the linear Robust H\(_\infty\) PSS at different operating conditions of power system study. The advantages of the proposed linear robust controller are addresses stability and sensitivity, exact loop shaping, direct one-step procedure and close-loop always stable [17]. The H\(_\infty\) theory provides a direct, reliable procedure for synthesizing a controller which optimally satisfies singular value loop shaping specifications [24-23]. The standard setup of the control problem consist of finding a static or dynamic feedback controller such that the H- INFINITY norm (a uncertainty) of the closed loop transfer function is less than a given positive number under constraint that the closed loop system is internally stable.

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The robust H_- synthesis is carried in two stages:

a. *Formulation:* Weighting the appropriate input – output transfer functions with proper weighting functions. This would provide robustness to modeling errors and achieve the performance requirements. The weights and the dynamic model of the system are then augmented into H- INFINITY standard plant.

b. *Solution:* The weights are iteratively modified until an optimal controller that satisfies the H_- optimization problem is found.

Figure 7 shows the general setup of the problem design where: P(s): is the transfer function of the augmented plant (nominal Plant G(s) plus the weighting functions that reflect the design specifications and goals),

- \( u_2 \): is the exogenous input vector; typically consists of command signals, disturbance, and measurement noises,
- \( u_1 \): is the control signal, \( y_2 \): is the output to be controlled, its components typically being tracking errors, filtered actuator signals, \( y_1 \): is the measured output.

![Figure 7. General setup of the loop-shaping H_- design](image)

The objective is to design a controller F(s) for the augmented plant P(s) such that the input / output transfer characteristics from the external input vector \( u_2 \) to the external output vector \( y_2 \) is desirable. The H_- design problem can be formulated as finding a stabilizing feedback control law \( u_1(s) - F(s).y_1(s) \) such that the norm of the closed loop transfer function is minimized.

In the power generation system including H_- controller, two feedback loops are designed; one for adjusting the terminal voltage and the other for regulating the system angular speed as shown on figure 8. The nominal system G(s) is augmented with weighting transfer function \( W_1(s), W_2(s), \) and \( W_3(s) \) penalizing the error signals, control signals, and output signals respectively. The choice proper weighting functions are the essence of H_- control. A bad choice of weights will certainly lead to a system with poor performance and stability characteristics, and can even prevent the existence of solution to the H_- problem.

![Figure 8. Simplified block diagram of the augmented plant including H_- controller](image)

The control system design method by means of modern robust H-infinity algorithm is supposed to have some linear conventional PID test regulator. It is possible to collect various optimal adjustment of such a regulator in different operating conditions into some database. Traditional Russian Power system stabilizer (realized on PID schemes) was used in this work as a test system, which enables to trade off
regulation performance, robustness of control effort and to take into account process and measurement noise [17].

3.2. GLOVER - DOYLE algorithm to synthesize a robust stabilizer PSS- $H_{\infty}$. Problem solving of standard control is proposed as follows [22]:
1. Calculates the Standing regime established (RP);
2. Linearization of the control object (GS+PSS+AVR);
3. The main problem in $H_{\infty}$ control and the definition of the control object increased P(s) in the state space:
   3.1. Choice of weighting functions: $W_1$, $W_2$, $W_3$;
   3.2. The obtaining of the command object increased from weighting functions $W_{1,2,3}$;
4. Verify if all conditions to the ranks of matrices are satisfied, if not we change the structure of the weightings functions;
5. Choosing a value of $\gamma$ (optimization level);
6. Solving two Riccati equations which defined by the two matrices H and J of HAMILTHON;
7. Reduction of the regulator order if necessary
8. By obtaining optimum values and two solutions of Riccati equations we get the structure of controller $H_{\infty}$ and the roots of the closed loop with the robust controller;
9. We get the parameters of robust controller $H_{\infty}$ in linear form 'LTI (SS state space, TF transfer function or ZPK zeros - pole - gains)
10. The simulation and realization of the stability study and robustness of electro-energy system under different functioning conditions.

The synthesis algorithm of the robust controller $H_{\infty}$ proposed in this work is clearly shown schematically by the flow chart of Figure 9.

![Flowchart](image)

**Figure 9. Synthesis algorithm robust controller of the excitation for a single machine**

3.3 Structure of the power System withe Robust Controllers $H_{\infty}$. The basic structure of the control system a powerful synchronous generator with the robust controller shown in Figure 10 [3].

As command object we have synchronous generator with regulator AVR-FA (PID with conventional PSS), an excitation system (exciter) and an information block and measures (BIM) of output parameters to regulated.

![Diagram](image)

**Fig 10. structure of the power system withe robust controllers $H_{\infty}$**
4. The Simulation Result Under GUI/ Matlab

4.1. Creation of a calculating code under MATLAB / SIMULINK. The “SMIB” system used in our study includes:

- A powerful synchronous generator (PSG);
- Two voltage regulators: AVR and AVR-PSS connected to;
- A Power Infinite network line

We used for our simulation in this paper, the SMIB mathematical model based on permeances networks model culled Park-Gariov, and shown in Figure 11[13]:

![Figure 11. Structure of the synchronous generator (PARK-GARIOV model) with the excitation controller under.](image)

4.2. The realized graphical interface GUI under MATLAB. To analyzed and visualized the different dynamic behaviors we have creating and developing a “GUI” (Graphical User Interfaces) under MATLAB. This GUI allows as to:

- Perform control system from PSS and H-PSS controller;
- View the system regulation results and simulation;
- Calculate the system dynamic parameters;
- Test the system stability and robustness;
- Study the different operating regime (under-excited, rated and over excited regime).

The different operations are performed from our GUI realized under MATLAB and shown in Figure 12.

![Figure 12. The realized GUI under MATLAB in our work](image)
4.3. Simulation result and discussion

- **Stability study.** We performed an perturbations by abrupt variation 15% of turbine torque at \( t = 0.2s \).

The following results (Table 1 and figure 13, 14 and 15) were obtained by studying the “SMIB” static and dynamic performances in the following cases:

1. SMIB in open loop (without regulation) (OL)
2. Closed Loop System with the conventional stabilizer PSS-FA and robust control \( H--\text{PSS} \) [13].

We simulated three operating: the under-excited, the rated and the over-excited.

Our study is interested in the powerful synchronous Generators of type: TBB-200, TBB-500 BBC-720, TBB-1000 (parameters in Appendix) [13].

Table 1 presents the TBB-1000 static and dynamic performances results in (OL) and (CL) with PSS and \( H-\text{PSS} \), for an average line \( (X_e = 0.3 \text{ pu}) \), and an active power \( P=0.9 \text{ p.u} \), for more details about the calculating parameters see GUI-MATLAB in the Appendix created.

Where: \( \alpha \): Damping coefficient \( \varepsilon \% \): the static error, \( d\% \): the maximum overshoot, \( t \): the setting time.

<table>
<thead>
<tr>
<th>Damping coefficient ( \alpha )</th>
<th>The static error</th>
</tr>
</thead>
<tbody>
<tr>
<td>( Q )</td>
<td>( \text{OL} )</td>
</tr>
<tr>
<td>0.1372</td>
<td>Unstable</td>
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<tr>
<td>0.4571</td>
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<tr>
<td>0.1896</td>
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<td>0.6356</td>
<td>-0.3660</td>
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</table>

The setting time for 5%, The maximum overshoot %

<table>
<thead>
<tr>
<th>Damping coefficient ( \alpha )</th>
<th>The static error</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

In the Figures 13,14 and 15 we shown an example of simulation result with respectively: 's' variable speed , 'delta' The internal angle, 'Pe' the electromagnetic power system, 'Ug' the stator terminal voltage; for powerful synchronous generators TBB-1000 with \( P = 0.9 \), \( X_e = 0.3 \), \( Q_1 = -0.1372 \) (pu)
• **Robustness tests.** In a first step we performed a variations electrical parametric (increase 100% of R), then, we performed an variations mechanical parametric (lower bound 50% of inertia J). The simulation time was evaluated at 8 seconds.

We present in the Figure 14 (For electrical uncertainties) and Figure 15 (For mechanical uncertainties)

![Figure 14](image1)

**Figure 14. functioning system in the under-excited used of TBB-1000 connected to a average line with PSS and H∞-PSS (1st robustness test)**

![Figure 15](image2)

**Figure 15. functioning system in the under-excited used of TBB-1000 connected to a average line with PSS and H∞-PSS (2nd robustness test)**

From the simulation results, it can be observed that the use of H∞-PSS improves considerably the dynamic performances (static errors negligible so better precision, and very short setting time so very fast system, and we found that after few oscillations, the system returns to its equilibrium state even in critical situations (specially the under-excited regime) and granted the stability and the robustness of the studied system.

5. **Conclusion.** This paper proposes an advanced control method based on advanced frequency techniques: a Robust H-Power system stabilizer based on loop-shaping optimization methods applied on the system AVR - PSS of powerful synchronous generators, to improve transient stability and its robustness of a single machine-infinite bus system (SMIB). This concept allows accurately and reliably carrying out transient stability study of power system and its controllers for voltage and speeding stability analyses. It considerably increases the power transfer level via the improvement of the transient stability limit. The computer simulation results (with test of robustness against electric and mechanic machine parameters uncertainty), have proved a high efficiency and more robustness with the Robust H-PSS, in
comparison whit using a Conventional Test stabilizer realized on PID schemes (Russian PSS with a strong action), showing stable system responses almost insensitive under different modes of the station. This robust loop shaping H-infinity generator voltage controller has the capability to improve its performance over time by interaction with its environment. The totality of the present work has been achieved with our Graphical User Interface realized under Matlab.

References
APPENDIX

1. The PSS-AVR model

2. Parameters of the used Turbo-Alternators

<table>
<thead>
<tr>
<th>Parameters</th>
<th>TRB-200</th>
<th>TRB-500</th>
<th>BBC-720</th>
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<td>0.023</td>
<td>p.u.</td>
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</table>

3. Dynamics parameters through GUI-MATLAB
CHARACTERISTICS OF TEACHERS, TEACHING METHOD AND CONTENT IN ADULT LITERACY: PERCEPTIONS OF ADULT LEARNERS

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ABSTRACT: The present study was designed to evaluate the perceptions of adult female learners about teachers, content and method of teaching of adult literacy programmes. The design of the study was qualitative and interview protocols along with focus group discussions were applied as research tools. The sample of the study consisted of 94 respondents including 46 adult female neo-literates, 24 literacy teachers, 14 supervisors and 10 community workers selected through random and criterion sampling techniques. The data were analyzed by constant comparison method. The major findings were; teacher should treat adult learners respectfully; content of adult literacy should be developed according to the needs and aspirations of learners and teachers should make the teaching learning process interesting. It was suggested that teachers may be trained in andragogical perspectives and content of literacy programmes may be designed after careful and systematic situation analysis of adults’ needs. Present study was conducted to explore psychological considerations which one should keep in mind while implementing adult literacy programmes in Pakistan. Generally the major inputs in adult literacy programmes are: the trained adult literacy teachers and content of basic literacy skills. In order to comprehend the nature of proper inputs for adult literacy programmes it seems necessary to highlight some characteristics of adult learners. Adult learners expect a learning environment e.g., (where they are respected, their opinions are valued; their interests are kept in mind etc.). Scholars and researchers suggest that adults are a group of learners who possess individual, group or situational characteristics that serve to differentiate them from children.
Characteristics of Adult Learner: [1] cited Brookfield (1986), Rogers (2002) and Cross (1981) who outlined the following characteristics of adult learners: (1) by legal definition or arguing as per their chronological age, adult learners prove themselves as adults; (2) adult learners want to engage in a purposeful exploration of a field of knowledge or a set of skills; (3) adult learners have expectations about accommodating and constructive learning process where their concerns are always taken seriously; (4) they have different and common physiological, social, cultural and psychological characteristics; (5) they quest for knowledge, skills, and experiences and self motivated; (6) they share host of experiences, skills, knowledge and values that influence how new ideas are received; how new skills are acquired and how the experiences of others are interpreted?; (7) prior learning experiences of adults comprise valuable curricular resources, and; (8) transactions among adult learners of familiar groups such as adult female learners will be characterized by a respect for individual member that will be manifested in the teaching process.

According to [2] adult learner is independent and has a need to understand how learning something new will benefit him, how it fits into his existing knowledge, and reinforces his autonomy to learn in a way that works for him. Similarly [3] stated that the unique contributions of a mature learner include considerable motivation, the ability to take charge of their own lives and experience and cognitive maturity. In adult literacy programmes, adult learners need to be treated with positive and accommodating attitude which is only possible when organizers of the literacy programmes would keep in mind some of the above stated basic psychological considerations of adult learners.

Literature Review: The researcher consulted the literature relevant to the psychological consideration in respect of teachers’ role, method of teaching and the content of adult literacy programs. [4] said the following premises provide a foundation upon which to establish a discourse of adult educational psychology. The character and quality of learning in adulthood contribute to development across the life span and relationship between teachers and adult learners is necessary. The teachers’ ability to motivate the students, the students’ sense of attraction to the teacher and mutual trust are the aspects that play their role in relationship.

[5] reported that successful programs of literacy not only require the well design materials for learning but competent teachers also. If teachers regularly teach learners to some extent, about 50% of achievement can be expected. According to [6]., in Nepal, the drop-out rate was low where adult literacy teachers treated the participants respectfully and, where the teachers of adult literacy treated their learners harshly, the drop-out rate was high. The positive behavior of adult literacy teachers can be assured by proper selection procedure of teachers’ recruitment, training in positive behavior and monitoring of their practices in class rooms. [7] reported that theories of adult learning focused on active involvement of learners in the process. [8] reported that storage of information for a shorter and longer time decrease at later stage due to little practice, the amount of attentional resources available diminishes with age, making people less able to carry out many tasks at the same time. There attentional resources could affect literacy acquisition in several ways: readers may be unable to process all the cues of a script simultaneously and thereby incur the high error rate and reading comprehension may be affected. In successful literacy programmes peer tutoring and group work method of teaching enhance better acquisition of reading and writing skills. [9] highlights some of the facts that make the literacy programs more effective. These includes when programmes recognize and build on the skills, knowledge and life experiences that learners possess; when programs respond to the needs and aspirations of the target learners; when the learners are encouraged and enabled to play their active role in their learning process; when the programmes are designed in language that can be spoken by the learners easily; and when the adult literacy trainers are well trained, supported and familiar with the context of the learners. [10] argues that participatory pedagogy can yield better results. The adult learners should be treated as adults, with self respect and authority to choose alternatives. The main aim of adult basic education programmes is to build the learner’s self confidence and sense of personal efficacy. The participatory pedagogy is the only solution for it with better training of the instructors.

[11] if the content of the literacy skills is according to the needs and aspirations of adult learner, they attended the classes regularly and learn the skills very easily. [12] reported that adult demand income generating skills and basic literacy skills. If income generating skills are provided along with basic skills, learners take keen interest in learning. Poverty alleviation activities should be included in adult literacy programs. He further explained that relevant
material for learning decrease the dropout rate in adult literacy programs. In Senegal women literacy program, the learning material was produced in local languages and it covered many areas like social, economic, religious, health, and moral development. For the purpose of creating a learning environment, five quarterly newspapers, one in each region was produced and circulated. Further for consolidating and improving already acquired literacy skills, books, posters and other relevant material was provided. The dropout rate was only 15% and reasons behind were the active involvement of participant and local community in establishing and defining the courses of the study. [13] reported that John Hasting a British citizen developed material in Nijira Shikhi for adult literacy program which was completely in line with the needs and aspirations of the target group. All the adult learners of this programme like the topics to learn because these have their utility in everyday life.

Objective of the study: The study was conducted to evaluate the perceptions of adult female learners about characteristics of good literacy teachers, good method of teaching and nature of good content in adult literacy program launched by Department of Literacy Punjab in the hilly rural areas of district Rawalpindi.

Research Questions: The following research questions were constructed to get satisfactory answers;
1. To what extent adult literacy teachers follow the psychology of adults in teaching process?
2. To what extent method of teaching is being used according to the orientation of adults to learn?
3. To what extent content of adult literacy programmes fulfils the needs and aspirations of adult learners?

Methodology: This study was follow up in nature. All adult female neo-literate, adult literacy teachers, literacy supervisors of National Commission for Human Development (NCHD) and active members of rural communities were the population of the study. Sample of the study was taken in two steps. Firstly, 20 adult female neo-literate, 10 adult literacy teachers, 06 literacy supervisors and 04 active members of community were randomly selected from each of two target union councils. Secondly, criterion sampling technique was applied to select 03 adult female neo-literate, 02 literacy teachers, 01 supervisor and 01 active member of society for focus group discussion in each of the two target union councils. The participants had not to be acquainted with one another but possessed experiences of literacy programmes of same organization (NCHD) at the same time.

Items of interview schedules and themes of Focused Group Discussions (FGDs) were framed on three main variables of the study namely teachers’ role, content of adult literacy programs and methods of teaching. In interview schedule and (FDGs) teacher’s role was evaluated by investigating her personal and professional traits as teacher like punctuality, understanding of her students, respectful treatment or behavior towards learners, motivating and encouraging adult learners in their study, building good rapport with learners, paying individual attention to learners, help in revision of daily lesson, classroom management, teaching techniques and ensuring classroom participation. Content of adult literacy programs was evaluated by investigating about need based content; easy to learn, following principles of learning, based on learners’ experiences, having activities and variety of topics to study. Both of the organizations had adopted different methods of teaching so the researcher evaluated method of teaching by raising question about interesting method of teaching, easy to learn how to read and write, participatory in nature, use of A.V. aids and exercises, group discussions, role playing and activities oriented.

Data Collection: Interview from teachers and supervisors was conducted separately by the researcher himself while adult female neo-literates were interviewed with the help of a female research assistant provided by heads of local NGOs. Adult female neo-literates were interviewed applying group interview technique. In a group, 02 to 03 neo-literates were included due to time constraints and cost effectiveness. Interviews from adult neo-literates were properly recorded on tape by research assistant and on paper by the researcher himself. FGDs were conducted in each of the target union councils. The cooperation of the heads of the organizations at local level facilitated to include those who were not acquainted with one another. In FGDs three main areas of the study were discussed in detail. After introduction, firstly, researcher invited the supervisors to share their views on each theme of the study followed by adult literacy teachers and then female neo-literates. Total two FGDs were conducted and each of the FGD was lasted for 80 to 100 minutes. Before leaving the place of interviews and FGDs, researcher discussed the statements with participants in order to validate the data.

Data Analysis: Data were analyzed through constant comparison technique. In the first step, transcripts recording of tape were compared and some changes were made on transcripts. Then transcripts of interviews were consulted in order to separate statements which were helpful for answering the research questions. Irrelevant statements were
eliminated from analysis. In order to get valid data analysis, a chart was designed and relevant statements were presented. The statements were compared and contrasted in order to generate meaning for better understanding. The answers of the participants were analyzed firstly by each answer of the participant and then each answer of the question across all of the respondents. The researcher moved back and forth to the answers of the participants. The chart was divided into three parts on the basis of research questions and coding and categorizing took place. Each part of the chart was representing different concept and theme. The statements were then clustered by themes. In the final step, the information on the basis of interpretations of each part and cluster were presented. As a result of this activity, major findings of the study emerged which are presented below.

**Results:** This study revealed that adult literacy teachers did not know how to deal (treat/behave) with adult learners in class. Teachers did not follow the psyche of adult learners to teach them in the class. Content of literacy programmes was not according to the needs and aspirations of the adult female learners. Teachers could not make the learning process interesting for learners in class. These findings provided fundamental support to answer the questions which guided the study.

1. **To what extent adult literacy teachers follow the psychology of adults in teaching process?**

   It was found that most of adult literacy teachers did not treat the adult learners respectfully; most of the respondents reported that adult literacy teachers had harsh behavior with adult learners in the class. Tasleen Begum, one of an adult learner said, “In our adult literacy class Sadia and Riffat were enrolled from our neighboring village, they were more regular than some of us. One day our teacher (Rabeeda) said to Sadia, why you did not do writing practice at home harshly, Sadia stood up and left the class. Due to Sadia, her friend Riffat also left the class and they never entered the class again”

   Adult learners were of the view that the teachers perceived themselves more superior than us. The supervisors also supported the statements made by the adult learners. Teachers did not motivate and encourage the adult learners to study well. It was also noted that most of adult literacy teachers did not pay individual attention to the learners. According to majority of adult learners, “Teachers usually supported their friends or relatives in the class, they sat and gossiped with them and told them everything related to reading, writing and numeracy skills. They did not bother to answer many of our questions related to study and blamed us as slow learners”.

   The study also revealed that teachers did not check the homework of the learners properly. Most of them did not come in the center regularly. They replaced themselves with their sisters or friends in the centers. Fake registration of learners was found as a common practice. Most of them did not spend specified time in the centers while few of them even spent more time in the center than specified for this activity. Views of teachers were contradictory to adult female learners, they said the adult learners did not attend the literacy classes regularly and they were not serious learners; and the venues of the literacy classes were not spacious for all the learners to sit comfortably. Teachers were not able to move around and to give proper individual attention to all the learners. It can easily be concluded that adult literacy teachers were not trained properly and they did not have knowledge and skills to teach adult learners. Congested venues of literacy classes were one of the barriers to involve adult learners actively through individual attention.

2. **To what extent content of adult literacy programmes fulfils the needs and aspirations of adult learners?**

   Majority of adult learners were of the view that the specified content of the adult literacy was not according to their needs and aspirations and they did not take interest to learn how to read and write?

   A very young learner Amna said, I left my school when I was in class 2 and then I could not avail the chance of getting education despite of my desire. When literacy programme was announced I decided to learn what I had forgotten. In the class, the learners of old age were disturbing us asking questions time and again from our class teacher. I learnt how to read and write and I was very happy. I wanted to learn more”

   Most of adult female learners told that they did not use their learnt basic literacy skills in life. It guaranteed that the content of the literacy had no utility in everyday life to the most of the learners. This study also identified three types of adult female learners; the learners in the age group 16 -24 years showed their interest in learning reading, writing and numeracy skills; the learners of age group 25-32 years showed their interest to learn income generating skills along with reading, writing and numeracy skills; and the learners more than 32 years of age were interested to learn about basics of religion and some income generating skills. Almost all of the learners wanted income generating
skills to learn that was missing component in the existing content of the adult literacy programs.

It can therefore be concluded that content of adult literacy programmes was not according to the needs and aspiration of adult learners. Mostly adult learners wanted to learn income generating skills which was not part of these adult literacy programmes. Income generating skills component was announced by DLNEP but it was not implemented. Psychologically the content was not interested for learners; they did not take interest to learn it.

3. To what extent method of teaching is being used according to the orientation of adults to learn?

Phonic teaching method used by NCHD was not found interesting by the learners. The learners did not play active role in learning. Teachers could not involve the learners in the learning process. Frida an adult learner said, “In our class, teacher taught few words in phonic methodology while she taught us remaining words in alphabetic methods. Use of both of the methods confused us” Most of the teachers of NCHD were using mixed method to teach the content of literacy and this technique made the learners confused.

Alphabetical method of teaching was not used properly by adult literacy teachers of DLNEP. The exercises of separating and combining of the words were not properly handled in literacy programs of DLNEP. The uninteresting teaching methods, irregularity of teachers, rude behaviors of teachers, congested space of literacy centers, and uninteresting content of the literacy were found unsuitable according to the psychology of adult learners. Alphabetical method of teaching was not used properly by adult literacy teachers of DLNEP. The exercises of separating and combining of the words were not properly handled in literacy programs of DLNEP. The uninteresting teaching methods, irregularity of teachers, rude behaviors of teachers, congested space of literacy centers, and uninteresting content of the literacy were found unsuitable according to the psychology of adult learners.

Problem solving, discussion method and peer tutoring techniques were not being used by adult literacy teachers.

Conclusions and Recommendations: As the present study reveals that the adult learners wanted to be treated respectfully. They wanted that their teachers should motivate and encourage them. According to them teachers must know how to help adult learners, how to build good rapport with adult learners. They also wanted that their teachers must know how to make the learning process interesting, how to involve adult learners in the class and how to engage adults in activities. Adult learners wanted to learn something which help them to earn more. In mere literacy skills of reading, writing and numeracy, they did not take interest. In any educational activity, psychology of the target learners has its own place and importance. Being diverse group, adult literacy planners, policy makers, practitioners and teachers must know and follow psychology of adults for enjoying more success. Without psychological foundations, our literacy programs would not be proved fruitful. Adult literacy teachers may be trained in andragogy. They may be trained how to treat and work with adult learners. This study identified three types of adult learners, their needs and aspirations are different from one another. It is a fact that in existing resources, it is challenging task to arrange literacy programs according to all the needs and aspirations of adult learners but effort can be made to design the content of literacy interesting for them to some extent. In the present situation there is a huge gap between theory of adult learning and its practical usage. It can be lessened by adopting proper approach; it will definitely increase the unit cost of learner but on the other hand it will also minimize the loss of wastage of educational and human resources.

Significant Contribution of the Study: The findings of present study are helpful for planners, policy makers, curriculum developers, managers and teachers to execute the literacy programmes according to the psychology of adult learners not only in Pakistan but to literacy personnel of the most of the developing countries also. They should trained adult literacy teachers in andragogy rather than pedagogy, the content of adult literacy programmes must have economic aspect to attract adult illiterate for learning and participatory approaches should be applied in teaching process.

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USE OF CUMULATIVE DISTRIBUTION FUNCTIONS IN ORDER TO ESTIMATE DAMAGE PROBABILITY

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ABSTRACT. In this study, the cumulative distribution function was formed to estimate the probability of earthquake damage risk of the residential buildings. Nonlinear Pushover analysis was performed to 25 reinforced concrete residential buildings. The information regarding the buildings was taken from their projects. A 3D computer model was drawn for each building and analysis was applied to these models. 4 damage limits (slight, moderate, extensive and complete) and 5 damage zones (undamaged, slight, medium, extensive and collapse) were determined on the modal capacity curves of the buildings. Probability density functions were calculated with the help of lognormal mean and lognormal standard deviation values of limit states. The cumulative distribution functions were generalized and the probability of the damage was shown. With the results of this work; damage possibility can be estimated for any reinforced concrete residential building which has same features such as soil type, story height, irregularities, soft story etc.

Keywords: Cumulative distribution function, fragility curves, damage estimation

1. Introduction. In probability theory and statistics, the cumulative distribution function (CDF), describes the probability that a real-valued random variable “X” with a given probability distribution will be found to have a value less than or equal to x (Zwillinger and Kokoska 2010). In the case of a continuous distribution, it gives the area under the probability density function from minus infinity to “x”. Cumulative distribution functions are also used to specify the distribution of multivariate random variables (Gentle 2009). As for, the loss estimation methods; earthquake loss estimation method is based on the damage states of the structures and there are several models which can be used to quantify the damages, characterization of damage state and estimation of losses after the earthquakes (FEMA 1997, Hamid and Mohamad 2013). Fragility analysis is one of the key components in seismic risk assessment and more specifically in regional seismic risk assessment.

As part of these procedures, fragility curves are employed in order to estimate the damage of a building after various intensities of ground motion shaking (Porter, Kiremidjian et al. 2001, Lignos and Karamanci 2013). Fragility curves express the probability of the structure reaching or exceeding various damage states as a function of a specific earthquake intensity measure. The function of fragility curves can be assumed as a cumulative distribution function, such as a normal distribution, lognormal distribution or beta distribution (Rota, Penna et al. 2008, Park, Towashiraporn et al. 2009, Rota, Penna et al. 2010, Bessason, Bjarnason et al. 2012, Hsieh, Lee et al. 2013).
In this study; CDF was used as a loss estimation method. There are many other loss estimation methods but fragility curve are useful tool for earthquake damage estimation studies in recent years (Serdar Kirçil and Polat 2006; Gentle 2009; Su and Lee 2013.

2. Earthquake hazard for turkey:Turkey has a population of more than seventy five million. A large part of our country located in “earthquake zone” according to “Earthquake Zoning Map for Turkey (ÖZMEN, NURLU et al. 1997). Thousands of earthquakes have been recording every year in Turkey according to Republic of Turkey, Disaster and Emergency Management Presidency (DEMP). Turkey is constantly threatened by earthquakes and more than 100,000 people have died because of earthquakes in Turkey in the last hundred years (TUDAP 2005). Many of existing buildings have either collapsed or sustained extensive damage during the past earthquakes because of low quality concrete, poor confinement of the end regions of columns and beams or similar reasons (ÇÖĞÜRÇÜ, DÖNDÜREN ET AL, 2006, HAKTANIR, T. ARI, K., 2007). Thus, there has been an increasing importance on the danger of earthquake disasters and seismic risk assessments have become one of the necessary issue for earthquake loss estimates (Shibata 2006, Hsieh, Lee et al. 2013). The loss estimation is based on the damage states of the structures and there are several models which can be used to quantify the damages, characterization of damage state and estimation of losses after the earthquakes (FEMA 1997, Hamid and Mohamad 2013). Fragility analysis is one of the key component in seismic risk assessment and more specifically in regional seismic risk assessment (Abo-El-Ezz, Nollet et al. 2013).

3. Description of the proposed methodology: It is possible to use linear or nonlinear methods in seismic analyses of structures. Linear analysis uses the methods of the elastic solution. Inelastic behavior includes to solution by specific coefficients. Results obtained from elastic analyses are lower realistic than inelastic analyses (Tekin, Gürbüz et al. 2013). It is need to include inelastic behavior of structural elements for more realistic results. Nonlinear time history (TH) analysis is the represents the most actual behavior of the structure. However, developing computer technologies provide easy to carry out it. TH analyses need to long time period because of multi-parameter solution way. Seismic loads are applied to the building directly in TH method. Earthquake data should be selected carefully. Past studies shows that nonlinear pushover (NSP) analysis is suitable alternative to TH by correct selection of parameters and assumptions (Saidi and Sozen 1981).

In this study; cumulative distribution function (cbf) was preferred to analyze the probability of earthquake damages. CBF was preferred as a earthquake damage probability analyze in recent researches. The results of CBF are called as fragility curves at these researches.

Fragility curve is a useful tool for predicting earthquake risk of buildings with similar characteristics such as material, height and design code level (Abo-El-Ezz, Nollet et al. 2013). The curves can be formed empirical, heuristic or analytical based methods (Singhal and Kiremidjian 1996, Porter, Kiremidjian et al. 2001, Rossetto and Elnashai 2003, Wu, Tesfamariam et al. 2012, Zhang and Hu 2005). The principle of the analytical method which is preferred in this study is to analyze the damage state of structures (Hsieh, Lee et al. 2013). Nonlinear static pushover analyze was performed on 3D computer models of the buildings. The reference design spectrum which has 10% probability of exceeding in 50 years was used according to TEC 2007. In addition, fragility curves are cumulative distribution functions that probability of reaching or exceeding a damage state as demand parameters such as story drift ratio (SDR), peak ground acceleration (PGA), spectral acceleration (Sa) or spectral displacement (Sd) (Serdar Kirçil and Polat 2006, Lignos and Karamanci 2013, Su and Lee 2013), (Hsieh, Lee et al. 2013, Suppasri, Charvet et al. 2013). It has been widely accepted that spectral displacement can be closely correlated with seismic damage of structures (Serdar Kirçil and Polat 2006) (Su and Lee 2013).

Probability density function of a random variable with lognormal distribution is as follows equation-1:

\[ f(\chi) = \frac{1}{\sigma_{\gamma} \sqrt{2\pi}} \exp \left[ -\frac{(\ln \chi - \mu_{\gamma})^2}{2\sigma_{\gamma}^2} \right], \quad (0 < \chi < +\infty) \quad (\text{Eq.1}) \]

In this distribution; \( \mu_{\gamma} \) is lognormal mean of variable \( Y \) and \( \sigma_{\gamma} \) is lognormal standard deviation of variable \( Y \). \( \mu_{\gamma} \) ve \( \sigma_{\gamma} \) are associated with \( \mu_{\gamma} \) ve \( \sigma_{\gamma} \) by equation-2 and equation-3.

\[ \mu_{\gamma} = \ln \left[ \frac{\sigma_{\gamma}^2}{\sqrt{\ln^2 + 1}} \right] \quad (\text{Eq.2}) \]
Probability of having a specific range of a continuous random variable can be written as equation 4:

\[ P(a < X < b) = \frac{1}{\sqrt{2\pi}} \int_a^b e^{-\frac{1}{2} \left( \frac{x-\mu}{\sigma} \right)^2} \, dx \]  

(Eq.4)

Probability distribution of earthquake damage is assumed to be lognormal distribution. Thus, the analytical expression of fragility curve for a damage level is written as the follows equation 5:

\[ P \geq \Phi \left( \frac{\ln \left( \frac{S_d}{SA} \right) - \ln S_{d,\alpha}}{\beta_{d,\alpha}} \right) \]  

(Eq.5)

\( P_d \) is probability of damage. \( S_d \) is modal displacement. \( \alpha_{d,i} \) is modal displacement for damage level “i”. \( S_{d,\alpha} \) is mean modal displacement for damage level “i”. \( \beta_{d,\alpha} \) is lognormal standard deviation of modal displacement values for damage level “i”. \( \Phi \) is cumulative distribution function.

Fragility curves can be formed empirical, analytical or heuristic based methods (Singhal and Kiremidjian 1996, Porter, Kiremidjian et al. 2001, Rossetto and Elnashai 2003, Wu, Tesfamariam et al. 2012, Zhang and Hu 2005 ). In this study, analytical fragility curves were obtained by nonlinear static pushover analysis. NSP analysis can be applied with two different ways. One of them is force controlled and the other one is displacement controlled analysis method. In this study, displacement controlled analysis method was applied. In addition to this, NSP analysis is employed by CSI SAP2000 computer program to obtain the base shears against roof displacements relationship for existing buildings.

Besides analytical fragility curves were obtained by spectral displacement values of modal capacity curves. End point of linear part of the curve was assumed as “slight damage limit”. Intersection point of idealized line was assumed as “moderate damage limit”, The Last point of modal capacity curve was assumed as “complete damage limit”. Finally; midpoint of the moderate and complete damage limits was assumed as “extensive damage limit.

Obtaining of damage levels as shown in Figure 3.1.

Figure 3.1. Obtaining of damage levels

4. Building Inventory: %90 of total building stock of Turkey are Low and midrise buildings. Thus; 3, 4 and 5 storey reinforced concrete residential buildings discussed about earthquake hazard and analytical fragility curves performed for 25 residential RC buildings with 3, 4 and 5 storey in this study. The buildings were selected by random sampling method. They were evaluated using their projects. Table 3.1 shows the
### Table 3.1: Building inventory

<table>
<thead>
<tr>
<th>Building Code</th>
<th>Number of Story</th>
<th>Soil Type</th>
<th>Concrete</th>
<th>Reinforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>B_01</td>
<td>4</td>
<td>Z3</td>
<td>C14</td>
<td>S220</td>
</tr>
<tr>
<td>B_02</td>
<td>4</td>
<td>Z4</td>
<td>C16</td>
<td>S220</td>
</tr>
<tr>
<td>B_03</td>
<td>3</td>
<td>Z4</td>
<td>C14</td>
<td>S220</td>
</tr>
<tr>
<td>B_04</td>
<td>4</td>
<td>Z3</td>
<td>C14</td>
<td>S220</td>
</tr>
<tr>
<td>B_05</td>
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<td>Z3</td>
<td>C14</td>
<td>S220</td>
</tr>
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<td>B_06</td>
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<td>C14</td>
<td>S220</td>
</tr>
<tr>
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<td>S220</td>
</tr>
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<td>C16</td>
<td>S220</td>
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<tr>
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<td>C14</td>
<td>S220</td>
</tr>
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<td>C14</td>
<td>S220</td>
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<td>C14</td>
<td>S220</td>
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<td>C14</td>
<td>S220</td>
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<td>Z3</td>
<td>C16</td>
<td>S220</td>
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<td>C14</td>
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<td>Z3</td>
<td>C14</td>
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<td>C10</td>
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<td>C14</td>
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<tr>
<td>B_25</td>
<td>5</td>
<td>Z3</td>
<td>C14</td>
<td>S220</td>
</tr>
</tbody>
</table>

5. **Analytical results:** The principle of the analytical method is based on nonlinear static analyze. Thus, a 3D computer model was occurred for each building to analyze the damage state of structures. As for the modeling issues; columns defined as reinforced concrete elements which work for axial load, M2 and M3 moment. Beams also defined as reinforced concrete element which working M3 moment. The rigid diaphragm effect
was modeled using “joint constrain” properties. Otherwise, “Adopted Kent Park model” was used for nonlinear behavior of concrete. Damping of the building was considered as 5%. Each procedure was applied for all buildings. Totally, 50 modal capacity curves were obtained. Figure 6.1 shows that modal capacity curves of buildings for weak direction as an example.
After the obtaining modal capacity curves; spectral demand values were calculated for related soil type according to TEC 2007. An example about obtaining of spectral demand from design earthquake demand spectrum for Z2 soil class is shown in Figure 4.2.

Mean modal displacement and lognormal standard deviation of modal displacement values were utilized. Fragility curves are assumed cumulative distribution functions that probability of reaching or exceeding a damage state as demand parameters spectral displacement. Thus, probability density functions were calculated for four damage levels. Figure 4.3 shows probability
density function graphics for four damage limits.

Slight Damage

Moderate Damage

External Damage

Complete Damage

Figure 4.3. Probability density function graphics

The area under the line shows that probability of damage in probability density functions. Figure 4.4 shows the transformation of probability density function to cumulative distribution function.

Figure 4.4: Transformation of probability density function to cumulative distribution function.

Fragility curves of slight, moderate, external and complete damage level for all buildings are shown in Figure 4.5.
Conclusions: In this study, cumulative distribution functions were formed to 25 reinforced concrete residential buildings with 3, 4 and 5 storey. 3D computer model was drawn for each building and analysis was applied to these models. 4 damage limits (slight, moderate, extensive and complete) and 5 damage zones (undamaged, slight, medium, heavy and collapse) were determined on the modal capacity curves of the buildings. Probability density functions were calculated with the help of lognormal mean and lognormal standard deviation values of limit states. Then, fragility curves that show probability of the damages according to design earthquake were generalized.

According to pushover results; plan asymmetric buildings have lower lateral capacity compared to asymmetric buildings. However modal capacity curves give information about the current status of the buildings, there are lots of building located in seismic zones. Therefore, regional studies and rapid risk assessment methods are required. Therewith, a general assessment can be made by the results of the fragility curves.

Analyzed buildings would be situated in undamaged zone with more than % 50 probabilities in the range of 0-2.50cm modal displacement. There is more than %50 probabilities for the buildings to be situated in slight damage zone in the range of 2.50–3.00cm, moderate damage zone in the range of 3,00-6.00cm, extensive damage zone in the range of 6.00-9.00cm and collapse zone above 9.00cm.

By the result of this study, cumulative distribution functions were applied as an earthquake damage estimation graphics. It is shown that; cumulative distribution functions should be use as a fragility curve for reinforced concrete buildings.

REFERENCES


GEOGRAPHICAL SIGNIFICANCE IN ASSESSING QUALITY OF LIFE IN CENTRAL KARAKORAM NATIONAL PARK INHABITANTS

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ABSTRACT. This paper addresses geographical significance in assessing quality of life among inhabitants of Central Karakoram National Park, Gilgit Baltistan, Pakistan. The aim is to evaluate the degree of the extent to which the quality of life conditions of an average person living in particular regions of Central Karakoram National Park (CKNP). Findings indicated that relationship of perception of quality of life among mountain inhabitants was a significant contributor factor in their lives (physical, psychological, social and environmental well-being, and satisfaction in life with hope, diversity in level of hope and planning to meet their goals). The presence of hope is positively associated with quality of life and subjective well-being of CKNP inhabitants. This has been important in identifying differences in mountain men and women and difference in valleys. Implications for mountain life and healthy living are indicated. This project was funded by the Research Grant from SEED project of KIU/Evk2 CNR to the first author with 2nd author assisting, acknowledgement of all those involved in data collection.

Keywords: quality of life, wellbeing, Central Karakoram National Park, hope, mountain

Introduction. This is a small attempt to show a glimpse of an immense research project to measure the quality of life, psychological wellbeing, meaning in life, life satisfaction, and longevity of inhabitants in Central Karakoram National Park (CKNP) (Gilgit-Baltistan). Present project explores and assesses health, psychological state, level of independence, social relationships, personal beliefs and their relationships to salient features of the CKNP environment. The aim is to evaluate the degree of the extent to which the quality of life conditions of an average person living in particular areas of CKNP.

The CKNP is Pakistan’s largest Protected Area, covering over 10,000km² and its Buffer zone is 7441 Sq KMs. It was officially notified as National Park in 1993 (Bilal, 2003; Shah, 2012). Most of the areas of CKNP has fragmented, fragile and challenging ecosystems. The park is characterized by heavy glaciations, with glaciers combining to form the largest and most extensive glacial systems outside the Polar Regions. Some famous world’s highest peaks including K-2, Broad peak, Gashabrum and Mashabrum are lying within the boundaries.
of CKNP. The park area is rich and unique in terms of ethnic, cultural and biological diversity with a wide range of development opportunities. The Park area is comprised of watersheds of 17 valleys, and each valley has its own access road system up to an elevation of 10,000 ft (HBP, 2008). The Central Karakoram National Park is one of the immense unexplored areas of Pakistan, where biodiversity is now being evaluated systematically for the better Protected Area management in future (Baig, 2009).

Ethnic groups may be differentiated on the basis of language: major languages of the area include Balti, Shina, Burushaski, and Wakhi. Besides the diversity of languages the spatial distribution of various Islamic sects is another attribute that characterizes the population of the area, for instance, religious groups are Ahle-Sunni, Ahle-Tasheeh, Ismaili, and Noorbukhshi. Apart from the highly critical demographic, cultural, and social settings, all the villages are rich with natural resources, particularly land, water, forests, and related resources. The remoteness and limited accessibility of the CKNP until now have meant that people here have had a high dependence on the natural environment, without access to many modern facilities. Traditional modes of living ensured harmony between the natural environment and human beings. But growing population, greater communication links and infrastructural and developmental interventions are changing traditional lifestyles and increasing the pressure on natural resources.

The objectives of the study are to explore domains of quality of life i.e. physical health, psychological health, social relationships, and environment of CKNP inhabitants; the relationship between wellbeing and quality of life among inhabitants of CKNP. However, the meaning of life as conceived by the inhabitants on gender basis was also discussed. The human values such as security, power, achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, and conformity among inhabitants of CKNP were also highlighted.

2. Method: All research measures were available in English language. For the viability of the indigenous natives of CKNP, it was necessary to translate these measures in Urdu language. Before the data collection from the inhabitants of CKNP valleys, all research tools have been translated and reviewed in group by the three research assistants who are lecturers in the department of Behavioural sciences. Finally these were reviewed by principal investigator and co-principal investigator. In addition, the final draft of the research tools has been reviewed by two judges (professors having command on Urdu and English languages). For tryout and to measure the test conceptualization, a small pilot study was conducted to ensure its reliability and validity.

2.1 Pilot Study: The resulting first draft of Urdu version of research tools and the original English versions were administered to postgraduate students (M.Sc. III = 14, 7 for English and Urdu versions each; M.Sc. I 5 for Urdu and 4 for English version) of the department of Behavioural Sciences with the instruction to identify the words which were not clear or confusing. The comments given by them have been thoroughly examined and incorporated in the corresponding statements of the scales. The final version of the research tools in Urdu language was printed and used for data collection.

2.2 Participants: The sample of 628 had been drawn from fifty villages of CKNP valleys (Shigar, Basha, Braldu, Khaplu, Hushey, Thalley, Astak-Tormik, Arandu, Haramosh, Bagrot, Hopper, Hispar, Rakaposhi, and Shimshal) through purposive-convenient sampling technique. 411 male (65.4%) and 217 female (34.6%), among 628 inhabitants 47.3% were early adults, 59.1% were Balti speakers, 22.8% matriculated and 22.2% were illiterate while 20.9% were intermediate. 48.6% were associated with farming and livestock. The monthly income of 45% inhabitants is below 10,000 rupees. 63.9% are married and 93% preferred to live in joint family structure. 43% families have one earner while 26% families have 2 earners at home; among them 49% were male earners and 17% female earners. Among 217 female, majority was farmers but they did not acknowledge themselves as earners for their families. The details of the demographic characteristics of the participants are given in appendix A and appendix B for a map of CKNP valleys.

2.3 Research Measures: Translated measures have been used in the present study such as WHO Quality of Life Scale –BREF (WHO QOL-BREF) has been used to assess the individual's perceptions in the context of their culture and value systems, and their personal goals, standards and concerns. The WHOQOL-BREF
The instrument comprises 26 items, which measure the following broad domains: physical health, psychological health, social relationships, and environment. The four domain scores denote an individual’s perception of quality of life in each particular domain.

**Meaning in Life Questionnaire (MLQ)** assesses how full respondents feel their lives are of meaning and how engaged and motivated respondents are in efforts to find meaning or deepen their understanding of meaning in their lives (Steger, Frazier, Oishi, & Kaler, 2006).

**Psychological Well-Being Scales** assesses six dimensions of psychological well-being: autonomy, environmental mastery, personal growth, positive relations with others, purpose in life, self-acceptance (Ryff, 1998).

**Satisfaction with Life Scale** is a widely used and well-validated measure of life satisfaction (Diener, 1985). Satisfaction with life represents the cognitive aspect of subjective well-being (Lucas, Diener, & Suh, 1996).

**Gratitude Questionnaire**-6: The GQ-6 is a short, self-report measure of the disposition to experience gratitude. Participants GQ-6 is positively related to optimism, life satisfaction, hope, spirituality and religiousness, forgiveness, empathy and prosocial behavior, and negatively related to depression, anxiety, materialism and envy (McCullough, Emmons, & Tsang, 2002).

**Adult Hope Scale** (AHS) measures Snyder’s cognitive model of hope which defines hope as "a positive motivational state that is based on an interactively derived sense of successful (a) agency (goal-directed energy), and (b) pathways (planning to meet goals)" (Snyder, Irving, & Anderson, 1991).

**Marlowe–Crowne Social Desirability Scale** assesses the need to obtain social approval using a series of statements concerning socially desirable opinions or behaviors that most people cannot truthfully claim to adhere to at all times, as well as 14 statements of socially undesirable opinions or behaviors that have been true for most people at least some of the time (Crowne & Marlowe, 1960).

**Schwartz’s Value Inventory** assesses the values, such as: how are individuals’ priorities affected by social experiences? How do individuals’ priorities influence their behavior and choices? And, how do value priorities influence ideologies, attitudes, and actions in political, religious, environmental, and other domains? Ten types of universal values are achievement, benevolence, conformity, hedonism, power, security, self-direction, stimulation, tradition, and universalism (Schwartz, 1992).

2.4 Procedure. After the pilot study, a team of three researchers & six assistants approached the respondents at their residences, work places and /or fields for main data collection. The purpose of research described briefly to the respondents. The research tools were administered individually after obtaining informed consent from the natives/villagers. The data was collected from fifty villages of fourteen CKNP valleys. The visits were started from July 2012 and ended in October 2013 (almost one and half year). Statistical Package of Social Sciences (SPSS) version 20.0 for windows used for data analysis i.e. descriptive and inferential statistics.

3. Data Analysis & Interpretations. After data analysis of the collected data, the major findings are enlisting here categorically:

A. **Quality of Life**
   a. 52.4% participants reported good perception of quality of life while 53% are satisfied from their overall perception of health while 23% perceived their health in highly satisfactory way.
   b. The mean scores of female from Rondu and Shigar valleys reported good quality of life as compared to mean scores of male of same valleys while no significant differences were found on individual’s overall perception of quality of life. Generally the mean scores of male perceived good health individually as compared to female of CKNP valleys
   c. Significant gender differences found on all research measures. Male from Haramosh & Thalley valleys reported high degree of physical health which indicated activities of daily living, energy and
fatigue, mobility in community, sleep and rest, and work capacity as compared to female of same and other CKNP valleys.

d. Generally the mean scores of male from CKNP valleys (especially Hopper and Thalley valleys) showed high degree of psychological health including positive and negative feelings, self-esteem, as well as thinking, learning, memory and concentration as compared to female of CKNP valleys.

e. Inhabitants of CKNP valleys showed tendency of high social relationships in their community depicted their high degree of personal relationships, social support, and bond of relationship with their family and community whereas female of Rakaposhi valley are more prone in maintaining social relationships and social support than male of same valley.

f. Overall Male of Thalley Valley showed high quality of life on domains of physical health, psychological and social relationships as compared to female of same valley.

g. The mean score of female of Rakaposhi and Khaplu valleys scored high on environment domain of WHO Quality of Life as compared to male, indicated the symbol of transformation of the socio-cultural perspectives and the gender roles. Women of Rakaposhi, Khaplu, and Shigar valleys are now playing a role of both homemakers and agriculturalists that enhance their responsibility to more control over household resources and farm-related income, as well as greater participation in community-level decision-making. It showed their life satisfaction.

B. Gratitude

a. 80.7% inhabitants of valleys reported low gratitude that showed lack of expressions of gratefulness and appreciation in daily life, as well as feelings about receiving from others.

b. Both gender and all age groups experienced poor expressions of daily life appreciation and admiration.

C. Meaning in Life

a. CKNP inhabitants particularly male of Rakaposhi, Braldu, Basha, Haramosh & Hushey valleys reported the presence of positive meaning in their lives. Thalley and Hisper inhabitants showed the sense of life and their struggling, motivation and desire in order to find the meaning of their lives.

b. Elderly and adults showed the sense of understanding the meaning of life, degree to which individuals feel that their life is full of meaning (e.g., I have a good sense of what makes my life meaningful) as well as motivation and desire to find or deepen the meaning in their lives (e.g., “I am always searching for something that makes my life feel meaningful”) as compared to adolescents of Hushey Valley.

D. Social Desirability

a. Generally significant gender differences found on social desirable scale showed that CKNP inhabitants are socially active and desirable in their community especially male of Bagrote and Haramosh valleys.

b. Adults of Rakaposhi and Khaplu and elderly of Braldu are more socially active and played a significant role in community, welfare for others, and decision-making as compared to other age groups.

E. Psychological wellbeing

a. Male of Haramosh and Basha valleys depicted high autonomy, self-determination, independent, able to resist social pressures to think & act in certain ways as well as regulate behavior from within community and regional level as compared to female of these valleys. Adults of CKNP valleys are more self-determined, independent, and evaluate themselves by personal standards especially adults from Shimshal and Hopper valleys while adolescents are much more concerned about the expectations & evaluations of others.

b. Female from Hopper has a feeling of continued development, observe self as growing & expanding by realizing her potential and open to new experiences while male from Thalley and Hushey reflected high personal growth indicated potential, sense of realization, and enhance to improve in self & behavior with the passage of time.

c. Inhabitants of CKNP valleys particularly male from Rondu, Thalley, Braldu, Basha, & Hushey valleys reflected high environmental mastery such as a sense of competency in managing the environment and make effective use of surrounding opportunities.
d. Male of CKNP valleys mainly Rondu, Hisper, Khaplu, Basha, Hushey reported positive relation with others, warmth and trusting relationships, affection, & intimacy while female of these valleys showed few close trusting relationships with others, had difficulty to be open & concerned about others and usually isolated & frustrated in interpersonal relationships and these female were reluctant to make compromises to sustain important ties with others even within community.

e. Generally inhabitants of CKNP valleys have purpose in life, they are goal-oriented and have sense of understanding of objectives for living. Male of Haramosh, Thalley, & Hushey valleys have a sense of directedness while female of these valleys lacked sense of direction and had few goals or aims in their lives.

f. Male of Haramosh scored high on self-acceptances showed possessing a positive attitude toward the self and feels positive about past life but they are conservative and dissatisfied with the outsiders or visitors. Whereas female of the same valley are dissatisfied with self, having troubled with certain personal qualities and wishes to be different than what she is.

F. Human values
a. The inhabitants of Shimshal, Thalley, and Basha valleys reported to have more benevolence, conformity, tradition, universalism, self-direction, stimulation, hedonism, achievement, power and security values, indicated preserving and enhancing the welfare of those with whom one is infrequent personal contact and pleasure and sensuous gratification for themselves as well as provide an internalized motivational base for such behavior. However, they showed the presence of conformity which showed restraint of actions, inclinations, and impulses likely to upset or harm others and violate social expectations or norms.

b. Both power and achievement values focus on social esteem. However, achievement values emphasize actively demonstrating successful performance in concrete interaction among Shimshal inhabitants, whereas power values among Basha inhabitants emphasize attaining or preserving a dominant position within the more general social system. The conformity values exhort responsiveness to current, possibly changing expectations in inhabitants of Shimshal and Thallay while Basha inhabitants stressed out power, security, and tradition values that showed social status and prestige, dominance over resources, safety, harmony, and stability of society, of relationships, and of self and the demand responsiveness to immutable expectations set down in the past.

c. Younger adults showed greater achievement orientation, independent thoughts and actions, the sense of power (showed social status and prestige), control or dominance over people and resources (farming, minerals, transport, livestock, decision making, shifted gender roles) in the valley. Whereas older adults showed more respect, commitment, and acceptance of the customs, traditional culture, or religion as well as the sense of understanding, appreciation, tolerance, and protection for the welfare of all people and for nature. Both younger and older adults showed excitement, novelty, and challenges towards goals in life but both do not differ on benevolence, security, conformity, and hedonism values.

G. Hope
a. Hope is defined as the perceived capability to derive pathways to desired goals, and motivate oneself via agency thinking to use those pathways. Inhabitants of Hushey Valley showed high level of hope, goal directed energy, and the extent of planning to meet goals. While male of CKNP valleys especially Thalley and Basha reported positive goal directed energy hope and planning to meet goals for future as compared to female of same valleys

b. Adults from Rondu and Khaplu valleys reported the tendency of positive hope as compared to adolescents while adolescents of Basha & Hisper valleys reflected goal directed energy for their future as compared to adults

Summary: The correlations of all measures were positively significant at 0.01 and .05 level, depicted the relationship of perception of quality of life among inhabitants was the most significant contributing factor in their lives which shown their physical, psychological, social and environmental well-being, and satisfaction in life, including diversity in level of hope and planning to meet their goals. Age, education, gender, and income are correlated with the quality of life and basic values while family patterns and marital status did not play any significant role.
in basic values. The presence of hope is positively associated with quality of life and subjective well-being of CKNP inhabitants. However, having more meaning of life has been positively related to physical health, social relationships, psychological well-being, life satisfaction, gratitude, hope, and human basic values, and religiousness. The presence of poor gratitude among CKNP inhabitants is really one of the unexpected findings. In addition, religion and cultural values also play significant role in decision-making as in many communities usually people do not express their opinions and views in front of community counselors or religious leaders due to social hierarchy as well as in cultural respect. Natural resources such as minerals, nallah, glaciers, pastures, and forests as well as farming and livestock enhance the quality of life individually in a harmonious way.

3.1 Conclusion. It is to be concluded that key findings are valuable in planning policy, governance model and management plan for CKNP. Lack of proper approach to basic necessities to life such as education, transport, electricity, and medical facilities as well as lack of leisure activities in a community leads to poor quality of life, hopelessness, uncertain fear, and deprivation of happiness and peace. In future, a commencement to allocate mental health professionals in each valley of CKNP is required in order to provide mental health, psychological well-being, health care delivery, and counseling and consultation services to community in order to enhance mental health literacy, decrease stigma of mental health problems, and encourage people with problems to get early help.

Appendix A

The details of the demographic characteristics of the participants are as follows:
2a. Valley wise distribution of participants in CKNP (n=628)
2b. Gender-wise distribution of CKNP Valleys (n=628)

![Gender-wise distribution of CKNP Valleys](chart)

2c. Languages speaking in CKNP Valleys

![Languages speaking in CKNP Valleys](chart)
2d. Education of participants

- PhD: 0.2%
- Illiterate: 22%
- Primary Level: 16%
- Below Matric: 1%
- Matric: 24%
- Intermediate: 21%
- Bachelors: 17%
- Masters: 6%

2e. Occupation of participants

- Framing: 18%
- Business: 8%
- Govt Employee: 21%
- Tourist Guide: 2%
- NGO Employee: 4%
- Student: 5%
- Unemployed: 4%
- Others: 7%
- Nil: 1%
- Household Chores: 1%
2f. Monthly Income of Participants

- 1% below 10,000
- 1% 11,000-20,000
- 1% 21,000-30,000
- 1% 31,000-40,000
- 3% 41,000-50,000
- 4% 51,000-60,000
- 10% 61,000-70,000
- 18% None

2g. Religious groups of Participants

- Ahle Sunnat
- Ahle-Tasheeh
- Ismaili
- Noor Bakushi
- Ahle Hadeees
2h. Marital Status of Participants

[Bar chart showing marital status distribution across different names]

2i. Family structure of Participants

[Bar chart showing family structure distribution across different names]
2j. Individual’s overall perception of quality of life

2j.1. Individual’s overall perception of quality of life in CKNP valleys
2k. Individual’s overall perception of participants’ health

![Pie chart showing satisfaction levels:]
- Very satisfied: 53%
- Satisfied: 23%
- Neither satisfied nor dissatisfied: 12%
- Dissatisfied: 10%
- Very dissatisfied: 2%

2k.1. Individual’s overall perception of health in CKNP valleys

![Bar chart showing satisfaction levels by place:]
- Very satisfied
- Dissatisfied
- Neither satisfied nor dissatisfied
- Satisfied
Appendix B

Map of CKNP valleys
AGENT BASED DISTRIBUTED INTRUSION DETECTION SYSTEM FOR AD HOC MOBILE NETWORKS

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ABSTRACT: MANETs are always in glitch due to lack of proper security system. Dynamic changing topology, heterogeneous and decentralized control with limited resources and unfriendly environment make the MANETs differ from traditional wired and wireless networks. Due to these characteristics, conventional security mechanisms not provide the required security services. The common security mechanisms provide abstract level services for end to end security in proactive manner. These are deployed in pre-define manner by using firewalling on some network premises or using bulky encryption units, commonly working on upper layers. Forgoad QoS and better security for MANETs, deep level inspections of the received packets are required at certain level. Here in this paper we introduced a new agent based distributed local intrusion detection system in which agents are distributed in all nodes and work in collaboration with each other. The local-DIDS checks the packets current condition by comparing the traces of previous attacks with packets and responds according to the packets condition. If some traces matches, the local-IDS sends these packets to base station on emergency bases and also alarm for surrounding node to inform about the intruders. The base station further analyzes the packet and scrutinizes the overall network behavior. If the network shows abrupt change or abnormal behavior, the base station sends messages to leaf nodes to go in sleep mode. The base station updates the signatures of the nodes by applying Markov process. The proposed local-distributed-DIDS shows a balance between false positive and false negative rate. Distributed local-DIDS useful for deep level inspection and is suited with the varying nature of the MANETs.

Key Words: Intrusion Detection System, Mobile ad hoc network, Markov Process, Reactive and Proactive, false positive and false negative, DDoS and MIM attacks, AODV routing protocol.

Introduction: The Mobile Ad hoc Networks (MANETs) is the collection of mobile and static nodes, having no pre-define infrastructure. MANETs can form anywhere, any time (ubiquitous) merged into arbitrary topology and partition into separate networks. Today MANETs have many variations, from sensor networks with limited resources, to more dedicated and complex networks having more resources. Mobile devices move from place to place in peer to peer fashion. MANETs have no pre-define structure, no centralized administration, so any node may leave or enter the network. MANETs have dynamic topology, heterogeneous and decentralized control with limited resources ( Bandwidth, processing ability, energy) and unfriendly environment leads to the inherent weakness of security. To provide a secure and efficient connection to mobile node in a structure (cellular based) and unstructured (ad hoc) is a challenge. Depends upon the situation MANETs have many variations like Cellular-Aided Mobile Ad Hoc Network (CAMA), Sensor Networks, Military Networks, Adaptive and
Heterogeneous Mobile Wireless Networks, Large scale heterogeneous wireless networks with control in base stations, Wireless networks with movable base stations (WNMB) etc.

Most of the MANETs use proactive security mechanism which included encryption and authentication. Proactive protocols are distance vector protocols in which most of the parameters are set in pre-define manner. Proactive protocols are actually table driven where each node maintains a table and shares table information periodically. Nearly all proposed scheme for MANETs are based on key management scheme. Pre-shared keys, pre-distributed symmetric keys with time stamps, pre-define certificate and certificate revocation list with public keys and all variations of these schemes are proactive mechanism. Because all these schemes work in a pre-define manner, most of the parameters are set before. But varying topology and decentralized management of MANETs, mobile nodes are compromised in many ways. Due to the unique nature of MANETs, proactive mechanisms are not the perfect solution. Because instead the presence of these mechanism still MANETs are vulnerable to different type of attacks. Actually these protocols do not analyze the received packet condition and do not observe the overall network behavior but works in proactive manner. For a secure and reliable ad hoc network needs deep level inspection of received data. In another words, MANETs needs another security level which is responsible for checking the received packets as well as the overall network performance. Therefore here we proposed a new scheme which works as in reactive manner (on demand). Reactive in a sense that when network show abnormal behavior or find some malicious code in received packets, the overall system collaboratively responds on the time. So if any misbehavior action has been detected, it not only informs the surrounding nodes and base station but also take some necessary action against those intruders.

Related Work: Proactive security mechanisms for MANETs are mainly focus on key management. Key management has many problems in ad hoc networks. Key creation (central or distributed), key storage (partially or permanent) and key distribution in public key as well as in secret key are main issues. The ad hoc closed-key networks is more secure because it use pre-define security policy which ensures by authentication and encryption. But open ad hoc networks are free for any node to come in and became the part of MANETs without any wavering. Most of proactive security mechanisms are insuring by using key management. Using any key management scheme, MANETs still vulnerable if an active attacker node present in the network. One solution for such situation is the presence certificate Authority (CA) [3]. CA use public and private key pairs, public key of the CA is known to everyone and it makes a digital certificate having the public key of each node sign by its private key [4]. Although public key available for public used and prove authenticity which avoid spoofing and play back attacks. But what happen when an attacker replace organization public key to its own public key? CA is responsible for authentication of each user public key. CA certifies the public of each node when a node joined to MANETs, when a new network established or when a node changed its public key. After certification, the certified public key sends by a node to any node who can verify its authenticity. [36]. Certification approach is looking convincing but it produce extensive overhead the network because of rapidly changing topology of MANETs and each time verification of each valid node. Another issue who is appointed as next CA when current CA down or leave the MANETs? Another solution is multiple CAs but certificate life cycle with public key infrastructure (PKI) leads to enormous overhead. A distributed CAs concept also recommended but the problem remains the same [5]. Certificate creation, verification and validation require a strong management between CAs and surrounding nodes. Localized certification is also recommended which works on public key infrastructure (PKI). The CAs and secret shared updates between nodes with revocation list are used in such typical scenarios [7]. Due to rapid changing topology of MANETs and limited resource of each node, it is rarely implemented and researchers want a realistic solution to reduce this overhead [35]. Symmetric key cryptography is also used for authorization and identification of a node within in typical MANETs but key distribution is key concern which requires pre-define or on time structure. Some time hybrid schemes are introduced in which major secret is shared by public key and then scrambling of data has been done with this major secret. Secret key management is used in some classical applications for authentication and authorization but network layer issues are also come across when these applied for ad hoc and temporary networks [6]. Another proposed scheme is Secure Routing Protocol (SRP). In SRP the correct routs are discovered from time to time and therefore compromised and re-played route are find out and must be rejected. In SRP security associations are exits between ends nodes that prevent intermediate nodes from participating in path discovery. SRP use unique identifier number and authentication codes for correct rout discovery [8]. In [34], Ad-hoc On-Demand Distance Vector (AODV)
routing protocol is used for quick adaptation to dynamic links, low processing and memory overhead and also for low network utilization. The security structure has built on key handling. The one way key chain is useful because the mobile nodes first authenticate themselves to the surrounding node before communication. The main focus of the proposed is low overhead [34]. Symmetric and asymmetric cryptography implements authenticity, integrity, non-repudiation and confidentiality while access control is implemented by firewalling which is difficult in MANETs [33]. All the above proposed solutions are proactive because nearly all key parameters are set before data transmission. Although pre-define key parameters some other parameters are set on the time (time stamping, unique number, pseudo random numbers).

To analyze the performance of a network and to check the packet updates for connection establishment and verification process, many Intrusion detection systems also proposed with different working styles and scenarios. Although different IDSs work in different fashion but the principle is the same that all IDSs are design to protect the MANETs from outsider and insider attacks. One approach is the co-operative and distributed IDS for ad hoc networks working on statistical anomaly based detection [9]. The scheme is useful in providing basic idea about anomaly based detection but having many provisions in their design. The working mechanism also complex and creating overhead in normal operations [9]. For fast and efficient analysis in ad hoc networks another scheme is proposed, based on analysis and integration [26]. The proposed mobile agent-based IDS create local character repository, updating with time. To reducing network overhead only concerned node apply agent operation to avoid broad casting and blocking the network. Therefore the overall network works in normal and efficient fashion [26]. According to the special architecture of MANETs, novel mobile agent based IDS architecture has proposed [27]. In which each node implements basic IDS functions while ranger agents roam the network executing more advanced functions. Additional functionality provided by these mobile agents moving around the network when needed [27]. Another scheme is node-based intrusion detection system for wireless ad hoc networks have been proposed [28]. This gets information from MAC layer and network layer and correlates it for normal behavior. They also suggest rule-based data mining technique for anomaly detection. Decision module minimize false positive rate while Bayesian network is added to evaluate multiple attacks. Evaluation results show effectiveness of the proposed work [28]. Another IDS is based on Suburban Ad-hoc Network (SAHN) and is known as SAHN-IDS [29]. SAHN-IDS useful for multi hop ad hoc network, where it detects misbehavior node by getting unfair share of transmission channel. It also detects anomalies in packet forwarding in effective and unique manner. The simulation results show the efficiency of the proposed scheme [29]. Routeguard [30] is another novel intrusion detection and response system, successfully detects malicious mobile node and hence protect the network. Routeguard mainly work on the concept of monitoring and node cooperation. Simulations show the effective of the scheme [30]. In [31], a “Cross Layer Based Intrusion Detection System” (CIDS) has been proposed. It detects intruders by analyzing the pattern of trace files. It communicates data securely from source to destination which increase network efficiency [31]. Another approach is agent based IDS, working on clustering algorithm. Clustering algorithm selects cluster head in connected nodes. Its architecture shows three types of agents; monitoring, decision making, and action [20]. But this approach of clustering algorithm is not too much intelligent and probably select center node as a cluster head [20]. To eliminate this problem another scheme known as hierarchical IDS has proposed [21]. Where cluster head has been selected on random basis with a fair monitoring method. But hierarchical approach has some implementation issues [21]. Another IDS based on properly organize and well planed Neural Network has been proposed [22]. The proposed IDS works on anomaly detection with rapidly recognize and classify different types of attacks. A real time IDS for ad hoc networks (RIDAN) [23] have been proposed. This works on finite state machine for detecting and classing real time attacks [23]. In [24], mobile agent based IDS has been proposed. The mobile agents are design according to specific tasks based on their functionality. In the hierarchical proposed IDS, mobile agents working in different way from each other but the show collaboration in working against intruders [24].

Although there are too many schemes working on different levels with different mechanisms. But still a light weight, portable and distributed IDS been needed which work in reactive manner and point out all the irreverent and malicious data. On the other side the self organizing nature, arbitrary and temporary topology and decentralized and distributed control of the mobile nodes in MANETs lead to inherent weakness of security [1]. The resources constraint of mobile nodes in MANETs such as limited power, limited communication range, limited processing and memory capabilities can lead tradeoffs between security and resources consumptions [2]. Here we proposed new, local and distributed IDS for MANETs.
The proposed local distributed-IDS are different in working mechanism from previous approaches. It is very effective in those situations where malicious codes play an important role in inside and outside network attacks.

**Thread model:** The ad hoc wireless connectivity and dynamically changing topology with limited resources makes the MANETs more vulnerable to active and passive attacks. Most of the attacks are man in middle or denial of services (DoS) in nature. In DoS attacks, the goal of the attacker is to obtained information or cryptographic keys to damage or replace a mobile node. In DoS actually utilize system resources and cause it malfunction [34]. The DOS attack in MANETs launched by the laptop node in the network. Laptop node has more resources compared to other mobile nodes in the network. DoS attack can activate at any layer in MANETs. At physical layer, DoS launched by continuously transmitting the signals which interferes the radio frequencies of the ad hoc network. This continuous retransmitting busy or jams the ad hoc network and effected for desire functionality of the network. At data link layer, DoS attack is launched by violating communication protocol. These communication protocols continually retransmit massages to generate collision. This retransmission effects node functionality by utilizing the energy of the mobile node. At network layer, the DOS attack affects all routing protocols in different ways [10]. One sophisticated routing protocol attack is routing disruption attack. In which the attacker node generate randomly constructed routing control packets and distribute them into the network. This bogus information prevents the source node from established the accurate path for routing [32]. DoS attack is more sophisticated in MANETs. There are too many types of DoS attack for MANETs. One dedicated DOS attacks in MANETs is Black hole router attack. In which the malicious node gets information from the surrounding nodes by claiming to be the path node and do not forward these information to the base station. Another dedicated DoS attack for MANETs is HELLO flood attack or resource exhaustion attack. In which the malicious mobile or static node broadcast or uni-cast HELLO massages again and again to the target nodes. Which utilize the resources, most of the time battery of the target node [12]. Another DoS attack in MANETs is routing loop. In which a loop is created in routing path, which circulate the data again and again and therefore did not reached to base station.

MANETs also suffers from various types of Man in Middle (MIM) attacks. MIM attacks are launched easily due to the wireless nature of the ad hoc network. There are many types of MIM attacks have been discovered in MANETs. Sybil Attack is one them, in which a single malicious node masquerading with multiple identities. Sybil attack is more serious impact on fault-tolerant schemes of the ad hoc network [10]. While in replication attacks, target node is capture, analyze, reprogram it and replicate it. These replicas are now inserted onto network at different location for various activities [10]. Attacking network is another one. In which malicious node partitions the connected network into small and sub networks. These sub network created in such way that they cannot communicated although they are connected [11]. Insider malicious and selfish nodes in network can also corrupt or miss guide the data.

Although the ad hoc networks have no central monitoring system and no central aggregation point. But today ad hoc networks are beyond this restriction. They have not only a base station but central management information system. Many variation of ad hoc network with central base station exists. As the base stations play an important role such networks. All decisions about network management are decide at base station. Therefore certain dedicated attacks are launched to compromise base station. And if any way base station has been compromised it means the entire network compromised. Hence it has been trying to protect base station from inside and outside attacks.

**Assumptions about the proposed system:** First, we assume that the proposed scheme is suitable for those environments where a central management system plays a vital role. All data has been collected to central point, known as base station (BS). Base station provides command and control structure to ad hoc network. All decision about network management is made here. In our proposed model the base station monitor the overall network performance and control the overall functionality of the ad hoc network. Example of such network is Cellular-aided Mobile Ad Hoc Network (CAMA), Military Networks, Adaptive and Heterogeneous Mobile Wireless Networks and Large scale heterogeneous wireless networks with
control in base stations Wireless networks with movable base stations (WNMB). Actually in these networks the mobile nodes have rich in resources and can do more than just collecting and forwarding the data. Because of rich resources much of the processing has been done at mobile node side and base station feels less overhead.

Second, a free define trust has been exist between nodes for communicating the routing and other information. We add IDS to enhance the security of the MANETs to prevent most of DoS and MIM attacks.

The proposed system is appropriate for either anomaly based or signature based. It can also used in hybrid form for high false positive rate. Case sensitivity of false positive and false negative totally depends on deign of the predefine profile or traces of pre define signatures. Here we assume that our deisgnalgorithm (proposed scheme) show balance between all cases (false positive, false negative, true positive and true negative).

In the proposed scheme, a strong collaboration between base station and mobile nodes exist. The base station strictly monitors the overall network performance as well as checks the received data from the leaf nodes in the network. When base station finds some traces for malicious activity, it sends a message for leaf node to go into sleep mode until a new message for awake is received. The leaf node hibernates for a specific time until base station detects the attack and provides another message to reactivate and start normal detection. This collaboration shows that this type of ad hoc network is not programmed for data collection but we can use such networks with special programming for special purposes. The leaf nodes or cluster heads even in live state can turn off the proposed IDS in a live network when base station send a message for deactivation of IDS agent.

Proposed System: There are many IDS has been proposed for MANETs. Most of them work anomaly detection with collaboration of routing protocols. A very few IDS are design for hybrid mobile ad hoc networks. Here we proposed such IDS for hybrid MANETs. The proposed IDS are distributive, local and collaborative for ad hoc network. Distributive means that each node analyze the data individually and independently through a smart agents in the network and therefore each node works as an IDS agent distributed into the whole network. Partitioned network with cluster heads can have one IDS distributed in all network. The proposed IDS are local because each node in the network (cluster head in sub networks) checks the collected data locally with pre-defines traces of some of the previous attacks. It is co-operative because it informs the surrounding nodes (cluster heads in partitioned network) for detecting the same threat. It also shows strong cooperation between base station and other nodes by sending synchronize messages. And when an intruder has been detected, the surrounding node and base station collectively take necessary action to get rid of such threats.

When data is received at mobile node, the data has been analyzed for intruders. Each mobile node have an agent, these agents have already define with some signature of the previous attacks. Each node with local IDS agent must programmed in such way that it must detect normal and abnormal activities. When the collected information finds some malicious data, then the concerned node inform the base station as well as the surrounding nodes to aware of such falsified malicious data. The mobile node forward these infected data to base station on priority bases for further analysis. The base station further analyzes it and takes appropriate action if necessary. The base station also analyzes the overall network performance. The base station has already programmed with predefine profile. It compared normal and abnormal activity with the threshold value of the pre-define profile. If certain activity find to be malicious or receive data having complaint message from nodes, the base station first analyze the malicious data/abnormal activity. The base station now informs rest of the cluster heads in that particular area and also informs other base station for this abnormal activity/malicious data. The base station now waits and watches the overall network behavior and also check the updates coming from other cluster heads as well as from other base stations. All these activities help the base station to for the overall performance of the network.

Base station is programmed in such a way that they send latest or important traces of attacks to nodes. The nodes update its signature using base station information. The base station monitors the level of the threat and network condition for updating the signature. The sharing updates are done through Markov process. Markov process is very useful in updating such information. The base station sends updates to other nodes using this process. The last node in the hierarchy receives
the difference of all of the nodes from base station to the last node. The net difference between two profiles/signatures is the signature updates.

**System Model and Working Principle:** The proposed system model consists of four parts. In Figure.1 the main parts of local-IDS are shown.

**Collection and Control Module:** In Local-IDS agent, data are collected by collection and control module (CCM). Collection and control module is the first place where data are collected from other nodes. It is also known as controller because it controls all activities of Local-IDS. Command and control unit plays very important role by activating local-IDS in the node. It does also deactivate the whole node functionality when base station sends to it sleep mode message. In simple words the command and control unit controls the total node functionality including local-IDS. The collected data passes through data processing unit where it reshapes the data for further processing. In the CCM the data processing unit arranged the data for further processing. The data is now ready to pass from analyzer module.

**Analyzer Module:** The analyzer module actually decided the working criteria for local detection. Here data first pass from profile unit where it was already decide what are the actual bounds for profile. And if a profile just cross the limit (below the threshold), detects it as malicious. Here a local repository also helps in detecting the previous attacks by comparing the signature of the attack data with the stored traces. The local detection engine categorizes the data as normal or malicious after passing from repository and profiling unit. It passes data as normal for normal operation or pass for priority to send it on prior bases. The analyzer module is heart of the IDS. Here the base station maintains the pre-define signature or profile for a node. Markov process is used for updating the IDS from base station. If analyzer module is tightly design then it increases the false positive rate which collected erroneous as well as correct data. But the analyzer module must also decreases the false negative rate where erroneous data is also marked as correct data. Therefore analyzer module are design in such a way that they show balance in all flavors of detection rates like false positive and false negative, true positive and true negative.

**Local Response Module:** LRM have two module one for normal data known as normal data unit and other for emergency data known as priority data unit. In priority data unit, data having compliant message from analyzer module are sent for assigning priority. Priority assign data needs to reach the base station as quick as possible. The LRM also sends an alarm message to surrounding nodes. After receiving the alarm message, surrounding nodes aware the threats nearly happen to him. The surrounding nodes know about the attack before the actual attack has been happened. Alarm message make possible a collaborative effort.

**Global Response Module (GRM):** The GRM have two units, normal operational unit for normal data and tagging data unit with priority data. Tagging data unit make the smart use of the priority data by applying some aggregation and sorting techniques. Tagging data is do not checked by other nodes if concerned node is distant from base station. Other nodes in the path just play a role store and forwarding. This is all happening to reduce the size of the data and leads to reduce network traffic and increase efficiency. After all this data is sends to the transmitting unit where it transmit for base station for further analysis of malicious data.

The base station then further analyze the tagged data and send massages to other base station and cluster heads as well as to the co-operative nodes. The base station finds a global response from all the base stations and cluster heads. The base station creates a profile of the whole network activities and monitors the overall performance of the network. The base station then follow a procedure how to tackle the intruders and how to manage the overall network. The proposed IDS is actually the smart agents based distributed local IDS. These smart agents collect data locally, check its profile for abnormal behavior or comparing its signature to the traces of previous attacks. If some profile deviate from normal behavior of find out some traces as malicious, the node sends those data on priority bases to base station and also inform the surrounding nodes about those malicious data. Now base station watched the network performance by analyzing the behavior of nodes.
Network shows abnormal behavior in the following way:

- Transmit for Base station

  - If out of hundred nodes 60 nodes are suddenly down (Black hole & Worm Whole attack).
  - Some existing path is suddenly changed (Routing protocols attack).
  - Network show network partition (Network Partitioned attack).
• Continuous process of authentication (DoS attack).

Now the base station feels the type of attack and responds like a typical intrusion prevention system by minimizing further network damage. The base station is actually tells the controller of the agents what do? How to do and when to do?

If the base station finds some suspicious activity continuously attempts to enter the network. All the surrounding nodes feel this activity. The base station knows that this is DoS attack launched by a resource rich node like laptop node. After receiving to base station, it instructs the controller of the IDS that drop the data until next command received for collecting data. The base station can also compel the nodes that do not send a specific type of data by comparing it with pre-define profile or signature. Special messages from base station to mobile node are passed for collecting or dropping data (1 = receive, 0 = drop). The base station sends updated signature to Local IDS by using Markov process. Markov process is mathematical procedure used for different real time calculation. Here the difference of the signature from the first node to the last node is the signature updates reached from cluster head to leaf node by Markov process. As the base station is far away from compromised node, the tagging data is sent through other nodes but no one check it on the path because of the attached tags. In fig.2, the system flow chart shows the overall structure of Local-IDS related to base station.

How The Local IDS Works?

Our proposed model works of information sharing in distributed form. Signature updates from Base station with surrounding and leaf nodes, are very important. Here we use Markov process [37] for signature updates between nodes. The Markov process is a stochastic process, used in many mathematical and analytical procedures. The leaf nodes (nodes on the tips of the network) or any other node within the same topological area, updates their signatures by using Markov process. Markov is a continuous mathematical process.

Consider the following topological area having different colored nodes. The color difference between nodes shows the difference of their signatures. Every third node color is different from fist node in the diagram. It means that S1 have different signature from (S3) while having some resemblance of both (S1) and (S3) with (S2). The base station (B) plays a vital role in signature updates from nearby nodes to leaf nodes. Here in this diagram, the base station (B) sends the latest signature traces to (SS) node. The SS node compared its updated signature to the nodes in its premises. The difference of the two signatures is actually the signature updates. All the nodes in the SS node’s premises with same color show the equivalency in the signature. The path node (S4) in the current updating process compared its signature to all other nodes in its premises. The difference is signature updates. In the same way, (S3), (S7) and (S6) update its signatures from the leading nodes. The difference from leading nodes to leaf node is actually the signature updates from base station to leaf nodes.
Figure 1

Figure 1 shows the difference between the nodes by coloring the nodes. The following equation shows the movements of the updates from leading nodes to the leaf nodes.

$$\bigcup_{x_{i-1}}^{x_{i}} (B) = (S_{4}) \cup (S_{7}) \cup (S_{6}) \cup \ldots \ldots \ldots$$

While in Markov process, the above topology shows how nodes are compared and signatures move from one node to another.

$$B \rightarrow (S_{1}) \rightarrow (S_{4}) \rightarrow (S_{7}) \rightarrow (S_{6}) \rightarrow (S_{8}) \rightarrow \ldots \ldots \ldots \ldots (2)$$

From base station to leaf nodes, the signature updates compared by using logical operators and move from node to node.

$$BS \rightarrow S_{1} \rightarrow S_{2}$$

$$BS, S_{1} \rightarrow S_{2} \rightarrow S_{3}$$

$$BS, S_{1}, S_{2} \rightarrow S_{3} \rightarrow S_{4}$$

$$BS, S_{1}, S_{2}, S_{3} \rightarrow S_{4} \rightarrow S_{5}$$

$$BS, S_{1}, S_{2}, S_{3}, S_{4} \rightarrow S_{5} \rightarrow S_{6}$$

$$\ldots \ldots \ldots \ldots$$

$$BS, S_{1}, S_{2}, S_{3}, S_{4}, S_{5}, \ldots, S_{n-2} \rightarrow S_{n-1} \rightarrow S_{n} \ldots \ldots \ldots \ldots (3)$$

Now consider the following node deployment with different colors as in figure 2. We assume same distances between all nodes.

Diagram 2

The differences between nodes are shown from general formula.

$$\sum (BS) = S_{1} + S_{2} + S_{3} + \ldots + S_{n}$$

Now from (BS) to (SS) node, how signatures are compared and sends the difference between those nodes.

$$\sum_{S_{i}}^{S_{j}} (BS) = \sum_{S_{i}}^{S_{j}} (S_{1}, S_{2}, S_{3}, S_{4}, S_{5}) = \sum_{S_{i}}^{S_{j}} (S_{1}, S_{2}) + \sum_{S_{i}}^{S_{j}} (S_{2}, S_{3}) + \sum_{S_{i}}^{S_{j}} (S_{3}, S_{4}) + \sum_{S_{i}}^{S_{j}} (S_{4}, S_{5})$$
\[ \text{DiF} (\text{BS}, S1, S2, S3, S4, SS) = \text{DiF} (\text{BS}, S1), \text{DiF} (S1, S2), \text{DiF} (S2, S3), \text{DiF} (S3, S4), \text{DiF} (S4, SS) \]

For analysis here we just consider three nodes (BS, S1, and S2) and then generalize for all nodes.

\[ \text{DiF} (\text{BS, S1, S2}) = \text{DiF} (\text{BS, S1}) \text{DiF} (S1, S2) \]  \hspace{1cm} (5)

\[ \text{DiF} (\text{BS, S1}) = \sum_{S2} (\text{BS, S1, S2}) = \sum_{S2} (\text{BS, S1}) + \sum_{S2} (S1, S2) = \text{DiF} (\text{BS, S1}) \sum_{S2} (S1, S2) \]  \hspace{1cm} (6)

\[ \text{DiF} (S1, S2) = \sum_{S3} (S1, S2) = \sum_{S3} (S1, S2) + \sum_{S3} (S1, S3) = \text{DiF} (S1, S2) \sum_{S3} (S1, S2) \]  \hspace{1cm} (7)

And

\[ \text{DiF} (S1) = \sum_{S2} (S1, S2) = \sum_{S2} (\text{BS, S1}) + \sum_{S2} (S1, S2) \]  \hspace{1cm} (8)

Therefore,

\[ \frac{\text{DiF} (\text{BS, S1}) \text{DiF} (S1, S2)}{\text{DiF} (S1)} = \frac{\text{DiF} (\text{BS, S1}) \sum_{S2} (S1, S2) \text{DiF} (S1, S2) \sum_{S3} (BS, S1)}{\sum_{S2} (BS, S1) + \sum_{S2} (S1, S2)} \]  \hspace{1cm} (9)

\[ \Rightarrow \frac{\text{DiF} (\text{BS, S1}) \text{DiF} (S1, S2)}{\text{DiF} (S1)} = \text{DiF} (\text{BS, S1}) \text{DiF} (S1, S2) \]

\[ \Rightarrow \frac{\text{DiF} (\text{BS, S1}) \text{DiF} (S1, S2)}{\text{DiF} (S1)} = \text{DiF} (\text{BS, S1}) \text{DiF} (S1, S2) \]

In the same way, all nodes co-operate and signature updates move from one to another. Table.1, show the Markov process for five nodes and for base station. The table shows how many connected each other and what are the difference between all those nodes.

<table>
<thead>
<tr>
<th>( \bar{\Delta} )</th>
<th>BS</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS</td>
<td>0</td>
<td>X</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>S1</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>S2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>S3</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>0</td>
</tr>
<tr>
<td>S4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>X</td>
<td>0</td>
</tr>
<tr>
<td>SS</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Table.1 Markov table for above straight topology
Figure 3. Showing the three nodes and base station

<table>
<thead>
<tr>
<th></th>
<th>BS</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS</td>
<td>0</td>
<td>.1</td>
<td>.1</td>
<td>.1</td>
</tr>
<tr>
<td>S1</td>
<td>.1</td>
<td>0</td>
<td>0</td>
<td>.3</td>
</tr>
<tr>
<td>S2</td>
<td>.1</td>
<td>0</td>
<td>0</td>
<td>.3</td>
</tr>
<tr>
<td>S3</td>
<td>0</td>
<td>.2</td>
<td>.3</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2. The differences between three nodes and base station for figure 2.

\[
\text{DiF}(S1, S2) = \sum_{\text{SS}}(S1, S2, S3) + \sum_{\text{SS}}(S2, S3) = \text{DiF}(S1, S2, S3)
\]  

(6)

\[
\text{DiF}(S2, S3) = \sum_{\text{SS}}(S2, S3, S4) + \sum_{\text{SS}}(S3, S4) = \text{DiF}(S2, S3, S4)
\]  

(7)

\[
\text{DiF}(S3, S4) = \sum_{\text{SS}}(S3, S4, S5) + \sum_{\text{SS}}(S4, S5) = \text{DiF}(S3, S4, S5)
\]  

(8)

The difference between two signatures of the two the nodes is denoted by sigma. At base station traces of the attack is actually the difference from leading nodes to the leaf nodes in the topological path. In equation (3), the difference at base station is actually equal to the difference at all the network nodes from (SS) node to (S1) node and then to (BS). The differences between nodes at different level are compared and signature updates move from place to place in the network.

Performance Evaluation
The performance of the proposed local-IDS is analyzed with network layer attacks. Here the attacker aim is not gain the control of the system but to utilize the system resources in a specific way to degrade system performance. These attacks usually hit on the individual node resources (CPU power, memory and power) by engaged them in tacking unnecessary decisions. The network bandwidth is also utilized by creating bogus and unnecessary traffic and keep the links busy all time. Table-3 shows the simulation parameters and its values for 600 × 600 campus network topology.

Table-3 NS-2, Simulation parameters and statistics

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data collection time interval</td>
<td>5 seconds</td>
</tr>
<tr>
<td>interval (periodic)</td>
<td></td>
</tr>
<tr>
<td>Interval transmission time</td>
<td>.20 second</td>
</tr>
<tr>
<td>Speed range of nodes</td>
<td>2 meters/second-8 meters/seconds</td>
</tr>
<tr>
<td>Topology shape</td>
<td>600 × 600 meter</td>
</tr>
<tr>
<td>Radio Range of each node</td>
<td>150-200 meters</td>
</tr>
<tr>
<td>Node moments</td>
<td>Random</td>
</tr>
<tr>
<td>Base Station Moment</td>
<td>Random/static</td>
</tr>
<tr>
<td>Topological Model</td>
<td>Multi hop planner</td>
</tr>
<tr>
<td>Maximum speed of a node</td>
<td>5 meters/second</td>
</tr>
<tr>
<td>Transmission Capacity</td>
<td>1.5 Mbps</td>
</tr>
<tr>
<td>Set Node count</td>
<td>20</td>
</tr>
<tr>
<td>Data payload</td>
<td>512 bytes/packet</td>
</tr>
<tr>
<td>Testing execution time</td>
<td>40 seconds</td>
</tr>
<tr>
<td>Total flows</td>
<td>10</td>
</tr>
<tr>
<td>Average transmission per flow</td>
<td>2 packets per second</td>
</tr>
</tbody>
</table>

The series of tables are showing the experimental results for system performance. The variation in the experimental results is based on the designation of define traces and how strictly define the analyzer module. If the analyzer module is designed with strong definition (tightly coupled) and with little bit large database traces then the system false positive rate will be high and the system will also tack time in analysis and system performance will be degrades. The proposed IDS are analyzed with three types of attacks; these are flooding, black hole and sleep deprivation attacks.

Flooding Attack: In flooding the network resources are tire out and to utilize the resources in such way to completely paralyze it. It severely degrade the MANETs performance by target network bandwidth and most of time, it causes the depletion the computational and battery power of MANETs node [38]. The AODV protocol create flood by sending RREQs for unknown destination. The ultimate goal of this attack to consumed the network bandwidth and utilizes the individual nodes resources which lead to DoS (Denial-of-Service) attack. Flooding can be stopped and the avoided by continuously checking the network condition. The proposed IDS prevent this attack by continuously monitored and check the network condition. It check the neighbor RREQs and block it if exceed certain pre-define threshold. But, it stopped flooding at certain level but cannot stop all flooding packets if below the specific threshold. Final decision is making on final network performance. The throughput of the system is checked with three variations. The graphs clearly show the throughput of the system.
Flooding attack and proposed scheme

Black hole Attack: The attacker node share false routing information with their neighbors’ nodes and instruct them to perform accordingly. This false routing information misleads normal nodes to send information to other nodes or cluster head. The attacker node or false cluster head then misuse or drop this information [39]. To prevent it, new packets CREQs (route confirmation requests) and CREP (route confirmations reply) are used [38]. The proposed local-IDS prevent it by sending fresh packets from BS to last/leaf nodes. The intermediate nodes update its traces by comparing its previous to new updates.

Throughput with black hole attack

Sleep Deprivation: The most critical nodes (cluster heads) are targeted by continuously engage them in choosing and selecting different routing paths and tacking decisions from time to time. Malicious node continuously changes the destination for targeted node again and again or it can also send request for non-existing nodes [39]. Malicious node having more resources and it enforces the neighboring node for tacking some unnecessary decision for collecting and forwarding data. All these operation leads abnormal behavior by utilizing the network bandwidth and nodes batteries and degrade overall system performance. The proposed local-IDS compared and analyze the network performance.

Throughput with sleep deprivation attack

The series of the table show the detection rates and the sensitivity of the local-IDS for different type of attacks. The different values tell about the system that how strictly it has been designed.
<table>
<thead>
<tr>
<th>Type of Attack</th>
<th>Detection Rate %</th>
<th>False Positive Rate %</th>
<th>False Negative Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding</td>
<td>100%</td>
<td>5.8%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Sleep Deprivation</td>
<td>86%</td>
<td>6.2%</td>
<td>2.7%</td>
</tr>
<tr>
<td>Blackhole</td>
<td>96%</td>
<td>3%</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

Table 4

<table>
<thead>
<tr>
<th>Type of Attack</th>
<th>Detection Rate %</th>
<th>False Positive Rate %</th>
<th>False Negative Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding</td>
<td>100%</td>
<td>2.1%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Sleep Deprivation</td>
<td>89%</td>
<td>3.1%</td>
<td>3.1%</td>
</tr>
<tr>
<td>Blackhole</td>
<td>98%</td>
<td>3.8%</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

Table 5

<table>
<thead>
<tr>
<th>Type of Attack</th>
<th>Detection Rate %</th>
<th>False Positive Rate %</th>
<th>False Negative Rate %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flooding</td>
<td>98.7%</td>
<td>1.3%</td>
<td>3.8%</td>
</tr>
<tr>
<td>Sleep Deprivation</td>
<td>88%</td>
<td>6.2%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Blackhole</td>
<td>99.4%</td>
<td>4.2%</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

Table 6

**Conclusion:** Resource restrictions (bandwidth, processing capabilities, battery life and memory) of mobile devices in MANETs lead tradeoff between security and resources consumption. In MANETs, proactive security mechanism like authentication, confidentiality, access control and non-repudiation are very difficult to implement. For better QoS and good security, some additional security requirements are also desired, like co-operation fairness, location confidentiality, data freshness and absence of traffic diversion. Instead of traditional security mechanisms some reactive security mechanism is required who analyze the routing packets and also check the overall network behavior of MANETs. Here we propose a local-DIDS for ad hoc mobile networks. In the proposed distributed-DIDS, each mobile node works as a smart agent. Data collect by node locally and it analyze that data for malicious activity. If any abnormal activity discover, it informs the surrounding nodes as well as the base station. It works like a Client-Server model, each node works in collaboration with server, updating its database each time by server using Markov process. The proposed local distributed-DIDS shows a balance between false positive and false negative rate. Re-active security mechanism is very useful in finding abnormal activities although proactive security mechanism present there. Distributed local-DIDS useful for deep level inspection and is suited with the varying nature of the MANETs.

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DETERMINANTS OF THE REAL EXCHANGE RATE: EVIDENCE FROM PAKISTAN ECONOMY

MUHAMMAD TARIQ

ABSTRACT Previous studies for Pakistan focused on the domestic drivers of exchange rate (nominal or real) fluctuations. This paper extends the analysis to the role of foreign factors in the determination of Pak-rupee real exchange rate (RER) by using a two variant backward looking modeling approach. For this purpose a large span of data over the period 1973-2008, consist on the two regime shifts (i.e. occurred during 1982 and 2000) is used. Our results show that exchange rate fluctuations during the sample period have historically been accounted for both domestic and foreign variables i.e. domestic inflation, domestic interest rate, US interest rate and US inflation. Exchange rate regime policies are also showed to be relevant.

Keywords: Real exchange rate, Regime shifts, Two variant approach, Purchasing power parity, Newy-West test

1. Introduction Movement of the world major economies towards the floating exchange rate system in 1973 increased the variability in both the nominal and real exchange rate. This is also true for those countries which even preferred to keep fixed regime(Mussa, 1986). With this development exchange rate become the central focus of the monetary authorities in both developed and developing countries. Exchange rate in nominal form measures the strength of a country’s currency in the foreign exchange market. However, it does not take into consideration the role of the price differential between the two countries. In contrast, the real exchange rate measures the proportionality between the purchasing power of two countries’ currencies by taking into account also the price levels. Real exchange rate helps a country in the judgment of its trade competitiveness in the international market. It plays a key role in an economy and instability in it hinder investment, trade flow and economic growth (Frankel and Rose, 2002; Broada and Romalis, 2003). Similarly, Cottani et al. (1990) and Sekkat and Varoudakis(2000) mentioned that real exchange rate instability is a major factor responsible for the weak economic performance of developing countries.

For understanding the variability of real exchange rate (RER) one of the appropriate approach is to find out the factors that causes fluctuations in it. Although identification of the factors of RER can be useful for the monetary authorities to maintain economic stability and solving the monetary ills. However, it is still a debatable issue and there is no agreed consensus exists in the literature over its specific determinants. Stancik and Prague(2007), mentioned that inflation, exchange rate regimes, interest rates, output level and domestic and foreign money supply are the general factors affecting the real exchange rate. Kumar (2010) found out that productivity differential, trade openness and terms of trade influence the real exchange rate. Similarly, Orlowski (2004) referred that domestic inflation and interest rate, Medeiros, et al (1997) and Agenor, et al (2002) foreign interest rate, and Hsing (2007) foreign interest rate and domestic inflation are the main determinants of real exchange rate. Balassa-Samuelson (1964), Jakab and Kovacs (1999), Alexis (2001) and Aleisa and Dibooglu (2002) stated that supply side factors (productivity shocks) are the important determinants of real exchange rate. Hau(2000) and Lee and Lin (2003) found out that both monetary and supply side factors affect the real exchange rate. In contrast, Clarida and Gali (1994) and Rogers (1999) mentioned that real exchange rate shows a depreciation/devaluation of the domestic currency (rupee) against foreign currency(dollar) and vice versa.

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Email: tariq_noor@awkum.edu.pk/tariq_noor82@yahoo.com
3 The nominal exchange rate is defined here is the domestic currency price of foreign currency i.e. PKRs USD. Whereas, the real exchange is defined the nominal exchange rate between domestic (PAK) and foreign (USA) countries adjusted for the relative prices of goods. A rise in both nominal and real exchange rate shows a depreciation/devaluation of the domestic currency (rupee) against foreign currency (dollar) and vice versa.

3 There is no specific theory or model which helps in successful determination of real exchange rate. Although Mark (1995), Richard and Rogoff (1983) and Chinn and Meese (1995), claimed some success in prediction of behavior of real exchange rate, however these studies are limited to particular countries and currencies and cannot be generalized.
exchange rate is mostly affected by monetary and demand side factors and the role of supply side factors is minimum. Similarly, Chen (2004), Inoueand Shigeyuki (2009) and Juvenal (2010) found out that real exchange rate is affected by demand side factors and the role of monetary factors is less important. Edwards (1988) stated that in the short run both monetary and real and in the long run only real factors determine the real exchange rate. However, Enders, et al. (1997) and Wang (2004) stated that only the real(demand and supply) factors bring variation in real exchange rate. Conversely, Grilli and Kaminsky (1991), argued that real and monetary factors are the main determinants of real exchange rate variability.

Similarly, the evidences whether regime shifts have any influence on RER are also mixed and contradictory in the literature. Liang (1998) and Harbinger and Wijeweera (2010) concluded that regime shift does not influence there exchange rate. In contrast, Stockman (1983), Kocenda (1998) and Kocenda and Valachy (2006) found out that regime shifts are not neutral and the behavior of RER is different under different regimes i.e. its variability increased under a flexible exchange rate system.

Like, other developing countries Pakistani rupee also showed a downward fluctuated pattern during the last four decades. In 1971, the rupee is delinked from pound sterling and attached with US dollar. After devaluation of 130% in nominal terms of rupee during 1972, the nominal exchange rate appreciated from 11.03 to 9.9 i.e. 10.24% in nominal terms and 13.70% in real terms. After that the exchange rate of rupee is kept fixed against US dollar for almost 9 year i.e. 1973 to 1981. However, at the beginning of 1980s the US economy faced a large budget deficit, which forced the government to raise the interest rate. This increase in the US interest resulted in a massive inflow of capital from abroad and leads to appreciation of dollar against rupee. Since rupee is attached with dollar, it is also overvalued because of the market pressure. This made Pakistan’s exports expensive and imports cheaper in the international market and resulted in the deterioration in the trade balance. Hence, for maintaining exports competitiveness in the international market and improving trade balance the State Bank of Pakistan (SBP) delinked the rupee from US dollar and moved to a managed float system in 1982. With this move, the nominal exchange rate of rupee increased from 9.9 to 12.84 i.e. it is devalued 29.69% in nominal terms and 24.74% in real terms. In 2000, the State Bank of Pakistan adopted a market based exchange rate system. However, the rupee continued its downward movement and the nominal exchange rate further devalued from 51.78 in 1999 to 58.03 in 2000 i.e. showed a decline of 12.07% in nominal terms and 11.87% in real terms respectively. During 2008 the nominal exchange rate was 62.55 showed a depreciation of 2.17% in nominal terms. However, in real terms the rupee showed an appreciation of 6.02%. (For detail see table 1, Appendix c).

The above discussion makes it clear that there is a need to assess the causes of fluctuations in the real exchange rate of Pakistan. Although there is already some empirical work has been done for examining the determinants of both nominal and real exchange rate in Pakistan i.e. Ahmed, 1992; Chishti and Hasan, 1993; Afridi, 1995; Siddiqui et al, 1996 etc. However, none of the studies accounted for the role of foreign factors in the determination of real exchange rate and focused only on domestic variables. Second, all the studies ignored the role of structural shifts i.e. regime shifts in the behavior of real exchange rate. Third, all of these studies defined real exchange rate in internal terms i.e. in terms of tradable and non-tradable goods.

The paper contributes to the literature to fill in the gap in the existing knowledge on the issue in several aspects. First, unlike the previous studies for Pakistan it examines the role of both the domestic and foreign factors in the determination of real exchange rate of Pakistan and focused only on domestic variables. Second, all the studies ignored the role of structural shifts i.e. regime shifts in the behavior of real exchange rate. Third, all of these studies defined real exchange rate in internal terms i.e. in terms of tradable and non-tradable goods.

4 Kent and Naja (1998) and Carrera and Vuletin (2003) argued that higher variability in exchange rate under flexible regimes is due to the relative sluggishness in price adjustment.

5 In this study exchange rate system and exchange regime will be used interchangeably.

6 Whereas, it was the largest devaluation of rupee in the history of Pakistan.

7 Although Afridi (1995), also used a dummy variable for three regimes periods i.e. two fixed(1960-1972, 1973-82) and one flexible(1983-1990) in his paper. However, his results do not give a clear picture of the role of regime shifts in the determination of real exchange rate of Pakistan. Also his sample size and regimes periods are different from the sample size and regimes periods used in this study.

8 However, the foreign variables are taken so that it is assumed that domestic policies (monetary or fiscal) have no influence on it. It is also assumed that the country is dependent for its exports and imports and it cannot influence the prices in the international market.

Further, the monetary authority is following an open economy Taylor rule where interest rate is used as a policy instrument and it also reacts to exchange rate fluctuations.
Unlike the previous studies for Pakistan instead of defining the RER in internal terms it is defined in external terms. Fourth, all the data is converted into cyclical form after excluding the trend from it by using Hodrick-Prescott method. Two research questions have been answered in this paper. First, what are the factors that causes fluctuations in the RER of Pakistan?. Second, whether regime shifts play any role in determination of RER or not?. The results show that both domestic and foreign factors determine the RER of Pakistan. Also, regime shifts are not neutral and it affects the RER of Pakistan.

The rest of the paper is organized as follows. Section-2 deals with the theoretical framework of the model. Estimation results are given in Section-3. Whereas, in Section-4, the study is concluded.

2. Theoretical Framework

Generally two approaches are used for the measurement of real exchange rate (RER). One approach is to compute RER in internal terms by multiplying the nominal exchange rate with the relative prices of tradable and non-tradable goods i.e. \( q = \frac{eP^*_f}{P^N} \) (Khan and Qayyum, 1987; Faruqee, 1995). However, this definition of the RER can be more useful when the purpose of the study is to measure the trade competitiveness of a country in the international market. It shows both internal and external equilibrium of an economy simultaneously. However, for empirical analysis and especially in developing countries because of general lack of data and unavailability of appropriate proxies for price indexes, RER is usually measured in form of “\( Q = E \frac{P^*_f}{P} \)” (Edwards, 1988). Here, \( Q \) stands for the real exchange rate, \( E \) for the nominal exchange rate, \( P \) and \( P^* \) for the domestic and foreign price indexes respectively. One benefit of defining RER in this way is that it is based on the purchasing power parity doctrine\(^8\)(PPP) which offers a basic economic model for its explanation. Another advantage of defining the RER in this way is that it is determined by the internal price structure across countries which provide better established link between the goods and assets markets of the two countries and it is easily extendable by incorporating more real and monetary variables. For computation of the RER Pakistan rupee is taken as quoted currency and US dollar is a based currency i.e. (PKR vs USD). The RER is computed against United States(US) dollar keeping in view the fact that US is one of the major trading partner of Pakistan with import and exports shares of 18.5% and 5.4% among the top four trading partners i.e. United Kingdom(UK) (2.6%, 4.9%), Japan (3.6%, 0.6%), Germany (3.8%, 4.2%), and Saudi Arabia (12.3%, 2.6%) respectively (Economic Survey of Pakistan, 2008-09). The second reason is that Pakistan’s major part of international trade is invoiced in US dollar. The third reason is that US dollar is the most trading currency in the world markets because of its stable value. Hence, the RER of Pakistani rupee against US dollar will take the following form:

\[
Q_{PK/US} = E_{PKR/USD}(P^US / P^PK)
\]

(1)

Here, \( Q_{PK/US}, E_{PKR/USD}, P^US \) and \( P^PK \) stand for real exchange rate, nominal exchange rate, and price indexes of the Pakistan and USA. Whereas, in growth terms the RER will become like as under:

\[
Q_{PK/US} = E_{PKR/USD} + P^US - P^PK
\]

(2)

Here, \( Q_{PK/US}, E_{PKR/USD}, P^US \) and \( P^PK \) are the real exchange rate, nominal exchange rate, and Pakistan and USA price levels in growth terms. However, as the RER used in this study is a combination of three regimes i.e. fixed\(^9\), managed float and full float exchange rate systems. Hence, the structure of RER under different exchange rate systems will be like as below:

\[
\]

(5)

\[
\]

(6)

\[
\]

(7)

Equation (5) shows the measurement of real exchange rate(RER) of Pakistan under the fixed exchange rate period. Whereas, equations (6) and 7 show the structure of RER under the managed float and full float periods. Hence, for the full sample period RER will be a combination of all the three regimes periods and will be like as under:

\[
Q_{PK/US} (1973-2008) = e + (\pi^US - \pi^PK)
\]

(8)

\(^8\)For detail analysis of purchasing power parity theory see Cassel (1918), Edison (1987), Patel (1990), Bhatti(1996), Alba and Park(2003) and Mohammad et al (2009) etc.

\(^9\)During the study period the first regime of Pakistan is based on fixed exchange rate system against US dollar and lost for 9 years from 1973 to 1981. As in this study real exchange rate is used instead of nominal exchange rate hence the movement i.e. increase or decrease in the real exchange rate for this period will be determined only by the price differential of domestic and foreign countries only for that particular period.
Now for examining the role of the different factors (domestic and foreign) and of two regime shifts i.e. Regm1 (occurred in 1982) and Regm2 (occurred in 2000) during the study period a backward looking framework has been designed. The general form of the model is as under:

\[ q = f(x + z) \]  

(9)

Equation (10) shows the general functional form of the model used in this study. Here “q” stands for RER, “x” is taken as a vector for explanatory variables and “z” is a vector for the two regime shifts i.e. Regm1 and Regm2.

First, for examining the role of both domestic and foreign factors in the determination of real exchange rate (RER), equation (9) is transformed into the following equation which is given as under:

\[ q_{it} = \gamma_0 + \sum_{t=1}^{T} \gamma_{iit} (\pi_{it}) + \lambda_{ipk}(\pi_{it-pk}) + \lambda_{tpk}(tb_{it-pk}) + \lambda_{us}(v_{it}) + \sum_{j=1}^{J} \gamma_{ji} (q_{jt}) + \epsilon_t \]  

(10)

Whereas, \( (\text{Regm}_2 = \text{Regm}_1 = 0) \) Here \( i = 1,2,..4 \) \( j = 1...2 \)

Equation (10) is a backward looking unrestricted model used for examining the role of different factors in the determination of RER(\( q_{it} \)) of Pakistan. Here, four variables i.e. domestic Inflation gap(\( \pi_{it-pk} \)), domestic interest rate gap(\( \delta_{it-pk} \)), domestic trade balance gap(\( \delta_{it-pk} \)) and foreign interest rate gap(\( \delta_{it-us} \)) have been included in the model as explanatory variables. However, the variables \( \pi_{it}, \delta_{it-pk}, \delta_{it-us} \), and \( \delta_{it-pk} \) have been taken in lag forms i.e. \( \pi_{it-pk}, \delta_{it-pk}, \delta_{it-us} \) whereas, \( \delta_{it-pk} \), and \( \delta_{it-us} \) are used in contemporaneous form. Lags of the real exchange rate (\( q_{it} \)) are also included in the model for showing its influence on RER(\( q_{it} \)). Whereas, \( \lambda_{ipk}, \lambda_{tpk}, \lambda_{us} \) and \( \lambda_{gpk} \) are the related coefficients and \( \lambda_0 \) stands for the intercept term. Whereas, \( \epsilon_t \) represents the error term. The two dummy variables are set equal to zero (\( \text{Regm}_1 = 0, \text{Regm}_2 = 0 \)) which shows that the role of the regime shifts is not considered. However, if the constraints (\( \text{Regm}_1 = 0, \text{Regm}_2 = 0 \)) are not relaxed and the role of the two regime shifts is also considered in the determination of RER(\( q_{it} \)), then in that case equation (10) will be changed into the following form:

\[ q_{it} = \lambda_1 + \sum_{t=1}^{T} \gamma_{iit} (\pi_{it}) + \lambda_{ipk}(\pi_{it-pk}) + \lambda_{tpk}(tb_{it-pk}) + \lambda_{us}(v_{it}) + \lambda_{Regm1}(\text{Regm}_1) + \lambda_{Regm2}(\text{Regm}_2) + \sum_{j=1}^{J} \gamma_{ji} (q_{jt}) + \epsilon_t \]  

(11)

Whereas, \( 1 \) for \( \text{Regm}_1 \), \( 0 \) otherwise \( \) \( i = 1,2,..4 \) \( j = 1...2 \)

Equation (11) represents an unrestricted model where the role of the two regime shifts has been also taken into account. Here both the dummy variables i.e. \( \text{Regm}_1 \) and \( \text{Regm}_2 \) are included in the model so that \( \text{Regm}_1 \) takes the value “1” for the full period of the second regime (1982-1999) and “0” for the other two regimes i.e. 1973-1981 and 2000-2008. Similarly, \( \text{Regm}_2 \) takes the value “1” for the full period of the third regime (2000-2008) and “0” for the other two periods i.e. 1973-1981 and 1982-1999. Here both the dummy variables are included for the shifts in intercept which will affect \( q_{it} \) directly in case if both of these variables turned significant. The coefficient “\( \lambda_1 \)” represents the intercept term.

However, if instead of including both the domestic and foreign variables directly their differential is taken, in that the restricted model given in equation (10) will become like as under:

\[ q_{it} = \lambda_2 + \sum_{t=1}^{T} \gamma_{itd}(\pi_{it-d}) + \lambda_{ipd}(\pi_{it-pd}) + \sum_{t=1}^{T} \gamma_{itd}(q_{jt-d}) + \epsilon_t \]  

(12)

Whereas, \( (\text{Regm}_1 = \text{Regm}_2 = 0) \) \( i = 1,2,..4 \) \( j = 1...2 \)

Equation (12) shows the restricted form of the backward looking model, where the differential variables (the difference between domestic and foreign counterpart variables) are included in the model for investigating its role in the determination of the RER(\( q_{it} \)) of Pakistan. Only four variables i.e. two domestic and two foreign are selected for this purpose. The first variable shows the difference between domestic and foreign inflation rates i.e. \( \pi_{it-d} = \pi_{it-pk} - \pi_{it-us} \) and the second shows the difference between the domestic and foreign interest rates i.e. \( \delta_{it-pd} = \delta_{it-pk} - \delta_{it-us} \). Also like equation (10) the lags of \( \text{RER} (q_{it-pk}) \) have also been included in the model. Here, \( \gamma_{itd} \) and \( \gamma_{itd} \) are the related coefficients whereas, \( \lambda_2 \) stands for intercept term.

Now if the role of the two regime shifts i.e. \( \text{Regm}_1 \) and \( \text{Regm}_2 \) is also considered in that case equation (12) will be transformed into the following model:

\[ q_{it} = \lambda_3 + \sum_{t=1}^{T} \gamma_{itd}(\pi_{it-d}) + \lambda_{ipd}(\pi_{it-pd}) + \lambda_{Regm1}(\text{Regm}_1) + \lambda_{Regm2}(\text{Regm}_2) + \sum_{t=1}^{T} \gamma_{itd}(q_{jt-d}) + \epsilon_t \]  

(13)
Equation (13) shows the unrestricted form of the backward looking model given in equation (12) where two dummy variables i.e. Regm_i and Regm_j are also included. Whereas, \( \lambda_3 \) represents the intercept term.

Now before moving to the empirical section given in section-3, it is important to understand the channels of relationship between the different explanatory variables and RER. It is known that under a fixed exchange rate system the nominal exchange rate is fixed and it is determined by the monetary authority whereas under a floating system it is determined by the interaction of the market demand and supply forces. However, as in this study instead of nominal exchange rate, real exchange rate (RER) has been used hence it will show upward and downward movements under both the fixed and flexible exchange rate systems. However, under the fixed exchange rate system the RER- will only be the difference between the domestic and foreign inflation rates. Whereas, under the floating regime the RER will take into account both the shifts in nominal exchange rate and the inflation rates. Hence, it is clear that unlike the nominal exchange rate, the RER shows fluctuations under both the fixed and floating exchange rate systems and it is determined by the market demand and supply forces.

Hence, the general form of the relationship between the market demand and supply factors and real exchange rate will be like as under:

\[
\uparrow \Delta_{D_{PKR}} \rightarrow \downarrow \Delta_{S_{PKR}} \rightarrow \downarrow \Delta_{Q_{PKR}} \rightarrow \downarrow \lambda_{q_{PKR}}
\]

Here, the arrows “↑” and “↓” show the up and downward movements and the arrow “―” shows the direction of the relationship between variables. The above relationship shows that an increase in market demand for rupee (\( \Delta D_{PKR} \)) will decrease its market supply (\( \Delta S_{PKR} \)). This will in turn decrease the quantity of rupee (\( \Delta Q_{PKR} \)) in the foreign exchange market which will ultimately decrease (appreciate) the RER (\( \lambda_{q_{PKR}} \)) of Pakistan and vice versa.

Now keeping the above general relationship as a focal point the relationship between all the explanatory variables used in this study and the RER will be like as under:

\[
(\uparrow \Delta \pi^{i}_{PAK} \text{ and } \uparrow \downarrow \pi^{j}_{USA}) \rightarrow (\uparrow \lambda q^{i}_{PKR})
\]

The above relationship shows the interaction between domestic (\( \pi^{i}_{PAK} \)) and foreign (\( \pi^{j}_{USA} \)) inflation rates and RER (\( \lambda q^{i}_{PKR} \)). It shows that a rise in inflation in Pakistan will overvalue the rupee value which will decrease the foreign demand for domestic exports and ultimately increase RER and vice versa. Similarly, a rise in the foreign inflation will increase prices of imported inputs which will increase the cost of production in the domestic country. This will increase inflation rate and will ultimately results in the depreciation of RER.

\[
(\uparrow \Delta i^{i}_{PAK}) \rightarrow (\downarrow q^{i}_{PKR}) \text{ and } (\uparrow \downarrow i^{j}_{USA}) \rightarrow (\uparrow \lambda q^{i}_{PKR})
\]

Similarly, the above relationship shows that how domestic (\( i^{i}_{PAK} \)) and foreign (\( i^{j}_{USA} \)) interest rates influence the RER(\( q^{i}_{PKR} \)). It shows that an increase in domestic interest rate will attract foreign investment inflow in the country. This will appreciate the real exchange rate via increase demand for rupee and vice versa. Conversely, if there is an increase in the US interest it will reduce the foreign investment inflow in the domestic country and will ultimately depreciates RER via decrease demand for rupee and vice versa.

\[
(\uparrow \Delta b^{i}_{PAK}) \rightarrow (\downarrow q^{i}_{PKR})
\]

Trade balance also play a major role in the determination of the rupee value of a country. The above relationship shows that if there is an improvement in the domestic trade balance(\( b^{i}_{PAK} \)) it will increase foreign demand for rupee which will ultimately results in the appreciation of the RER through various channels i.e. improvement in terms of trade, increase in foreign investment inflow etc. and vice versa.

\[
(\uparrow \Delta \text{rem}^{i}_{PAK}) \rightarrow (\downarrow q^{i}_{PKR})
\]

Workers’ remittances also play an important role in the determination of currency value and it accounts for a large part in Gross Domestic Product in Pakistan. The relationship shows that an increase in remittances (\( \text{rem}^{i}_{PAK} \)) will increase the investment activities in the domestic country which will rise exports production and demand and ultimately results in the appreciation of RER and vice versa.
3. Estimation Results

The empirical analysis is divided into two parts i.e. Part-1 and Part-2 respectively on the basis of a two variant approach. A backward-looking framework has been adopted for estimation in both the parts. Whereas, instead of focusing on the behavior of RER in the long run this study is focused only on the short term movements in RER after obtaining the cyclical components of the data by using Hodrick-Prescott Filter method. Specifically, the explanatory variables included in the models are domestic inflation gap(\(\pi_{t}^{g}\)), domestic interest rate gap(i_{t}^{gpk}), domestic trade balance gap(b_{t}^{gpk}), domestic remittances gap(rem_{t}^{g}), foreign inflation gap(\(\pi_{t}^{s}\)) and foreign interest rate gap(i_{t}^{spk}). Also as the sample size of this study consist on three regimes i.e. fixed exchange rate system (1973-1981), managed float exchange system (1982-1999), and floating exchange rate system (2000-2008) hence for this purpose two dummy variables i.e. Regm_{1} and Regm_{2} have also been included in the model for examining its impact on \(\text{RER}(q_{t}^{g})\). Whereas, where Regm_{3} is a dummy variable represents the shift towards the managed float exchange rate system occurred in 1982 and Regm_{2} is the dummy variable stands for the shift towards the full float exchange rate system occurred in 2000. The subscript “g” on the variables shows that all the variables are in cyclical form.

For analysis Ordinary Least Squares method has been used. In Part-1, two regressions i.e. Regression-1 and 2 given in table.1 are computed. Regression-1 is derived for examining the role of both domestic and foreign variables in the determination of \(\text{RER}(q_{t}^{g})\) after imposing the restrictions i.e. Regim_{1} = 0 and Regim_{2} = 0. Both the restrictions show that the role of the regime shifts is not considered. However, in Regression-2 the impact of the two regime shifts is also considered and the restrictions Regim_{1} = 0 and Regim_{2} = 0 are relaxed. The main purpose here is to find out that whether regime shifts are neutral or play any role in determination of \(\text{RER}\).

Similarly, in Part-2 two more regressions are computed which are given in table.3. However, here unlike table.1, instead of including both the domestic and foreign variables directly, their differentials have been taken. For this purpose two domestic variables(\(\pi_{t}^{g}, i_{t}^{g}\)) and two foreign variables(\(\pi_{t}^{s}, i_{t}^{s}\)) are selected. The domestic variables are selected on the basis of the foreign variables. For the selection of the foreign variables (\(\pi_{t}^{s}, i_{t}^{s}\)), United States(US) is selected as a foreign country. The US economy is selected on the basis of two reasons. One reason is that as in this study the \(\text{RER}(q_{t}^{gpk/\pi})\) for Pakistan is computed against USA. The Second reason is that United States is the major trading Partner of Pakistan. Only two foreign variables i.e. inflation(\(\pi_{t}^{s}\)) and interest (i_{t}^{s}) are taken by considering it the most important factors affects the exchange rate of Pakistan. The difference between the domestic and foreign variables is computed so that for computing inflation differential rate, US inflation rate is subtracted from Pakistan inflation rate i.e. \(\pi_{t}^{d} = \pi_{t}^{g} - \pi_{t}^{s}\). Similarly, for the computation of the interest rate differential, US interest rate is subtracted from the Pakistan interest rate i.e. \(i_{t}^{d} = i_{t}^{g} - i_{t}^{s}\).

Like table.1 of part-1 two regressions (Regression-1 and 2) are derived. First, Regression-1 is computed to investigate the role of the differential variables (DVs) in the determination of \(\text{RER}(q_{t}^{g})\) with the imposition of the restrictions i.e. Regim_{1} = 0 and Regim_{2} = 0. After that Regression-2 is computed where the role of the two regime shifts have also been considered in the determination of \(\text{RER}(q_{t}^{g})\) by relaxing the restrictions Regim_{1} = 0 and Regim_{2} = 0 in the presence of differential variables (DVs). The main purpose here is to find out how \(q_{t}^{g}\) behaves if instead of including both domestic and foreign variables directly their differential is taken. Also to know that whether regime shifts play any role in the determination of \(\text{RER}\) in the presence of the DVs or not?. The results derived are as follows.

Part-1

In Part-1, table.1 shows the results obtained for the two regressions i.e. Regression-1 and Regression-2. First, Regression-1 results are computed with restrictions Regm_{1}=0 and Regm_{2}=0 for examining the role of both the domestic and factors i.e. \(\pi_{t}^{gpk}, i_{t}^{g}, b_{t}^{gpk}, i_{t}^{s}\) in the determination of real exchange rate. After that Regression-2 results are derived and the restrictions Regm_{1}=0 and Regm_{2}=0 are relaxed. The purpose here is to examine that whether regime shifts play any role in the determination of the \(\text{RER}\) of Pakistan or not. The detail is given in table.1 as below.

Table.1

| Dependent Variable: q_{t}^{g} |

11 In part-1, the model is not a pure backward looking model and some variables have been included in it contemporaneously. However, in part-2 a pure backward looking model has been used where only lags of all the variables have been included.

12 For a detail discussion about all the variables see Appendix A.

13 Each equation is computed separately by using Ordinary Least Squares method. However, to avoid the problems of spurious relationship between the variables and series implications for the t-statistic, standard errors and Durbin Watson(DW) statistic, Newey-West HAC (Heteroskedasticity and Autocorrelation Consistent) is applied.
Method: Least Squares
Newey-West HAC Standard Errors and Covariance


<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Regression-1 Coefficient (S.E.)</th>
<th>Regression-2 Coefficient (S.E.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \pi_{t,1} )</td>
<td>-0.730115*** (0.231258)</td>
<td>-0.561270** (0.161174)</td>
</tr>
<tr>
<td>( \pi_{t,2} )</td>
<td>0.824647*** (0.262542)</td>
<td>0.832545*** (0.193420)</td>
</tr>
<tr>
<td>( \pi_{t,3} )</td>
<td>-0.322134* (0.164032)</td>
<td>-0.395448*** (0.150420)</td>
</tr>
<tr>
<td>( \pi_{t,4} )</td>
<td>0.657441*** (0.128270)</td>
<td>0.669502*** (0.097005)</td>
</tr>
<tr>
<td>( i_{t,1} )</td>
<td>-0.810312* (0.401611)</td>
<td>-0.652078* (0.375838)</td>
</tr>
<tr>
<td>( t_b )</td>
<td>-8.88E-06* (4.61E-06)</td>
<td>-8.92E-06** (2.90E-06)</td>
</tr>
<tr>
<td>( r_m )</td>
<td>--------</td>
<td>-4.785253** (1.707835)</td>
</tr>
<tr>
<td>( i_{ma} )</td>
<td>0.806831** (0.217760)</td>
<td>0.693351*** (0.164366)</td>
</tr>
<tr>
<td>( Regm_1 )</td>
<td>--------</td>
<td>-2.817979** (0.792681)</td>
</tr>
<tr>
<td>( q_{t,1} )</td>
<td>-0.307195* (0.1675712)</td>
<td>-0.434699** (0.139841)</td>
</tr>
<tr>
<td>( q_{t,2} )</td>
<td>-0.403646** (0.170924)</td>
<td>-0.491666** (0.147075)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>R²</th>
<th>AdjR²</th>
<th>DW</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>0.69</td>
<td>0.54</td>
<td>2.14</td>
</tr>
</tbody>
</table>

- Asterisks **, *** stands for 90%, 95%, and 99% confidence level
- Figures in parenthesis show SEs(Standard Errors) of the estimates.
- The best regressions results are obtained by using AC criterion statistic, LM test and CUSUM stability test.
- Other variables Regm₂, Domestic output gap, foreign output gap and domestic government expenditures are dropped from the model after founding it insignificant. The intercept term is also dropped from the model.

The results of both the regressions i.e. Regression-1 and Regression-2 are given in table.1. The results of the Regression-1 show that all the variables turned out significant according to the theoretical expectations. It is found that domestic inflation(\( \pi_{t,1} \)) showed a lag influence on \( q_t \). It affects the \( q_t \) with four lags i.e. \( \pi_{t,1} \), \( \pi_{t,2} \), \( \pi_{t,3} \), and \( \pi_{t,4} \). The coefficients signs of \( \pi_{t,1}(-0.730115) \) and \( \pi_{t,4}(-0.322134) \) are negative, whereas the coefficients signs of both \( \pi_{t,2}(0.824647) \) and \( \pi_{t,3}(0.657441) \) are positive. However, the overall impact of \( \pi_{t,1} \) on \( q_t \) is positive i.e. (+0.824647) > (-0.730115) and (+0.657441) > (-0.322134) showing that an increase in \( \pi_{t,1} \) also increase(depreciates)\( q_t \). Similarly,
domestic interest rate ($i_{i, tpk}$) also remained significant with the expected negative sign. However, its effects are also transmitted to $q_t$, with a lag of one year i.e. $i_{i, tpk,-1}(-0.810312)$. This result shows that a 1% increase in $i_{i, tpk}$ will bring 0.81% decrease (appreciates/revalue) in $q_t$ via channels of foreign investment inflows etc. Similarly, as expectedly domestic trade balance ($tb_{tpk}$) also shows a negatively significant relationship with $q_t$, i.e. -8.88E-06. This result shows that an improvement in $tb_{tpk}$ will put a negative effect on $q_t$ through channels of improvement in terms of trade, foreign investment inflows etc. The impact of the domestic remittances inflow ($rem_{i, tpk}$) on $q_t$ has also been investigated however, it is dropped from the model after finding it insignificant. Similarly, the impact of the foreign interest rate ($i_{i, nw}$) on $q_t$ has been examined which is also turned out positively significant i.e. 0.806831. It shows that a 1% increase in $i_{i, nw}$ will increase the $q_t$ by 0.80%. This result is also according to expectations as an increase in foreign interest rate (US) i.e. $i_{i, nw}$ will decrease demand for domestic currency via channels of reduction in foreign investment inflow. This will increase the supply of domestic currency and ultimately leads to depreciation of $q_t$. Similarly, lags of $q_t$ have also been included in the model which also turned significant at lag-1 and 2 i.e. $q_{t-1}$ and $q_{t-2}$. The signs of both the lags are negative (-0.307195 and -0.403646). The value of the $R^2(0.69)$ shows that the explanatory variables explained most of the variations in $q_t$. Also, the Durbin-Watson (DW) statistic value is 2.14 which shows that there is no serial correlation problem in the residuals. These results are also confirmed by using the post diagnostic tests i.e. Q-statistic, LM-statistic and CUSUM-square test which are given in Appendix B.

Similarly, in Regression-2 two dummy variables represents the two regime shifts i.e. $Regm_1$ and $Regm_2$ have also been introduced for investigating its impact on $q_t$ after relaxing the restrictions $Regm_1=0$, $Regm_2=0$. $Regm_1$ is included in the model so that it takes the value of “1” for the full period of the managed float exchange rate system (1982-1999) and “0” otherwise. Similarly, $Regm_2$ is included in the model so that it takes the value of “1” for the full period of floating exchange rate system (2000-2008) and “0” otherwise. The main purpose here is to find out that whether regime shifts are neutral or not in respect to the behavior of $q_t$ in the presence of other explanatory variables. Both the dummy variables are included in the model. However, the coefficient of $Regm_1$ turned significant with a negative sign. Whereas, $Regm_2$ remained insignificant and showing no influence on $q_t$. The negative sign of the $Regm_1$ shows that a shift towards a more floating regime against fixed regime although increased the variability in $q_t$. However, it decreases the $q_t$ shows positive influence on rupee value against US dollar. Similarly, all the explanatory variables i.e. $\pi_{i, tpk}$, $tb_{tpk}$, $i_{i, nw}$, $i_{i, tpk}$ are still significant with the expected signs, and showing almost the similar impact on $q_t$ in terms of level of significance and magnitudes. The results show that $\pi_{i, tpk}$ is still shows a similar lag impact on $q_t$ and significant up to four lags i.e. $\pi_{i, tpk,1}$, $\pi_{i, tpk,2}$, $\pi_{i, tpk,3}$, $\pi_{i, tpk,4}$ like Regression-1. However, here the overall impact of $\pi_{i, tpk}$ on $q_t$ increased with the consideration of the regime shifts i.e. 0.545329 > 0.4229425. Similarly, $tb_{tpk}$ is still negative and affecting $q_t$ with a lag of one year i.e. $tb_{tpk,1}$. However, its effect on $q_t$ decreased comparatively i.e. 0.652078 < 0.810312. The $tb_{tpk}$ is still significant with a negative sign. However, its impact on $q_t$ is also increased i.e. 8.92E-06 > 8.88E-06. Similarly, $i_{i, nw}$ is also significant expectedly however, and its overall impact on $q_t$ decreased i.e. 0.693351 > 0.806831. This decrease effect of $i_{i, nw}$ is justified in the sense that as a shift towards a more floating regime enables the monetary authority to use its monetary policy more independently of foreign influences. Hence, the impact of the foreign interest rate $i_{i, nw}$ will be minimum and defendable in comparison to fixed exchange rate system. Also with the inclusion of the dummy variables for the regime shifts unlike Regression-1, in Regression-2 domestic remittances ($rem_{i, tpk}$) also turned significant with the expected negative sign. This shows that with a 1% increase in $rem_{i, tpk}$ will decrease $q_t$ by 4.78% via channels of rise in domestic investment activities and exports production etc. The lags of $q_t$ are still significant with negative signs. The $R^2(0.77 > 0.69)$ is also improved and the DW statistic (2.21) valueshow that these results are reliable which is also supported by the Q-statistic, LM-statistic and CUSUM-square test given in Appendix B.

Overall, the results show that although the coefficient of $Regm_2$ remained insignificant, however the significance of $Regm_1$ clearly shows that regime shifts are not neutral and affect the RER ($q_t$) of Pakistan. F-statistic is used, which confirmed the overall significance of all the explanatory variables in Regression-2.

Table 2

<table>
<thead>
<tr>
<th>Wald/F test for Overall Significance of Regressors:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable: $q_t$</td>
</tr>
<tr>
<td>Results</td>
</tr>
</tbody>
</table>

$^{24}$ It would be more interesting to examine the behavior of RER under the three regimes i.e. fixed, managed float and full float by dividing the full sample size into three periods i.e. 1973-1981, 1982-1999 and 2000-2008. However, because of the small sample period of the study a sub-sample analysis was difficult to perform. Also, selection of appropriate variables was another problem.
Regression:  
\[ \pi_{g1}, \pi_{g2}, \pi_{g3}, \pi_{g4}, i_{g1}, i_{g2}, \text{rem}_{g1}, \text{Regm}_{1}, \text{Regm}_{2}, q_{g1}, q_{g2} \]  

Regression 2:  
\[ \pi_{g1}, \pi_{g2}, \pi_{g3}, \pi_{g4}, i_{g1}, i_{g2}, \text{rem}_{g1}, \text{Regm}_{1}, \text{Regm}_{2}, q_{g1}, q_{g2} \]  

13.16**  
51.68**  

Asterisks "**" stands for 95% confidence level

For overall significance of all the variables of both the regressions i.e. regression 1 and 2 of table, F test has been used. The results computed are given in table 2. It is found that all the variables in both the regressions are also significant altogether.

Part 2

In Part 2, two more regressions Regression 3 and 4 has been computed. Regression 3 is derived for investigating the role of differential variables (DVs) i.e. \( \pi_{g1} \) and \( i_{g1} \) in the determination of \( q_{g1} \) after imposing the restrictions \( \text{Regm}_{1}=0 \) and \( \text{Regm}_{2}=0 \). After that Regression 4 is computed and the restrictions \( \text{Regm}_{1}=0 \) and \( \text{Regm}_{2}=0 \) have been relaxed. The purpose here is to find out that whether regime shifts affect the \( q_{g1} \), or they are neutral. The results for both the regressions are given in table 3 as follows.

Table 3

Dependent Variable: \( q_{g1} \)  
Method: Least Squares  
Newey-West HAC Standard Errors and Covariance

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Independent Variables</td>
<td>Coefficient</td>
<td>Coefficient</td>
</tr>
<tr>
<td></td>
<td>(S.E.)</td>
<td>(S.E.)</td>
</tr>
<tr>
<td>( \pi_{g1} )</td>
<td>-0.482833***</td>
<td>-0.415676***</td>
</tr>
<tr>
<td></td>
<td>(0.172167)</td>
<td>(0.139573)</td>
</tr>
<tr>
<td>( \pi_{g2} )</td>
<td>1.001340***</td>
<td>1.003640***</td>
</tr>
<tr>
<td></td>
<td>(0.214361)</td>
<td>(0.179243)</td>
</tr>
<tr>
<td>( \pi_{g3} )</td>
<td>-0.322742*</td>
<td>-0.260502*</td>
</tr>
<tr>
<td></td>
<td>(0.155885)</td>
<td>(0.151261)</td>
</tr>
<tr>
<td>( \pi_{g4} )</td>
<td>0.759628***</td>
<td>0.796352***</td>
</tr>
<tr>
<td></td>
<td>(0.164626)</td>
<td>(0.142917)</td>
</tr>
<tr>
<td>( i_{g1} )</td>
<td>-0.797667***</td>
<td>-0.940872***</td>
</tr>
<tr>
<td></td>
<td>(0.449293)</td>
<td>(0.330274)</td>
</tr>
<tr>
<td>( \text{Regm}_{1} )</td>
<td>--------</td>
<td>-2.382353***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.503364)</td>
</tr>
<tr>
<td>( q_{g1} )</td>
<td>-0.237703</td>
<td>-0.396669***</td>
</tr>
<tr>
<td></td>
<td>(0.130650)</td>
<td>(0.086148)</td>
</tr>
<tr>
<td>( q_{g2} )</td>
<td>-0.405737</td>
<td>-0.545540**</td>
</tr>
<tr>
<td></td>
<td>(0.123161)</td>
<td>(0.086546)</td>
</tr>
<tr>
<td>R²</td>
<td>0.58</td>
<td>0.73</td>
</tr>
<tr>
<td>AdjR²</td>
<td>0.46</td>
<td>0.64</td>
</tr>
</tbody>
</table>
The results obtained in Regression-1 show that both the DVs i.e. inflation differential ($\pi g_{t-1}$) and interest rate differential ($i v_d$) turned significant with the expected signs. $\pi g_{t-1}$ shows a lag influence on $q g_{t+1}$ and remained significant up to lag-4 i.e. $\pi g_{t-1}, \pi g_{t-2}, \pi g_{t-3}, \pi g_{t-4}$. Whereas, $i v_d (-0.482833)$ and $\pi g_{t-3}(-0.322742)$ it shows a negative and at $\pi g_{t-1}(+1.001340)$ and $\pi g_{t-4}(0.759628)$ it shows a positive relationship with $q g_{t+1}$ respectively. However, its overall impact on $q g_{t+1}$ is positive i.e.($+0.955393$) showing that an increase in the $\pi g_{t-1}$of the domestic(Pakistan) country against the foreign(United States) country also increases the RER($q g_{t+1}$) via channels of exportetc. Similarly, $i v_d$ also negatively influence $q g_{t+1}$ with a lag of one year i.e. $i v_d(-0.797667)$. This result shows that an increase in the $i v_d$ of domestic country against the foreign country also decreases $q g_{t+1}$ via channels of foreign investment inflows etc. The results further show that $q g_{t+1}$ is still influence by its lags and turned significant up to lag-2 i.e. $i v_{t-1} g_{t-1}$ and $q g_{t-1}$ respectively. Also, the signs of both the variables are still negative. The R2 value is 0.58 which shows that the fit is good. The DW statistic value is 1.74 which shows that there is no serial correlation in the residuals. The reliability of the results has been also confirmed by applying the Q-statistic, LM-test and CUSUM-square test which are given in Appendix B.

After that for examining the role of the two regime shifts, Regression-2 is computed. Two dummy variables i.e. i.e. Regm-$1$ and Regm-$2$ was included in it. The main aim here is to find out that whether regime shifts play any role in the determination of $q g_{t+1}$ if instead of including both domestic and foreign variables separately their differential has been included. The results shows that Regm-$1$ turned negatively significant. However, Regm-$2$ remained insignificant. This result shows that regime shifts are not neutral and show its influence on $q g_{t+1}$. The DVs i.e. $i v_d$ and $\pi g_{t-1}$ are still significant with the expected signs. Like Regression-1, $i v_d$ shows its influence on $q g_{t+1}$upto four lags i.e. $\pi g_{t-1}, \pi g_{t-2}, \pi g_{t-3}, \pi g_{t-4}$ and remained negative at $\pi g_{t-1}(-0.415676)$ and $\pi g_{t-4}(-0.260502)$ and show a positive relationship with $q g_{t+1}$ at $\pi g_{t-4}(+1.003640)$ and $\pi g_{t-3}(+0.796352)$. However, its overall impact on $q g_{t+1}$ is positive and increased as compared to the results of Regression-1 i.e. (1.123814>0.955393). Similarly, the coefficient of $i v_d$ also turned negative like Regression-1. However, it shows a greater impact on $q g_{t+1}$ comparatively i.e. 0.940872>0.797667. Like Regression-1 both the lags of the dependent variable ($q g_{t+1}$) are still significant with negative signs. The $R^2$ value is 0.73>0.58 shows that the fit is improved. Also the DW statistic (2.10) value shows that the model is correctly specified and there is no serial correlation problem in the residuals. This result is supported by Q-statistic, LM-test. For stability of the parameters the CUSUM square test is used which shows that the test statistic is within the 5% percent significance lines and the parameters are stable. For detail about all the tests see Appendix B.

Overall, the results of both Part-1 and Part-2 show that both the domestic and foreign factors play an role in the determination of RER($q g_{t+1}$). Similarly, Regime shifts also influence the $q g_{t+1}$. Comparing the results of both Part-1 and Part-2 it is found that the results obtained for both the sections are quite similar. This argument is also stands for the role of the two regime shifts in determination of $q g_{t+1}$ in both the parts.

Table 4

<table>
<thead>
<tr>
<th>Wald/F test for Overall Significance of Regressors</th>
<th>Dependent Variable: $q g_{t+1}$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Results</td>
<td>Explanatory Variables</td>
</tr>
<tr>
<td>Regression:1</td>
<td>$\pi g_{t-1}, \pi g_{t-2}, \pi g_{t-3}, \pi g_{t-4}, i v_{t-1} d_{t-1}, q g_{t-1}, q g_{t-2}$</td>
</tr>
<tr>
<td>Regression:2</td>
<td>$\pi g_{t-1}, \pi g_{t-2}, \pi g_{t-3}, \pi g_{t-4}, i v_{t-1} d_{t-1}, \text{Regm}<em>1, \text{Regm}<em>2, q g</em>{t-1}, q g</em>{t-2}$</td>
</tr>
</tbody>
</table>

- Asterisks " ** " stands for 95% confidence level
Concluding Remarks The paper examined the role of both the domestic and foreign factors in the determination of Pak-rupee real exchange rate (RER) over the period 1973 to 2008 in the framework of a two variant backward looking model. The analysis is carried out so that first the impact of both domestic and foreign factors have been examined individually on the rupee RER. After that the role of the differential variables (DV) computed by taking the difference between the domestic and foreign variables have been investigated in the determination of RER. Furthermore, the role of the dummy variables replicates the two regime shifts (i.e. occurred during 1982 and 2000) have also been assessed in the determination of RER. The results show that both domestic and foreign variables i.e. domestic inflation, domestic interest rate, trade balance, remittances, US interest rate and US inflation influence the RER of Pakistan. Moreover it is found that although these second dummy variable represents the movement towards the full float exchange rate system remained insignificant however, the dummy variable stands for the shift from the fixed to the managed float exchange rate system turned out significant showing that the exchange rate policies of State Bank of Pakistan influence the RER. These results are also consistent with the results obtained for the DVs. The post diagnostic tests i.e. Q-statistic, LM, test and CUSUM squares test have been applied which confirmed the reliability of these results.

REFERENCES


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Appendix: A

Data Sources and Variables Definition

In this study annual data has been used for the period 1973 to 2008. The data is also divided into three sub-samples on the basis of fixed, managed and flexible exchange rate regimes followed by the country during 1973-1981, 1982-1999 and 2000-2008 respectively. However, the original periods are i.e. fixed exchange rate system from 1947 to 7th January 1982, managed from On 8th January 1982 and full float exchange rate system from 19th May 1999 onwards. However, it is modified purposively as in this study annual data has been used.

DOMESTIC VARIABLES

<table>
<thead>
<tr>
<th>Variables</th>
<th>Definition</th>
<th>Proxies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Exchange Rate</td>
<td>Real exchange rate of Pakistan rupee vs USA dollar</td>
<td>q_{t}</td>
</tr>
<tr>
<td>2. Pak Inflation Rate</td>
<td>Average percentage change in consumer price index</td>
<td>π_{t}</td>
</tr>
<tr>
<td>3. Pak Interest Rate</td>
<td>Annual money call rate</td>
<td>i_{t}</td>
</tr>
</tbody>
</table>
5. Pak Remittances Total workers’ inflow of remittances in million of rupees \( \text{rem}^\text{tpk} \)

6. Pak Trade Balance Total exports minus total imports in million of rupees \( \text{tb}^\text{tpk} \)

7. Pak CPI Consumer price index of Pakistan

8. Regm\(_1\) Dummy variable for the shift towards the managed float exchange rate system of SBP occurred in 1982.

9. Regm\(_2\) Dummy variable for the shift towards the full float exchange rate system of SBP occurred in 2000.

**FOREIGN VARIABLES**

1. US Inflation Rate Average percentage change in consumer price index \( \pi^\text{us} \)

2. US Interest Rate Annual federal reserve rate \( i^\text{us} \)

3. US GDP Gross domestic product of US in million of Pakistan rupees \( y^\text{us} \)

4. US CPI\(_{usa}\) Consumer price index of USA

Data Sources: All the data are collected from, Economic Survey of Pakistan various issues, Fifty Years Statistics of State Bank of Pakistan and International Financial Statistics, IMF.

1. \( i^\text{tpk} = i_t - i^*_t \) is Pakistan interest rate gap which is used as a monetary policy instrument in this study. It is computed by taking the difference between actual money call rate(\(i_t\)) and targeted money call rate(\(i^*_t\)). For de-trending Hodrick-Prescott Filter technique is used.

2. \( i^\text{us} = i_t - i^*_t \) is US interest rate gap which is used as a monetary policy instrument in this study. It is computed by taking the difference between actual money call rate(\(i_t\)) and targeted money call rate(\(i^*_t\)). For de-trending Hodrick-Prescott Filter technique is used.

3. \( \pi^\text{tpk} = \pi_t - \pi^*_t \) is Pakistan inflation gap which is the difference between actual inflation rate(\(\pi_t\)) and targeted inflation rate(\(\pi^*_t\)). For de-trending Hodrick-Prescott Filter technique is used.

4. \( \pi^\text{us} = \pi_t - \pi^*_t \) is US inflation gap which is the difference between actual inflation rate(\(\pi_t\)) and targeted inflation rate(\(\pi^*_t\)) of USA. For de-trending Hodrick-Prescott Filter technique is used.

5. \( q^\text{gt} = q_t - q^*_t \) is the real exchange rate gap. It is the difference between actual(\(q_t\)) and targeted real exchange rate(\(q^*_t\)) after converting nominal exchange rate into real from. Whereas, real exchange rate is defined as the nominal exchange rate of Pakistan currency against US dollar multiplied by the ratio of the foreign to domestic price level (\(\text{RER} = q(\text{CPI}_{usa}/\text{CPI}_{pak})\). For converting RER into growth terms log of it has been taken.

6. \( \text{tb}^\text{tpk} = \text{tb}_t - \text{tb}^*_t \) is trade balance gap which is computed by taking the difference between actual(\(\text{tb}_t\)) and targeted(\(\text{tb}^*_t\)) trade balance. For de-trending Hodrick-Prescott Filter technique is used.

7. \( \text{rem}^\text{tpk} = \text{rem}_t - \text{rem}^*_t \) is the remittances of Pakistan. For computation first it is converted into real form by using 1976 as base year. After that log of it has been taken. Hodrick-Prescott filter is used for de-trending and multiplied with 100.

8. Regm\(_3\) stands for shift towards the first regime. It takes the value of 1 for the full period of the second regime and 0 otherwise.

9. Regm\(_4\) stands for shift towards the second regime. It takes the value of 1 for the full period of the third regime and 0 otherwise.

10. \( \pi^\text{gd} \) is computed by taking the difference between Pakistan and US inflation rates \( (\pi^\text{tpk} - \pi^\text{us}) \). For de-trending Hodrick-Prescott Filter technique is used.

11. \( i^\text{gd} \) is computed by taking the difference between Pakistan and US interest rates \( (i^\text{tpk} - i^\text{us}) \). For de-trending Hodrick-Prescott Filter technique is used.

Eviews. 6 is used for analysis of the data.

Appendix :B

Part-1
Regression: 1
Correlogram-Q-Statistics
Sample: 1977-2008

<table>
<thead>
<tr>
<th>Autocorrelation</th>
<th>Partial Correlation</th>
<th>AC</th>
<th>PAC</th>
<th>Q-Stat</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
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<td>.</td>
<td></td>
<td>1</td>
<td>-0.082</td>
<td>-0.082</td>
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<tr>
<td>.</td>
<td>*</td>
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<td>-0.079</td>
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</table>

Breusch-Godfrey Serial Correlation LM Test:

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>F-Statistic</th>
</tr>
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<tbody>
<tr>
<td>F-statistic</td>
<td>0.427012</td>
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<tr>
<td>Prob. F(4, 17)</td>
<td>0.7871</td>
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</tbody>
</table>

Obs*R-squared 2.921603

Prob. Chi.Square(4) 0.5710

CUSUM Square Test for Stability

CUSUM of Squares 5% Significance
Regression:
Correlogram-Q-Statistics
Sample: 1977-2008

<table>
<thead>
<tr>
<th>Autocorrelation</th>
<th>Partial Correlation</th>
<th>AC</th>
<th>PAC</th>
<th>Q-Stat</th>
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</tr>
</thead>
<tbody>
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Breusch-Godfrey Serial Correlation LM Test:

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CUSUM Square Test for Stability
Part-2

Regression: 3
Correlogram-Q-Statistics
Sample: 1977-2008

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CUSUM of Squares  ---  5% Significance
Regression: 4
Correlogram-Q-Statistics
Sample: 1977-2008

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CUSUM Square Test for Stability
## Appendix :C

### Table 1:

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* (-ve) sign stands for appreciation and (+ve) for depreciation

Table 2

Duration of Business Cycles in Pakistan

The above table showed the business cycles duration in Pakistan since inception. It shows that soon after the inception Pakistan economy went into recession which was continued for almost 11 years. The main reasons for this longer period of recession was the slow economic progress in the country because of the different problems i.e. communal upsets, poor infrastructure weak industrial base, lack of private sector etc. During 1960 the economic conditions are improved and which helps the economy to enter in the second phase i.e. recovery because of different economic planning and its effective implementation. During 1970s the economy once again fell into recession again. Separation of East Pakistan, nationalization of industries etc. might be the the main reason for that. After a long period of 12 years the economy recovered for a 9-year period. The third recession started in 1991 and is estimated to be continue till 2004-05.

EFFECT OF DURATION OF USE OF COCS (COMBINATION OF ETHINYL ESTRADIOL (0.03MG) AND NORGESTREL (0.3MG)) ON SERUM LIPID PROFILES, FASTING BLOOD SUGAR, BLOOD PRESSURE AND BMI IN CHILD BEARING AGE WOMEN.

DR RUBINA NAZLI1, DR NABILA SHER2, DR MOHAMMAD AKMAL KHAN3, DR TASLEEM AKHTAR4, PHD, ZARGHUNA ZAFAR5, MASHAL ZAFAR6

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dr.nabi65@gmail.com
3 Psychiatry Department Hayat abad Medical complex Peshawar
amlpak@yahoo.com
4 PMRC Research Centre Khyber Medical College, Peshawar
t.akhtarpmrc@gmail.com
5 IPMR, KMU
dr.nabi65@gmail.com
6 Third Year BDS
mashal.zafar@hotmail.com

ABSTRACT: Background: Combined Oral Contraceptives Pills (COCs) are effective and widely used method for contraception. There is a positive relationship between COCs and lipid and carbohydrate metabolism in previous studies. We have seen the effect of duration of COCs (0.3mg norgestrel and 0.03mg ethinyl estradiol) used in tertiary care hospitals of Peshawar Khyber Pakhtunkhawa Pakistan on the lipid and carbohydrate metabolism in women taking combined oral contraceptives.

Study Design: This cross sectional analytical study included 100 participants women of child bearing age 14-49yrs using COCs divided in three groups according to the duration of use group A at least 6 month COCs users, group B were 1 year COCs users, group C more than 1 year COCs users. Serum Total cholesterol (TC), triglyceride (TG), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), very low density lipoprotein cholesterol (VLDL-C), fasting blood sugar (FBS) were determined by using standard colorimetric techniques. BMI and BP were also measured in all subjects. Their levels were found gradually increasing from 6months to those who are using it for 1 year and more than 1 year.

Results: To estimate the effect of duration of use of combined oral contraceptives on the levels of different biochemical parameters, the results showed significant elevation of cholesterol (p=0.0003), HDL-C (p=0.0229), LDL-C (p=0.0271), VLDL-C (p=0.0004), Triglycerides (p=0.0006) levels in the group of more than 1 year users females when compared with 6 months users.
Conclusion: The levels of cholesterol, HDL, LDL, VLDL and Triglyceride levels were found to be increased with the duration of use in the women of child bearing age of Khyber Pukhtunkhwa.

Introduction: The combined oral contraceptives are common and widely accepted method used for contraception.(1) In Pakistan it is used since its introduction in international market and the most common combined oral contraceptive is the combination of ethinyl estradiol (0.03mg) and norgestrel (0.3mg). (2,3)

The contraceptive prevalence in the urban Pakistan is 5.5% more than twice (9.8% vs. 3.9%) that of rural prevalence. (4) The combined oral contraceptive pills changes the serum lipoprotein profile, HDL increase and decrease in LDL due to estrogens (a desirable effect), (5,6) whereas these beneficial effects of estrogen are negated by progestin. (7) Therefore, the preparations having dominant estrogen is best for individuals with elevated serum cholesterol. The estrogen regulate in the fat tissue lipolysis, lipogenesis and adipogenesis. (8, 9, 10) The dose and type of progestin also affect the lipids blood levels. (11, 12)

Many experimental studies have indicated that the use of combined oral contraceptives altered lipid metabolism by increasing the levels of triglyceride, LDL-cholesterol, and VLDL-cholesterol with the duration of use. (13) Serum TG, HDL-C and VLDL levels were significantly higher and LDL-C levels found lower in users of combined oral contraceptives. (14) The combined oral contraceptive has positive effect on carbohydrate metabolism by changing their fasting levels. (15, 16) and was also reported high risk of diabetes among the premenopausal women who were recently on oral contraceptives as well as were using oral contraceptive for more than 1 year. (17) The previous studies shows no positive influence on body weigh with the long-term use of combined oral contraceptives. (18)

The systolic and diastolic B.P was also an important factor in women taking combined oral contraceptive pills because the gradual increase in systolic and diastolic B.P was seen in combined oral contraceptives users with age (19, 20). The cardiovascular effects of long term use of hormonal contraception have continued to generate interest from scientists, unfortunately, most of the studies have focused mainly on the evaluation of changes in serum lipids and not much has been reported on long term use effects of combined oral contraceptives. This present study seeks to determine the effect of duration of combined oral contraceptives use on lipids and carbohydrates metabolism and also on BMI and BP in Peshawar Khyber Pakhtunkhwa province of Pakistan.

Materials and methods

Study design: A cross sectional/analytical study was conducted after ethical approval from ethical board of institutional research ethical board (IREB) Postgraduate Medical Institute (PGMI) Hayat Abad Medical Complex Peshawar.

Hundred women using combined oral contraceptives for at least 6 months onwards. This study was conducted in the Family Planning Department of tertiary referral health care facilities of Peshawar, viz. Khyber Teaching Hospital, PGMI Hayatabad Medical Complex Peshawar and PGMI Lady reading Hospital Khyber Pukhtunkhwa Province (KPK) Pakistan. The analytical work was done in Pakistan Medical Research Council (PMRC) Research Centre, Khyber Medical College, Peshawar and Institute of Basic Medical Sciences Khyber Medical University.

Study groups The participants were randomly selected without a personal and family history of hypertension, diabetes mellitus, renal/cardiovascular diseases, stroke, familial tendency of obesity and smoking and screened for changes in lipid and carbohydrate metabolism by taking fasting blood samples.

The combined oral contraceptives user’s women were grouped in six month users group A, one year users group B and more than one year users group C, to compare their biochemical and other parameters.

Our study population was women of reproductive age group taking hormonal contraceptives for at least six months from the family planning departments of tertiary care hospitals of Peshawar (KPK) within a defined period coming to Family Planning Department of tertiary referral health care facilities without a history of hypertension, diabetes mellitus, renal/cardiovascular diseases, stroke, familial tendency of obesity and smoking were randomly selected and screened for changes in lipid and carbohydrate metabolism by taking fasting blood samples. Women taking any medication, which is affecting lipid metabolism or blood glucose or any medication that may interact with combined oral contraceptives and women with family history of diabetes and hypertension were excluded from the study.
After explaining aims and objectives, informed consent was taken from each subject for participation in this study. The height, weight, BMI and two readings of blood pressure were recorded and take the mean of the blood pressure. The data was processed on computer software package SPSS version 16. The numerical and categorical data was presented as mean. The Student’s t test was applied to evaluate mean differences in serum lipid concentrations between COCs users and control subjects. Significance among the means of groups was expressed in term of P-value. 95% Confidence Interval (CI), $P < 0.05$ was considered as significant, $P< 0.01$ was considered as more significant, $P<0.001$ was considered as Highly significant and $P<0.0001$ as very highly significant.

**Results:** We compared the levels of different biochemical Parameters and BMI, systolic and diastolic B.P in women with different duration of combined oral contraceptive users. The table-1 summarized these values and showed gradual increase of Cholesterol, LDL, VLDL, Triglyceride, and Fasting blood sugar with increase in duration of combined oral contraceptive use. Their levels are gradually increasing from 6months to those who are using it for more than 1year. The Cholesterol level was 170.73mg/dL in 6 months users and the women who used it more than 1 year was 204.561mg/dL, LDL from 90.69 mg/dL to 109.04mg/dL, VLDL from 36.08mg/dL to 46.61mg/dL, Triglyceride from 180.00mg/dL to 232.92mg/dL and FBS 114.0mg/dL to 122.78mg/dL, the mean BMI kg/m2 in 6months users was25.64 and in 1 year users was 27.74 Kg/m2 and in group of more than 1 year was 28.36kg/m2. The BMI, systolic and diastolic B.P also showed gradual increase.

**Table-1  Effect of duration of use of Oral contraceptives on different Parameters**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>6 months Oral cont users (n=23) Mean ± SEM</th>
<th>1 yr Oral cont users (n=36) Mean ± SEM</th>
<th>&gt; 1yr Oral cont users(n=41) Mean ± SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Cholesterol</td>
<td>170.73 ± 6.08</td>
<td>174.27 ± 4.85</td>
<td>204.56 ± 4.46</td>
</tr>
<tr>
<td>HDL-C</td>
<td>43.95 ± 1.63</td>
<td>44.50 ± 1.28</td>
<td>48.90 ± 1.29</td>
</tr>
<tr>
<td>LDL-C</td>
<td>90.69 ± 5.88</td>
<td>90.63 ± 4.63</td>
<td>109.04 ± 5.13</td>
</tr>
<tr>
<td>VLDL-C</td>
<td>36.08 ± 1.32</td>
<td>39.13 ± 0.43</td>
<td>46.61 ± 1.99</td>
</tr>
<tr>
<td>Triglycerides</td>
<td>180.00 ± 6.58</td>
<td>195.63 ± 2.14</td>
<td>232.92 ± 9.96</td>
</tr>
<tr>
<td>FBS</td>
<td>114.00 ± 2.48</td>
<td>115.97 ± 9.19</td>
<td>122.78 ± 7.39</td>
</tr>
<tr>
<td>BMI</td>
<td>25.64 ± 0.86</td>
<td>27.74 ± 0.48</td>
<td>28.36 ± 0.59</td>
</tr>
<tr>
<td>Systolic B.P</td>
<td>128.04 ± 2.94</td>
<td>133.88 ± 2.10</td>
<td>135.73 ± 3.32</td>
</tr>
<tr>
<td>diastolic B.P</td>
<td>80.87 ± 2.36</td>
<td>84.16 ± 1.52</td>
<td>87.68 ± 2.05</td>
</tr>
</tbody>
</table>

In table-2 the different parameters with duration of use of combined oral contraceptives was compared and t-test applied and P value found. VLDL, Triglycerides showed significantly high value of 0.012 and 0.010 respectively.

**Table-2  Comparison of different parameters with 6months users and 1year users of combined oral contraceptives**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>6 months COCs users (n=23) Mean ± SEM</th>
<th>1 yr COCs users (n=36) Mean ± SEM</th>
<th>t-test p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T-Cholesterol</td>
<td>170.73 ± 6.08</td>
<td>174.27 ± 4.85</td>
<td>0.6511</td>
</tr>
<tr>
<td>HDL-C</td>
<td>43.95</td>
<td>44.50</td>
<td>0.7938</td>
</tr>
</tbody>
</table>

982
mg/dL ± 1.63 + 1.28

<table>
<thead>
<tr>
<th>Parameters</th>
<th>1 yr COCs users (n=36) Mean + SEM</th>
<th>&gt; 1yr COCs users (n=41) Mean + SEM</th>
<th>t-test p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T- Cholesterol mg/dL</td>
<td>174.27 ± 4.85</td>
<td>204.56 ± 4.46</td>
<td>0.000168</td>
</tr>
<tr>
<td>HDL-C mg/dL</td>
<td>44.50 ± 1.28</td>
<td>48.90 ± 1.29</td>
<td>0.018710</td>
</tr>
<tr>
<td>LDL-C mg/dL</td>
<td>90.69 ± 4.63</td>
<td>109.04 ± 5.13</td>
<td>0.0102</td>
</tr>
<tr>
<td>VLDL-C mg/dL</td>
<td>36.08 ± 1.32</td>
<td>39.13 ± 0.43</td>
<td>0.0127</td>
</tr>
<tr>
<td>Triglycerides mg/dL</td>
<td>180.00 ± 6.58</td>
<td>195.63 ± 2.14</td>
<td>0.0102</td>
</tr>
<tr>
<td>FBS mg/dL</td>
<td>114.00 ± 2.48</td>
<td>115.97 ± 9.19</td>
<td>0.8668</td>
</tr>
</tbody>
</table>

The table shows comparison of different parameter in women taking combined oral contraceptives for 1 year and women who take it from more than 1 year user. A high significant increase in T-Cholesterol, VLDL-C and Triglyceride were noted in combined oral contraceptive users of > 1year duration. The change in FBS was not significant.

Table-3 Comparison of different parameters of 1year users with more than 1year users of combined oral contraceptives

In table-4 similarly the women taking Oral contraceptives for 6months and those women who used it for more than 1 year were compared, t-test applied and P value found. The results are summarized with very high significant of P< 0.00029 in case of Cholesterol levels. VLDL and Triglyceride also show high significance of p < 0.004 and 0.006, HDL and LDL show significant levels of p < 0.0229 and 0.0271 respectively. No significant change was noted for FBS.

Table-4 Comparison of different parameters of 6months users with more than 1year users of combined Oral contraceptives

<table>
<thead>
<tr>
<th>Parameters</th>
<th>6 months COCs users (n=23) Mean ± SEM</th>
<th>&gt; 1yr COCs users(n=41) Mean ± SEM</th>
<th>t-test p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>T- Cholesterol mg/dL</td>
<td>170.73 ± 6.08</td>
<td>204.56 ± 4.46</td>
<td>0.00029</td>
</tr>
<tr>
<td>HDL-C mg/dL</td>
<td>43.95 ± 1.63</td>
<td>48.90 ± 1.29</td>
<td>0.0229</td>
</tr>
</tbody>
</table>

983
Table-5 shows changes in BMI with increase in the duration of combined oral contraceptive use (25%) of combined oral contraceptive users were the women who used combined oral contraceptives for more than 1 year and their BMI was >27kg/m2.

Table-5  Effect of duration of use of Oral contraceptives on BMI

<table>
<thead>
<tr>
<th>BMI Kg/m2</th>
<th>6months users</th>
<th>1 year users</th>
<th>More than 1 year users</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n)</td>
<td>%</td>
<td>(n)</td>
</tr>
<tr>
<td>&lt;22.99</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>23 - 24.99</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>25 - 26.99</td>
<td>5</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>&gt;27</td>
<td>6</td>
<td>6</td>
<td>22</td>
</tr>
</tbody>
</table>

Discussion: About 100 million women worldwide use combined oral contraceptives and in the United States 11.6 million women or 19% of the adult female population used it which demonstrated its efficacy and safety since their introduction. (26)

The contraceptive prevalence in the urban Pakistan is 5.5% more than twice (9.8% vs. 3.9%) that of rural prevalence. (4) However, epidemiologically an increased risk of cardiovascular diseases remains a cause for concern in the combined oral contraceptives users. Several factors associated with cardiovascular diseases risk in women taking combined oral contraceptives, including the ethinyl estradiol dose (27) and type of progestogens used (27,28).

Combined oral contraceptives are divided on the bases of its doses of estrogen and type of progestin content and according to the sequence of their development into different generation by decreasing the doses of hormones and improving their side effects. (29)

Reductions in the dose of ethinyl estradiol (< 50 μg) have resulted in a decreased incidence of cardiovascular diseases (27, 28). Even very low doses of ethinyl estradiol (i.e., 10 μg) have been shown to adversely affect haemostatic parameters (27).

The change in the composition and dosage in different generation of combined oral contraceptives and the careful selection for use by women lower the risk of cardiovascular diseases. The World Health Organization (WHO) “study of cardiovascular diseases and steroid hormone contraception conducted in developing and developed countries” revealed a higher overall risk of Ischemic stroke among combined oral contraceptives users in developing countries than those in developed countries of Europe. These differences were attributed to the type of combined oral contraceptives used and the frequency with which users reported that their blood pressure and other parameters had been checked prior to or during combined oral contraceptives use. (30)

This randomised analytical study was done to see the effects of duration of use of second generation monophasic combined oral contraceptives which are commonly used in Pakistan on the carbohydrate and lipid metabolism, blood pressure and BMI. we have divided the oral contraceptive users in three groups according to the duration of the use of these hormones 6 months Oral contraceptive users (n=23), 1 yr Oral contraceptive users (n=36) and > 1yr Oral contraceptive users (n=41). The clear influence was noted on the fasting biochemical parameters of lipid profile and blood sugar levels, blood pressure and basal metabolic index.
When we compared the fasting lipids levels between 6 months combined oral contraceptives users and 1 year combined oral contraceptives users, the significant high levels of VLDL and Triglycerides was noted. In previous study they observed significant increased levels of triglyceride, LDL-cholesterol, and VLDL-cholesterol with the duration of oral contraceptive use. (13)

We also compared these different parameters in women taking oral contraceptives for 1 year and women who take it from more than 1 year. A high significant increase in T-Cholesterol, VLDL-C and Triglyceride were noted in combined oral contraceptive users of > 1 year duration. Similar results were shown by the studies conducted by (24, 25). Different observation was reported by other investigators they observed that serum triglyceride, LDL and VLDL cholesterol did not showed significant variations with duration of use of combined oral contraceptives. (31).

The fasting blood sugar in our study groups shows no significant change. A dose–response relationship was revealed between the duration of combined oral contraceptives use and the risk of diabetes among premenopausal Chinese women (17).

The mean fasting glucose level was not changed at 6 cycles from baseline in the study conducted by (21). This is similar to previous studies (22, 23).

In “Nurses’ Health Study” a small increased risk of diabetes was found among past combined oral contraceptives users, And significant increased risk of diabetes was observed among recent and long-term OC users (32).

The mean systolic and diastolic BP were found increasing in our study with the duration of use of the combined oral contraceptives and was recorded as 128.043±2.944 mmHg, 133.889±2.100 mmHg, 135.732±3.325 mmHg in 6 months, 1 year and more than 1 year users groups.

The Mean BMI Kg/m2 in 6 months, 1 year and more than 1 year users groups were recorded as 25.646 ± 0.868 Kg/m2, 27.741±0.484 Kg/m2 and 28.367±0.592Kg/m2. It was noted that (25%) of combined oral contraceptive users were the women who used combined oral contraceptives for more than 1 year and their BMI was > 27kg/m2.

A study conducted on third generation combined oral contraceptives using women in their child bearing age. The results of that study do not indicate a long-term influence of combined oral contraceptives on weight gain but it was the age of the combined oral contraceptives users reported a weight increase in excess of 10 kg during period from 19 to 44 years of age (18). Another study reported that there was no evidence of weight gain of the combined contraceptives users (19, 33).

The high level of lipid and sugar raised systolic and diastolic blood pressure and BMI has high risk of cardiovascular diseases (CVD). Our study revealed these risk factors in combined oral contraceptives users of Khyber Pakhtunkhwa province of Pakistan and the association between these risk factors with the duration of combined oral contraceptives use. Similar results were shown by previous study (34).

The resulting difference in our study as compared to other international studies may be due to the combined oral contraceptive which is the second generation and also due to the social and the cultural attitude and racial differences between different countries. The importance and strength of our study lies in the fact that it is the first study which analyses the effect of duration of use of combined oral contraceptive on lipids and carbohydrate metabolism, BMI and BP in Peshawar Pakistan.

REFERENCES
ROLE OF FACTORS INFLUENCING ONLINE KNOWLEDGE SHARING: A STUDY OF HIGHER EDUCATION IN PAKISTAN

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Abstract. Knowledge sharing is not only the requirement of professional lives but it has proved its importance in daily lives as well. This study particularly addresses the behavior of knowledge sharing in online world. Henceforth, this study explores the effect of different individual aspects like personality traits, engagement in online social networking sites and online community of practices on the online knowledge sharing behavior. In order to attain the goal of measuring the relationships, this study attempted a simultaneous multiple regression analysis technique to check their effect on online knowledge sharing behavior. In a nut shell, one of the important and major conclusions of this study is that the engagement of individuals in online social networking sites and online community of practices plays a very vital role in their online knowledge sharing behaviors irrespective of the demographic group they belong to or what personality traits they possess. These findings are significant since they provide a better insight to the behavior of students when it comes to online knowledge sharing as a result of online social interaction. This study can find many utilities regarding the course contents and online study plans in educational institutes and personnel screening of human resource in organizations.

Keywords: Online knowledge sharing, online community of practices, online social networking sites.

1. Introduction. Education and the educational institutes play a very important role in constructing and building the nations. The strength of a nation is defined by the human resources polished by the educational institutes. Higher education not only provides individuals the knowledge for themselves but it gives them an insight how to align the random images of economic and social issues. The responsibility of endowing the students with skills and empowering them with advanced knowledge regarding their aptitudes lies with higher education. In this hi-tech era only qualified graduates find a way to significantly use technology, combined with the knowledge gained during the education tenure, can be used for policy making, decision making and ultimately for economic and social development [1]. Sociability is natural to human beings [2], therefore, the interaction of students is also certain and when students interact with each other any way, they share knowledge as well. Today’s progressed societies have triggered the world to contract into a global village, a concern of the modern era, has brought diverse groups closer than ever [3] that demands and favors the flow of knowledge. In addition, social bonding and the cohesiveness of individuals in Pakistani society with diverse demography encourages knowledge sharing among them that, in turn, highlights the new prospect of discoveries when they interact in their institutes.

Communication among the diverse groups with diverse demography and unlike experiences gives rise to constructive conflicts along with distinct development and evolutions as well [4]. Moreover, where interaction of different personalities uncovers the horizons for the collaborative synergy, there one’s sharing
of knowledge also determines the new perspectives of already existing scenes. Higher education has many objectives; however, this study is about the influence of online social interaction and personality traits on the knowledge sharing among the students of higher education institutes situated in Islamabad, Pakistan.

Knowledge sharing has highlighted itself as a very important issue in the last decade and had also been a focus of attention for the researchers. Knowledge sharing, no matter what, is being observed not only in the professional lives as the requirement of job but in our daily lives as well. Since the inclusion of online knowledge sharing in daily life cannot be denied hence, its importance in different fields also needs to be given an appropriate consideration. Therefore, there are certain factors that undoubtedly affect the behavior of online knowledge sharing among the individuals. These factors can be internal like the personality attributes, behaviors, and attitudes of the individuals; or external like society, organization, group members etc., that have a tendency to influence the level of online knowledge sharing among them.

The objectives of this study are to understand the role of personality trait, engagement in online social networking sites and online community of practices on online knowledge sharing behavior. This study also aims at examining the extent to which these variables altogether predict the online knowledge sharing in students’ behavior and also to provide an insight of the online knowledge sharing in Pakistan business education sector/academia among students.

This study covers personality, online social networking sites and online community of practices only because personality is the internal trait i.e., inherent to individuals that cannot be denied in any case. Secondly online social orientation are contextual factors since Teh, Yong, Chong & Yew [5] mentioned that there are two types of factors that affect the knowledge sharing i.e., internal and external/contextual. Therefore, it will be interesting to study the role of both internal and contextual factors in online knowledge sharing.

2. Literature Review. Knowledge is, no doubt, a highly valued asset of all [6, 7, 8, 9, 10, 11, 12, 13, 14, 15] either tangible or intangible [16, 17] or traditional [18, 19]. Knowledge has been accepted as a crucial characteristic for the human survival and the organization’s existence too [20, 21]. Furthermore, it has been considered as an individual characteristic [12, 22, 23, 24, 25, 26, 27, 28, 29, 30] but few researchers consider it altogether as a group activity [16]. Consequently, once it is disseminated it facilitates the groups, organizations or institutions to which they belong [7, 10, 14, 28]. Therefore, the significance and worth of knowledge can be denied neither for individuals nor for the organizations; also the knowledge is a fundamental unit of all structural and functional activities.

Knowledge has been defined in different ways by different researchers [31]. Adaileh and Atawi [32] argued knowledge to be the blend of experiences, values and expertise that helps giving an idea to further experience. Pui [12] defined it as the mixture of information and data along with the expertise, opinions and skills. Alavi, Kayworth and Leidner [33] claimed knowledge to be the information and experience owned by the individuals. Knowledge cannot be limited to the job or organization. Knowledge is an individual possession that is carried wherever the individual moves. Consequently, knowledge can be used in every field of life not necessarily be the professional only. To summarize, knowledge can be defined as the understanding based on the experience, expertise and skills adhered and provide an insight to appraise future events.

2.1 Knowledge Sharing. In this period of progress, sharing knowledge has become a critical concern [34, 35]. Individuals who interact with each other share knowledge either knowingly or unknowingly. Knowledge sharing has changed the traditional mindset and been proved to be a source of new ideas [8, 27, 36, 37, 38, 39, 40]. Literature has discussed following different requisites of knowledge sharing that can be grouped as; (i) understanding of context; and, (ii) willingness to share.

To understand the knowledge shared, one has to know the context as well in which it was developed [22, 32]. Nevertheless, it is found that the tacit knowledge is context specific and impossible to be shared without the consent of the knowner or source [21, 23, 32, 41, 42, 43]. Tacit knowledge alone cannot be sufficient to carry on the activities either personal or professional so is explicit knowledge. Additionally, when the same piece of information is shared with diversified individuals, they tend to interpret that according to the previous experiences, context of knowledge, instincts, intuitions etc. which in turn gives rise to different perspectives of the same information [44, 45, 46, 47, 48]. Knowledge sharing can be direct i.e., face-to-face or indirect i.e., through another medium like internet or repositories [41, 49, 50]. Since the comprehension of the context and background gives a better insight into the knowledge shared, therefore, for the better understanding of the knowledge being shared, apart from the analytic skills of the receiver,
familiarity with the context in which it was carried out is also equally important and that is not possible without the consent of the sharer or the source.

When knowledge is subjected to be shared, individual’s willingness to cooperate plays a very important role [25, 39, 51, 52, 53, 54, 55] because knowledge sharing is not a one way action [29] and acquisition, Hall [48] argued, can happen without codification. Hence, knowledge sharing is successful when the parties show propensity to share their knowledge, inherent from their unique experiences and results. Therefore, if the knowledge is shared with the willingness of the parties it encourages the worth and significance of the knowledge shared for both the parties i.e., the receiver and the sender.

2.1.1 Definition of Knowledge Sharing. Knowledge sharing is a momentous activity [56, 57] and is defined in the literature differently. Henneberg et al. [37] described knowledge sharing as joint process. Vazquez et al. [10] and Pai [12] claimed knowledge sharing as the process of transferring knowledge from one group to another. Lin and Lee [39] argued knowledge sharing as the activities of community members to facilitate the knowledge exchange in order to achieve the goals while Kumar and Ganesh [24] proposed knowledge sharing as the exchange of any kind of knowledge between two parties. Ford and Staples [58] considered knowledge sharing as the process of departing one’s knowledge to the recipient. Ling et al. [28] defined knowledge sharing as the spreading of knowledge and information. Cummings [59] argued knowledge sharing to be the information, understanding or and task related know how about any product or procedure. These authors have specified the nature of knowledge though the sharing of knowledge can be personal and professional as well. Although willingness to share has been mentioned extensively in the literature however, has not been included in the definition. Therefore based on above discussion it can be summarized that knowledge sharing is the intentional or unintentional process of mutual willingness of parties, one or more, in which one or many share knowledge regarding anything and the others seek it.

Different researchers for example, Martins and Meyer [60], Kumar & Ganesh [61], Bakker, Leenders, Gabbay, Kratzer and Engelen [62] and Dalkir [2] explained two types of knowledge used in knowledge sharing i.e., exploration and exploitation. Exploitation is related to the expression, transfer and application of existing knowledge while exploration indicates discovering new dimensions, synthesizing and creating new knowledge. It is also extensively argued that the existing knowledge plays an important role in the creation of new one [15, 40, 44, 63, 64]. Therefore, either knowledge is explored or exploited, the role of the already existing knowledge or the knowledge gained already, cannot be denied. Individuals incorporate not only the existing knowledge but they also seek the new knowledge as well that is not integrated previously [50, 57, 65]. Therefore, in order to gain new knowledge, individuals not only tend to use the knowledge they already possess in order to know new perspectives. On the other hand, they look to acquire new knowledge as well that could be utilized in future practices for new ideas.

The concept of knowledge sharing evolved in the last decade and has been researched from different perspectives [44, 56, 58, 60, 61, 65, 66, 67, 68]. However, little attention has been given to knowledge sharing from the perspective of the online social orientation [17, 70], personality traits i.e. extroversion and openness to experience [65]. No matter what is the motivation of knowledge sharing but the personality traits, online social orientation cannot be ignored while studying knowledge sharing among the students. This study, therefore, aims at identifying role of social orientation and personality in online sharing knowledge.

2.2 Personality and Knowledge Sharing. No individual possesses all the knowledge required [61]. Among all the perspectives that human beings have been studied for, personality easily finds a place in them [5, 13, 19, 50, 51, 61]. In addition, the individuals are likely to differ according to the personality traits so does their propensity to share knowledge [11, 51, 67]. The research done in the last decades the five factor model (FFM) of personality is considered more consistent to present a reliable personality taxonomy framework [11, 19, 35].

It is also claimed that the FFM sufficiently covers the sphere of a normal adult human personality [5, 13, 19, 35, 66, 71] and the researchers have replicated the FFM using various scales and measurements considering different analyzing techniques from different perspectives [13]. Liu [35] stated the cross-cultural generalizability of the five factor model that enhances its credibility across the world. Since the generalizability of FFM is unquestionably acceptable allover therefore, the FFM is an appropriate choice for research in a country like Pakistan.

The FFM for personality contains the five human dimensions; neuroticism (vs emotional stability), extroversion (vs introversion), openness to experience (vs closeness to experience), agreeableness (vs...
rudeness) and conscientiousness (vs non dependability) [5, 11, 13, 19, 35, 67, 71, 72]. Neuroticism is linked with depression, anxiety, insecurity and instability. Agreeableness is characterized by the cooperation, cheerfulness, support and helping others while conscientiousness defines dependability, organization, reliability and success oriented. Extroversion characteristic indicates the individuals who are more sociable, confident, energetic, and talkative and like interacting with others. Openness to experience defines the daring behavior and positive attitude towards new experiences as they are more inclined in the direction of curiosity, intelligence, manners and broadmindedness. Therefore, this study considers openness to experience and extroversion traits as the dimensions of personality variable and defines openness to experience implies willingness to know about the other's distinguished insights and extroversion on the other hand seeks socializing and talking to others [11, 19]. From FFM, Carbera et al. [13] included agreeableness, conscientiousness and openness to experience while Matzler, et al. [66] incorporated agreeableness and conscientiousness with knowledge sharing through effective commitment. However, extroversion and openness to experience have not been given an appropriate attention in literature. Openness to experience and extroversion will be significant predictors for knowledge sharing. Extroverted students tend to share the information, they get from other sources, with other team members or who so ever seeks it (Teh et al., 2011). Teh et al. [5] also found that the students in Asia tend to have high score in openness to experience. Therefore, when individuals with different personality traits interact in different social networks, they tend to share knowledge accordingly.

2.3 Online Social Orientation. Knowledge sharing is a social process which is rendered by the individual knowledge and their social interactions [25, 55, 65, 73]. Individual knowledge, on the other hand, is embedded in the social interactions that form a network [6, 18, 40, 56, 66, 75, 76, 77, 78]. Therefore, the interaction of the individuals though individually or in groups, plays an important role in networking and knowledge sharing.

Literature has highlighted the importance of online social networking with two main benefits of online social networking, one as a source of knowledge and other as an opportunity to share knowledge. It is found as well that social orientation is important for individuals and the networking is a natural process that occurs at workplace and community [18, 23, 27, 42, 56, 64, 65, 68, 69, 76, 77]. In addition, when the individuals interact and socialize with each other, they come to know about the different experiences of other members. This also encourages the sharing of knowledge among the members. Therefore, social orientation has a very vital role to play in knowledge sharing among individuals since social networks exist in every kind of organization. Sustained and vibrant environment gives individuals opportunity to meet and interact with new people and share knowledge [6, 25, 44, 47, 55, 57, 78, 79, 80]. Different researchers claimed that the social interaction among the individuals can be electronically or face to face [29, 41, 47, 50]. Thus, information of any such physical or online community enhances the chances of mutual interaction and also the sharing of knowledge among the affiliates of particular group. Every individual member of a social network is a potential source of knowledge [6, 27, 66, 73]. This study includes the following two types of online social orientation as variables i.e., (i) online social networking sites (OSNS); and, (ii) online communities of practices (online CoP's).

2.3.1 Online Community of Practices (Online CoP’s) and Knowledge Sharing. The term “Community of Practice” was first introduced by Wenger and Leave in early 1990’s [73, 81]. The contribution of the individuals in such socializing set up is voluntary and they are privileged with an access to the contributions made by others [13, 34, 46, 55, 82]. Such networking is voluntary and is composed of individuals with inherent willingness to socialize irrespective of their geographic locations. Therefore, they include the members of different backgrounds that participate in these sites.

Ford and Staples [58] stated that individuals who have a tendency to share knowledge, they support the knowledge sharing around them as well. In addition, it has also been argued extensively [7, 9, 17, 28, 29, 47, 50, 53, 55, 64, 66, 74, 82, 83, 84, 85, 86, 87, 88, 89, 90] that the individuals with common professional interests or job functions interact with each other in common activities and group themselves to form a community of practice that are ahead of any hierarchy and merit. It has also been stated extensively that the individuals with common interests and professions form communities. In addition, such communities have become more dependent on internet and have an online presence as well. However, no attention has yet been paid to this online CoP’s in literature.
Additionally, these online communities provide one-to-one and one-to-many communication, consequently becoming a source for professional development [17, 83]. These are the CoP’s that soothe and compact the flow of new ideas and provide opportunities to open new realms of thoughts for the existing members. Such online professional groups of individuals, not only tend to make others contributions and thoughts available but also urge the passive members to share their views. Hara and Hew [17] found the reason for the success of CoP’s that major part of human knowledge is intangible and tacit in nature. Nonetheless, these communities share the knowledge not necessarily for the professional goal achievement although other non-professional purposes as well. Such informal and self organizing networks help fostering the knowledge sharing among the groups [64, 71, 73, 91, 92]. Consequently, individuals can reap the outcomes of knowledge and valuable intellectual resources by interacting with each other [14, 34, 53, 55, 94, 95]. Therefore, when the individuals with common professions and the mutual field of studies interact with each other they form community of practice. Such community of practice not only provides the opportunities to the members to interact but also shows them new ways to share their experiences and ideas related to their field with each other. Consequently, online community of practice is an internet-based official or unofficial, non-hierarchal and self organizing group of experts and/or naives who share same profession. Therefore, online CoP’s provide professionals an opportunity to interact and share their experiences, skills, expertise that is unique to every member.

2.3.2 **Online Social Networking Sites (OSNS) and Knowledge Sharing.** The digital media, undoubtedly, has updated the socializing among the individuals to the online entertainment and social networking activities [5, 17, 55, 83]. Ogunseye et al. [66] defined social networking as the relationship in specific group of people while some researches mentioned that the interaction may be through chat, e-mail, forums, blogs, specialized portals, RSS feeds and web conferencing etc. [52, 82, 83]. Such online or internet based networking sites today include Facebook, Youtube, Twitter, Hi5, Myspace etc. [66, 83, 96]. The nature of social interaction via OSNS is non professional and totally upon the will of the individual member.

The social networking helps in determining the way of sharing and interpreting the knowledge shared, which depends upon the existing knowledge in mind and the individual past experiences and the personality traits as well [33, 51, 62, 63, 71, 75, 86, 97, 98]. Therefore, based upon the above discussion, online social networking is the online group of people where linkages between the individuals are non-instrumental based on mutual interests and the engaged individuals regard each others as friends.

3. **Theoretical Framework and Research Methodology.** Online social interaction has provided the individuals from diverse backgrounds to come closer and interact with each other. This opportunity of knowing and interacting with individuals from different background has increased the chances of sharing different perspectives of knowledge, rendered by their diverse backgrounds. Following conceptual framework has been developed on the basis of the gaps found while the literature was reviewed as shown in figure 1.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent Variable</th>
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<tbody>
<tr>
<td>Personality Traits</td>
<td></td>
</tr>
<tr>
<td>• Extroversion</td>
<td></td>
</tr>
<tr>
<td>• Openness to Experience</td>
<td></td>
</tr>
<tr>
<td>Online Social Networking Sites (OSNS)</td>
<td>Online Knowledge Sharing Behavior</td>
</tr>
<tr>
<td>Online Community of Practices (OCoP’s)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Conceptual Framework of the Study
The above mentioned theoretical framework includes five variables i.e., (i) online knowledge sharing behavior (ii) personality traits; (iii) online social networking sites; and, (iv) online community of practices. Personality, online social networking sites and online community of practice are independent variables and knowledge sharing is dependent variable.

Based on the above literature discussed and the conceptual framework designed in the study, following hypotheses were developed for this study.

H1 Personality has an effect on online knowledge sharing
H2 Engagement in OSNS has an effect on online knowledge sharing
H3 Engagement in OCoP’s has an effect on online knowledge sharing

4. Methodology. This study underpins the quantitative approach of research for testing the hypotheses developed. The target population for this study was the students of department of the management [20]. One of the major reasons for targeting the population of students for this study is due to the fact that students are more satisfied with sharing their knowledge with others, hence, knowledge sharing has been observed more in students than any other group of people [5, 6, 40, 99]. Moreover, students have also proved to be more involved in online interaction than other individuals [5, 87]. The sampling design used for this study was the stratified random sampling with proportional allocation [100]. This sampling design was chosen since the data was divided into two strata i.e. public sector and private sector universities and the total size of population was also known. Tabachnick and Fidell [101] mentioned that a data of more than 200 is considered as a large sample. Since the sampling was the stratified random sampling with proportional allocation, therefore, the sample was taken 5% of the population. The sample drawn was 476, thus, meeting the criteria of good and large sample size as described above. This study used both primary and secondary data for the data collection. This study used questionnaire survey as a technique for collecting data. The questionnaire contained five parts and 44 items in total. The first part of the questionnaire was about the particulars of the respondents. It comprised of 6 items inquiring about the demographic profile. The second part of the questionnaire was about the personality traits of extroversion and openness to experience. The scale of extroversion and openness to experience was adapted from the Teh et al. [5]. There were 10 items total in the personality variable; addressing the traits of extroversion and openness to experience with an alpha reliability of 0.72. These items were measured on five point Likert scale ranging from 1 to 5; 1 being the highest state of disagreement and 5 being the highest state of agreement. The third and fourth part of the questionnaire addressed the variables of engagement in online social networking sites and online community of practices containing 12 and 9 items respectively. The scale for these two variables was self-developed. The scale was also developed on five point Likert scales ranging from strongly disagree to strongly agree. The scale of online social networking sites had an alpha reliability of 0.77 while that of online community of practices had an alpha reliability of 0.88. In the same way, the fifth part of the questionnaire contained the scale of knowledge sharing behavior. This scale was adapted from the study of Ling et al. [28]. It contained 6 items that had an alpha reliability of 0.80 and were adapted according to the knowledge sharing behavior in an online context. The contents of the questionnaire were also validated by the experts of different fields of social sciences so as to get a better insight of the contents appropriateness and then pilot tested. The response rate for the study was 67%. This study used the three types of correlations for this study i.e., (i) inter item correlations; (ii) item total correlations; and, (iii) inter scale correlations. The factor analysis used for this study was the principle component factor analysis, however, before conducting the factor analysis, Kaiser-Meyer-Olkin (KMO) was conducted to know the adequacy of sample for conducting the factor analysis and the Bartlett’s Test of Sphericity was conducted to measure that the variables used in this study are not correlated in the population. Principal component factor analysis was used with VARIMAX rotation to determine if the items loaded in one factor measured the respective construct; having an eigenvalue more than one. All the factors showed a factor loading of above 0.40.

5. Results and Discussions. Hypotheses testing for all the variables were conducted at the 0.05 level of significance as it is the normal practice in research [100]. In statistics, significance means probably true. The significance levels show how likely is the result due to chance. 0.05 level of significance means that there is a 5% chance that the findings will not be true [100]. Therefore, this study shows a 95% chance that the results are true.
Three of the hypotheses were tested with the regression analysis. Different researchers described that the multiple regression analysis is used to measure the effect of one or many variables in predicting other variable(s) [101]. However, there are few assumptions of regression analysis that should be met in order to run the regression analysis; they are: (i) independence of observations; (ii) normal distribution of data; (iii) outliers; (iv) linearity of data; (v) homoscedasticity; (vi) multicollinearity and singularity. This study met the assumptions of the multiple regression analysis; therefore, three hypotheses were tested using multiple regression analysis. This study used the multiple simultaneous regression analysis because the literature did not provide any evidence in the support of any variable over the other.

In order to measure the effect of the independent variables on the dependent variable; regression equation was developed. Since the general equation for regression analysis can be written as follows:

\[ Y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \ldots + \beta_n x_n + E \]

(A)

Where

- \( Y \) is the dependent variable
- \( \beta_0 \) is the \( y \)-intercept of the equation
- \( \beta_n \) is the standardized coefficient of the respective independent variable
- \( x_n \) is the respective dependent variable
- \( E \) is the unstandardised coefficient error

This study includes three independent variables that were checked with the regression analysis i.e., personality variable, online social networking sites and online community of practices; to find their effect on the dependent variable of online knowledge sharing behavior:

**Online Knowledge Sharing = \( \beta_0 + \beta_1 \text{Personality} + \beta_2 \text{OSNS} + \beta_3 \text{OCoP's} + E \)**

The regression equation gives a comprehensive and integrative view of how the dependent variables of personality, OSNS and OCoP’s will explain the online knowledge sharing behavior.

This study used multiple (simultaneous) regression analysis for testing the hypotheses \( H_1 \), \( H_2 \) and \( H_3 \) because the literature does not reveal or supports any evidence regarding the intensity or priority of any independent variable over the other. However, there are few assumptions of regression analysis that should be met in order to run the regression analysis as mentioned above. This study met the assumptions of the multiple regression analysis; therefore, three hypotheses were tested using multiple regression analysis.

Table 1

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>t</th>
<th>( \beta )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personality</td>
<td>-0.10</td>
<td>0.03</td>
<td>-0.03</td>
<td>0.00</td>
</tr>
<tr>
<td>OSNS</td>
<td>0.21</td>
<td>0.04</td>
<td>5.42</td>
<td>0.15***</td>
</tr>
<tr>
<td>OCoP’s</td>
<td>0.80</td>
<td>0.02</td>
<td>29.00</td>
<td>0.82***</td>
</tr>
</tbody>
</table>

***p<0.001, \( R^2 = 0.87 \); F (3, 314) = 707.53; Adjusted-\( R^2 = 0.87 \) \( \beta = \) Standardized Coefficients, \( SE = \) Unstandardised coefficient standard error
The $R^2$ value shows that 87% variance in the online knowledge sharing behavior can be characterized with personality, OSNS and OCOP’s as checked by regression. The value of adjusted $R^2$ indicates a revised estimate of the variability in the dependent variables. Nonetheless, for this study it does not show deviation from the value of $R^2$ indicating that these independent variables cause approximately 87% change in the behavior of online knowledge sharing. When the variables were checked for significance; personality variable did not show a significant impact on the behavior of online knowledge sharing ($p=0.760$). The standardized $\beta$ coefficient for the personality variable (extroversion and openness to experience) did not tend to affect the behavior of knowledge sharing when it comes to online knowledge sharing. However, the independent variable of engagement in online social networking sites showed a positive effect on the online knowledge sharing behavior. The standardized beta coefficient indicates that 15% change in the online knowledge sharing behavior can be explained by the engagement in online social networking sites. Furthermore, the independent variable of involvement in the online community of practices causes 82% variability in the online knowledge sharing behavior. Therefore, the results show that the engagement in online social networking sites and online community of practices positively and highly significantly boosts the online knowledge sharing. In contrary, personality does not indicate and effect on knowledge sharing behavior when it comes to the online knowledge sharing.

Online knowledge sharing behavior, in this study was considered at the individual level. Past researches have focused the managerial and organizational context of knowledge sharing while this study covers the individual perspectives of knowledge sharing. This study found that the online knowledge sharing is significantly related to the communication modes and the social networks that individuals use for their social interaction, either it is related to the profession or for personal interests. This finding is very much aligned with the findings of Kimmerle et al. [38]. It also supports the results of Tohidinia and Mosakhani [7] that more the individuals are willing to share the knowledge easier it gets to attain the outcomes. The results of personality variable showed that extroversion and openness to experience do not have a positive effect on the online knowledge sharing behavior. In addition, the two personality traits i.e. extroversion and openness to experience showed a consistency with the results obtained by Hsieh et al., [51] and endorse their findings that extroversion and openness to experience do not have an effect on the knowledge sharing behavior. In addition, the lack of effect of openness to experience on online knowledge sharing was further supported by Wang, Noe and Wang [102], Amayah [71], Teh et al. [5]. However, the results of this study regarding the openness to experience contradict with the findings of Matzler, et al. [11], Matzler, et al. [65], Hsu, Wu and Yeh [104], Wang and Yang [103] and Cabrera, Collins and Salgado [13] that openness to experience tends to show a positive effect on the knowledge sharing. The other personality trait of extroversion also could not find a consistency with the findings of Hsu, et al., (2006), Teh et al., (2011) that extroversion has a positive effect on the knowledge sharing. The lack of alignment in the results of openness to experience and extroversion is mainly due to the fact that the knowledge sharing focused in this study is the online knowledge sharing. Secondly, the personality traits checked in the past were considered at the team level with physical interaction of the individuals. However, this study has taken individual level knowledge sharing into the account. Another possible reason is the difference of the cultural values and the traditions prevailing in the society. Pakistani society being the collectivist society did not show a positive trend with the online knowledge sharing. However, Amayah [71] reasoned the absence of relationship of openness to experience and extroversion with a lack of interest in sharing the knowledge since the individuals with such attributes may seek the knowledge more than sharing it with others.

One of the major focuses of this study was to check the effect of online community of practices and online social networking sites on the online knowledge sharing behavior of the individuals. Interestingly, this study found very significant role of engagement in online community of practices on the online knowledge sharing behavior that supports the findings of many researchers such as Wolf et al. [74], Ogunseye et al. [66], Zboralski [64], Zhang and Watts [46], Abrams et al. [94] and Renko et al. [90]. These researchers also found that the physical community of practices fosters knowledge sharing among the individuals. This study also supports the idea put forth by Ardichvili et al. [89] that the social interaction and communication in an online community of practices is equally important as that in a physical community of practices. Henceforth, there also happens adequate online knowledge sharing via online community of practices regarding the professions and the work related tasks. Moreover, this study also proved that the online community of practices does play a positive role in supporting the online knowledge sharing behavior of the members that was also proved by Jeon et al. [81] regarding the physical community of practices. This flow of knowledge in online community of practices can be attributed with the fact that the technology has been intensified in every field of life and
most of the work done is online, either its educational or professional. Therefore, this online presence has made the social interaction with other individuals very easy and has supported the knowledge sharing behavior as well.

In addition to the significant results regarding online community of practices, engagement in online social networking sites also found a positive relationship with the online knowledge sharing behavior of the individuals, thus, emphasizing the results of Wolf et al. [74], Bennett et al. [83], Huang and Li [34], Steiner [96], Kimmerle et al. [38] and Hara and Hew [17]. This study also supports the findings provided by Abrams et al. [94] that not only the work related interactions tend to enhance the opportunities to share knowledge but common interests also foster this behavior. Therefore, online social communication that takes place in different social networking sites also becomes a source of knowledge sharing. The results of this study endorse the verdict of Renko et al. [90] that the social interaction that is frequent, tends to have more inclination towards the knowledge sharing. This positive relationship of the online social networking sites with online knowledge sharing behavior is because of the fact that the individuals who interact socially more tend to share knowledge more with each other. Individuals tend to spend more time online, more they interact and more they are inclined towards sharing their knowledge with each other.

6. Contributions, Recommendations and Conclusion. This is the first study in Pakistan regarding online community of practices and online social networking and has contributed towards the framework development that has not been studied before. However, the findings of the study will help the Higher Education Commission of Pakistan in proposing and modifying the course contents and study policies. The findings will also help the organizations while hiring the fresh candidates by knowing their preferences about sharing knowledge. Additionally, the organizations by knowing the effect of online social orientation on the knowledge sharing will help the Human Resource managers in evaluating the individual propensity towards online knowledge sharing. Findings of this study also highlight the preferences of individuals for online social interaction that has become possible and somewhat necessary in this era of technology and advanced gadgets. Consequently, these have uncovered the possibility of online learning about new things and happenings related to interests and professions. Therefore, it makes the interaction easier with far away professionals who can add to the knowledge base and understanding of the employees in local organizations. Henceforth, it is not limited to the professional interaction but can be applied to the common interests as well.

Results of the study propose more ideas for the future researches in the field of both management and psychology. Since this study considers only two traits of personality that is extroversion and openness to experience; future studies can take all five traits of personality proposed in big factor model theory. In addition, other factors can also be included in the study that have not been included in the research model that can mediate or/and moderate variables like trust, ethics etc.; thus, proposing a more comprehensive model addressing the online knowledge sharing attitudes and behaviors in coming years. Moreover, this study can also be conducted on the management personnel and other industries so the findings can be verified. In this regard, apart from the educational institutes it can be conducted in the organizations as well for knowing the current online knowledge sharing behavior of the management and future trends of organizations about the online knowledge sharing. Apart from that, more generalized results can be obtained by conducting the causal relationships with the longitudinal research design. In addition, this study also recommends that if the mixed methods are used for the data collection and data analysis, the findings will be more generalized and rigorous as this study has used only the quantitative methods of research. As an answer to the query put forth by Siemens (2005) that can the technology mould our thinking process, it has become the need of the hour to redefine and restructure our sources and interaction that play a role in shaping our thought process and ultimately our behaviors. This is the time to embrace the technology for the good of society and mankind.
REFERENCES


ABSTRACT: This descriptive study aimed at investigating the peer learning as resource management strategy in both learning systems assessed by students at higher education level. Population of the study comprised 264 BCS & MCS/MS students from four selected Public Sector Universities and four selected Virtual University campuses of Khyber Pakhtunkhwa. 65 students from scaffolding based self-regulated learning system and 135 students from formal learning system. A part of Motivated Strategies for Learning Questionnaire (MSLQ) originally designed by Pintrich, Garcia & Mckeachie (1993) related to peer learning was used for the study. Cross-tab, Chi-square test of Goodness of fit and paired sample t-test was applied to analyze the data. Peer learning is also one of the ways to study which modern educators emphasizes. So group activities and discussion with peers through video-conferencing as it is done in scaffolding based self-regulated learning may be implemented in formal learning system.

KEYWORDS: Scaffolding-based Learning, Self-regulated Learning, Formal Learning, Peer learning, Learning.

Peer Learning definition and Strategies to adopt: The term “Peer learning” came out of cognitive psychology which is one of the educational practice through which students seek help for learning and interest to get educational objectives. It can be said as cooperative learning. In 1916, John Dewey also advocated peer learning while saying that education is not just telling but an active and constructive process.

Peer learning means the sharing of knowledge, ideas and experience between the participants. It is basically mutual learning. (Boud, 1988). Peer learning is not a single educational strategy; there are varieties of models for peer learning (Griffiths, Housten and Lazenbatt, 1995). These model are proctor model, students partnership, discussion schemes, laboratory work, study groups, peer assignments, project work, community activities, etc. Peer learning will be useful, if teacher provide intellectual scaffolding. Teacher can help students in selecting topic; can put guided questions to prompt students towards more sophisticated level thinking to make participation of all group members meaningful. (Nelson, 1999)

To make successful peer learning, following strategies can be adopted.
1. Buzz groups
2. Affinity group
3. Solution and critic group
4. Teacher-write-discuss (Johnson & Holubec, 1993).
Peer learning can give result in the form of:

- Team-building spirit
- Social competence
- Well communicative skills
- Self-esteem
- High attainment and increase yield in terms of enhanced learning outcomes. (Kaufman, Felder & Fuller, 1999)

According to Topping (2001), When planning peer learning, the following aspects should be considered:

1. Context
2. Objectives
3. Curriculum area
4. Participants
5. Helping techniques
6. Contact
7. Materials
8. Training
9. Process monitoring
10. Assessment of students
11. Evaluation

Figure 1
Source: dbis.rwth-aachen.de
12. Feedback.
Theoretical Model of Peer learning (Topping & Ehly, 1998)
Dee Fink (2002) describes that small groups can be used in three ways: casual, cooperative and team-based. Casual group can be a quick creation in class of two or three students engage in discussing the problem and solve it by themselves. They are allowed to get help with the material provided. Cooperative learning is basically team based learning to engage the group in more structured activities intentionally.

Peer Learning and Information Technology: There are different ways to promote peer learning. Information Technology is one of the various ways. Peer learning through distance learning with online facility has been expedited nowadays. Graham (2002) reviewed that in virtual environment i.e. for distance education groups are formed online and are structured for learning activities like quiz and can share knowledge and clear concepts with group interactions.

Davies (2000) worked on computerized peer assessment at university level. He developed software which helped to manage peer learning and proper management information system was provided for the coordinator or facilitator of a program. (Bull & McCalla, 2002) Through this software, which assess the tutoring system formatively, will give regular, frequent and timely feedback to both helpers and helped on the effectiveness of peer learning. (Topping, 1999) There are some challenges too for peer learning which are unclear aims and objectives, no proper program design and arrangements, no proper assessment and program and individual boundaries are not clear.

Aims and objectives should be SMART- Specific, Measurable, Achievable, Realistic and Time specific. (Walker & Avis, 1999) It needs to be determined that they will follow formal approach of learning or informal approach will be more suitable for them. Selection should be based on the ability and need of the target group. Community based setting may be more appropriate. (Shinner, 1999) Another important issue for peer learning is that there is no proper assessment in past to evaluate the effectiveness of the peer learning for both the learning group and educator (Milburn, 1995). Peer learning as a resource management strategy has been utilized at higher education level to train extensively in many learning strategies (e.g. Time Management, Effective Studying, Exam Preparation, Note-making, Reading and Retention, Focus and Concentration). Such activities will facilitate to develop team work skills, to present work effectively, develop leadership qualities and other student development opportunities.

Current Study: The word “Scaffolding” is a symbol given to a type of assistance by a teacher or a capable peer. The teacher helps the student to complete the given task or get mastery over the concept which he is unable to grasp at the beginning. The teacher gives him chance to complete most of the task unassisted but help in those parts in which he is primarily unable to take hold of independently.

It is an instructional approach which supports beginners by limiting the complexities gradually and learners gain the knowledge, skills, and confidence to handle complexities (Young, 1993). Jerome Bruner (1976), a Cognitive Psychologist presented scaffolding Theory at first in 1950s. He explained the word in the context of young children’s oral language acquisition. The first tutors are their parents who help them to speak and provided with natural structures to learn a language in traditional way. Formal learning is an organized, systematic, structured system having set of definite norms and rules, with fixed curricula, methodology and evaluation procedure regarding objectives. It involves a triangular relationship of teacher, the students and institution. It requires students’ classroom attendance. This learning involves both formative and summative evaluation. Usually punitive and mono-directional methodology is applied which fails to stimulate students and to provide their active participation in the learning process. This system is not learner centred and usually ignores the students’ standards, values and attitudes and for most of the time, teachers pretend to teach and students pretends to learn (Dib, 1987).

Motivated Strategies for Learning Questionnaire (MSLQ) originally designed by Pintrich, Garcia, and McClatchy (1993) was adapted and only one part related to peer learning was taken for BCS and MCS students studying in both Public Sector Universities of Khyber Pakhtunkhwa and Scaffolding based self-regulated learning system to determine the peer learning strategies as merits and demerits of both learning systems at higher education level and compare the effectiveness of peer learning in both learning systems. Basically this study proposed a better learning system that involves the self-study by using peer learning strategies to sustain their interest in self-learning. Further research in different situations and contexts can be conducted to get different results.
Objectives Of The Study: Following were the objectives of the study. To determine the effectiveness of peer learning as a resource management strategy in Scaffolding based self-regulated learning system and formal learning system at university level. Furthermore, to compare the effectiveness of peer learning as resource management strategy in Scaffolding based self-regulated learning system and formal learning system at university level as assessed by the students.

Hypotheses Of The Study: Following were the null hypotheses of the study.

Ho1. There is no significant difference among the views of students about peer learning as a resource management strategy studying in scaffolding based self-regulated learning system at higher education level.

Ho2. There is no significant difference among the views of students about peer learning as a resource management strategy studying in formal learning system at higher education level.

Ho3. There is no significant difference among the views of students about peer learning as a resource management strategy studying in both scaffolding based self-regulated learning and formal learning system at higher education level.

Method: This research was descriptive and survey type in nature.

Participants: For survey, all BCS and MCS students studying the subject of Database System in four selected Public Sector Universities of Khyber Pakhtunkhawa, Pakistan.

2. Kohat University of Science and Technology, Kohat.
3. University of Science and Technology, Bannu.
4. Gomal University, D.I. Khan.

and four selected campuses of Virtual University,

1. Virtual University Campus, Peshawar.
2. Faran Educational Complex, Kohat.
3. Virtual University Campus, Karak.
4. Virtual University Campus, Bannu, Pakistan constituted the population of this study.

Procedure: For survey, the sampling frame for the study was IT students enrolled to study Database subject in which 135 out of 185 students in selected Public Sector Universities of Khyber Pakhtunkhawa and 65 students out of 79 students studying in four selected Virtual University campuses were randomly sampled. Motivated Strategies for Learning Questionnaire (MSLQ) originally designed by Pintrich, Garcia & McKeachie (1993) was adapted and permission was sought from the developers. The following 5-point Likert rating scale was applied to this study. The scale was adopted from Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1991). A manual for the use of the Motivated Strategies for Learning Questionnaire (MSLQ), National Centre for Research to Improve Postsecondary Teaching and Learning. Ann Arbor: University of Michigan.

Questionnaire in its original form is already standardized, having high validity. However, suggestions and expert opinion were also taken from experts working in different Universities of Khyber Pakhtunkhawa and were incorporated.

Moreover, for reliability and validity, considering the issue of culture laden questionnaire, it was personally administrated to 10 subjects as a pilot run. The reliability coefficient through SPSS-16 at Cronbach’s alpha was .78. Data was collected personally from the above mentioned universities and Virtual University Campuses of Khyber Pakhtunkhwa, Pakistan.

Results And Discussion: On the basis of the objectives of the study, the collected data were entered in SPSS-16 and Equal probability Chi-square test of Goodness of fit was used to measure the Scaffolding based self-regulated system and formal learning system. Paired sample t-test was used to compare the students’ peer learning strategies of both learning systems at university level.
Table 1: Student’s views about Resource Management Strategies: Peer Learning in scaffolding based self-regulated learning system. (N = 65)

<table>
<thead>
<tr>
<th>S. N</th>
<th>Statement</th>
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<th>SDA</th>
<th>DA</th>
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<th>A</th>
<th>SA</th>
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<th>P</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>When studying for this course, I often try to explain the material to a classmate or friend.</td>
<td>3</td>
<td>11</td>
<td>9</td>
<td>32</td>
<td>10</td>
<td></td>
<td>37.69</td>
<td>.00</td>
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<td></td>
<td></td>
<td>13</td>
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<td>13</td>
<td>13</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I try to work with other students from this class to complete the course assignments.</td>
<td>2</td>
<td>12</td>
<td>13</td>
<td>19</td>
<td>19</td>
<td></td>
<td>14.92</td>
<td>.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>When studying for this course, I often set aside time to discuss course material with a group of students from the class.</td>
<td>3</td>
<td>9</td>
<td>23</td>
<td>18</td>
<td>12</td>
<td></td>
<td>18.62</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>O</td>
<td>8</td>
<td>32</td>
<td>45</td>
<td>69</td>
<td>41</td>
<td></td>
<td>34.87</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td>39</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A significant difference was found in the views of students studying in both system between the observed and expected frequencies (with \( \chi^2 = 34.87 \) and p-value = .00). Therefore the null hypothesis “There is no significant difference among the views of students about peer learning of scaffolding based self-regulated learning at higher education level” is rejected at 0.05 level of significance.

Table 2: Student’s views about Resource Management Strategies: Peer Learning in Formal learning system. (N = 65)

<table>
<thead>
<tr>
<th>S. N</th>
<th>Statement</th>
<th>O</th>
<th>SDA</th>
<th>DA</th>
<th>UD</th>
<th>A</th>
<th>SA</th>
<th>²</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>When studying for this course, I often try to explain the material to a classmate or friend.</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>59</td>
<td>53</td>
<td></td>
<td>1.0</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>I try to work with other students from this class to complete the course assignments.</td>
<td>2</td>
<td>12</td>
<td>20</td>
<td>56</td>
<td>45</td>
<td></td>
<td>76.4</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>When studying for this course, I often set aside time to discuss course material with a group of students from the class.</td>
<td>4</td>
<td>9</td>
<td>37</td>
<td>57</td>
<td>28</td>
<td></td>
<td>68.4</td>
<td>.00</td>
</tr>
<tr>
<td></td>
<td></td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td>27</td>
<td></td>
<td>67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>O</td>
<td>11</td>
<td>29</td>
<td>67</td>
<td>172</td>
<td>126</td>
<td></td>
<td>45.67</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td>81</td>
<td></td>
<td>67</td>
</tr>
</tbody>
</table>

Table No. 2 shows that there is significant difference between the observed and expected frequencies with \( \chi^2 = 45.67 \) and p-value = .00. Therefore the null hypothesis “There is no significant difference among the views of students about peer learning of Formal learning system at higher education level” is rejected at 0.05 level of significance.

Table 3: Comparison of students’ view about Peer learning strategies in both learning systems (N= 65)

<table>
<thead>
<tr>
<th>System</th>
<th>Mean</th>
<th>S.D.</th>
<th>t</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scaffolding</td>
<td>10.6</td>
<td>2.81</td>
<td>2.7</td>
<td>0.01</td>
</tr>
<tr>
<td>Formal</td>
<td>11.8</td>
<td>2.09</td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2.7</td>
<td></td>
<td>0.01</td>
</tr>
</tbody>
</table>

Table 3 shows that there is significant difference among the students’ view about peer learning in both learning systems at higher education level. Therefore, the null hypothesis “There is no significant difference among the views of students about peer learning of scaffolding based self-regulated learning and formal learning system at higher education level” is rejected at 0.05 level of significance.
Hogan, Diane M. (etal)(1999) presented in their article “Implication of Vygotsky theory for peer learning” that there are certain conditions under which collaboration is most likely to foster cognitive growth. In a research article published on October, 2005 in Studies in Higher Education with title “Peer learning as pedagogic discourse for research education” by D. Boud and A. Lee, University of Technology, Sydney, Australia. It was suggested that a more suitable teaching way should be adopted for ‘peer’ for research study. Through this way, peer learning would be more effective for the research in education.

In article “Implication of Piagetian theory of peer learning” by De Lisi (etal) (2012) showed that peer interaction can enhance learning outcomes in tasks within a developmental framework. Peer interactions also support cognitive change through dialogue and discussion more effectively than independent, individual work. In this study, according to students’ views peer learning is more active in formal learning as compare to scaffolding based self-regulated learning system. There is significant difference in the views of students in both learning systems about peer learning at university level. There is one hour video conferencing section in scaffolding based self-regulated learning system which enhance peer learning to broaden horizon the vision across the country among all virtual university campuses.

Conclusions And Recommendations: From the analysis and interpretation, it can be concluded that:
1. According to students’ views of scaffolding based self-regulated learning system, there is significant difference about peer learning of scaffolding based self-regulated learning system at higher education level.
2. According to students’ views of formal learning system, there is significant difference about peer learning of formal learning system at higher education level.
3. There is significant difference among the students’ views about peer learning of scaffolding based self-regulated learning system and formal learning system at higher education level.

On the basis of the conclusions, the following recommendations can be made:
1. Peer learning is also one of the ways to study and modern educators emphasize its importance. So group activities and discussion with peers through video-conferencing as it is done in Scaffolding based self-regulated learning may be implemented in formal learning system. It will broaden the horizon as well as expression power of the students.
2. If peer learning is properly planned then it enhances communicative power, retention, fluency, automaticity etc.
3. Further researches can be conducted in different situations and contexts to compare the results of both learning systems.

REFERENCES

work published 2002).


CRITICAL SUCCESS FACTORS FOR PORTFOLIO COST MANAGEMENT IN OFFSHORE SOFTWARE DEVELOPMENT OUTSOURCING RELATIONSHIP FROM VENDOR’S PERSPECTIVE: ANALYSIS BASED ON ORGANIZATION TYPE USING SYSTEMATIC LITERATURE REVIEW

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ABSTRACT: Offshore Software Development Outsourcing (OSDO) is increasingly becoming the normal practice in the software industry. It offers a bundle of core benefits for client organizations which includes: high quality, fast and cost effective development of software products. However, OSDO possesses substantial risks and limitations during project management. To handle such problems Portfolio Cost Management (PCM) is used one of the best approaches. It is a set of centralized management of processes, methods and technologies used between client and vendor to reduce software costs and improve quality. We have performed a Systematic Literature Review (SLR) by applying customized search strings obtained from our research questions, along with the other SLR steps such as protocol development, initial publication selection, final publication selection, publication quality assessment, data extraction process and data synthesis. In this research, we explore 16 success factors of PCM to analyze the association between a client and vendor. It includes: ‘efficient cost estimation strategies’, ‘efficient project management’, ‘efficient knowledge sharing management’, ‘efficient software effort estimation’, ‘planning realistic goals’, and nine others. Furthermore, we analyze these factors based on different types of organizations, i.e. research and non-research. For best results in the software industry, it is proposed for vendor organizations to address the factors: ‘efficient cost estimation strategies’, ‘efficient project management’, ‘efficient knowledge sharing management’, ‘efficient software effort estimation’ and ‘planning realistic goals’.

Keywords: Portfolio Cost Management; Offshore Software Development Outsourcing Relationships; Global Software Development; Systematic Literature Review.

1. Introduction: It is documented that globalization process has affected every industry including Software Engineering (SE) in the form of Global Software Development (GSD) [1]. GSD has become the
normal practice in SE due to its fruitful outcome and smart development of software products. GSD is the situation in which software development teams are distributed across the boundaries of a region [2]. GSD behaves like a big umbrella, where Offshore Software Development Outsourcing (OSDO) is a term under this umbrella. OSDO is a relationship between two parties i.e. client and vendor organizations. In OSDO relationships client organizations contract out all or part of its software development activities to a vendor organization, who provide agreed services for remuneration [3]. Client organizations benefit from offshore outsourcing because vendors in developing countries (offshore vendors) charge them one-third less than onshore vendors [4]. Thus client organizations are highly motivated to consult the services of vendor organizations for the attractive benefits to increase the value of an organization’s business strategy.

Many reasons drove OSDO practice rise, where reducing development costs can be more highlighted [5]. OSDO enables organizations to abstract themselves from geographical distances, while having qualified work force and minimizing cost, thus increasing the market area by producing software(s) for remote clients and obtaining a longer workday by taking advantage of time differences [2, 6]. The nature of OSDO allows development work to be sub-divided into modules, which may be developed in parallel across multiple globally distributed sites thus leading to improved cycle time [7]. Besides the long-term benefits of practicing OSDO, it also poses substantial risks for both client and vendor organizations including poor project management. Various countries are practicing offshore outsourcing strategy. Now a days India is known as a leader in delivering high end software outsourcing services and they have increased their socio economics up to a high extent using this software development strategy [8, 9].

One of the key factors influencing software project success or failure is project management. When vendor organizations get contracts of many projects at a same time, then the proper management is a challenge for vendors. In this situation Project Portfolio Management (PPM) plays its significant role and is becoming a key competence for companies handling numerous projects simultaneously [10].

In PPM, projects are managed in a coordinated way to deliver benefits that would not be possible if the projects were managed independently [11]. PPM is the art and science of applying a set of knowledge, skills, tools, expertise and techniques to a collection of projects to meet or exceed the needs and expectations of an organization’s investment strategy [12].

Portfolio Cost Management (PCM) is the situation where project manager is intended to manage the software development cost without affecting the quality. PCM aims to reduce software development costs and improve software quality. In this paper, we are intended to explore the factors that positively influence PCM in the situation of offshore software development outsourcing. To decide whether to bid for a contract, software cost estimation can provide a condition in PCM.

A critical activity in the initial project phases is the proper estimation of the necessary project development costs. Software cost estimation occurs before a project is started, when either the cost of the project must be estimated from the project description, given the available project budget [13]. Software cost estimation affects almost all activities of software project development such as; bidding, planning and budgeting, more over the accurate estimation is very crucial to the success of the project [14]. The main software cost estimation methods are expert judgment, algorithmic cost estimation and estimation by analogy [15].

Inaccurate estimates are directly responsible for a great number of issues related to PCM, like low quality and lose of milestones. Typically a software development environment involved more than one project at a time, the available tools in the area of software cost estimation deals mostly with single software project [16]. Our long-term research goal is to introduce an effective Portfolio Cost Management Model (PCMM) to assist vendor organizations in assessing their software development cost estimation and management activities in a project portfolio environment.

2. Background and Motivation: In order to successfully design PCM initiatives in the context of OSDO, we need to be constantly aware of what really positively influence portfolio cost management process in terms of OSDO. It is important to discover what critical success factors will positively influence PCM process. As research shows that, half of the companies that have tried outsourcing have failed to realize the anticipated results [17]. The knowledge of these factors lead us to the development of a new and improved PCM approach, while the adoption of this approach will take an organization to the aimed peak in the software industry.

Literature shows that no SLR has applied to PCM in the context of OSDO and this is the motivation for the research reported in the paper. We have used a systematic approach and have identified sixteen success factors,
which positively influence PCM in the situation of OSDO.

Project portfolio cost estimation and management is an indisputably important activities for the proper planning, follow-up and control of projects, especially for large organizations while developing software intensive systems [18]. According to the recent research: the majority of the outsourced projects involving software development activities, suffer from budget and schedule overruns, caused among other reasons, by insufficient initial estimations [19]. Effort estimations are helpful for both IT developers as well as for IT clients, based on these estimations, the acquiring organization may assess and monitor implementation costs, evaluate bids and develop realistic budgets and schedule [20].

Estimating and predicting development cost of software project success is a well-researched area, but maintaining the ratio of sound precision is still a great challenge for project managers. In software project management one of the important issues is to effectively control the expensive investment of software development costs [21]. It is necessary to utilize various estimating techniques to effectively estimate software project cost within the information technology domain. In the shade of experience, it is always difficult for any generic software cost estimation technique to produce accurate statistics that are better than the target value of 25% when applied to some project data set [20]. The efficiency of a project state can be defined as the relationship of cost to its success probability, and the action of optimizing this relationship is equivalent to a multi-objective problem [22].

In order to effectively control the cost, the project managers must have to allocate the costs to the different phases of the software development life cycle. Factors which affect system development efforts directly or indirectly includes, size of the system, system complexity, team member capabilities, team experience and expertise, use of innovative tools and technologies, requirement instability and the software environment [23]. In order to produce accurate estimates and avoid large errors, several cost estimation techniques and models have been introduced like Constructive Cost Model (COCOMO) used to accurately calculate the amount of cost and time schedules for software projects. Improving the accuracy of cost estimation models available to project managers would facilitate more effective control of time schedules and budgets during software development. Software engineering economics approximates concepts from economics sciences and corporate finance theories to the software development context, supporting stakeholders like investors and managers who work in the software industry to make better decisions about their software projects increasing profits and minimizing losses [24]. As software development becomes an increasingly important enterprise in the industry, managerial requirements for cost estimation and management increase, yet we continue rather a long history of failing to cost software system development adequately.

3. **Research Questions:** To understand portfolio cost management in the situation of offshore software development outsourcing relationships, we have formulated the following research questions. While the first question is the basic one and belongs to the newly identified critical success factors and the other question belongs to the study of analysis of these success factors which will be entertained one after another in this paper.

**RQ1:** What are the critical success factors, as identified in the literature, to be addressed by vendor organizations that positively influence/assist portfolio cost management in the context of offshore software development outsourcing relationships?

**RQ2:** What is the association between the newly identified critical success factors with respect to the different types of organizations?

4. **Methodology:** For undertaking this research, a Systematic Literature Review (SLR) is used as the main approach for the data collection. The SLR is a structured and methodical way of identifying, assessing and analyzing all the available relevant published primary studies in order to investigate a specific research question. Systematic reviews are rigorous, formally planned and methodically executed, which makes it differ from ordinary literature surveys. Planning the review, conducting the review and reporting the review are the main phases of a systematic review [25]. A systematic review protocol was initially written to describe the plan for undertaking the review, this protocol describes all the planning steps with details [25]. Many of the latest research have been carried out using systematic reviews [26-29]. The major steps in our methodology are:

- Constructing a search strategy and then perform the search for relevant papers
- Perform study selection process
Apply study quality assessments
Data extraction process and analyzing/synthesizing the extracted data

Our search strategy is based on the following steps:
- Derive the major terms by identifying Population, Intervention and Outcome.
- Find the synonyms and similar words for these major terms.
- Verify these terms in relevant papers and academic databases.
- ‘OR’ operator is used to connect synonyms and similar spellings (if allowed in the concern database)
- ‘AND’ operator is used to connect major terms (if allowed in the concern database)

On the basis of the above search strategy, we have formulated the following search terms:
- POPULATION: offshore software development vendor organizations
- INTERVENTION: factors and characteristics
- OUTCOME OF RELEVANCE: best practices for PCM in the context of offshore software development outsourcing relationships, innovation in PCM
- EXPERIMENTAL DESIGN: empirical studies, exploratory studies, case studies, SLR’s, theoretical studies and expert opinions

We applied our search terms in different numerous academic databases and found the potential relevance to the topic, shown by the following terms:

**Project portfolio cost management:** project portfolio management OR project portfolio charge management OR project portfolio price management OR project budget portfolio management OR project portfolio rate management.

**Global software development:** global software development OR GSD OR information system outsourcing OR information technology outsourcing OR software contracting-out OR distributed software development OR multi-site software development.

**Success factors:** factors OR drivers OR motivators OR elements OR parameters OR characteristics.

After trial search(s) we have designed the following search strings:
(Project portfolio management OR project portfolio charge management OR project portfolio price management OR project budget portfolio management OR project portfolio rate management) AND (global software development OR GSD OR information system outsourcing OR information technology outsourcing OR software contracting-out OR distributed software development OR multi-site software development) AND (factors OR drivers OR motivators OR elements OR parameters OR characteristics)

Based on the available access and importance, the following digital libraries were used:
- IEEE Xplore; (http://www.ieeexplore.ieee.org)
- Science Direct; (http://www.sciencedirect.com)
- ACM Portal; (http://dl.acm.org)
- Springer Link; (http://link.springer.com)
- CiteSeer; (http://citeseerx.ist.psu.edu)

Note: Since these digital libraries vary from each other in their architecture, search mechanisms and capabilities, so we have tailored our search strings accordingly.

The following inclusion criteria were used after retrieving the relevant literature through these search strings:
- Studies that describe portfolio cost management from vendor’s perspective
- Studies that describe the factors/motivators for portfolio cost management in the situation of offshore software development outsourcing
- Studies that describe offshore software development outsourcing with a focus on portfolio cost management
- Studies, which describe criteria for a successful portfolio cost management
- Studies that describe challenges, issues, barriers in portfolio cost management
- Studies that describe the factors affecting the continuation/termination of portfolio cost management

The following exclusion criteria were used:
- Studies that are not even relevant to the research questions
- Studies that do not describe offshore software development outsourcing with a focus on portfolio cost management
• Studies other than offshore software development outsourcing relationships
• Papers written in non-English are excluded
• Poor-English written papers are excluded as they lead to ambiguity
• Textbooks are excluded (printed/electronic)
• Master level thesis, graduation projects, and PhD dissertations are excluded

No compromise on quality leads to the anticipated results. For the purpose of measurement of quality, a quality assessment was done for any manuscript to pass the initial phase; quality assessment was performed after making a final selection of publications. The quality of papers was assessed in parallel at the time of data extraction. Three quality check lists were prepared as shown in Table 1.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does the paper clearly state the findings and results?</td>
<td>Yes=1</td>
</tr>
<tr>
<td>Do the arguments well-presented and justified?</td>
<td>Yes=1</td>
</tr>
<tr>
<td>Does the paper well referenced?</td>
<td>Yes=1</td>
</tr>
</tbody>
</table>

We have identified and positioned our finally selected 50 papers in total, shown in Table 2, retrieved through our customized search strings, which meets our inclusion/exclusion criteria and quality assessment as well.

<table>
<thead>
<tr>
<th>Resources</th>
<th>Total results found</th>
<th>Initial selection</th>
<th>Final selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>IEEE Xplore</td>
<td>125</td>
<td>31</td>
<td>16</td>
</tr>
<tr>
<td>Science Direct</td>
<td>90</td>
<td>40</td>
<td>8</td>
</tr>
<tr>
<td>ACM Portal</td>
<td>332</td>
<td>55</td>
<td>15</td>
</tr>
<tr>
<td>Cite Seer</td>
<td>930</td>
<td>36</td>
<td>3</td>
</tr>
<tr>
<td>Google Scholar</td>
<td>515</td>
<td>59</td>
<td>4</td>
</tr>
<tr>
<td>Springer Link</td>
<td>592</td>
<td>28</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>2584</strong></td>
<td><strong>249</strong></td>
<td><strong>50</strong></td>
</tr>
</tbody>
</table>

The review was undertaken in a team work. However the data extraction phase was completely performed by the principal author of the paper. In order to reduce author’s bias, inter-rater reliability test was performed. The secondary reviewer randomly selected 6 publications from the list of papers already used in the data extraction by the primary reviewer and extracted independently. The results obtained were compared with the results produced by the primary reviewer and found insignificant differences. The following data were extracted from each of the papers chosen for the data extraction purpose: Paper S.no, Paper ID, Date of Review, Paper Title, Paper Authors, Reference, Database, Sample Population, Target Population, Publication Quality Description, Methodology/Study Strategy (i.e. Interview, Questionnaire survey, Case study, Survey), Organization Type (i.e. Research organization, Non-research organizations, Educational Organization), Organization Size (i.e. Small size, Medium size, Large size), Outsourcing Type (i.e. Offshore, Inshore, Near-shore, Global software development), Country/Location of the analysis and Year of the analysis. After the data extraction phase a list of success factors/motivators were identified from the sample of these papers. Both primary and secondary reviewers performed the data synthesis thoroughly, in order to derive a list of categories to classify these newly identified success factors. Initially a list of 18 categories was identified. After a sound review, for clarity, some of the categories were merged together and finally obtained a list of 16 success factors, shown in Table 3.

5. Results and Discussions

5.1. Critical success factors identified through systematic literature review: In order to answer RQ1,
Table 3 shows the list of critical success factors identified through SLR. We have identified a list of 16 success factors that play a very important role in portfolio cost management in the context of software outsourcing relationships. ‘Efficient cost estimation strategies’ (80%) [23], is the most common success factors identified in our study.

- To effectively estimate project cost with in information technology domain, it is necessary to utilize various estimating strategies and techniques. In this regard the use of formal estimating models are positively related to the proper predictability of project cost [23].
- In addition for a software cost estimation strategy/method to be useful, it should produce sound estimates, accepted and trusted by the practitioner [30].

Our results indicate that ‘efficient project management’ (70%) is an important factor in the fruitful outcomes of OSDO projects in a portfolio environment. Efficient project management is the key factor in the success or failure of a software project. Over the last two decades many firms in the USA and UK have used to outsource their software projects to vendor organizations of other countries such as India, China, Russia, Pakistan and Malaysia. In vendor organizations one of the main reasons for software development outsourcing failures; is the lack of efficient project management. Different studies have described the impact of ‘efficient project management’:

- Best project management practices used by project managers can optimize software project cost estimation and management [23].
- Efficient software project management can leverage the beneficial effects of budget on schedule pressure in software development to gain more competitive advantage in the global market [31].
- One of the key factors influencing project success or failure is project management, an active project manager is able to improve their cost estimation accuracy by efficiently managing the outsourced projects [32].

In our study we have identified that ‘efficient knowledge sharing management’ (42%), contribute to the effective establishment of portfolio cost management activities in outsourced projects. Knowledge between the different stakeholders in the development team must be shared properly. In our studies different researchers have cited this factor:

- The development of cost estimates depends on the organizational knowledge sharing, moreover the authors also claims that project managers require the core competency to acquire, share and integrate organizational knowledge to accurately predict, estimate and manage IT projects costs [23].
- Establishment of an efficient communication and knowledge sharing mechanisms between the members of the organization allowing a developer to discover the status and changes made with in each project in a project portfolio [6].

60% of the articles in our research described ‘efficient software efforts estimation’. The estimation of software efforts are the most important activity during project portfolio management. Therefore these efforts like cost, time, and workforce should be estimated properly and effectively, improving software cost estimation dramatically. A number of techniques are available to portfolio project managers for this purpose like artificial neural networks, algorithmic models and analogy based estimation.

- Cost and efforts estimation is used for protecting the head count in projects or organizational units or to ensure the continuation of a project, and does not consider the intentional estimate distortion [18].
- Software efforts estimation can be used for a number of purposes e.g. budgeting, tradeoff and risks analysis, project planning and control, and software process improvement analysis [33].

Our results also indicate that ‘planning realistic goals’ (18%) can get the vendor organizations to the peak of success. The planed goals and milestones must be achievable. The goals must be close enough to reality which could be accomplished in a timely manner. Our research suggest about this factor:

- The application of meaningful goal oriented measures significantly influence cost estimation [34].
- For a project manager who hopes to use the cost/schedule trade-off relationship for project planning, a plot of cost as a function of actual not scheduled completion time is more useful [35].

Thirty percent of our selected literature describes ‘realistic co-relation between software cost and quality’ is one of the main factors in portfolio cost management. Most of the time the software developers tries to provide high quality software with minimal cost, but sometime it goes wrong and as a result the quality suffered by minimizing the software costs. Understanding and controlling software qualities, relates to the management of software costs. So a realistic co-relation between cost and quality is crucial. Various studies
have described the impact of realistic co-relation between software cost and quality:

- A project which tries to simultaneously reduce software cost and improves software quality can do so by intelligent and cost effective use of modern software techniques [36].
- The vendor organizations must have aim to reduce software cost and improves productivity and quality on software development [37].
- Software quality plays an important role in determining service costs for more mature products [38].

We have also identified several other factors that have a positive influence on vendor organizations in portfolio cost management in the situation of offshore software outsourcing as publicized in Table 3 (RQ1).

<table>
<thead>
<tr>
<th>S.No</th>
<th>Success Factors</th>
<th>Total Frequency in SLR (n=50)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Efficient Cost Estimation Strategies</td>
<td>40</td>
<td>80%</td>
</tr>
<tr>
<td>2</td>
<td>Efficient Project Management</td>
<td>35</td>
<td>70%</td>
</tr>
<tr>
<td>3</td>
<td>Efficient Knowledge Sharing Management</td>
<td>21</td>
<td>42%</td>
</tr>
<tr>
<td>4</td>
<td>Efficient Contract Management</td>
<td>4</td>
<td>8%</td>
</tr>
<tr>
<td>5</td>
<td>Realistic Co-relation between Cost and Quality</td>
<td>15</td>
<td>30%</td>
</tr>
<tr>
<td>6</td>
<td>Design &amp; Development Concise Coding</td>
<td>10</td>
<td>20%</td>
</tr>
<tr>
<td>7</td>
<td>Cost Sourcing</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>8</td>
<td>Efficient Resource Allocation &amp; Management</td>
<td>8</td>
<td>16%</td>
</tr>
<tr>
<td>9</td>
<td>Efficient Software Efforts Estimation</td>
<td>30</td>
<td>60%</td>
</tr>
<tr>
<td>10</td>
<td>Mechanisms for Error Prediction</td>
<td>2</td>
<td>4%</td>
</tr>
<tr>
<td>11</td>
<td>Planning Realistic Goals</td>
<td>9</td>
<td>18%</td>
</tr>
<tr>
<td>12</td>
<td>Project Post-mortem Analysis</td>
<td>9</td>
<td>18%</td>
</tr>
<tr>
<td>13</td>
<td>Project Scheduling</td>
<td>7</td>
<td>14%</td>
</tr>
<tr>
<td>14</td>
<td>Contingency Resources</td>
<td>3</td>
<td>6%</td>
</tr>
<tr>
<td>15</td>
<td>Software Life Cycle Cost Management</td>
<td>8</td>
<td>16%</td>
</tr>
<tr>
<td>16</td>
<td>Staff Training</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>

5.1. The association of critical success factors with respect to the organization type: In order to answer RQ2, Table 4 shows a list of success factors identified and reported in two types of organizations i.e. research and non-research organizations. Non-research organizations belong to the offshore outsourcing industry, while research organizations are those who are intended to carry out research about offshore outsourcing strategies in order to bridge the gap between academia and industry. We aim to find whether these factors differ from research and non-research organization.

We suggest that understanding the similarities and differences in these factors can positively contribute to the body of portfolio cost management in offshore software development outsourcing relationships.

Because of the ordinal nature of data we have used linear by linear association chi-square test in order to investigate the significant differences across the different types of organizations, shown in Table 4. When data is ordinal, in such case, linear by linear association is more powerful than Pearson chi-square test, in order to measure the significant differences [39].

Table 4 depicts that round about four percent of the SLR studies were piloted on research organizations, while twenty-six percent of the original studies were piloted on non-research organizations. This is because our core research area belongs to the offshore software development. The remaining studies i.e. round about 70% literature shows the mixed category. Where mixed category illustrates that these studies neither shows research nor non-research organizations.

Comparison of these success factors identified in these two types of organizations indicates that there are
more similarities than differences among the success factors. We have found only one significant difference between these two categories i.e. non-research and research organizations, as shown in Table 4.

According to our results, thirteen success factors out of sixteen have been reported in non-research organizations. Amongst these success factors, five factors have been cited ≥30% of the articles. These five factors are ‘efficient cost estimation strategies’ (80%), ‘efficient project management’ (70%), ‘efficient knowledge sharing management’ (42%), ‘realistic co-relation between software cost and quality’ (30%), and ‘efficient efforts estimation’ (60%). It is worth noticing that the success factors ‘efficient cost estimation strategies’, ‘efficient project management’ and ‘efficient software efforts estimation’ has the highest percentages i.e. (85%), (62%), and (62%) respectively, for non-research organizations. Our analysis indicate that non-research vendor organizations should focus on ‘efficient cost estimation strategies’, ‘efficient project management’ and ‘efficient software efforts estimation’ to maintain there long lasting successful relations with client organizations in OSDO.

We have found ten success factors for research organizations in the literature. These success factors have been cited in ≥50% of the articles. Three success factors out of these ten factors have the highest percentage (100%) of occurrence for research organizations. These success factors are ‘efficient cost estimation strategies’, ‘efficient software efforts estimation’ and ‘software life cycle cost management’. Our analyses indicate that the aforementioned motivators have a significant impact on the research organizations. We suggest the research organizations to address these factors to mitigate the gap between offshore software development research and practices.

The purpose of this study is to explore different categories of motivators, which has a positive impact on portfolio cost management in the situation of global software development. However this is still a sign of interrogation that why these success factors are commonly cited in research and non-research organizations. We encourage independent studies on this topic.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Success Factors for Portfolio Cost Management</th>
<th>Occurrence in SLR N=50</th>
<th>Occurrence in SLR (n=50)</th>
<th>Chi-square Test (Linear-by-Linear Association) α=.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Non-research Organization N=13</td>
<td>Research Organization N=2</td>
<td>Mixed N=35</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Freq</td>
<td>%</td>
<td>Freq</td>
</tr>
<tr>
<td>1</td>
<td>Efficient Cost Estimation Strategies</td>
<td>40</td>
<td>11</td>
<td>85</td>
</tr>
<tr>
<td>2</td>
<td>Efficient Project Management</td>
<td>35</td>
<td>8</td>
<td>62</td>
</tr>
<tr>
<td>3</td>
<td>Efficient Knowledge Sharing Management</td>
<td>21</td>
<td>6</td>
<td>46</td>
</tr>
<tr>
<td>4</td>
<td>Efficient Contract Management</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>Realistic Correlation between Cost and Quality of the Software</td>
<td>15</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td>6</td>
<td>Design and Development Concise Coding</td>
<td>10</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td>7</td>
<td>Cost Sourcing</td>
<td>7</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>8</td>
<td>Efficient Resource Allocation and Management</td>
<td>8</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>9</td>
<td>Efficient Software Efforts</td>
<td>30</td>
<td>8</td>
<td>62</td>
</tr>
</tbody>
</table>
6. **Limitations:** How valid our findings of critical success factors in PCM in the context of OSDO relationships are? One possible threat to the internal validity is that for any specific paper, their reported success factors may not have been in fact described underlying reason. Internal validity provides support for an overall assessment of the results. We may not be able that this threat is to be controlled independently. The concern authors were not supposed to report the original reasons that why these critical success factors were considered in portfolio cost management in the situation offshore software development outsourcing relationships. The tendency for particular kind of critical success factors reported in various studies may also exist.

During the data extraction process we found several papers lacking sufficient details regarding organization type, in our sample of 50 papers 15 papers have provided details about organization type. Due to such limitations, drawing full fledge picture of the entire 50 articles in the analysis related to the type of organization were impossible. However according to other SLR researchers, this is not a systematic review fault [40].

During studies selection and data extraction process, the Inter-rater reliability test was performed, in order to reduce researcher’s bias. However, it was not possible for the secondary reviewer to apply the aforementioned test for each paper.

For study selection, we have used a number of digital libraries. However, are unable to say that we have used all the numerous digital libraries such as Scopus due to limited resources. The digital libraries we used are more than enough for the generalization of our findings in our study.

7. **Conclusion and Future Work:** Via SLR, we have identified critical success factors to be addressed by offshore software development outsourcing (OSDO) vendors in order to best manage their portfolio cost management initiatives in the context of OSDO relationships. The results presented in this paper are of core importance to OSDO vendor organizations for successful PCM activities.

In order to answer RQ1 we have identified 16 success factors in total as shown in Table 3. Amongst these factors three were marked as critical based on 50% occurrence criteria. These three critical success factors (CSFs) are ‘efficient cost estimation strategies’- 80%, ‘efficient project management’-70% and ‘efficient software efforts estimation’-60%.

We suggest that vendor organizations should focus on addressing all the 16 identified success factors in general and the 3 critical success factors in particular. We suggest that offshore vendor organizations should focus on these success factors in order to attain valuable outsourcing contracts and maintain long lasting successful relations with client organizations. We have further analyzed and compared these success factors with organization’s type based, in order to find out the association of these success factors with different types of organizations. By analyzing the datasets for non-research and research organizations, we have found two significant differences i.e. ‘realistic correlation between cost and quality of the software’ and ‘software life cycle cost management’. We also realize that there are more similarities than differences in these factors based on non-research and research organizations. Our objective is to provide OSDO vendors with a body of knowledge that can help them out in best managing software development costs in a portfolio environment in the situation of offshore software development outsourcing. If vendors are doing outsourcing with different
types of organizations, they should focus on the frequently cited success factors identified in Table 4 (RQ2).

As no SLR has previously applied to portfolio cost management in the context of offshore software development outsourcing relationships, so we encourage independent studies on this topic. This will increase confidence levels in our findings and track changes in attitudes to PCM activities over time. We believe that a good understanding of these factors is vital in improving the offshore vendors for portfolio cost management activities. The findings of our current study, track us for the following goals that we plan to achieve in future:

- Validate the identified success factors of SLR by conducting empirical studies with practitioners and experts working in the offshore software outsourcing industry. The empirical study for validation of our findings will be conducted in the format as done by other researchers [44, 46].
- Analyze the identified success factors based on different variables such as continents, study strategies, organization’s size and decades
- Conduct empirical studies to determine the implementation of those success factors, which has frequently cited in our study.

Our ultimate goal is to develop an effective Portfolio Cost Management Model (PCMM) in order to assist outsourcing vendor organizations in the successful management of their portfolio cost management activities. A similar approach has also been used by other researchers [41-46]. This paper contributes to only one component of PCMM i.e. the identification of the success factors via SLR. Our contribution to improving portfolio cost management processes will provide help to other researchers, intended to explore the areas of managing the software development costs in the context of offshore software development relationships.

Many research outputs end up with frameworks and models, which never make it into industrial practices. We expect our work will alleviate this trend in portfolio cost management in the context of offshore software development outsourcing relationships.

Acknowledgment: We are thankful to the Abdul Wali Khan University Mardan (AWKUM) and to the Software Engineering Research Group (SERG-UOM) University of Malakand for their valuable review comments and suggestions in the reporting phase of this systematic review. We are also thankful to the anonymous reviewers of the International Organization of Scientific Research Journal of Computer Engineering (IOSR-JCE), for their remarkable reviews in the validation process of the planning phase (SLR Protocol) of this research. We would also like to thank Mr. Muhammad Ilyas Azeem and Mr. Hameed Ullah for their assistance in the analysis and other activities of SLR.

REFERENCES


REQUIREMENT ENGINEERING PRACTICES IN PAKISTAN SOFTWARE INDUSTRY: MAJOR PROBLEMS

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ABSTRACT. Requirement engineering is now an essential practice performed in almost every software manufacturing industry around the globe. It increases the amount of project success in a greater way. Sometimes this could be a labeled activity or sometimes not. However, almost every software development environment across the world is using some sort of basic requirement engineering process now days. The situation is not different in a developing country like Pakistan. A good number of software industries are following standard requirement engineering practices completely or partially. There are multiple reasons behind partial implementation such as lack of knowledge about processes, cost in terms of time and money and implementation of processes. In our study, we have collected factual data regarding current requirement engineering practices from Pakistan software industry. We have studied the organizations of varying size and types of projects. We also find out their success rate and problems which are due to partial or wrong implementation of requirement engineering practices. We are hopeful that this study will provide a cost effective solution for improving requirement engineering practices in Pakistan industry.

Keywords: Requirement Engineering, Pakistan Industry, Current Practices, Problems, Parameters.

1. Introduction. Requirement engineering has shaped itself as a complete discipline now with a bundle of theoretical and practical application for software industry [1 - 4]. It has defined core activities like elicitation, analysis, specification, validation and management [2]. A comprehensive view of the field of requirement engineering is provided by Nuseibeh, B et all in [5]. They have presented an overview of the field along with its main areas of practice. They have also discussed the open research questions. However, the field of requirement engineering starts from the elicitation of the requirements from client. What actually elicitation is described by the Davey, B et all in [6]. As per their opinion, elicitation is actually collecting the information from the client. However, the collection of requirements could place by using one
way or the combination of multiple ways. The ways which are used for the elicitation of requirements are called techniques of requirement elicitation. Goguen, J et al. have discussed the requirement elicitation techniques like interview, questionnaire, written material etc in [7].

The second major phase of requirement engineering is requirement analysis. As per Sommerville, I., & Kotonya, G analysis is concerned with discovering problems specially inconsistencies and incompleteness which are not been discussed by stakeholders [4]. It is actually a bridge between requirement elicitation and specification which is the next phase after analysis process. They have discussed various techniques for requirement analysis like prototypes and context diagrams. However, industry has adopted context diagrams especially unified modeling language as the standard one [8]. However, analysis phase always incur negotiation in it to resolve the issues. Ahmad, S in his work discussed the importance of requirement negotiation for analysis process, its stages and the conflict that are actually cause of error in requirements [10]. Negotiation in analysis is not taken as a low level activity by the research community. Criteria for negotiation meetings is being defined by In, H. P., & Olson, D in their work [10]. They have provided a framework which is very much useful while conducting requirement negotiation meetings.

The next step after analysis and negotiation is the preparation of specification document. Dorfman in his work has defined some rules for writing specification document, what should be the conventions and who should be the suggested readers etc are the questions being answered [11]. At this level of requirement engineering, some parts of the industry likes to write a complete software requirement specification document and some like some part of it like functional document only. However, there always exits some standard documents or templates which are being used by the people. These templates are being provided by some of the famous international standardization organizations like IEEE, ANSI etc.

In older days of software engineering, it was trend just to validate the system developed. However, the situation is completely different now. People have started validating the requirement document as well. They have defined techniques like reviews, inspections and prototypes etc for the validation of requirement document. Yousuf, F et al. presented a survey of the some requirement validation techniques which are in practice by the industry [12].

The last and one of the critical step in requirement engineering is requirement management as it has always a greater cost in case of error detected. We all know that “there is nothing constant in the world except change” and change always has a price. There could be multiple reasons for the change. People have defined procedure for requirement change management. Leffingwell, D., & Widrig, D provided a complete study about the role of change management in the field of requirement engineering [13].

In recent days, all of the core requirement engineering activities are being modeled in form of documented processes implicitly or explicitly. Sommerville, I., & Kotonya, G and SHAMS-UL-ARIF etc have presented the process of requirement engineering which are built upon the core activities of requirement engineering [4, 14]. These models are from simple to complex ones. A study on in practice requirement engineering process models by the industry is provided by the Martin, S. et al [15].

As far as our study is concerned, we have find this loop hole that industry in Pakistan is very much annoyed from following requirement engineering processes or following partially. There are multiple reasons for it raised by the industry.

We have studied the current practices from industry, identified their problems and tried to suggest the solutions for it. We have divided our work into multiple sections. What are being the information collection parameters for us are discussed in sections 2. What are the current practices of industry are discussed in section 3 while major problems raised by the industry are the part of sections 4. Finally the discussion on our work and future dimensions have been presented.

2. Information Collection. Data collection and defining parameters for this process is very much important step in analysis research as it helps to identify problems and suggest solutions for those problems. Similar kind of study based upon factual data collected about offshore software development is performed by Akram, M. U et al. in their work [16]. They targeted the teams/industry accomplishing offshore software projects and identified their requirement engineering problems. Also the requirement engineering practices for service-oriented system engineering, complex systems, electronic commerce, mobile information systems, agile development, web applications and software product lines are discussed in [17 - 23].

To the best of knowledge, the study of requirement engineering practices followed by the industry in a specific country is performed by Solemon, B et all and Zainol, A et all in [24, 25]. They have performed a survey of the current requirement engineering practices in Malaysian industry. In our case, we have taken
Pakistan which has rapidly growing software industry. As discussed above, we collected factual information from the industry as it was a basic required step for this type of research. There are various factors which directly or indirectly influences the implementation of requirement engineering practices in industry. We didn’t forget to capture those. We targeted the organization with number of employees from low to high. We included the industry varying in types of projects doing. We have interviewed and studied the documented procedures for the requirement engineering practices. In our interview process, we have been able to interview the employees from a developer level to chief operating officers. The discussion on each of the above three parameters is coming in the next sections.

2.1. Number of Employees. We have been able to visit the segments of industry varying in number of employees. It has been a very fruitful for us that industries having number of employees from 10 to 2500 or more. We have visited total 16 industries. This parameter will definitely highlight the similar and different deficiencies found at both extremes. To maintain the data integrity, we have provided labels to the organizations along with their size as shown in the Figure 1.

![Figure 1: Organization and Their Size in terms of Employees](image)

2.2. Type of Projects. Another major problem in successful and complete implementation of requirement engineering practices is the nature of projects. People have suggested specific requirement engineering practices for a certain type of projects which are greatly inspired by the nature of projects [16]. No use of those practices is a major niche in the project life cycle which will be discussed in later sections. For building understanding, we have presented a graphical representation of the type and amount of projects which are accomplished by the software industry in Pakistan in Figure 2.

![Figure 2: Types of Projects](image)
2.3. Information Sources. This is very much important to know that who is directly or indirectly involved in the implantation of requirement engineering practices in an organization. Sometimes, it is performed by only one or sometimes by a group of people. This phenomenon varies from organization to organization depending upon the size of organization. As we discussed above, we have been able to interview the individuals from a developer level to chief operating/executive officer as shown in the Figure 3 below.

Figure 3: Percentage Split of Interview Sources

3. Current Practices. As far as the current practices of requirement engineering are concerned, very small amount of the industry in Pakistan is following requirement engineering practices completely. Most part of the industry is partially following the requirement engineering practices. We have made a study on current trends of requirement engineering practices in each segment of industry. We have taken fiver core activities of any requirement engineering model at one end while the trend of following a practice completely or partially on the other hand. We have presented our results in form of a graph in Figure 4. The graph shows that a particular industry is following a certain part or whole of an activity explicitly.

Figure 4: Current Trends of RE Practices in Pakistan

4. Major Problems. One of the major contribution of our work is the identification of problems while practicing requirement engineering. These problems are raised by the representatives from software industry. We have broadly discussed those problems in a catagorial way. The categorical list of the problems identified is as follows.

- Unavailability of any type of written materials from client
- Management and support are the major problems
5. Discussion & Future Work. Requirement engineering as discussed above has become an integral part of any software development organization. The country like Pakistan is also feeling the need of requirement engineering practices in their development culture. However, there are lots of hazards in the implementation of requirement engineering practices in Pakistan software industry. In our work, we have done a detailed study of requirement engineering practices in Pakistan industry on the basis of following parameters like size of Organization, types of project accomplished, the individuals involved in the implementation of requirement engineering practices directly or indirectly, explicit implementation of requirement engineering practices, major problems faced in requirement engineering practices and their success rate. We hope that these are the parameters which could be very much helpful in setting future dimension of requirement engineering practices for Pakistan’s software industry. We have also plans to extend this work in future by incorporating agile development techniques followed by Pakistan’s software industry. We will add more detailed parameters into our study. We are hope hopeful that those parameters will help a lot to suggest solutions for the problems identified. We have plans to present concrete solutions to those problems in future.

REFERENCES

CAPTURING WILLINGNESS TO PAY AND ITS DETERMINANTS THROUGH CONTINGENT VALUATION METHOD FOR IMPROVED SOLID WASTE MANAGEMENT IN ABBOTTABAD, PAKISTAN

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ABSTRACT: A dignified and healthy life remains a distant nightmare to the large majority of population in developing countries including Pakistan. Large masses living in this world particularly South Asian country (that is home to over one fifth of the world’s population) is still striving for it. Pakistan, being a developing country, is no exclusion to that state. The condition of sanitation and solid waste management (SWM) in the country carries a grave challenge to health and hygiene. This study was carrying out to show at the household’s (HH’s) demand for improved environmental settings over valuing their willingness to pay (WTP) for better SWM facilities. The study follows contingent valuation method for assessing the HHs preferences for better living standards. Primary data used in the research was gathered with the application of tailor made questionnaire from both rural and urban regions of district Abbottabad, Pakistan at HHs premises. The objective was to discover the determinants of HH’s WTP for improved environment through better SWM services; the binomial logit regression method was used. Education, income, awareness, location and HH size were established to be influencing HH’s WTP. The study established that HHs were WTP, if adequate services were delivered to them.

**Key Words**: Contingent valuation method, binomial logit regression, willingness to pay, solid waste management, environment, Pakistan

Introduction. A dignified and healthy life remains a distant nightmare to the large majority of population. Masses living in the developing world including South Asian countries (that is home to over one fifth of the world’s population) is still striving for it. Pakistan, being a developing country, is no exclusion to that state. The situation of sanitation and solid waste management (SWM) in the country poses a serious challenge to health and hygiene. Improper SWM results in air and water pollution, soil degradation and emission of greenhouse gases. Negligence on this part also causes certain societal issues like spread of insects, odour, loss to scenic beauty, loss in property values and vulnerability to the diseases as waste heaps attract animals and birds. The interminable link between quality of life of poor families in the underdeveloped countries (especially South Asia) and inferior state of water, sanitation and hygiene is well established [1]. Correction
to the existing worse environmental situation is not only imperative for better life quality but it is also our moral and heritor duty to preserve the environment for our coming generations. We must provide them with environment; at least in a state what we inherited from our forefathers, if not better. Based on such arguments, the sustainability issue is now discussed almost all around the world; however, every country has its own distinct features and environmental endowments. Hence, there is a need to take up fresh research and take into account all costs and opportunities attached with the environment. In this connection, the most important research question is to know the household’s (HH’s) Willingness to Pay (WTP) for better environmental goods and to pin point its determinants for policy implication. Hence, in order to quantify the HHs demand for better services and find a monetary value for it, this study processes HH’s WTP for upgraded SWM facilities and its determinants.

As we know, willingness to pay (WTP) is the maximum amount a person would desire to pay, exchange or sacrifice for any commodity, good or item. There is a need to have a Choice Models to predict efficiently that how individuals would react in a particular situation. These models help us in identifying human qualities that affect their decision making behavior. Literature regarded the use of choice models as the most suitable method for estimating consumers’ willingness to pay for quality improvements in multiple dimensions including SWM. We will frame our analysis in the same fashion.

2. Quantification and line of action. Cost estimation is an important stage in ensuring optimal allocation of scarce resources. Especially the problem arises with non-marketed goods in particular with the items which belong to environment. The estimation of monetary cost is aimed to internalize the external costs which generally are derived from social costs instead of private cost. For environmental goods, the absence of visible demand and supply system (which determines the market valuation mechanism), has resulted in the development of other tools which can be used for estimating value for these goods. Among these, the most important valuation techniques include Contingent Valuation Method (CVM), Averting Behaviour Approach, Hedonic Pricing and the Travel Cost Method. Adoption of these techniques depends upon the nature of the study and item in question.

In the current literature, CVM is the most frequently used tool for environmental assessment. Contingent Valuation (CV) is assumed to produce reliable estimates for the judicial assessment of damages [2]. The validity of CVM to estimate monetary valuations for environmental goods have been adequately established in the literature for Pakistan as well [3, 4, 5, and 6]. It is the direct method of enquiry based upon the stated preferences of the consumers for a specific environmental good. CVM is a questionnaire based valuation technique where the consumers are given a hypothetical situation of an improved environmental situation and are directly asked to value it by expressing their WTP for it.

In CV surveys, HHs are being asked about their WTP if in a particular sector a desired service level is provided [7]. Keeping in view the merits of CVM, our analysis is also based on the CVM technique and we used it to gauge HH’s WTP for improved service level for SWM. As discussed, CV is a technique of assessing the monetary worth of non-marketed environmental goods over survey questions that carry out person’s inclinations about such goods [8]. In the CVM surveys, the questions regarding the quality levels are carefully described and the respondents are asked for their WTP for the change in service quality [8]. The simple postulation behind this technique is to denote or value the objective quality enhancement that the study enquires the HHs to asses.

In order to capture HH’s WTP in the CV studies, question can be structured in a number of ways like dichotomous choice [9, 10, 11, 12, and 13], bidding games [14, 15], payment cards [16] or open ended questions [10, 11]. However, these methods in isolation are not capable to capture bespoke consumer surplus i.e. a representative value of WTP for any environmental good. Therefore, in this study a combination of the stated methods were used. HHs were questioned in such a fashion that they were obliged to indicate their true WTP. We used the statement of most likely limits for WTP which reduces the opportunity of extreme over pledging [17]. Such mechanism also encourages participation and avoids protest responses [18]. Moreover, with the provision of an open ended question at the end, it was tried to overcome the starting point bias.
SWM sector was taken as an experimental field in this study. To find out public WTP for an improved SW management situation, a tailor-made CVM survey was conducted in Abbottabad district of Khyber Pakhtunkhwa province, Pakistan. Keeping in view the nature of the study, the question concerning the WTP for improved SWM services was framed very carefully. First of all respondents were thoroughly briefed about the improved services which they would avail under the improved SWM services system (if they adopt it). The superior SWM services were explained as HHs would be given door to door coverage for waste collection, the street and community waste dumps would be taken away on regular basis and Teshil Municipal Administration (TMA) workers would clean the streets at regular intervals. In addition, to ascertain the people that the new system is reliable and would continue to work they were asked the question as if twenty five percent of the HHs in the locality has already decided to adopt the new system.

Once they were briefed about the improved SWM services, in response they were asked that for such a system ‘would they be willing to pay nominal amount’ (Rs. 50 per month). Their responses were recorded as “Yes” or “No”. If the HHs responded with “No”, they were asked an open ended question about the amount which they are WTP even if lower than Rs. 50. On the other hand, if the HHs responded “Yes”, they were again asked, raising the monthly charge to Rs. 100 for same services, which was to be answered with “Yes” or “No”. Following the second question irrespective of the answer, HHs were yet again asked with an open ended question that what is their maximum WTP for such services above or below the stated amount i.e. Rs. 100/month. The open ended question was aimed to capture both the lower as well as upper limits of amount\(^1\), which respondents want to dedicate in order to acquire the said services. Hence, by this iterative mechanism, it was tried to calculate the presumed consumer surplus that HHs had for such services. Moreover, the value stated in response to the open ended question was used as their final WTP in this study. Thus, it was tried to thoroughly capture the true bespoke value for HHs WTP for improved SWM services.

3. Field Visit and Methodology of the Survey. As indicated above, this study is based on primary data which is collected from rural and urban areas of district Abbottabad. For this purpose, three stage stratified systematic random sampling techniques was adopted. In the first stage, according to the nature of the study, total population was divided into the interest groups i.e. rural and urban and specific sample weights (40:60) were assigned for data collection from the rural and urban areas, respectively. In the second stage, different strata (streets/wards in urban areas while villages in rural areas, to cover for different income groups into the account) were formed in the selected areas. And finally in the last stage, sample data was collected from each strata. The whole sample size comprising both urban and rural regions was 455 HHs, which contain of 2779 HHs’ members. Sample characteristics are given in Table 1.

It is important to indicate here that the SW problem generally pertain to urban area that’s why more weight was required to be given to the urban areas. Therefore, purposively 60 percent of the HHs were selected from the urban areas. Nevertheless, because of the rapid urbanization and limited urban area in Abbottabad, the surrounding designated rural area is sharing the burden of urban population. A large segment of the population is residing in rural area but for daily business they regularly commute to the city. Therefore, it was imperative to assign certain weight to the rural areas as well and accordingly 40 percent of response was collected from rural areas.

A well structured pretested questionnaire was used for data collection. In the first portion, information regarding the socioeconomic situation of the HHs was gathered including income of the HH, employment status and sectors they are engaged in, their dwelling status, health issues and utilities that they are availing. The 2\(^{nd}\) part was dedicated to issue in question i.e. SWM and related concerns including HH’s WTP for improved SWM services.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Distribution</th>
<th>Total (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Minimum</td>
<td>Under 1</td>
</tr>
<tr>
<td></td>
<td>Maximum</td>
<td>105</td>
</tr>
</tbody>
</table>

\(^{1}\) other than the stated amount of either Rs. 50 and Rs. 100/month
4. **Qualitative assessment of public’s willingness to pay for better SWM in district Abbottabad.**

With the passage of time, governments around the world are trying to devolve and deregulate different sectors for efficient services delivery. However, for private sector involvement it is crucial to estimate public’s WTP for such services. Moreover, assessment of HH’s WTP is also vital in order to grasp consumer’s demand for different services.

As discussed earlier, in order to measure HH’s maximum WTP, an iterative mechanism was adopted where the basic fee, for the provision of improved services, was increased gradually. In response to the first question (i.e. WTP for Rs. 50), overwhelming results were obtained. Ninety eight percent of HHs responded to the question. It was noted that urban HHs were more WTP\(^2\) for improved waste collection and disposal services as compared to the rural dwellers. Within urban, 82 percent HHs replied in affirmation to the question while 28 percent of the rural HHs was ready to pay Rs. 50 per month. Hence, overall 62 percent of the samples HHs were WTP for improved SWM services (Figure 1). The difference in response amongst urban and rural HH’s can be explained as; firstly, the significant difference in the income level at the rural and urban centres and secondly, a number of alternative avenues are available in the rural areas for waste disposal without any cost. Thirdly, it also depends upon the awareness level of the dwellers. Beside the given rural and urban differences in response, this is still an encouraging proportion of HHs which is WTP and wants improved waste management services. This indicates the importance they attach to the proper disposal of solid waste and avoidance of hazards attach to it.

![Figure 1: HHs WTP for Rs. 50 for Improved SWM services](image)

\(^2\) Provided that, there is a continued supply of the given quality of service.
In the next question the benchmark, for improved SWM services, was increased from Rs. 50 to Rs. 100. In response, 71 percent HHs replied to the question, thus with the increase in fee, the overall response declined from 98 percent to 71 percent. This is indicative of the fact that at higher cost, the sampled people were less interested in the new system for SWM and hence their total response has declined. However, despite the higher charge, urban HHs were still more WTP in comparison with the rural dwellers. Within the urban HHs 49 percent while 32 percent of the rural HHs were ready to pay even the higher amount (Rs. 100) for the new improved system.

Being deprived of the facilities, rural HHs are somewhat more consistent in their WTP as compared with the urban dwellers. The ratio of those who accept the new system in the rural areas was 28:72 (yes: no) which changed to 32:68 for the higher charge\(^3\). On the other hand, the same ratio for the lower WTP was 81.5:18.5 which drastically changed to 49:51 for higher bound of WTP (Figure 2). Nonetheless, in the new response with higher benchmark, the overall percentage of those HHs which are WTP has fallen from 62 percent (for Rs. 50/month) to 44 percent.

To further dig into the issue, it is important to note down factors that cause non-payment for new improved system of SWM. This will show the preferences and reasons for which people are not WTP for a promised improved system. To capture those elements a question was asked from the respondents to state the reasons for which they were not WTP for the improved SWM services. Total response to the query was 84 percent of the total sample size. Factors that come out to be the major reason for not paying and adopting new system were as 61 percent of the respondents think that it's government responsibility to provide such basic facilities. The second important factor for rejecting new system was the dislike towards TMA as a service provider. Twenty percent of the respondents termed it a cause for not going for the new system. The reason for this mistrust might be due to the fact that being the current service provider, public is not satisfied with the TMA's performance. So in order to tap people's WTP in this sector, service provider must meet the required satisfaction level of the public.

Third main answer was of those who mentioned that they are satisfied with the existing system of SWM. Only 9 percent of the respondent indicated positively to this option while the overwhelming majorities (91%) were not satisfied with the existing SWM practices (Figure 3). Very little percentage (5%) of the respondents was not welcoming the private company in this sector to take initiative of this kind.

Figure 2: HHs WTP for Rs. 100 for Improved SWM services

<table>
<thead>
<tr>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>48.80%</td>
<td>32.10%</td>
</tr>
</tbody>
</table>

Figure 3: Factors responsible for non-payment for improved SWM services

\(^3\) It should be kept in mind that total response 2nd question had decreased to 71 percent as of 98 percent for the first WTP question.
So to sum up, consumers WTP is influenced by a variety of factors. HHs was really willing for new and improved SWM services and WTP as well. However, the services should be up to the mark and well maintained. Initially, it is noted that consumer’s WTP was very much elastic and negatively responsive to the increase in the charges. One of the major reasons that can explain the situation is that people are used to the problems caused by SW and have not witnessed any of the positive effects of improved SWM services. Nonetheless, once TMA, either by itself or with the private sector collaboration, provide the HHs with the new, improved and efficient system for SWM services, public will positively respond to the services by accepting relatively higher user charges. In addition proper importance should be given to the factors mentioned by the HHs for not adopting the new system of improved SWM services.

4. **Quantitative assessment of WTP for SWM.** After having a grasp of general trends from the qualitative analyses, we would use certain more sophisticated techniques to have deep understanding of the situation. Hence, in order to have quantitative analysis and find the major factors which influence HH’s preferences, a economic model is developed and discussed here.

5.1 **Model for CVM.** Solid waste is a factor that negatively affects the environment by deteriorating the living conditions of the public living around. Improper SWM have negative implications on the area like environmental degradation, health hazards and have other potential problems. The perpetual link between quality of life in the underdeveloped countries especially South Asia and state of water and sanitation and hygiene is well established [1]. Being a non-market good there are problems in estimating the cost it causes to the environment and to the people living in the area. Therefore, to estimate public WTP for its avoidance, a non-market valuation method i.e. CVM was used which was discussed earlier. In order to find out the major factors that determines and affects public WTP, an economic model was developed for solid waste management following [3 and 4].

In economics, we recognize that individuals have inclinations beyond goods from both market and non-market places. These likings of persons are indicated over their utility functions. Consumer wants to capitalize their utility from quantity and quality of goods & services under their given budget restriction. Thus, the utility function can be framed as:

\[ U(w, g) \]  

\[ w = \text{waste management} \]
\[ g = \text{composite of all market goods} \]

Whereas the expenditure function is

\[ e(p, w, u) \]  

Where \( p = \text{prices} \) and \( u = \text{utility} \)

Equation 2 the expenditure function dealings the lowest sum of cash the buyer essentially spend to attain the agreed level of utility. This is cumulative function of ‘p’ and ‘u’ and diminishing function of ‘w’.

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Subsequently, customer wants to stay with the identical utility, it is suitable to practice spending minimization issue.

\[
\text{Min (g + Pg)}
\]

s.t \( U = U (w, g) \)

Where price of composite goods are equal to one (Pg=1).

The exceeding minimization problem can be resolved by adopting Lagrange’s multiplier to obtain Hicksian demand for the analogous goods.

The Hicksian demand is assumed by:

\[
h_i = h_i(p_w, u^*)
\]

Substituting the values of matching Hicksian demand in the lowest expenditure function we can calculate the least expenditure function:

\[
e^* = e (p, w, u^*)
\]

Where “e” is minimum expenditure required to achieve fixed level of utility “u” and using the waste management “w”, and is the function of price of other goods, the fixed level of utility and the quality of SWM services itself.

The derivative of expenditure function with respect to price gives corresponding Hicks Compensated demand function for good under consideration.

\[
\frac{\partial e}{\partial p_i} = h_i(p_j, u^*)
\]

WTP for the change in SWM services is the integration of marginal WTP to achieve better waste management from “w” to “w”

\[
\text{WTP} = - \int_{w}^{w^*} \frac{\partial e (w, u^*)}{\partial w} \ . dw
\]

WTP is the full amount of money a buyer would contribute to appreciate an enhancement in the value of life due to better SWM. The WTP for the improved SWM is:

\[
\text{WTP} = e (p, w, u) - e (p, w^*, u)
\]

Where, “w” is a tainted level of waste management and “w” is a better level of SWM.

The change in spending is either rewarding excess or corresponding surplus, if the situation is close of the initial utility, it is reimbursing and if the situation level of utility is final then it is corresponding surplus. Now taking into account the model findings, we can predict that HH’s WTP, including other factors, rest on income, wealth, education level and reserve from the prevailing solutions. Hence, to capture major determinants of WTP following regression model can be finalised and would be used for estimation

\[
\text{WTP}_i = \alpha_0 + \alpha_1 (H_i) + \alpha_2 (D_i) + \alpha_3 (A_i) + \alpha_4 (V_i) + u_i
\]

Where:

\[
\text{WTP}_i = \text{HHs’ willingness for better SWM}
\]
$H_i =$ Households features (Highest education level of the HH, income level of the HH and HH size).

$D_i =$ Demographic characteristics of the Households (urban, rural)

$A_i =$ Awareness about adverse effects of improper SWM.

$V_i =$ Vector born Diseases

### 5.2 Important variables

In order to have brief introduction about the characteristics of the variables that were used in the model, variables of interest are presented in summarised form (Table 2). The mean income of sample respondent was Rs. 13701 per month. Income of the HHs ranges from Rs. 700 to Rs. 94000 per month, thus the sample consists of both the poor and non-poor. As there is huge variation among the income variable, therefore, in the model, income was converted into four quartiles and they were turned into dummies to analyse their incremental effect on HH’s WTP for better SWM services.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Observation</th>
<th>Mean</th>
<th>Standard Error</th>
<th>Min</th>
<th>Max</th>
<th>95% Conf. Interval</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income per month</td>
<td>455</td>
<td>13701.8</td>
<td>682.17</td>
<td>700</td>
<td>94000</td>
<td>12361.19</td>
<td>15042.41</td>
<td></td>
</tr>
<tr>
<td>Highest Education among the HH</td>
<td>455</td>
<td>11.21</td>
<td>0.17</td>
<td>0</td>
<td>18</td>
<td>10.87</td>
<td>11.55</td>
<td></td>
</tr>
<tr>
<td>Awareness</td>
<td>455</td>
<td>0.78</td>
<td>0.02</td>
<td>0</td>
<td>1</td>
<td>0.74</td>
<td>0.82</td>
<td></td>
</tr>
<tr>
<td>HH size</td>
<td>455</td>
<td>6.11</td>
<td>0.12</td>
<td>2</td>
<td>18</td>
<td>5.88</td>
<td>6.341</td>
<td></td>
</tr>
<tr>
<td>Disease History</td>
<td>455</td>
<td>0.36</td>
<td>0.02</td>
<td>0</td>
<td>1</td>
<td>0.318</td>
<td>0.407</td>
<td></td>
</tr>
<tr>
<td>Average WTP</td>
<td>455</td>
<td>34.46</td>
<td>1.96</td>
<td>0</td>
<td>200</td>
<td>30.61</td>
<td>38.32</td>
<td></td>
</tr>
<tr>
<td>None zero WTP</td>
<td>241</td>
<td>65.06</td>
<td>2.33</td>
<td>10</td>
<td>200</td>
<td>60.46</td>
<td>69.66</td>
<td></td>
</tr>
</tbody>
</table>

Another important variable discussed in the model is the education level. The highest education among the HH members was considered to check HH’s behaviour towards environment. In the model, it was assumed that if there are more educated persons in a HH, their attitude towards SWM would differ from those who have less educated persons. According to the sample, average educational level hover around 11 years of schooling i.e. above metric. In the education variable, there are cases for illiterates while at the same time some HHs members have up to 18 years of education. Therefore, education levels too, were converted into dummies i.e. metric, graduate and post graduate keeping the primary or below education as the base category.

Awareness regarding the importance of SWM is another variable which need special attention. As evident from summary statistics, 78 percent of the HHs was aware of the hazards that result from the mismanagement of SW. This variable was also treated as categorical variable. HH size is important determinant of HH WTP for improved SWM facilities and is therefore included in the analysis. Average HH size of the sample was 6.11, which ranges from 2 to 18 persons in a HH. Diseases caused by SW were kept as a single variable in the model. Major diseases caused by SW and reported in our sample were related to skin, asthma, hepatitis, stomach, kidney problem, malaria and diarrhoea. On average 36 percent of the HHs had some history of diseases mainly caused due to the mismanagement of SW.

The dependent variable in the analysis was the HH’s WTP that was captured through CVM. It is bifurcated in two types. If we consider the overall response and include those who have shown even zero WTP, the average WTP comes out to be Rs. 34 per month with limits ranging from zero to 200 rupees. The reason for including those who are not willing to pay in monetary term is that, in the CVM zero WTP is also considered a response. On the other hand, if we want to analyse only those who have responded positively and have indicated their WTP with some positive integer, their mean WTP is Rs. 65 per month. This WTP ranges between Rs. 10 to Rs. 200 per month to attain the benefits from improved SWM system.
5. **Empirical results.** In order to estimate the above mentioned equation and to capture the effects of different independent variables on the HHs WTP, the binomial logistic regression technique was applied. HH’s WTP was defined in two categories i.e. zero and one, according to the response given by the HHs during the survey. Zero WTP depicted that HH is not WTP to pay for improved SWM services while the integer one was showing that HH is WTP. The responses i.e. HH’s WTP was considered as dependent variable. On the other side the factors which influence public’s WTP (i.e. independent variables) consisted of; the highest education level within the HHs (Metric, Graduate and Post graduate), the Income quartiles (Q2, Q3, Q4), household size, HH’s awareness level regarding SWM, disease history related to SW and lastly the demographic location (i.e. the rural/urban divide). Hence, after finalizing the variables, the regression results are given at Table 3.

Income level is always conceived as an important determinant that would influence public WTP for any service. In our analysis, HHs were divided according to their income levels into four quartiles. In the model, the lowest income quartile was taken as the base and the remaining three higher income levels were used as independent variables to know the relationship between the HH’s WTP and their income level. Interestingly people in the second and third income quartile were not WTP for an improved SW collection, transportation and disposal services. On the other hand, people which fell in the highest income category i.e. 4rth income quartile, they were found WTP in this range.

These results were in the line with facts because nowadays everyone is trying hard to earn his livelihood and to fulfill his HH necessities. So, being at the lower income quartile, HHs finds it hard to set aside any money for the improvement in the SWM services and were less concerned about the environment. Thus, according to the regression results, for the group of HHs which falls in the fourth income quartile, their WTP was found 19 percent higher as of Q1, while the other who has less income (Q2, Q3) were not willing to pay at all (Table 3).

Education is always a crucial factor in achieving higher awareness. It positively affects the public attitudes towards health and hygiene. According to the regression results, education significantly affects HH’s WTP. All the three education levels (metric, Graduate and postgraduate) do have positive and significant effect on public’s WTP. So, those who had certain level of education were round about 25 percent more WTP as compared to others who have less or no education.

Location is another important factor which affects HH’s living standards. People living in the urban areas are more concerned about their surroundings due to two reasons. First is that urban places are more congested as compare to the rural areas and secondly they are dependent on the government agencies for the SWM services due to lack of community ownership to the areas, as well as absence of alternative waste reduction possibilities which do exists in the rural areas. Moreover, there is some demonstration effect in practice as well. That’s why, in the regression too, the rural/urban divide was an important determinant of the HH’s WTP for better SWM services. According, to the results, people who live in the urban areas had 20 percent higher WTP as compared to the rural dwellers. This further affirmed the fact that public’s WTP is strongly influenced by the location where they live.

HH’s WTP for improved SWM services is also influenced by their awareness level. As the level of awareness increases, HH become more desperate to avoid the negative consequences associated with the unmanaged SW. It is also clear from our estimation results that the HHs which possessed some sort of knowledge (regarding the adverse affects of SW) they were really WTP for the improvement in the service levels. HH’s awareness (regarding the problems related to improper SW management) has positive and significant relationship with their WTP for an improved SWM services. According, to our estimated results, if HHs have some awareness regarding the adverse effects of SW they have 15 percent higher WTP for improvements in the existing system to have better services quality. This also provide evidence that as people would become more aware of the negative effects of SW, they would be more willing to pay for avoidance.

Another important variable, which has bearing on HH’s WTP and discussed in the model, is the HH size. It is a very important factor and affects WTP of the family. Interestingly, HH size has a significant but
negative relationship with the HH’s WTP. This negative relationship explains that as the HH size increases, the WTP goes down. There are several reasons for this negative significant relationship. One is that as the HH size increases people face more economic burden and their purchasing power goes down (there is a positive correlation between size of household and poverty) that’s why they are less WTP for environmental issues. Besides, it can also be interpreted in a way that with the increase in the family size, HHs member increases and they have more workers to get rid of waste properly and hence they don’t consider waste a problem. Moreover, with the increase in size of family, the overall production of waste per head decreases gradually. All these factors lead to negative relationship between the two variables i.e. HH WTP and HH size.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Dependent variable (Willingness-to-pay)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Second income quartile</td>
<td>dy/dx -0.068 (0.347)</td>
</tr>
<tr>
<td>Third income quartile</td>
<td>dy/dx 0.063 (0.369)</td>
</tr>
<tr>
<td>Fourth income quartile</td>
<td>dy/dx 0.198* (0.006)</td>
</tr>
<tr>
<td>Metric (Maximum HHs level of education)</td>
<td>dy/dx 0.245* (0.012)</td>
</tr>
<tr>
<td>Graduation (Maximum HHs level of education)</td>
<td>dy/dx 0.278* (0.005)</td>
</tr>
<tr>
<td>Post-graduation (Maximum HHs level of education)</td>
<td>dy/dx 0.256* (0.011)</td>
</tr>
<tr>
<td>Location (Urban/Rural)</td>
<td>dy/dx 0.202* (0.000)</td>
</tr>
<tr>
<td>Awareness about importance of SWM</td>
<td>dy/dx 0.158* (0.009)</td>
</tr>
<tr>
<td>Household Size</td>
<td>dy/dx -0.021** (0.051)</td>
</tr>
<tr>
<td>Disease history</td>
<td>dy/dx 0.088 (0.102)</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>dy/dx -279.031</td>
</tr>
<tr>
<td>Total number of observation</td>
<td>dy/dx 455</td>
</tr>
<tr>
<td>LR chi2(10)</td>
<td>dy/dx 71.10</td>
</tr>
<tr>
<td>Prob &gt; chi2</td>
<td>dy/dx 0.0000</td>
</tr>
</tbody>
</table>

In parentheses probabilities of critical values are reported.

* = significance at 5% level.
** = significance at 10% level.
The last variable discussed in the model, is the disease history of the HH. Here specifically those diseases were captured and regressed which were caused by SW or its mismanagement. The important diseases were skin diseases, asthma, hepatitis, stomach & diarrheal diseases and malaria etc. However, according to the regression results, no significant relationship was found between HH’s disease history and their WTP.

**Conclusion:** With the application of tailor made questionnaire for CVM estimates, the study tried to capture unbiased real WTP for better SWM services. This study not only tried to avoid the negative influences of over pledging, start or end point bias in valuation but also encouraged participation. The adoption of said technique helped in finding actual contribution which HHs are ready to make so as to get rid of adversities attached with mismanagement of SW. Furthermore, analysis of the determinants of the HH’s WTP helped in finding out the contributing factors which affects the HH response.

The existing system of solid waste in Abbottabad is not up to the expectation of HHs both in amenities and value to happen the requirements of the HHs. This study explores that 78 percent of the HHs were aware of the importance of SWM and they are sensitive to it. It is also encouraging to note that 62 percent of the HHs was willing to pay for improved solid waste management services. This suggests that people were aware but they need some light at the end of the tunnel to take practical steps and conserve the environment. From the discussion it is clear that urban HHs are not only in need of better SWM services as of rural but are also willing to contribute monetarily to avoid it. On the other hand, less of the rural HHs were WTP for improved SWM services but they are consistent in accepting levy (even of higher charges) for better SWM services.

According to expectations, education has a significant contribution in framing HHs behaviour towards environmental goods. Those who had certain level of education were more WTP as compared to others. Similarly, demographic location, awareness and higher income were the important determinants of HH’s WTP. In addition, HHs size has a negative and significant effect on the said variable.

Hence, education plays its actual role in persuading the broad community observation towards the prospect price for living in unhygienic conditions. Thus government should increase its investment in education and awareness campaigns. TMA should come up with certain projects to encourage composting either by natural methods or via aerobic composting methods and giving licenses to the private sector. No doubt, the given factors are imperative but service quality is of extreme importance. HHs should be provided clean and hygienic environment to live in which will convince the public and persuade them to share the burden of the government through paying appropriate levy.

**REFERENCES**


AVAILABILITY AND USABILITY OF AV-AIDS IN AFGHAN REFUGEES SCHOOLS AT PRIMARY LEVEL IN KPK PAKISTAN

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ABSTRACT. Teaching learning process has many things to make it more effective, fruitful and result oriented. Audio visual aids are one of those ingredients. Sufficient Availability and effective usability of AV aids makes teaching learning more effective and objective oriented. The need of the study was to identify the availability and usability of AV aids in the Afghan refugees’ schools in Khyber Pakhtunkhwa. The responses of the female school teachers and male school teachers were used to determine the availability and usability of AV aids in the afghan refugees’ schools. Total 22 afghan refugees’ schools 4 girls and 18 boy’s schools constituted the population of study. The study was delimited to 8 schools from total 22 schools i.e. 4 from boys and 4 from girl’s schools. Thus, 30 afghan school teachers were taken as sample of the study (15 female school teachers from 4 girl’s schools and 15 male school teachers from 4 boy’s schools). One questionnaire was constructed for collection of the information. The data obtained by using the appropriate research tool, questionnaire, was tabulated, analyzed and interpreted by using statistical tools i.e. percentile. It was concluded that AV aids are available in the afghan refugees’ primary schools but modern AV aids are required and teachers of the schools need training and course to the utility of AV aids to the fullest benefit. Keywords: Availability, Usability, Questionnaire, Refugees, Percentile.
1. Introduction. For effective teaching to take place, a good method must be adopted by a teacher. Teachers are aware that students learn in different ways and have different ways of absorbing information and of demonstrating their knowledge. Teachers employ a variety of teaching strategies and methods to ensure that learners have equal opportunities to learn. However, it must be stated that teaching methodology along with audio visual aids in education is not a new concept in the teaching learning process. New methods and techniques evolve almost every day to supplement existing ones in teaching. Notable among them is technology-supported ones.

In the past the teachers was considered to be the sovereign as far as the teaching-learning process was concerned. The role of the students was mostly passive. Modern trends have changed the face of educational world. Many progressive methods and devices have come in the wake of these trends. Yet the traditional methods are not being given up altogether, they are being modified and adjusted to the changed concepts and situations in this state of the art technological era.

The significance of audiovisual aids in teaching has been realized by the teachers on account of their vast professional experience and positive attitude that could be conducive to any plan of development in future regarding Audio-Visual. The great majority of the teachers are aware about the significance of audio-visual aids in teaching. In this connection they put various relevant reasons. The teachers in majority also emphasize that audio-visual aids in teaching has great impact on knowledge, skills and attitude of the students. It has been discovered that the teachers in majority and in majority of the departments in Faculty of Arts had access of all the available equipment of audio-visual aids in their departments. The teachers in majority suggested that: (a) the departments and their leadership should approach resourceful persons in the society to assist them in having adequate modern equipment’s of audio-visual aids in teaching, (b) the university should take more interest to provide fund to the departments in managing the affairs of the audio-visual aids in teaching. Observed that the teachers have also realized that the university has been doing its best to provide with adequate Audio-Visual Aids and develop information technology in all the departments.

2. Statement of the Problem. The study was to determine the availability and usability of AV aids in the Afghan refugees schools.

3. Objectives. The objectives of the study were:
   a. To identify the availability of A-V-Aids in Afghan refugees schools.
   b. To explore the usability of A-V-aids in afghan refugees school.

4. Need of the Study. Afghan children are suffering from their different aspects of life. Education is one of the most important amongst them. Afghan children in Pakistan enjoy better facilities and education in in many ways. However, education needs more attention in Pakistani schools and afghan schools alike. Afghan refugees’ primary schools in KPK Pakistan are responsible for basic education to afghan children in Pakistan. These schools are being funded by various national and international institutions and different ways. Facilities like AV aids are under study in their availability and usability perspective in the same schools. The study is significant as AV aids paly important role to play in teaching learning process.

5. Literature Review. Topkara, et al., (2012) emphasising the training of the trainee teachers suggested that trainee-teachers should use AV aids to make their practice lessons and teaching lessons and it is the responsibility of the administration and the head teachers to assist the trainee teachers to make their lessons more effective. Trainee teachers should use modern gadgets like multimedia and computers as well in their lessons.

It has been suggested and recommended that the study has shown that when appropriate media (e.g. audio-visuals) are integrated into the curriculum to complement the traditional method, higher learning outcomes in terms of achievement scores would probably result. Performance was significantly improved by the use of audio-visual aided instructional approach in teaching Physics. The mean achievement scores of both male and female students were significantly improved by the use of audio-visual aided instruction. The study has shown that the use of audio-visual-aided instruction enhances student achievement in physics better than the use of the traditional method.. It is also suggested that researchers and physics teachers should explore the use of audio-visual-aided instruction to teach
other physics areas not covered by this study in order to determine its effectiveness and possible adoption as a major instructional strategy (Quarcoo-Nelson, Buabeng, & Osafo, 2012). Naryan, (1980) has reported that the first few years of a child’s life are the most impressionable years and learning experiences provided these years in or outside the schools and other institutional arrangements have a predominant effect on the future behavior pattern of the child. Sensory experiences of all kinds contribute to strengthen and enrich the child’s perception. Toys, building blocks, card-games, puzzles as well as audio visual aids.

Akerele & Afolabi, (2012) concluded that when video is used in teaching, it enhances learners’ positive attitude towards the course. Also it affects their performances positively. It was recommended that having studies in-depth the effect of video on teaching, the following are the every teaching learning activities should always be supplemented with media such as video. Availability of A.V. Aids in Schools: Unavailability and deficiency is a barrier in effective use of A.V. Aids. According to National Education Policy 2009, a well regulated system of competitive manufacturing of A.V. Aids and their incorporation in the curricula shall be introduced. This policy provision should be implemented at the earliest to eliminate deficiency of A.V. Use of AV. Aids in right time can make teaching effective. It is an integral part of curriculum and should function as an essential part of the educational program. The teacher should use A.V. Aids in a proper situation to add visual clarity to concepts, ideas, and for focusing the attention of the target group on key points (Ali, Ghani, & Ali, 2011).

In the recent years, an increasing emphasize has been put on audiovisual aids utility in teaching, there has been very little research in suitability and effectiveness of the media for this purpose. However, there have been studies in other fields notably, educational broadcasting research and communication studies, which though set in the domain of the first language acquisition and comprehension, may have relevance for English language teaching. With one or two notable exceptions, no one appears to be considering one of the main questions arising from the widespread of audio and audio-visual aids as a source of language input to the foreign language learner (Barani, Seyyedrezaie, & Shojai, 2013)

It has been further emphasised that although recent years have been an increasing volume of literature on audiovisual aids and language teaching, there has recently been very little research into suitability and effectiveness of the media for this purpose. However, there have been studies in other fields notably, educational broadcasting research and communication studies, which though set in the domain of the first language acquisition and comprehension, may have relevance for English language teaching. With one or two notable exceptions, no one appears to be considering one of the main questions arising from the widespread of audio and audio-visual aids as a source of language input to the foreign language learner. A.V aids make teaching learning process effective, provide knowledge in depth and in detail and brings positive changes in classroom environment. It is helpful for teachers to teach the new concepts in an easy way and makes teaching learning process interesting (Rasul & Bukhsh, 2012).

6. Research Methodology

6.1. Population. All the primary schools of afghan refugees in Khyber Pakhtunkhwa (KPK) constituted the population of the study.

6.2. Delimitation of the Study. The study was delimited to 22 schools of District Kohat i.e., 18 boys’ schools and 4 girls’ schools of Afghan refugees’ primary schools, due to multifaceted problems like shortage of time, paucity of resources and level of the study.

6.3. Sample. Total 30 teachers were taken as sample of the study by simple random sampling technique. Further, 15 female teachers were from girls’ primary schools of afghan refugees and 15 male teachers were taken from boys primary schools of afghan refugees.

6.4. Research Instrument. A questionnaire was constructed for the collection of data in order to know about the availability and usability of the AV aids in Afghan refugees schools.

6.5. Validity of Research Instrument. Self-constructed questionnaire was sent to the experts of concerning field. After receiving the questionnaire back, with the opinion of experts, it was rephrased and amended accordingly.

7. Research Questions

1. Are A-V-aids available in all afghan refugees’ schools?
2. Are A-V-aids used in all afghan refugees’ schools?
3. Are A-V-aids used effectively in the Afghan refugees’ schools?
8. **Results and Discussions.** The present study was conducted to the availability and usability of AV aids in the primary schools of boys and girls of Afghan refugees in district Kohat. Researcher himself with his team visited district Kohat for the collection of factual information from the sample. Data was analysed by using following tables. Following results were concluded from the study through applying statistical tools for the analyses;

**Table No1:** Are writing boards available in your school?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
</tbody>
</table>

Table 1 shows, those 100% female teachers and 100% of male teachers stated that writing boards are available in the primary schools of afghan refugees.

**Table No2:** Are flip charts available in your institution?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>00</td>
<td>15</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>00</td>
<td>15</td>
<td>100</td>
<td>00</td>
</tr>
</tbody>
</table>

Table 2 shows, those 100% female teachers and 100% of male teachers stated that flip charts were not available in the primary schools of afghan refugees.

**Table No3:** Is there a proper AV aids section established in your school?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>9</td>
<td>6</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>53.33</td>
<td>46.67</td>
</tr>
</tbody>
</table>

Table 3 shows, those 60% female teachers and 53.33% of male teachers stated that a proper AV aids section established in your school in the primary schools of afghan refugees but 40% female teachers and 46.67 Male teachers opined otherwise.

**Table No4:** Is there digital camera available in the AV aids section?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
<td>100</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 4 shows, those 100% female teachers and 100% of male teachers stated that digital camera is not available in the AV aids section in the primary schools of afghan refugees

**Table No5:** Are flash charts available in the AV aids section?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
</tbody>
</table>

Table 5 shows, those 100% female teachers and 100% of male teachers stated that flash charts available in the AV aids section in the primary schools of afghan refugees
Table No 6: Is there multimedia available in the school?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
<td>100</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 6 shows, those 100% female teachers and 100% of male teachers stated there is no multimedia available in the primary schools of afghan refugees for the students.

Table No 7: Are pointers available in the class rooms?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
</tbody>
</table>

Table 7 shows, those 100% female teachers and 100% of male teachers stated that pointers are available in the class rooms in the primary schools of afghan refugees for the students.

Table No 8: Are there globes available in the resource room?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
</tbody>
</table>

Table 8 shows, those 100% female teachers and 100% of male teachers stated there are globes available in the resource room in the primary schools of afghan refugees for the students.

Table No 9: Are the maps available in the resource room?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>15</td>
<td>00</td>
<td>100</td>
<td>00</td>
</tr>
</tbody>
</table>

Table 9 shows, those 100% female teachers and 100% of male teachers stated that maps were available in the resource room in the primary schools of afghan refugees for the students.

Table No 10: Is there any tape recorder available?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>00</td>
<td>15</td>
<td>00</td>
<td>100</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>00</td>
<td>15</td>
<td>00</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 10 shows, those 100% female teachers and 100% of male teachers stated there is no any tape recorder available in the primary schools of afghan refugees for the students.

Table No 11: Is AV aids equipment properly issued?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>13</td>
<td>02</td>
<td>86.67</td>
<td>13.33</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>14</td>
<td>01</td>
<td>93.33</td>
<td>6.67</td>
</tr>
</tbody>
</table>

Table 11 shows, those 86.67% female teachers and 93.33% of male teachers stated AV aids equipment is properly issued in the primary schools of afghan refugees but 13.33% female teachers and 6.67% male teachers
Table No12: Have you ever done course of using AV aids?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>53.33</td>
<td>46.67</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>9</td>
<td>6</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 12 shows, those 53.33% female teachers and 60% of male teachers stated that they have done course of AV aids in the primary schools of afghan refugees but 46.67% female teachers and 40% Male teachers opined otherwise.

Table No 13: Do you use AV aids effectively in your class during teaching learning process?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>4</td>
<td>11</td>
<td>26.67</td>
<td>73.33</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>5</td>
<td>10</td>
<td>33.33</td>
<td>66.67</td>
</tr>
</tbody>
</table>

Table 13 shows, those 73.33% female teachers and 66.67% of male teachers stated that AV aids were not used effectively in class during teaching learning process in the primary schools of afghan refugees but 26.67% female teachers and 33.33% Male teachers opined positive.

Table No 14: Do you AV aids frequently during your teaching sessions?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>53.33</td>
<td>46.67</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>9</td>
<td>6</td>
<td>60</td>
<td>40</td>
</tr>
</tbody>
</table>

Table 14 shows, those 53.33% female teachers and 60% of male teachers stated that AV aids were frequently during your teaching sessions in the primary schools of afghan refugees but 46.67% female teachers and 40% Male teachers opined otherwise.

Table No 15: Do head teachers emphasize upon the use of AV aids?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>2</td>
<td>13</td>
<td>13.33</td>
<td>86.67</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>3</td>
<td>12</td>
<td>20</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 15 shows, those 86.67% female teachers and 80% of male teachers stated that head teachers did not emphasize upon the use of AV aids in the primary schools of afghan refugees but 13.33% female teachers and 20% Male teachers opined otherwise.

Table No 16: Are the AV aids sufficient in the school?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>6</td>
<td>9</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>7</td>
<td>8</td>
<td>46.67</td>
<td>53.33</td>
</tr>
</tbody>
</table>

Table 16 shows, those 60% female teachers and 53.33% of male teachers stated that AV aids were not sufficient in the primary schools of afghan refugees but 40% female teachers and 46.67 Male teachers opined otherwise.
**Table No 17:** Is there permanent staff available in the resource room?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>53.33</td>
<td>46.67</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>9</td>
<td>6</td>
<td>46.67</td>
<td>53.33</td>
</tr>
</tbody>
</table>

Table 17 shows, those 53.33% female teachers and 46.67% of male teachers stated that there was permanent staff available in the resource room in the primary schools of afghan refugees but 46.67% female teachers and 53.33% Male teachers opined otherwise.

**Table No 18:** Are you assessed on the basis of use of AV aids?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>9</td>
<td>6</td>
<td>60</td>
<td>40</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>53.33</td>
<td>46.67</td>
</tr>
</tbody>
</table>

Table 18 shows, those 60% female teachers and 53.33% of male teachers stated that they were assessed on the basis of use of AV aids in the primary schools of afghan refugees but 40% female teachers and 46.67% Male teachers opined otherwise.

**Table No 19:** Are you satisfied on the utility of AV aids in your teaching learning process?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>15</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>15</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 19 shows those 100% female teachers and 100% of male teachers stated that they were not satisfied on the utility of AV aids in your teaching learning process in the primary schools of afghan refugees for the students.

**Table No 20:** do you use videos in your teaching sessions?

<table>
<thead>
<tr>
<th>PARTICIPANTS</th>
<th>TOTAL</th>
<th>YES</th>
<th>NO</th>
<th>YES %</th>
<th>NO %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female Teachers</td>
<td>15</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>100</td>
</tr>
<tr>
<td>Male Teachers</td>
<td>15</td>
<td>0</td>
<td>15</td>
<td>0</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 20 shows those 100% female teachers and 100% of male teachers stated that they did not use videos in their teaching sessions in the primary schools of afghan refugees for the students.

**9. Conclusions.** In the light of the analysis of data and findings of the study following conclusions were drawn.it is concluded that:

1. Av aids like charts, flip charts writing boards (black board with chalk), maps, globes and pointers(old wooden) are available but digital camera, multimedia tape recorder are not available in the primary afghan refugees’ schools. Moreover, resource rooms are not developed to meet the requirements but 60% teachers said that AV aids sections had been established.
2. Av aids are not effectively used in the class rooms and all the teachers are trained for the utility of the AV aids. Old teachers did course of the same but new teachers did not avail the opportunity of AV aids course.
3. Av aids equipment was not sufficient in the schools and was not managed by the permanent trained staff.
4. Av aids are used in the assessment of the teachers but equipment is old and modern AV aids like recordings, movies are not used by the teachers.

**10. Recommendations.** Above results lead to the under mentioned recommendations;

1. Besides charts, flip charts, maps and globes, and sufficient modern AV aids like, multimedia, computers and digital cameras should be provided in the afghan refugees’ primary schools so that teachers may be in a better position to teach the kids.
2. Head teachers and administrators should take the task to the effective utilisation of the AV aids in the classrooms. Curriculum developers should keep this aspect in consideration while designing curriculum for the said level.
3. Teachers can be assessed for the utility of AV aids in their normal teaching sessions. Moreover, Workshops, seminars and interactive sessions can be arranged for the teachers to make them understand the significance of usability of the AV aids in teaching learning process.

REFERENCES


HUMAN RESOURCE, TECHNOLOGY AND ECONOMIC DEVELOPMENT
(A CASE STUDY OF PAKISTAN)

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ABSTRACT: This study analyzes the impact of Human Resource Development (HRD) and foreign technology proxied by foreign R&D capital stock, imports of capital goods and FDI on economic growth and development of Pakistan over the period of 1972-2010 by employing co-integration analysis based on Autoregressive Distributed Lag (ARDL) model. Estimates show positive impact of foreign R&D capital stock and imports of capital goods, and negative effect of FDI on economic growth of Pakistan. Absorptive capacity of Pakistan in terms of education shows that present quality of education negatively impacts per capita GDP in the scenario and emergence of a knowledge-based and technological society and new global requirements about human resource characteristics. Quality education and market-driven skills are vital determinants of economic growth for all countries generally and for Pakistan specifically. None of the previous studies has used foreign R&D capital stock measured by domestic R&D capital stock of advanced countries weighted by their import share in the GDP of developing countries for single country case as well as impact of these three channels of foreign technology transmission on the economic growth of the economy simultaneously. Thus this research has filled this gap in literature in the Pakistan context. Pakistan has to develop her human capital in order to survive in the technological global world and achieve faster and sustained economic growth and development.

Keywords: Technological Diffusion, Human Resource Development, Foreign R&D Capital Stock and Spillovers, Capital Imports, FDI.

1. Introduction. Achievement of Sustained output growth has been emphasized by development economists and macroeconomic policy makers as a fundamental objective. That is why much work has been done in the search of determinants of economic and income growth ([8]; [25]; [26]; [33]; and [40]). In the search of determinants of economic growth, recent advances of endogenous growth theory highlighted the importance of human capital and knowledge as an engine for sustained economic growth and development as compared to traditional theories of growth which focused on the factor accumulation for sustained growth. Economic integration acts as a source for using foreign knowledge and technology in the domestic production via foreign trade and capital imports that
ultimately promotes total factor productivity. A country can benefit more from foreign research and development (R&D) through imports of more machinery and equipment. Empirical evidence shows that countries trading with World’s technological leaders experienced faster growth than those who did not trade with technological leaders. Now-a-days promotion of knowledge (technology) is necessary to catch up the developed countries as well as compete with them in international markets. A well developed and educated workforce has been considered as an important factor for attracting foreign direct investment which in turn integrates the economy into the global world. Since 1990s, the emphasis on the globalization of trade and finance has been provoked by development paradigm due to accumulation of knowledge. Since 1980s, the share of world trade has increased by 5 times in real terms and from 36 percent to 55 percent of world GDP over the period. A number of low and middle income countries converged to new trading system (IMF, 2007). The global FDI inflow has also increased by 40 percent and has biased towards those economies which have skilled labor force that can adopt foreign technological advances, knowledge and information (UNCTAD, 2008). Globalization is a source of promoting income growth, human capital development, technological advances and spillovers in all regions and countries via increased foreign direct investment in the host county. This feature of globalization has been proposed by Kuznets hypothesis which describes that after the transitional phase, industrialization will eventually shrink the inequalities among countries [52].

The beneficial effects of globalization can be utilized by utilizing the foreign technological spillovers. As these technological spillovers are basically local instead of international1 that is why technologically less developed countries develop close links with technologically more advanced countries in order to explore these spillovers and production facilities. This investment motive of technologically less developed countries has been termed as “technology acquisition” or “technology sourcing” and has been empirically proven2 FDI inflows enhance economic growth of the host country by promoting manufacturing exports [34]. FDI as a technological diffusion channel is more complex and have data scarcity issue as compared with international trade. That is why FDI has been considered as an inefficient proxy for multinational enterprises, so that technological and knowledge spillovers via FDI has received little attention [77]. Technology transfer from developed countries has multiple channels, one of which is technology oriented machinery and intermediate goods and transport equipment. Multinational Enterprises (MNEs) also transmit international technology through FDI.

For the utilization of foreign technology and managerial skills transmitted by foreign investors, absorption capacity of host country matters a lot. [60] and [13] measured the absorption capacity in terms of human capital. Moreover, a number of studies as discussed above have found the negative effect of FDI on economic growth of the developing countries because of inadequate and insufficient level of human capital along with some other influential factors like lack of basic infrastructure, socio-political issues etc.Pakistan has also failed to capture the positive effect of technological learning by foreign direct investment. Because of these inefficiencies and lack of capabilities, Pakistan has lost 40% inflow of foreign direct investment in 2010. As indicated by UNCTAD (2010), local firms cannot benefit from foreign technology, information and knowledge transmitted by foreign direct investment unless they maintain a minimum threshold level of absorptive capacity (skills and knowledge). Since late 1980s, Pakistan has adopted liberal trade and investment policies by reducing the average tariff rate to 20 percent in 2001-02. Since 1997, Pakistan has given 100 percent conditional foreign ownership in most of the sectors of economy with national treatment provision and duty and tax exemption under FDI followed by WTO obligations. Unfortunately, in spite of all these implications, FDI to GDP ratio of Pakistan has remained less than 1% along-with insignificant effect of FDI on economic growth of Pakistan due to inefficiencies in human capital, infrastructure and some other important factors.

Almost all the economists and policy makers are agreed on the positive effect of foreign technology, knowledge and research and development capital on the productivity enhancement and economic growth of developing countries. But there is much controversy about the most effective channel for foreign technology transmission. Some economists postulate that the country with a high degree of openness in term of exports and imports along-with adequate human capital can benefit more from foreign technology [23].While some other economists argue that an exporter country will be more productive and efficient than non-exporter [14]. As “learning by exporting” hypothesis stems that when exporting country enters in international market, she has to improve the quality and standard of her product in order to compete with global standard as well as to fulfill the requirement of foreign

1 [6]; [17]; and [48].
2 [50]; [69] [61]; and [68].
customers. In this way the firms of exporter country will have to improve the quality of product according to the latest knowledge, technical expertise and efficiency level which they have learnt from the international market. Furthermore, by specialization and division of labor, economies of scale will be achieved on one side. And on the other side, per unit cost of production will be reduced by adopting modern method of production. Thus reduction in trade restrictions will increase surplus of consumers as well as of producers of developing countries like Pakistan.

Another school of thought postulates that cumulative domestic research and development capital stock and domestic knowledge are more effective channels for capturing the foreign technology spillovers and promoting the domestic productivity ([22]; [35]). Domestic research and development capital stock and R&D efforts of trading partners are very helpful tools for utilizing the international spillovers transmitted by international trade, FDI and international exchange of knowledge and information. A country can benefit from its own existing resources, foreign technical and technological advances on the basis of domestic R&D capital stock. While from foreign R&D capital stock, the country can benefit by learning and exploiting the new technologies, organizational methods and production materials as well as by importing technological knowledge and advances embodied goods and services [23].

In view of this controversy about the different channels of foreign technology transmission, we used in this study, all these three channels to find the most significant channel for foreign technology transmission in the case of Pakistan. In order to measure the absorptive capacity of Pakistan for foreign technology and knowledge, we used the enrollment level of all educational institutes of Pakistan. Whereas, we used imports of machinery, transport equipment and technology imports for the assessment of productivity promotion of Pakistan associated with the use of these capital imports from developed and advanced countries. The per unit increase in GDP associated with foreign competition and other production and organizational spillovers has been assessed by the relationship of foreign direct investment and GDP per capita. In this technological era and knowledge society, research and development capital is essential for the progressive survival of any economy in the global village. Domestic research and development capital stock and domestic knowledge promote the absorption capacity of economy. But unfortunately both of these factors are in scarce supply in Pakistan. In these circumstances, Pakistan can only benefit from technological advances, knowledge, research and information by utilizing the research and development capital stock of its developed import trade partners which have considerable level of cumulative domestic R&D capital stock. We measured the foreign stock of research and development capital stock by bilateral import-share weighted average of domestic R&D capital stock of importing trade partners of Pakistan.

1.2. Objectives of the Study. This study serves a number of objectives: (i) To examine the significance of human resource for economic development, foreign R&D capital stock utilization and foreign direct investment of Pakistan. (ii) To find the long-run and short-run impact of technology transmission on per capita income of Pakistan. (iii) To evaluate compatibility of human resource of Pakistan with global technology breakthroughs. (iv) To give suggestions for trade policy, domestic R&D capital stock building and imitation of foreign technology.

1.3. Significance of the Study. All the previous literature has used panel study analysis for analyzing the impact of foreign knowledge peroxied by cumulative domestic R&D capital stock of importing trading partners weighted by their share of imports in the GDP of developing countries. Moreover no study has used the impact of these three channels of foreign technological diffusion and spillovers i.e. FDI, foreign R&D capital stock and imports of capital stock, on the economic growth and development of any economy by using time series as well as panel data analysis. This is the first study which has analyzed the impact of foreign R&D capital stock along-with imports of capital goods and FDI on economic development of a single country of Pakistan simultaneously by using time series data. In this way, our study has filled this gap of literature.

2. Review of Literature. [20] analyzed two different impacts of foreign technological knowledge and spillovers on growth and productivity through competitive effect and technological diffusion effect. His estimates showed that foreign technological knowledge and spillovers enhanced the productive capacity of domestically owned firms through increasing value added per worker in the industry in which the output production is proportionally higher in foreign owned firms. [15] found a significant and positive effect of FDI biased towards higher income developing countries which have relatively increased level of absorption capacity. But they analyzed that absorption capacity of an economy is not the only factor to utilize the FDI. [23] found positive and significant impact of domestic and foreign R&D measured by domestic R&D capital stock of trade partners weighted import shares on the TFP of 21 OECD countries and Israel over the period of 1971-90. They used pooled data for the estimation of innovation-driven growth model. They emphasized that an open economy for foreign trade will reap more significantly and
beneficially the impact of foreign R&D capital and international spillovers on domestic growth and productivity. Moreover, elasticity of TFP with respect to R&D capital stock is larger and significant for large countries as compared to small countries. They found that domestic R&D is most important for TFP of developed G7 countries as compared to foreign R&D.

[32] estimated the extended Cobb Douglas production function to analyze the impact of workforce, capital, investment-to-GDP ratio, domestic R&D investment, foreign R&D capital stock, measured in terms of domestic R&D capital stock of import partners weighted by bilateral import share to GDP ratio, on the GDP of eleven Asian countries categorized by High Performing Asian Countries (HPAC) and Medium Performing Asian Countries (MPAC) for the period 1970-1993. Results showed that coefficients of workforce and capital are positive and significant. But the coefficients of international spillover R&D capital stock, foreign R&D capital stock (international spillover R&D capital stock) and investment-GDP ratio have negative signs. Whereas the coefficient of interaction term of foreign R&D capital stock with school enrollment ratio is negative as well as non-significant. While random effect model showed that interaction term of foreign R&D capital stock with school enrollment ratio as well as with import shares is positive and non-significant. Thus it emphasized on investment in human capital and openness for generation of enhanced absorptive capacity. Furthermore, results showed that HPAC had more absorptive capacity for foreign technological spillovers than MPAC.

[79] employed OLS with white’s hetsrokedasticity consistent covariance estimation method on Cobb-Douglas production function to analyze the impact of foreign technological transformation of industrialized countries through trade of capital goods, inward and outward FDI, on LDCs’ TFP by using data from 1971 to 1990 for 21 OECD countries. They revealed that technology transformation has remarkable positive impact on TFP growth of these countries. They assessed the role of FDI for the transformation of foreign technology and knowledge by using a sample of 13 OECD countries over the period 1983-90. The results indicated that outward FDI transfer imported technology back towards innovating country through multinational enterprises. This study has not taken into account the endogeneity problem of variables that lies in Cobb-Douglas production function. There is also a need to build theoretical justification for econometric issues and methods of study.

[5] explored the presence of Bhagwati hypothesis, FDI significantly affect economic growth under export promotion (EP) regime instead of import promotion (IP) regime, in Pakistan by using time series data and Engle-Granger (EG) and Hansen techniques over the period 1970-2001. They have estimated the long run relationship among GDP, FDI, labor force, gross capital formation as a percentage of GDP, education expenditure as a percentage of GDP and total merchandise trade to GDP ratio. Results showed that overall impact of FDI is positive and significant for Pakistan economy as negative coefficient of FDI is greater than the interaction term of FDI and merchandise trade. So, They have suggested that Pakistan should has to shift its policy regime from IS to EP. And she should give priority to FDI and HRD in its outward looking development strategy.

[43] theoretically analyzed four major channels of foreign knowledge and technology transmission from DCs to LDCs, which are foreign trade in goods, FDI, international mobility of people, trade in knowledge or transmission of techniques and methods of production. They found that total factor productivity (TFP) of LDCs’ is strongly enhanced by technical imported goods from industrialized developed countries. That’s why they have suggested liberal trade policies for domestic economy as well as certain type of policy recommendations for WTO trade related rules.

[51] investigated the impact of international spillovers through foreign R&D embodied imports and FDI on the growth of 27 transition and 20 western European countries by employing co-integration test and latest technique of panel unit root over the period 1990-2006. Domestic R&D capital stock and human capital have been treated as control variables and as a proxy for absorption capacity of importing country, which have strong impact on the TFP of nominated countries. The study indicated that foreign trade and FDI are significant channels of transferring foreign technology but former has relatively stronger impact on TFP of DCs and LDCs as compared to the latter. In view of these results he concluded that an economy with significant absorptive capacity and domestic R&D capital stock can significantly exploit foreign technology and spillovers.

3. Theoretical Framework and Data Sources. Empirical studies related to the determinants of economic growth explain that economic growth of countries depends upon increased total factor productivity rather than factor
accumulation [28]. Technological catch-up of developing to developed countries is strongly based upon foreign technology breakthrough, foreign trade, foreign direct investment and imports of foreign technological knowledge and information embodied capital imports along-with domestic research and development capital stock of developed import partners. But all these channels of foreign technological transmission are dependent upon the developed human capital. [1] indicated that over past 60 years technical breakthrough is skill oriented so it is biased toward high level of skills and education. Level of education and skills are a pre-requisite to absorb, adopt and implement foreign technology and innovations and also for domestic technological and scientific innovations [71]. This view is contrary to the New Classical growth theory and early models of endogenous growth theory. These theories have considered technology as an exogenously and universally available factor. A number of models show the complementary relationship among human capital and technological innovations and imitations. Likewise [60] also presumed that imitation and adoption of foreign technological innovations of developing countries from developed countries are significantly and positively affected by developing countries’ level of education. That is why standard cross-country regression has specified and derived a human capital augmented production function [57]. In this Cobb-Douglas production function, per capita income proxied for economic development of the economy in a given period of time depends upon labor force (L), physical capital (K) and human capital (H) as:

\[ Y_t = A_t \cdot L_t^\beta_1 \cdot K_t^\beta_2 \cdot H_t^\beta_3 \text{ (1)} \]

But contrary to it, [13] defined human capital as a factor that directly impacts productivity rather than specified it as an input factor like L and K. So, now Cobb-Douglas production function will be specified as:

\[ Y_t = A_t \cdot (H_t)^\beta_4 \cdot L_t^\beta_5 \cdot K_t^\beta_6 \text{ (2)} \]

Productivity level of an economy can be enhanced by a number of channels that depend upon foreign trade [37]. International trade enhances domestic productivity by introducing an ample variety of high tech intermediate and capital goods and equipment along-with improved product design and increased competitiveness. Foreign Direct Investment (FDI) is also a component of globalization. It enables a country to increase value added per unit of input by employing cross-border learning of production and organizational methods. Thus, in this era of scientific and technological innovations, imitation and adoption of foreign technology is a significant determinant for promotion of economic growth. In view of this, [24] and [12] used domestic research and development capital stock of developed importing partners of developing countries that can be utilized by developing countries. And GDP ratio of capital imports of developing countries, imported from the developed import partners which have significant domestic research and development expenditures in their GDP. Import of technology goods is a significant channel of foreign technology transfer and a determinant of productivity as indicated by [23], [47], [24], [77] and [58]. A country can benefit from technological information, breakthrough and knowledge spillover by importing technology goods from them. We have considered this effect of industrialized countries’ stock of knowledge and technology through imports of Technology goods divided by total imports of Pakistan (MKG) ([19]; [29]; and [37]).

According to [36] rate of return from investment in R&D is much higher than investment in structures, equipment and machines. Benefits of R&D spillovers are substantial for industrialized countries as well as for their developing trade partners [23]. Developing countries can achieve substantial marginal benefits from domestic research and development capital stock of industrialized developed countries by composing their import to GDP ratio biased towards these industrialized countries. Thus impact of foreign R&D capital stock (T) on Pakistan’s economic growth has been measured by weighted average of domestic research and development capital stock of industrialized developed import partners of Pakistan by serving import share of these developed countries in the GDP of Pakistan, as weights. Domestic research and development capital stock is also very significant and important factor for promotion of economic growth and development. However due to non-availability of data on domestic R&D capital stock and insignificant amount of R&D capital stock of Pakistan like other developing countries [23], we dropped this variable from the estimated equation. By inserting these three channels of foreign technological diffusion, knowledge and R&D capital stock, we reach at testable equation of Pakistan based upon literature and theoretical background of the study.

\[ \ln(Y_t) = \beta_0 + \beta_1 \ln(K_t) + \beta_2 \ln(L_t) + \beta_3 (\text{MKG}_t) + \beta_4 (\text{FDI}_t) + \beta_5 (T_t) + \beta_6 \ln(H_t) + \epsilon_t \text{ (3)} \]

Where Y is GDP per capita and is used as a proxy for economic development of Pakistan. MKG is technology goods import intensity defined as imports of technology goods divided by total imports. FDI is foreign direct investment to GDP ratio of Pakistan. K and L are gross fixed capital formation and number of employed workers, which act as the core determinants of production. Total education including enrollment of all kinds of educational and occupational institutions of Pakistan are taken as a proxy for human capital. All variables have been taken in natural log except for ratio variables that are MKG, FDI and T. \( \epsilon_t \) is a random error term.
3.1. Data Sources. Data of gross fixed capital formation (Rs. Millions) and GDP per capita (Rs. Millions), imports of technology goods and total education were taken from Pakistan Economic Survey (various issues). The data for employed labor force was taken from International Labor Organization. The variable of foreign research and development capital stock was calculated from the domestic gross expenditure on research and development (GERD) data from the OECD’s Main Science and Technology Indicators. This data was in nominal terms, so we deflated it by using R&D price index that is as follows:

$$R&DPI = 0.5 \text{ WPI} + 0.5 \text{ CPI}$$

Where WPI and CPI are the wholesale price index and consumer price index, respectively. Research and Development capital stock ($S$) was calculated by using following perpetual inventory method on the basis of domestic R&D expenditures.

$$S_t = (1 - \delta)S_{t-1} + R_{t-1}$$

Where $\delta$ is the depreciation rate and is taken as 5 percent. Benchmark for research and development capital stock ($S$) has been calculated by Griliches (1988) procedure that is as:

$$S_0 = \frac{R_0}{(g + \delta)}$$

Where $g$ is the annual logarithmic growth rate of R&D expenditures on average over the period for which published data of R&D was available, $R_0$ is the first year’s available R&D data and $S_0$ is the benchmark for the first year research and development capital stock.

We used data on domestic R&D expenditures from the paper of [23] over the period 1971-80 and further we generated domestic R&D capital stock of countries by using perpetual inventory method on the basis of gross domestic R&D expenditures.

The year of 1971 was very critical period for Pakistan due to the separation of East Pakistan so we used the period for estimation from 1972 to 2010. The data for visual analysis via tables and graphs has been taken from HEC, Annual report of State Bank, WDI and Pakistan Economic Survey (Various issues).

4. Econometric Specification. Co-integration analysis tests the existence of long run relationship through linear combination of non-stationary variables. Existence of co-integration among any set of variables shows that in the long run variables will come to their equilibrium position even in short run if they show fluctuations against the equilibrium position ([4]; [30]). Co-integration technique developed by [31], [44] and [45] is an inconsistent and unreliable technique for small sample size and its pre-requisite is the same integration level for all variables. This condition is seldom fulfilled in most of the studies ([39]; [49]; [56]; [67]).

In order to get rid of the drawbacks of co-integration technique described above, Pesaran and Pesaran [64], Pesaran and Smith [66] and Pesaran et al. [65] developed a technique based upon general-to-specific modeling technique called ARDL Model. This model is suitable for short run as well as for long run and after the recognition of lags for ARDL model the co-integration can be showed by simple OLS [59]. ARDL bounds testing approach to co-integration can be estimated efficiently and reliably for small sample size [41] as well as it creates data generating process under the general-to-specific framework by taking satisfactory number of lags [53]. It also takes into account the problem of endogeneity of descriptive variables. A dynamic ECM obtained by ARDL, after simple linear transformation, integrates short run dynamics and speed of adjustment to long run from short run disturbance along with long run information [9]. The decision of co-integration under bounds testing approach is based upon F statistic which is sensitive to first differenced variables’ lag numbers [7]. So after imposing restrictions on coefficients with null hypothesis, F statistic can be carried out. Null hypothesis under ARDL model indicates that there is no long run relationship among variables and vice versa for alternative hypothesis. If F statistic is greater than the upper bound, it will lead to rejection of null hypothesis and if it is less than the lower bound we cannot reject the null hypothesis. Finally, if F statistic lies between the two bounds, the decision of co-integration will be inconclusive.

4.1. Unit Root Analysis. Stationarity test for data series is a prerequisite for any econometric model in order to avoid estimation of spurious regression and unreliable results that emerge due to non-stationary of data. As [63] reported that it is prerequisite condition for bounds testing that data series must be integrated of order I(0) or I(1). Otherwise in case of integration at I (2), the computed F statistic value will become invalid Pesaran et al., [65]. Dickey and Fuller [27] developed Augmented Dickey Fuller test to check the stationary of data and it uses higher order lags to control the higher order serial correlation as ADF can be used with correlated error term. Null
Hypothesis under ADF test is about the non-stationary of series against the alternative hypothesis that assumes the series to be stationary i.e.

\[ H_0 = \delta_2 = 0 \]
\[ H_1 = \delta_2 = 1 \]

The following regression equation has been estimated under ADF test:

\[ \Delta Z_t = \delta_2 + \delta_1 t + \delta_2 Z_{t-1} + \sum_{k=1}^{\infty} \phi_k \Delta Z_{t-k} + v_t \]  

(4)

In order to make error term, \( v_t \), serially uncorrelated, we have to include \( n \) number of lagged changes in \( Z_t \) by assuming homoskedastic or white noise error term.

Equation 5.5 and 5.6 are also related to ADF test in which data series are characterized by \( I(1) \) process with a drift and without a drift as:

\[ \Delta Z_t = \delta_2 + \delta_1 Z_{t-1} + \sum_{k=1}^{\infty} \phi_k \Delta Z_{t-k} + v_t \]  

(5)

And

\[ \Delta Z_t = \delta_2 Z_{t-1} + \sum_{k=1}^{\infty} \phi_k \Delta Z_{t-k} + v_t \]  

(6)

The decision about presence and absence of unit root depends upon \( t \) statistic.

\[ t \text{ statistic} = \frac{\hat{\delta}_2}{SE(\hat{\delta}_2)} \]  

(7)

If the value of calculated \( t \) statistic is greater than critical tabulated values developed by MacKinnon (1990) then we will be able to reject the null hypothesis related to unit root of the data series and do not reject alternative hypothesis based upon stationary status of data and vice versa.

Furthermore, Ng and Perron [62] proposed that first estimate ADF test by setting upper bound with \( n_{max} \), if absolute value of \( t \) statistic is greater than 1.6 then use same \( n_{max} \) lag length and apply unit root test. Otherwise in case of less than 1.6 value of \( t \) statistic, reduce lag length by one and repeat the same process in order to avoid practical problem of lag length selection under ADF test.

4.1.1. Phillips-Perron Test (PP). Phillips-Perron test is a modified generalized form of ADF test developed by Phillips and Perron [67] that incorporates an automatic correction to auto-correlated error term. PP test has same test hypothesis and regression equations like ADF i.e. with drift and time trend and without drift and time trend. Its \( t \) statistic is also same as that of ADF test so it is comparable with MacKinnon [55] tabulated values.

5. Stability Test

Brown, Durbin, and Evans [18] proposed and Pesaran et al. (2001) suggested CUSUM test for structural stability of parameters and CUSUM square test to check the constancy of parameters, in short run and long run, based upon recursive residuals which have following characteristics with constant parameters assumption:

\[ RR_t \sim N(0, \frac{\sigma^2}{T-t}) \]  

(8)

Null hypothesis of this test states the consistency of parameters and \( RR_t^2 \) are distributed \( \chi^2(1) \) variables. The anticipated value of numerator and denominator is \( (t-i) \) and \( (T-i) \), respectively.

So

\[ E(S_i) = t-i/T \cdot i \]  

(9)

\[ t=i+1, i+2, i+3, \ldots, T \]

The significance of divergence of both tests can be evaluated by drawing two parallel lines around the mean value under 5% critical bounds that passes through the following points:

\[ (T_i, \pm 3\sqrt{T - i}) \]  

(10)

Where \( d \) parameters depend upon selected significance level \( (\alpha) \) for the test and normally it takes value of 5%.

If the graphs of CUSUM and CUSUMSQ stay within the bounds then null hypothesis about stability, constancy and proper specification of parameters can’t be rejected.

6. ARDL Bounds Testing Procedure. Bounds testing approach developed by Pesaran et al. (2001), Pesaran and Pesaran and Pesaran [64] and Pesaran et al. [65] to test long run relationship are a prior step before testing ARDL model. For above mentioned purpose, we estimated following equation for all variables that include short run as well as long run estimates of long run co-integration among variables.

\[ \Delta \ln(Y_t) = \alpha + \sum_{i=1}^{m} \alpha_{yi} \Delta \ln(Y_{t-1}) + \sum_{i=1}^{n} \alpha_{yi} \Delta (MKG)_{t-1} + \sum_{i=1}^{m} \alpha_{yi} \Delta \ln(EDU)_{t-1} \]  

(11)
Where \( \alpha \)s are denoting short run coefficients and \( \delta \)s are showing long run multipliers while \( m \) is the optimal lag length of ARDL model in above equation. The null and alternative hypotheses under ARDL model are as follows:

- **H0**: \( \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0 \)
- **H1**: \( \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq 0 \)

These hypotheses will be tested by using Wald Test for which F statistic will be computed from equation 5.10. Moreover, this calculated F statistic will be compared with critical values, tabulated by Pesaran et al. [65] table. If this computed F statistic is greater than upper bound then null hypothesis indicating no co-integration will be rejected in favour of the alternative hypothesis. If the computed F statistic is smaller than lower bound then null hypothesis indicating no co-integration will not be rejected. And finally if the value of F statistic lies within the critical bounds then the test of co-integration will be nominated as inconclusive.

### 6.1. Empirical Findings and Results Discussion

Stationarity test for variables is a pre-requisite for estimation of any econometric model. So, before applying bounds testing approach we have to check stationarity status of variables so that our results should not be spurious and unreliable by misleading value of F statistic. For this purpose we applied Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP) test to check out the stationarity status of variables. The results of both of these tests are presented below:

<table>
<thead>
<tr>
<th>variables</th>
<th>Augmented Dickey Fuller Test</th>
<th>Phillips-Perron (PP) Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>1st difference</td>
</tr>
<tr>
<td></td>
<td>With intercept</td>
<td>With trend and intercept</td>
</tr>
<tr>
<td>MKG</td>
<td>-3.579063 *</td>
<td>3.521069***</td>
</tr>
<tr>
<td>ln(TEC)</td>
<td>2.038467</td>
<td>-1.021337</td>
</tr>
<tr>
<td>ln(L)</td>
<td>.462999</td>
<td>-1.270544</td>
</tr>
<tr>
<td>ln(EDU)</td>
<td>5.52257</td>
<td>-1.829499</td>
</tr>
<tr>
<td>ln(K)</td>
<td>-1.830423</td>
<td>-2.691438</td>
</tr>
<tr>
<td>FDI</td>
<td>-3.504487*</td>
<td>-3.441427**</td>
</tr>
<tr>
<td>Ln(Y)</td>
<td>-0.351135</td>
<td>-1.670772</td>
</tr>
</tbody>
</table>

\* , \*\* , \*\*\* denotes significance level at 1%, 5% and 10%, respectively.

ADF results show that imports of technology goods variable and Foreign Direct Investment variable are stationary at level while technology measuring variable, capital, Labor, total education variable peroxide for human resource and GDP per capita are integrated of order one because null hypothesis of non-stationary has not been rejected at level for these variables based upon t statistic.

Results of Phillip-Perron test are showing same results about stationarity status of variables as shown by ADF test. Phillip-Perron test shows that imports of technology goods and foreign direct investment variables are stationary at level i.e. integrated of order I (0). Whereas technology measuring variable, Labor, capital, Total education and GDP per capita variables are integrated of order I (1).
6.2. Results of ARDL Bounds Testing. Table 3 contains value of computed F-statistic from equation 5.10. The optimal lag length is 2 which has been selected according to the David Hendry’s general-to-specific approach about lag selection. The F-statistic has a value of 5.22 which is greater than upper bound tabulated value of F-statistic at both 10% and 5% significance levels. Thus we reject the null hypothesis of no co-integration and accept the alternative hypotheses that dependent and independent variables of the model are highly co-integrated over long run.

Table 3
Wald’s F-Statistic for Co-Integration

<table>
<thead>
<tr>
<th>Calculated F-statistic</th>
<th>At 10% level of significance</th>
<th>At 5% level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lower bound I(0)</td>
<td>Upper bound I(1)</td>
</tr>
<tr>
<td>5.22</td>
<td>2.03</td>
<td>3.13</td>
</tr>
<tr>
<td></td>
<td>2.32</td>
<td>3.50</td>
</tr>
</tbody>
</table>

After the confirmation of long-run co-integration among dependent and independent variables of our model, we proceed towards long-run estimates of ARDL model based upon equation 7.14. Estimates of long-run ARDL model are tabulated in Table 4 below:

\[
\ln(Y_t) = \alpha_0 + \sum_{i=1}^{m} \alpha_{1i} \ln(Y)_{t-1} + \sum_{i=1}^{m} \alpha_{2i} (MKG)_{t-1} + \sum_{i=1}^{m} \alpha_{3i} \ln(EDU)_{t-1} + \sum_{i=1}^{m} \alpha_{4i} \ln(L)_{t-1}
\]

Table 4
Long-run Coefficients

ARDL (1, 0, 1, 0, 0, 1) Selected Based on Schwarz Bayesian Criterion

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard error</th>
<th>T-Ratio</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>2.742</td>
<td>.241</td>
<td>11.392*</td>
<td>[.000]</td>
</tr>
<tr>
<td>(MKG)</td>
<td>.003</td>
<td>.001</td>
<td>2.262*</td>
<td>[.033]</td>
</tr>
<tr>
<td>ln(T)</td>
<td>.0185</td>
<td>.011</td>
<td>1.756**</td>
<td>[.092]</td>
</tr>
<tr>
<td>ln(L)</td>
<td>.692</td>
<td>.184</td>
<td>3.751*</td>
<td>[.053]</td>
</tr>
<tr>
<td>ln(EDU)</td>
<td>-.083</td>
<td>.039</td>
<td>-2.149*</td>
<td>[.042]</td>
</tr>
<tr>
<td>ln(K)</td>
<td>.1853</td>
<td>.084</td>
<td>2.217*</td>
<td>[.037]</td>
</tr>
<tr>
<td>FDI</td>
<td>-.002</td>
<td>.169</td>
<td>-0.14</td>
<td>[.989]</td>
</tr>
</tbody>
</table>

* and ** denote 5% and 10% levels of significance, respectively.

Table 4 shows long-run relationship between GDP per capita and imports of capital goods intensity, foreign technology spillovers, labor, capital, education and foreign direct investment. Results show that all variables positively impact GDP per capita in long run except FDI and education because education is not enriched in quality that is a prerequisite for foreign technological adoption and absorptive capacity. Further, results indicate that imports of capital goods intensity (MKG) has positive and significant effect on per capita income as 10% increase in imports of capital goods (capital, machinery, parts of machinery and transport equipment) leads to .03% increase in per capita income. Import of capital goods intensity is a way to increase domestic as well as international competition. It can increase value addition process in domestic firms and enhance
skills of labor force of Pakistan. On the other hand, it will increase incentives of foreign investors to invest in a capital oriented production processing country like Pakistan who can achieve this title by increasing imports of capital goods instead of finished luxurious items. It is also a significant source of transferring technological knowledge from industrialized innovating countries to developing ones [70]. Our results are superior to those of Akbar et al. [2], as they have estimated no significant relationship between imports and economic growth for the Pakistan economy while our research stems that imports of capital goods are not only positively affecting economic growth but are also a significant factor to enhance it.

Stock of foreign technology spillovers (T) which Pakistan has accessed, as measured by domestic R&D capital stock of her industrialized developed countries weighted by Pakistan’s imports-to-GDP ratio with these importing partners, has also significant and positive impact on per capita income as 10% increase in it will lead to 0.2% increase in per capita income that will further enhance economic growth and development. Foreign technological spillover is a source to increase foreign knowledge spillovers and technological innovations that can be imitated by developing countries like Pakistan. Furthermore, it modifies the domestic production function positively. Such technological transfer leads to enhance total productivity of economy and boost economic development aside from capital accumulation alone and is a source to explain the Solow Residual of growth ([23]; [28]; [46]; [73]; and [24]). Traditional factors of production, capital and Labor both are positive and significant as 1% increase in capital and labor is a source to increase GDP per capita by 18% and 69%, respectively. These results support Solow [75], Swan [76], and Romer ([71] and [72]).

Human capital variable has been used as a proxy for absorptive capacity for foreign knowledge, technology spillover and imitating capability. It was assumed to be positive and significant but it has appeared negative showing negative impact on per capita income in association with foreign technology, knowledge spillover and imports of capital goods. A 1% increase in recent low quality level of education will lead to 0.8% decline in per capita income of Pakistan. In other words, recent education quality of Pakistan in terms of absorptive capacity for foreign technological knowledge spillover will lead to decline in economic growth. Because such education cannot generate such skills and technological knowledge oriented labor force that is required and consistent for the adoption of foreign knowledge spillovers and imitation capability. Our findings support the findings of [10] who described that only more educated and trained workers can have advantage to adopt and implement the imported foreign technology. Likewise [74] has estimated negative and insignificant impact of Human development index (HDI) on economic growth of low income countries in a cross sectional study by using fixed effects model. Furthermore, our findings are also consistent with the findings of [58] who estimated that low education and skill quality of developing countries’ labor force are not consistent with technologically specialized imported machinery. This low quality education of Pakistan is responsible for relatively less positive effect of technology transferring channels on per capita GDP.

Foreign direct investment is showing insignificant as well as negative impact on per capita income of Pakistan. This negative relation of FDI with economic growth can be due to well-known data issues as well as by using FDI as a poor proxy for MNEs as being unable to measure the technology related activities of MNEs [42]. Our results are consistent with the findings of [3], [21] and [54]. The insignificant and negative impact of FDI on economic growth of developing countries like Pakistan is due to lack of highly qualified and skilled labor force that is a pre-requisite and essential requirement in order to gain from capital intensive and foreign knowledge oriented FDI ([11]; [15]; and [16]). FDI is negatively affecting per capita GDP of Pakistan due to inconsistent infrastructural facilities, bad law and order conditions, energy crisis, low absorptive capacity in terms of unskilled and uneducated labor force and focus on import substitution regimes.

Finally, for the short-run dynamic parameters, ECM has been estimated using the following equation.

\[
\Delta \ln(Y_t) = a + \sum_{j=1}^{m} a_{yj}\Delta \ln(Y_{t-j}) + \sum_{j=1}^{m} a_{kj}\Delta (MKC)_{t-j} + \sum_{j=1}^{m} a_{lj}\Delta (D\&U)_{t-j} + \sum_{j=1}^{m} a_{lj}\Delta (FDI)_{t-j} + \Theta (ecm)_{t-j} + v_t \quad (7.15)
\]

Where speed of short-run adjustment towards long-run equilibrium is indicated by ‘\( \psi \)’ and estimated by equation 7.15. Results of ECM are presented in Table 5.
The results of ECM confirm the short-run adjustment of prescribed model towards long-run equilibrium. As ECM coefficient shows that model will adjust towards long-run equilibrium with the speed of 39% per year from short-run disturbance.

### Table 5
**Error Correction Representation for the Selected ARDL Model**
ARDL (1, 0, 1, 1, 0, 0, 1) selected based on Schwarz Bayesian Criterion Dependent variable is dln(Y); 38 observations used for estimation from 1972 to 2009.

<table>
<thead>
<tr>
<th>Regressor</th>
<th>Coefficient</th>
<th>Standard Error</th>
<th>T-Ratio[prob]</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>1.0663</td>
<td>.16702</td>
<td>6.3841[000]</td>
</tr>
<tr>
<td>D(MKG)</td>
<td>.0012474</td>
<td>.4481E-3</td>
<td>2.7840[.010]</td>
</tr>
<tr>
<td>dln(T)</td>
<td>.0071875</td>
<td>.0035907</td>
<td>2.0017[.056]</td>
</tr>
<tr>
<td>dln(L)</td>
<td>-.13052</td>
<td>.12230</td>
<td>-1.0672[.296]</td>
</tr>
<tr>
<td>dln(EDU)</td>
<td>-.0031814</td>
<td>.017608</td>
<td>-1.8068[.858]</td>
</tr>
<tr>
<td>dln(K)</td>
<td>.072047</td>
<td>.038691</td>
<td>1.8621[.074]</td>
</tr>
<tr>
<td>dFDI</td>
<td>.011692</td>
<td>.059918</td>
<td>.19514[.847]</td>
</tr>
<tr>
<td>ecm(-1)</td>
<td>-.38891</td>
<td>.070054</td>
<td>-5.5516[.000]</td>
</tr>
</tbody>
</table>

R² explains 76% variation of dependent variable due to independent variables and the remaining is due to error term. Goodness of fit of the model and functional form are indicated by Adjusted R² and F statistic which are .63 and 9.2, respectively and both are significant.

#### 7. Diagnostic Test
Sensitivity analysis has been employed to test and evaluate the homogeneity, normality and proper specification of model.

- The specification errors of model i.e. omitted variable error, incorrect functional form, evaluation of correlation and specified data form in terms of logs, power, reciprocal or any other form are analyzed by regression specification error test (RESET) proposed by Ramsey. Null hypothesis under Ramsey RESET test hypothesis is that the model is correctly specified and vice versa for alternative hypothesis.
- Heteroskedasticity is checked by White test which is based on the regression of squared residuals on squared fitted values.
- Normality of data is checked by skewness and kurtosis of residuals.
- Serial Correlation is assessed by Lagrangian Multiplier (LM) Test.

### Table 6
**Diagnostic Tests**

<table>
<thead>
<tr>
<th>Problem</th>
<th>Test</th>
<th>X²-statistic</th>
<th>F – statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serial Correlation</td>
<td>Lagrange Multiplier</td>
<td>X²=1.8208 [.177]</td>
<td>F= 1.1720 [.291]</td>
</tr>
<tr>
<td>Normality</td>
<td>Skewness and Kurtosis of Residuals</td>
<td>X²=4.2996 [.117]</td>
<td>----</td>
</tr>
<tr>
<td>Functional Form</td>
<td>Ramsey's RESET</td>
<td>X²=.4479E-3 [.983]</td>
<td>F=.2737E-3 [.987]</td>
</tr>
<tr>
<td>Heteroskedasticity</td>
<td>White</td>
<td>-</td>
<td>1.1497 [0.366]</td>
</tr>
</tbody>
</table>
7.1. **Variance Decomposition Test.** In order to investigate relative exogenous intensity of variables among each other, Variance Decomposition Test has been applied that is summarized in Table 5.4.7. It analyzes forecast error of one variable at the base of other variables. Furthermore, it shows relative strength of variable in creating fluctuations in other variables. According to estimates of Table 7, per capita GDP (Y) is less exogenous than other variables as it explains 42 percent fluctuations by itself after 7 years. On the other hand, T, MKG, L, K, FDI and EDU explain forecast variance and fluctuations about 3.45, 9.76, 23.85, 3.82, 3.49 and 12.80 percent, respectively, after seven years.

<table>
<thead>
<tr>
<th>VDC of</th>
<th>Period</th>
<th>S.E.</th>
<th>Y</th>
<th>T</th>
<th>MKG</th>
<th>L</th>
<th>K</th>
<th>FDI</th>
<th>EDU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>1</td>
<td>0.007300</td>
<td>100.00</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>0.0187</td>
<td>51.91</td>
<td>3.25</td>
<td>7.17</td>
<td>17.48</td>
<td>3.77</td>
<td>3.28</td>
<td>13.109</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>0.0209</td>
<td>42.79</td>
<td>3.45</td>
<td>9.76</td>
<td>23.85</td>
<td>3.82</td>
<td>3.49</td>
<td>12.80</td>
</tr>
<tr>
<td>T</td>
<td>1</td>
<td>0.1473</td>
<td>5.2921</td>
<td>94.707</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.1780</td>
<td>8.4142</td>
<td>85.708</td>
<td>2.2126</td>
<td>0.0071</td>
<td>1.0239</td>
<td>2.5055</td>
<td>0.1283</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.2203</td>
<td>15.205</td>
<td>66.985</td>
<td>5.7896</td>
<td>3.6072</td>
<td>3.82</td>
<td>3.49</td>
<td>12.80</td>
</tr>
<tr>
<td>MKG</td>
<td>1</td>
<td>3.2695</td>
<td>45.511</td>
<td>6.9150</td>
<td>47.573</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>4.1053</td>
<td>46.802</td>
<td>7.1005</td>
<td>34.961</td>
<td>0.8812</td>
<td>7.3543</td>
<td>0.5276</td>
<td>2.3720</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>4.4076</td>
<td>47.969</td>
<td>6.3505</td>
<td>30.374</td>
<td>1.1562</td>
<td>9.7339</td>
<td>2.2032</td>
<td>2.2122</td>
</tr>
<tr>
<td>L</td>
<td>1</td>
<td>0.0081</td>
<td>3.6413</td>
<td>4.4821</td>
<td>14.056</td>
<td>77.820</td>
<td>0.0000</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0095</td>
<td>5.5760</td>
<td>3.2839</td>
<td>18.913</td>
<td>69.887</td>
<td>0.8286</td>
<td>1.0915</td>
<td>0.4186</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.0111</td>
<td>6.0254</td>
<td>2.4542</td>
<td>20.211</td>
<td>64.484</td>
<td>2.6100</td>
<td>0.9287</td>
<td>3.2858</td>
</tr>
<tr>
<td>K</td>
<td>1</td>
<td>0.0302</td>
<td>49.774</td>
<td>0.3299</td>
<td>6.8512</td>
<td>0.1402</td>
<td>42.903</td>
<td>0.0000</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0466</td>
<td>56.823</td>
<td>1.6292</td>
<td>9.6750</td>
<td>1.1470</td>
<td>30.089</td>
<td>0.2199</td>
<td>0.4165</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.0560</td>
<td>53.490</td>
<td>4.2601</td>
<td>10.438</td>
<td>2.3583</td>
<td>24.189</td>
<td>4.1377</td>
<td>1.1247</td>
</tr>
<tr>
<td>FDI</td>
<td>1</td>
<td>0.0154</td>
<td>1.7415</td>
<td>7.5064</td>
<td>0.0066</td>
<td>0.0069</td>
<td>5.1805</td>
<td>85.557</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0167</td>
<td>1.9521</td>
<td>6.7359</td>
<td>1.1037</td>
<td>0.2230</td>
<td>14.425</td>
<td>75.189</td>
<td>0.3707</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.0192</td>
<td>4.1772</td>
<td>5.5701</td>
<td>7.7998</td>
<td>0.1729</td>
<td>23.104</td>
<td>58.363</td>
<td>0.8114</td>
</tr>
<tr>
<td>EDU</td>
<td>1</td>
<td>0.0570</td>
<td>3.6378</td>
<td>1.9379</td>
<td>9.6342</td>
<td>0.8409</td>
<td>2.1324</td>
<td>1.8782</td>
<td>79.938</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>0.0702</td>
<td>2.4151</td>
<td>2.6854</td>
<td>8.2491</td>
<td>6.2782</td>
<td>1.4170</td>
<td>2.3707</td>
<td>76.584</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0.0781</td>
<td>2.0801</td>
<td>5.1473</td>
<td>6.9665</td>
<td>6.6767</td>
<td>1.1690</td>
<td>1.9175</td>
<td>76.052</td>
</tr>
</tbody>
</table>

*Cholesky Ordering: Y T MKG L K FDI EDU*

7.2. **Test of Model Stability.** Cumulative Sum of Recursive Residuals (CUSUM) and Cumulative Sum of Squares of Recursive Residuals (CUSUM square) have been used to check the stability of parameters. It has proved the stability of our model as the fitted residuals do not get out of 5% critical bounds. These figures show that short-run speed of adjustment towards long-run is stable at 5% significance level and no fluctuations are outside the critical bounds.
8. Conclusion and Policy Recommendation. The results show that imports of capital goods and foreign R&D capital stock have positive effect on per capita income of Pakistan in terms of foreign technological transmission and knowledge spillovers in Pakistan. FDI shows negative effect on economic growth. This finding is consistent with the findings of several single-country studies that technology spillover impact of MNEs in terms of FDI is positive and significant for developed countries like Australia and Canada but insignificant for developing countries like Morocco and Venezuela.

Absorptive capacity of Pakistan appears with negative sign indicating poor quality of educational system of Pakistan which is incapable to utilize and imitate the foreign technological transmission. Pakistan has skill mismatch with new global required skills, low literacy rate and inadequate human capital. With the passage of time technological breakthroughs are increasing so if quality of education of Pakistan remains on the same standards then its education will negatively impact its economic growth.
Unfortunately, Pakistan has very low investment in research and development and she has only three industrialized developed countries in the list of her top ten trade partners which has significant domestic research and development capital stock among other Asian countries which have insignificant research and development capital stock.

On the basis of all theoretical and empirical discussion and estimation of this study, we can postulate that imports of capital goods and foreign research and development capital stock are significant factors for the transmission of foreign technological spillover, knowledge, managerial skills and ultimately for economic growth, prosperity and development of Pakistan. FDI has insignificant and negative impact on per capita income of Pakistan. Pakistan must build domestic research and development capital stock and well developed and managed human capital for the promotion of her absorptive capacity so that she can utilize these channels of foreign technological transmission and can beneficially utilize FDI.

8.1. Policy Recommendations. In order to survive and promote economic growth in this knowledge based technological society, Pakistan should avail new emerging opportunities in Asia and Middle Eastern countries, but she should formulate her import policy biased towards the imports of capital and technological goods and towards those countries which have significant level of domestic R&D capital stock. So that there emerge new employment opportunities (value addition processes) that will ultimately curtail the crucial issue of unemployment. Energy Crisis, poor Law and Order situation, terrorism and under-developed financial system are significant hurdles in the way of promotion of domestic and foreign investment in Pakistan. Government must solve energy crisis on priority basis by importing electricity from Asian countries at low cost and by building new dams and increasing the generation capacity of already existing power houses. By removing line losses, streamlining payment to energy producers and strong management and law and order situation, this problem can be overcome at some extent. Pakistan must focus on quality education for creation, development and management of long-term competitive human resource capital. Focus of educational policies should be on quality oriented education and demand-driven skills that can match with needs and requirements of domestic and global markets. Economic policies, social policies, labor market policies and human development policies need parallel attention for the promotion of adoptive and absorptive capacity, sustainable economic growth and accelerated faster economic development.

FDI has emerged an insignificant factor for economic development of Pakistan because we have not enough resources for productive and beneficial utilization of FDI. Unfortunately, Pakistan has also failed to attract substantial level of FDI due to above mentioned in-efficiencies including poor infrastructure and poor human resource. Creation of human resource development is essential not only for MNEs but also for domestic firms in order to stimulate their managerial and production expertise. By providing tax and financial incentives, liberalizing policies for foreign investors, proper infrastructure, security and skilled and educated labor force, Pakistan can utilize the technological spillovers generated by FDI.

REFERENCES


ROLE OF PARALLEL COMPUTATION TECHNOLOGY IN DEVELOPED SCIENTIFIC FIELDS

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ABSTRACT. In this paper the role of distributed and parallel computing in different fields of science and engineering is discussed. Our purpose in this introductory article is highlighting the impacts of using multi processor environment for achieving more accuracy and less execution time and memory usage in solving different arithmetical and logical problems which potentially are considered talented for parallelism. Here we brought concrete and interesting examples from different fields of science which we can apply parallel and distributed structure in place of traditional sequential structures for solving them. Also a concrete applied problem related to oil extraction industries investigated here.

Keywords: Parallel computation, multi processor systems, computational problem.

1. Introduction. It may be you are one of those people for whom "fast" isn't fast enough. Today's workstations are about hundred times faster than those made just a decade ago, but the most of computational scientists and engineers need even more speed. They make great simplifications to the problems they are solving and still must wait hours, days or even weeks for their programs to finish running. Faster computers let you tackle larger computations. Suppose you can afford to wait overnight for your program to produce a result. If your program suddenly ran 10 times faster, previously out-of-reach computations would now be within your grasp. You could produce in 15 hours an answer that previously required nearly a week to generate. Of course, you could simply wait for CPUs to get faster. In about five years CPUs will be 10 times faster than they are today (a consequence of Moore's Law). On the other hand, if you can afford to wait five years, you must not be in that much of a hurry! Parallel computing is a proven way to get higher performance now. Parallel computing is the use of a parallel computer to reduce the time needed to solve a single computational problem. Parallel computing is now considered a standard way for computational scientists and engineers to solve problems in areas as diverse as galactic evolution, climate modeling, aircraft design and molecular dynamics and etc. Many important scientific problems are so complex that solving them via numerical simulation requires extraordinarily powerful computers. These complex problems, often called grand challenges for science, fall into several categories: Quantum chemistry, statistical mechanics, and relativistic physics, cosmology and astrophysics, computational fluid dynamics and turbulence, materials design and super conductivity, biology, pharmacology, genome sequencing, genetic engineering, protein folding, enzyme activity, and cell modeling, medicine, and modeling of human organs and bones, global weather and environmental modeling.

Applications that explore, query, analyze, visualize, and, in general, process very large scale data sets are
Secondly, we would like to discuss about a concrete applies problem related to oil extraction industry that is important for both computing intensive and data intensive applications in the future. The performance in mathematical base will likely play an important role in integrating spatial environmental models for related to.

For example, available is not fast enough also the natural parallel about this in [1]. Some examples of using parallel and distributed systems explained here [2].

2. Applied and scientific examples talented for parallelism. In many fields of science we can find hundreds applied and computational problems that can be modeled in mathematical base. For example, most of such problems can be written in the form of linear on non linear system of equations. Also they can be written in the form of ordinary differential equations, either linear or non linear form. As proof, we can mention some examples from different areas of science that these problems can be found there more than usual. We would like to divide these examples into two basic and engineering categories. In the both categories we brought examples that scientists applied parallel structure for solving considered problems in order to access more accuracy, time saving and also optimal memory usage.

2.1. Basic sciences: About problems related to physics it will be interesting knowing that the natural parallel and distributed structures of beam physics problems allow the use of parallel and distributed computer systems. But the usual approaches based on traditional numerical methods demand using the resources of supercomputers. This leads to the impossibility of using such multiprocessing systems as computational clusters. In many research papers some examples of beam physics problems are discussed from the computational point of view using clustered systems [2]. Related to physics we can encounter with some other interesting problems that are talented for parallelism. Generally, we can say that any problem containing optimization aspect can be talented for parallelism. Our main discussed problem in this paper is related to optimization of results obtained from a mathematical problem. But specially about applying parallel computing in physics, the global optimization is playing an increasing role in physics, chemistry, and biophysical chemistry. One of the most important applications of global optimization is to find the global minima of the potential energy of molecules or molecular assemblies, such as crystals. The solution of this problem typically requires huge computational effort. Even the fastest processor available is not fast enough to carry out this kind of computation in real time for the problems of real interest, e.g., protein and crystal structure prediction. One way to circumvent this problem is to take advantage of massively parallel computing. You can find detailed information and real examples about this in [3].

Parallel computing also will likely play an important role in integrating spatial environmental models for large-scale systems. Inter visibility analysis with error simulation in a digital elevation model is used to illustrate an approach to developing parallel models, and to demonstrate some benefits of high-performance computing. Analyzing the structure of the application problem ensures an appropriate match between problem and parallel system implementation. Data communication is the most important computational issue in this application. Then we can strongly say that the role of multi processor environment and parallel computing strategy in aero cosmic and aerospace field is inevitable [4].

Advances in high performance computing are making it possible to calculate the properties of materials...
accurately and reliably from the fundamental laws of quantum mechanics. Many non-technical explanations are given of how the calculations are done, and of how massively parallel computing is already playing an important role in the field. The new possibilities that are opening up are illustrated by recent works on properties of materials under extreme conditions. The key importance of high performance computing for the future development of different fields of science is indicated in many articles and research reports related to using parallel computation in science and engineering [5].

The use of parallel computing is gaining increasing popularity in geographic information systems applications too. There exists a class of spatial analysis algorithms that are based on local computation and are single step, hence leading to simple and efficient parallel code. For another class of algorithms it is not possible to make any assumption about the locality of computation, for example when extracting complex or global terrain features, and a number of iteration may be necessary to satisfy a convergence criteria, giving rise to non-local iterative algorithms. An example is the algorithm to extract drainage basins from digital terrain models. Despite the increasing difficulties there is an interest in parallelizing non-local iterative algorithms. The number of applications that require parallel and high-performance computing techniques has diminished in recent years due to the continuing increasing in power of PCs, workstation and mono-processor systems. In natural fields of science as geographic topics using parallel computation strategy is developed too. However, Geographic information systems (GIS) still provide a resource-hungry application domain that can make good use of parallel techniques. There are many works which discuss about geographical systems for environmental and defensive applications and some of the algorithms and techniques we have deployed to deliver high-performance prototype systems that can deal with large data sets. GIS applications are often run operationally as part of decision support systems with both of a human interactive component as well as large scale batch or server-based components. Parallel computing technology embedded in a distributed system therefore provides an ideal and practical solution for multi-site organizations and especially government agencies who need to extract the best value from bulk geographic data. The distributed computing approaches which used to integrate bulk data and metadata sources and the grid computing techniques has been described in related works and reports. In situation like this embed parallel services in an operational infrastructure should be used. We describe some of the parallel techniques we have used: for data assimilation; for image and map data processing; for data cluster analysis; and for data mining. We also discuss issues related to emerging standards for data exchange and design issues for integrating together data in a distributed ownership system. We include a historical review of our work in this area over the last decade which leads us to believe parallel computing will continue to play an important role in GIS. We speculate on algorithmic and systems issues for the future [6, 7].

In recent years, in our world the problems related to water and oil products transmission are become as the one of most vital and critical aspects of any government and society. Absolutely, using parallel computation technology in this field can help developing and improving this section. Most of problems in mentioned area can be modeled and changed into mathematical and numerical problems and we can applied parallel strategies in this situation. Efficient numerical tools taking advantage of the ever increasing power of high-performance computers, become key elements in the fields of energy supply and transportation, not only from a purely scientific point of view, but also at the design stage in industry. Indeed, flow phenomena that occur in or around the industrial applications such as gas turbines or aircraft are still not mastered. In fact, most Computational Fluid Dynamics (CFD) predictions produced today focus on reduced or simplified versions of the real systems and are usually solved with a steady state assumption. By investigating in related researches it can be shown how recent developments of CFD codes and parallel computer architectures can help overcoming this barrier. With this new environment, new scientific and technological challenges can be addressed provided that thousands of computing cores are efficiently used in parallel. Strategies of modern flow solvers are discussed with particular emphasis on mesh-partitioning, load balancing and communication. These concepts are used in two CFD codes developed by CERFACS: a multi-block structured code dedicated to aircrafts and turbo-machinery as well as an unstructured code for gas turbine flow predictions. Leading edge computations obtained with these high-end massively parallel CFD codes are illustrated and discussed in the context of aircrafts, turbo-machinery and gas turbine applications. In general, it can be said that future
developments of CFD and high-end computers are proposed to provide leading edge tools and end applications with strong industrial implications at the design stage of the next generation of aircraft and gas turbines [8].

2.2. Engineering fields: Newly, a parallel optical processor for implementing arithmetic operations is presented. The presented processor addresses some of the architectural complexities of the past parallel optical processors. In some papers nontrivial computational problems have been adapted to the presented processor. As the special topic in parallel computing technology the optical processor for performing arithmetic operations in parallel systems is developed. The implementation of arithmetic operations makes it possible to perform various computational tasks. As case studies the bounded subset sum problem in parallel has been solved and parallel execution testing has been performed. The processor uses two-dimensional optoelectronic planes for both performing logic operations and storing data, which eliminates the need for transferring data from electronic devices in each step of the computation. The presented processor seems easier to realize than most of the past parallel optical processors due to its simpler and more compact architecture, while staying powerful enough to carry out computations from diverse applications [9].

Absolutely, for implementation of any parallel algorithm in a parallel environment we need to a parallel programming language to test its performance and superiority in comparing with traditional sequential version. Parallel programming is programming in a language that allows you to explicitly indicate how different portions of the computation may be executed concurrently by different processors. Existing programming languages have some facilities for parallel processing. But some of these languages are stronger than the others and have instructions or commands which help programmers to implement parallel operations. A lot of research has been invested in the development of compiler technology that would allow ordinary Fortran 77 or C programs to be translated into codes that would execute with good efficiency on parallel computers with large numbers of processors. This is very difficult problem and while many experimental parallelizing compilers have been developed, at the present time commercial systems are still in their infancy. The alternative is for you to write your own parallel programs.

In object-oriented programming (OOP) languages, the ability to encapsulate software concerns of the dominant decomposition in objects is the key to reaching high modularity and loss of complexity in large scale designs. However, distributed-memory parallelism tends to break modularity, encapsulation, and the functional independence of objects, since parallel computations cannot be encapsulated in individual objects, which reside in a single address space. For reconciling object-orientation and distributed-memory parallelism, OOPP (Object-Oriented Parallel Programming) is introduced, a style of OOP where objects are distributed by default. As an extension of C++, a widespread language in HPC, the PObC++ language has been designed and prototyped, incorporating the ideas of OOPP [10].

But MPI (Message Passing Interface) is a standard specification for message passing libraries. Libraries meeting the standard are available on virtually every parallel computer system. Free libraries are also available in case you want to run MPI on a network of workstations or a parallel computer built out of commodity component (PCs and switches). If you develop programs using MPI, you will be able to reuse them when you get access to a newer, faster parallel computer.

In electrical engineering field the parallel computation can play an inevitable role. Because electrical circuits are used in any field of industry and daily life more and more. Of course, by using parallel technology we will encounter by many inventions and innovations in mentioned field. Transmission and distribution of electricity involve technical as well as Non-Technical Losses (NTLs). Illegal consumption of electricity constitutes a major portion of the NTL at distribution feeder level. Considering the severity and devastating effects of the problem, illegal consumption of electricity has to be detected instantly in real-time. To this end, possibility and role of High Performance Computing (HPC) algorithms in detection of illegal consumers has become an important problem. We can find many methods and solutions that designs and implements an encoding procedure to simplify and modify customer energy consumption data for quicker analysis without
compromising the quality or uniqueness of the data. Parallelization of overall customer classification process is exists too. Suggested different parallelized algorithms have resulted in appreciable form [11].

Finally, we would like to discuss about a concrete computational problem related to oil extraction industry which is named gas lift process. Here our main focus is on the parallelization of Gas-lift process. There are many scientific works focused on mathematical solving for oil extraction problems and specially related to gas-lift method. For more information you can see [12-14]. But in fact, there wasn’t a concrete and comprehensive mathematical model for mentioned problem and even existing methods and algorithms can't reach to acceptable accuracy and fastness. In our research we are focusing the results arises from [15-17]. The problems of motion of fluids, gases and gas–liquid mixtures in pipes related to gas-lift oil recovery are mathematically formulated as Ordinary Differential Equations (ODE)s based on initial value problems (IVP)s and it solved through Iterative Runge Kutta (IRK). We parallelized the traditional and sequential solution method and increase accuracy or obtained results using parallel computing environment. Figure 3 give a comprehensive image of gas lift oil well.

The main purpose of this process is lifting oil from well by injecting gas into it. In fact, this process is one of EOR methods for more extracting of oil from wells. But this is so important finding the optimal amount of injected gas for lifting maximum amount of gas-oil mixture. As it seems, this is completely an optimization
problem. We solved the equation gotten from mathematical model of this process in the form of non linear ODEs. Equations arise from this problem is as system (1) shown below:

\[
Q' = \frac{2a_1 \rho F_1 Q^2}{c_1^2 \rho_1^2 F_1^2 - Q^2}, \quad x \in [0, l - 0] \quad Q(0) = Q_0 \\
Q' = \frac{2a_2 \rho_2 F_2 Q^2}{c_2^2 \rho_2^2 F_2^2 - Q^2}, \quad x \in [l + 0, 2l] \quad Q(l + 0) = \gamma Q(l - 0) + (-\delta_1 (Q(l - 0) - \delta_2)^2 + \delta_1)\bar{Q}
\]

Where coefficients used in the equation are as:

\[
u_1=0.100849644636985 \quad \quad \quad \rho_1=0.717, \\
f_1=0.006021647718768237 \quad \quad \quad C_1=331, \\
u_2=-89.77276884123468 \quad \quad \quad \rho_2=700, \\
f_2=0.004185386812745002 \quad \quad \quad C_2=850. \\
\gamma = 1, \quad \delta_1=0.1, \quad \delta_1=0.1, \quad \delta_1=0.02 \quad \text{and} \quad \bar{Q} = 106.9
\]

But this solution is for some amount from given interval as IVPs. Using parallel computing we can solve mentioned equation for much more initial values from given interval in order to get much more results and increasing accuracy of solution. Increasing accuracy can be happened by increasing number of amounts from given interval and also it can be happened by decreasing the amount of a coefficient used in IRK. But by using one processor computer it can be executed in hours and days. In this purpose we apply parallel computing methods for solving mentioned problem. Numerical results and charts obtained from parallel and sequential algorithms and comparison of them proofed that our suggested algorithm can be more accurate and of course more fast.

3. Conclusion. With the industry-wide switch to multiprocessor and multicrputer architectures, parallel computing has become the only venue in sight for continued growth in application performance. In order for the performance of an application to grow with future generations of hardware, a significant portion of its computation must be done with scalable parallel algorithms. It is therefore important to develop and deploy as many scalable parallel algorithms as possible. This paper takes a critical look at the major challenges involved in the development of scalable parallel algorithms and points to needs for compiler tool innovations to help address these challenges. About parallel programming language which is the most important tool for implementation and comparison of designed parallel algorithm with traditional sequential version, we briefly can say that the PObC++ language implements the concept of Object-Oriented Parallel Programming (OOPP). OOPP reconciles distributed-memory parallel programming with OO programming principles. OOPP separates concerns about inter-object and inter-process communication. OOPP makes it possible the encapsulation of distributed-memory parallel computations in objects. Performance of PObC++ programs is almost similar to the performance of C++/MPI programs. Finally, as a general result of this paper, Parallel computing has been an enormous success. This is despite many arguments against it. Parallelism has become main stream, in the multi core chip, the GPU, and the internet data center running MapReduce. In our study field large-scale scientific computing, parallelism now reigns triumphant. About the gas lift process we investigated parallel solving of the concrete and computational mathematical problem related to oil extraction industry which is named the gas lift method. As mentioned above, the mathematical model for this problem exists and scientists have suggested some sequential traditional solutions for that. Now we can say that, about problems like this it absolutely will be better to use parallel computations for solving them. Specially, where we need to optimize obtained results for getting accuracy and optimal amount from a massive composed of results. In parallel version we save noticeable execution time and memory usage. Also parallel solution
method allowed us to obtain more accurate answers and optimize the determined problem easily in comparison with sequential one by computing the equation for the large number of initial values from given interval. Another proof for accuracy of the parallel solution method in comparing with sequential method is that we can change the factor of accuracy through the method RK.

REFERENCES


SPATIOTEMPORAL VARIATIONS AND TRENDS IN MINIMUM AND MAXIMUM TEMPERATURES OF PAKISTAN

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ABSTRACT: To assess variations and trends in mean minimum and maximum temperatures of Pakistan, data from 30 meteorological observatories for a period of 30 years (1976 to 2005) were acquired across the country. We found that climate zones located in high elevation in North, North West and the West of the country i.e. Hindukush Himalayan regions showed 0.01 degree change per year, whereas most of the plain and coastal areas showed a notable increase in mean maximum and minimum temperatures. As a whole on country level, a positive trend of 0.11°C/decade in mean temperature, 0.1°C/decade in minimum temperature and 0.12°C/decade in maximum temperature were found during the entire study period. This calculated temperature trend in Pakistan (0.11°C per decade) is less than the global temperature trend (0.6°C), but it has significant impacts on the society as observed during the recent years and therefore policy makers should be reluctant for any such change in the future.

Key Words: Climate change, Minimum and Maximum temperatures, Trends and variability.

Introduction: Studies on long-term variations in surface air temperature for the entire globe (Jones et al. 1986c; Hansen and Lebedeff 1987, 1988) as well as for the hemispheres (Angell and Korshover 1978) have shown a rising trend during the last few decades. Pakistan is no exceptions, where climate change is an arising issue and its impacts can be felt severely in the form of droughts, sever cold/ heat waves, and flash flooding. The observed increase in temperature has great implications on food productions, natural eco-systems, loss of biodiversity, fresh water supply and quality and increase health risks (Dai et al., 1999; Przybylak, 2000; Braganza et al., 2004; Alam, 2009). Different studies (WMO, 2010; Cavallo and Ilan Noy, 2010; Peduzzi, 2005; Munich, 2002; Erbach and Gaudet, 1998) have been conducted on the occurrence and intensities of the extreme weather events and most of them have reported that temperature rising and frequent rainfall are the main factors of economic damage in the world. Mozaharul, et al., (2007) reported an increase in the intensities and frequencies of extreme weather events, which will further lead to hunger, diseases spread, and economic losses on a larger scale. Similarly IPCC (2001) report shows that due to human activities the green house effect has been intensified in the later part of the 19th century and global climate will remain warm over the next few decades of the 21st century (Karl and Trenberth, 1999). In the context of Pakistan, the most significant environmental effects includes, extreme weather events such as heat waves in June 2007 and May 2010 in many parts of the Punjab, Sindh and Baluchistan, and heavy torrential rains across Pakistan in Jul – Aug 2010 leading to heaviest floods and landslides in the history of the country. Although, Pakistan contributes very little in GHG emission (up to 0.43%) but rated as the 12th most vulnerable country in the world in terms of effects of climate change (Brooks, 2003). Agriculture sector is one example where reduced productivity, water shortage and different crop management practices are further worsening the situation. Agriculture is the largest income and employment-generating sector of Pakistan’s economy with two third populations of the country living in rural areas and earning livelihood directly or indirectly from agriculture and
cattle farming (Ali, 2000). Agriculture contributes about 24% to the GDP of Pakistan and provides an employment to 48% of the labor force (EAW, 2003), where as industries and 80% exports are almost agro-based with low forest cover (4.5%) and high deforestation rate i.e., 0.2- 0.4 % per annum (World Bank, 2006). The reports of Pakistan Agricultural Research Council (2003) shows that temperature increase in winter months (Dec-Mar) have negative impacts on wheat, sugarcane and fruits production. The production volume and quality have been adversely affected because of temperature changes in reproductive periods (Spring/late winter season), irrigation water requirements and its supply for Kharif and Rabi crops (TFCC, 2010). According to the World Bank (2006), Pakistan is among the 17 countries that are already facing water shortages and is among the 36 countries where there is a serious threat of food crisis.

Another important challenge imposed due climate change is water availability. As demand for water has been steadily increasing and due to shortening of the winter season or increase in the minimum temperature snow/glacial melting is likely to start early. This phenomenon not only affects the hydropower generation but also affect urban water supplies and agricultural sectors negatively (Roohi, 2004). Similarly reduction in river flow will also negatively affect the hydroelectric power generation. Pakistan which, is already infested by the worst load shedding of the history, will lead to an increase in fossil fuel combustion and hence more GHG emissions. In addition, higher temperature, particularly in the summer season has already increased demand for electricity for air-conditioning and refrigeration in domestic and commercial sectors. This demand is likely to go further up and hence necessitates additional generation capacity.

Farooqi et al., (2005) have also identified ecological impacts on wetlands and mangrove forests. Pakistan could face the loss of mangrove forests - a vital source of fuel wood and seafood for local consumption and export. Accelerated melting of glaciers and seasonal snow cover in Himalayas, Karakoram and Hindu Kush ranges is threatening the natural habitat of rare animals such as the Markhor and Ibex and hence, hundreds of rare plants and animals are in danger of extinction (UNEP, 1995). The glaciers present in the Himalayan region are reported to be melting faster than in any other part of the world and fears have been expressed that they might disappear till 2035 (Rees and Collins 2004; WWF 2005; IPCC 2007). Further, the studies of National Institute of Oceanography indicate that the sea level along the coast of Pakistan has been rising approximately at 1.2 mm per year since 1960. Besides these, weather related disasters hit the countries regularly like cyclones, hurricanes like Katrina and Nargis, heat waves, super floods, droughts and intense rainfall. According to a World Bank Report (2006), the country loses nearly $4.5 billion annually from environmental disasters.

Over last couple of decades, in Pakistan rainfall patterns have become very unreliable and unpredictable, making it difficult for communities to make necessary arrangements for their safety, crops and livestock. For instance, on one hand the super flood of 2010 was caused by intensive and extended rainfall and on the other hand droughts have become more evident with the worst drought in the south. From the above facts and perceived threats it becomes imperative to protect the country from such adverse impacts of climate change before they strike. According to the reports of Oxfam on climate change (2011) and Hussain, et al (2010) that due to climate change events in Pakistan about 40% of population of Pakistan is highly prone to frequent and multiple disasters due to variations in rainfall patterns, storms, floods and drought. For this purpose the present study has been designed to determine the existence of any significant trends in the minimum, maximum and mean temperatures in Pakistan. In terms of meteorological variable, atmospheric temperature plays an important role in assessing the climate of particular area. Therefore, minimum and maximum temperatures are considering the main indicators for the determination of trends in climatic variables.

2. Study area: Pakistan: This study focus on country level climatic changes, as Pakistan experiences diversified climate due to its large latitudinal extent from north to south and also due to large variations in the topography. Pakistan is geographically situated approximately between 24-37° N latitudes and 62-75° E longitudes in the western zone of south Asia. The country occupies a total geographical area of 803943 km² (Pant and Rupa Kumar, 1997). The plains of Pakistan, drained by the river Indus and its tributaries, are surrounded by many mountain ranges in the North, Northwest and the West (Rodo, 2003). High mountain ranges comprise of Himalaya and Karakoram with a small part of the Hindukush located in the north of the country. Pakistan is the only country where these three great mountain ranges meet. Most of the areas in the central and southern Pakistan are arid, while the northern part of the country is humid except the extreme northern mountains where it is dry. During the summer months (April to September), the mountainous north is pleasant and temperate, while the Indus Valley has temperatures in the range
of 40º C or more. In late summer the southern region experiences monsoon weather systems, particularly along the coastal belt and in winter season, the low-lying areas cool down to a range of 10-25º C (Rodo, 2003). The dominant component of climate variations was spatial shifts in the rainfall patterns (Rodo, 2003), like the monsoon winds that bring rainfall in summer. The Western Depression originating from the Mediterranean region and entering Pakistan from the west brings rainfall in winter.

2.1. Zonal classification of the country

It is difficult to consider the whole country as one region because different stations have different topography and complex microclimates. Therefore I divided the study area into five zones based on geographical features (Fig 1).

![Figure 1. Map of Pakistan Showing different climate zones of Pakistan along with their latitude and longitude.](image)

**Zone A**: This Zone comprises of the stations having cold climate and high mountains, situated in the North of Pakistan. These stations are Chitral, Gilgit, Muzaffarabad, Said-u-Sharif, Skardu, Astor, Dir, Chilas Parachinar and Kakul, shown in the green part of Fig. (1) in North. These are hilly stations located between 34 N to 38 N in the Himalayan Hundukush region.

**Zone B**: This zone has mild cold climate and sub-mountains, located between 31 to 34 N. The stations are Sialkot, D.I.Khan, Islamabad, Peshawar, Cherat and Lahore shown with the red color in Figure 1.

**Zone C**: Here climate is cold in winters and hot in summers. Most of them are mountainous stations with high elevations from mean sea level and laying between 27 N to 32N and 64 E to 70 E. Stations included in this zone are Quetta, Zhob, Kalat and Khuzdar.
**Zone D:** This is the hottest and dry zone of the country, where highest maximum temperatures are recorded in stations of Sibbi and Jacobabad. Stations included are Sibbi, Jacobabad, Bahawalpure, Khanpur, Multan and Rohri.

**Zone E:** Zone E is a big zone (blue part of the map in the south) having many stations and coastal cities, near to Arabian Sea. The coastal part comprises only a small part of this region and climate above coastal parts in Balochistan as well as in Sindh province is arid. The selected stations from this zone are Hyderabad, Karachi, Nawabshah and Jiwani.

### 3. Data and Methodology

#### 3.1. Station selection criteria:
The dataset used in this study consisted of daily minimum and maximum temperatures records obtained from the Climate Data Processing Centre (CDPC) of Pakistan Meteorological Department (PMD). The dataset spreads over a period of 30 years (1976-2005) covering the whole country. The stations included in this study were selected on the basis of their latitudinal position, elevation from sea level, length of record, completeness and reliability of data so that a synoptic view of the entire country could be obtained. List of Meteorological stations along with their location and climate are shown in Table 1. An additional factor controlling the choice of stations was that they were not changed/ displaced in last 30 years, as some of the meteorological stations were re-established or relocated to new sites.

<table>
<thead>
<tr>
<th>S.No</th>
<th>Station</th>
<th>WMO Ref</th>
<th>Altitude (m)</th>
<th>Latitude</th>
<th>Longitude</th>
<th>Zone and Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Astor</td>
<td>41520</td>
<td>2168</td>
<td>35°20'N</td>
<td>74°54'E</td>
<td>Zone A, Cold climate and high mountains</td>
</tr>
<tr>
<td>2</td>
<td>Chilas</td>
<td>41519</td>
<td>1250</td>
<td>35°02'N</td>
<td>74°06'E</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Chitral</td>
<td>41506</td>
<td>1499</td>
<td>35°51'N</td>
<td>71°50'E</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Dir</td>
<td>41508</td>
<td>1375</td>
<td>35°12'N</td>
<td>71°51'E</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Gilgit</td>
<td>43516</td>
<td>1459</td>
<td>35°55'N</td>
<td>74°20'E</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Kakul</td>
<td>41535</td>
<td>1308</td>
<td>34°11'N</td>
<td>73°15'E</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Muzafarabad</td>
<td>45532</td>
<td>701</td>
<td>34°22'N</td>
<td>73°29'E</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Parachinar</td>
<td>41560</td>
<td>1725</td>
<td>33°52'N</td>
<td>70°05'E</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Said-u-Sharif</td>
<td>41523</td>
<td>961</td>
<td>34°44'N</td>
<td>72°21'E</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Skardu</td>
<td>43517</td>
<td>2209</td>
<td>35°18'N</td>
<td>75°41'E</td>
<td></td>
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<tr>
<td>11</td>
<td>Cherat</td>
<td>41565</td>
<td>1372</td>
<td>33°49'N</td>
<td>71°33'E</td>
<td>Zone B, Mild cold climate and sub-mountains</td>
</tr>
<tr>
<td>12</td>
<td>D.J.Khan</td>
<td>41624</td>
<td>173</td>
<td>31°49'N</td>
<td>70°55'E</td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Islamabad</td>
<td>41571</td>
<td>507</td>
<td>33°37'N</td>
<td>73°06'E</td>
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</tr>
<tr>
<td>14</td>
<td>Lahore</td>
<td>41640</td>
<td>213</td>
<td>31°33'N</td>
<td>74°20'E</td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Peshawar</td>
<td>41530</td>
<td>359</td>
<td>34°01'N</td>
<td>71°35'E</td>
<td></td>
</tr>
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3.2. Limitation of the data: Spatial and temporal changes in temperature trends are sometime complicated due to missing values, seasonal and other short-term fluctuations or climate variability and lack of homogeneity of the data e.g. due to changes in instrument and observation techniques and location change of the station. The time series used have been chosen according to the PMD data quality check and in function of the length of the period of records and homogeneity of time series. All time series used are continuous from 1976 to 2005, as the PMD has estimated the missing values.

3.3. Data Analysis: The first step of the analysis includes the understanding of the climate variables not only for time series of each individual station, but also for the zonal or regional averages. For this purpose, average values were compiled carefully for the entire period 1976-2005, for fifteen year periods for each station, zone and for the whole country. The reliability of data and homogeneity of means were statistically tested by applying Analysis of Variance (ANOVA) along with Duncan Multiple Range test, using SPSS version 20. ANOVA test is designed to obtain a significant value and difference among the means of more than two groups (with and within the groups) by assuming equal variances or normal distribution of the data. Now worldwide for the detection of the temperature trend, mostly ANOVA test is applied. In this sense, the application of statistical test makes it easy to compare the means of different periods and to assess the significance of the changes for each station, zone and for the overall country. Further, for the visualization of the data, ArcGIS software is applied which is used for all mapping and editing tasks as well as for map-based query and analysis.

4. Results and Discussion: Analysis of the temperature trends spatially and temporally across the country has been summarized based on zonal classification of the study area and two time periods. Changes between 1976 and 1990 referred as Period1, while changes between 1991 and 2005 referred as Period2. The following section discusses the spatial changes in temperature trends:

4.1. Single Station Analysis: In six different locations, we observed high increase in minimum temperature in the second period i.e., between 1991 and 2005 compared to period1. Fig.2 A & B and table 2 gives the detailed account of the changes observed.
Figure 2. Map of Pakistan showing significant increase, decrease and no change in the minimum temperature. (A): For period 1976-1990; (B): For period 1991-2005.

Table 2. Stations are showing significant increase, decrease, and no change in mean minimum temperature.

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Two stations namely Parachinar and Jewani have been observed with significantly decreasing trend i.e. -4.09°C and -0.46°C with standard error 0.60 and 0.10 respectively, while rest of the stations have shown no significant change. Parachinar and Jewani are situated in different zones (Zone A and Zone E) and completely different in terms of their latitude, longitudes and atmospheric conditions. Jewani is a coastal area situated at comparatively low altitude in the southwest bordering the Arabian Sea while Parachinar is a town situated in the Kurram Agency (Federally Administered Tribal Area) in northwestern part of the country in Koh-e-Sufaid mountain range along Pak-Afghan border. The sudden drop of temperature in both stations indicates their abnormal behavior. Hence, further research is needed to investigate other meteorological variables such as humidity, sunshine, precipitation and cloudiness etc., in detail. The intensity of the colors on the map Fig. 2B from high to low temperatures shows the range of minimum temperature i.e., from 3.4 to 21.8°C. Similarly for the mean maximum temperature illustrated in Figure (3 A & B) depicts a greater rising trend for Karachi, Quetta and Nawabshah, while Parachinar, Kalat, Hyderabad, Khuzdar and Zhob showed variation from 0.5°C to 0.7°C in the period 1991-2005. The stations, with maximum variation in temperature are located in different parts of the country, mainly from Zone A, C and E. Table 3 lists all the stations showing maximum increase in temperature and display significant increasing trend. Quetta is the capital city of Balochistan province and considered as one of the atmospherically polluted city while Kalat, Khuzdar and Zhob are mountainous towns of the province with less environmental pollution. Karachi and Hyderabad (Zone E) are big urban centers with heavy industry and transport vehicles. All these environmental factors could be the causes of rising trend of temperatures in these cities (Munich Report, 2004 and Shirazi and Ali. 2009). According to Shirazi and Ali (2009), many of the world’s cities are home to around 50% of the world’s population with rapid growth trend, using 75% of the world’s energy resources and are responsible for 75% of global greenhouse gas emissions (GHG) and global warming. Similarly Munich Report (2004) estimates approximately 80% of GHG emission from urban areas. Based on present warming trends, World Energy Outlook predicts a 53% increase in global energy demand by 2030, with 70% of that coming from developing countries. Therefore, various studies with different approaches have documented the climate variation as well as the warming trend in the country (e.g. Chaudhry and Sheikh, 2002; Chaudhry and Rasul, 2007; Afzal et al. 2009)

Figure 3. Map of Pakistan showing significant increase, decrease and no change in the maximum temperature. (A): For period 1976-1990; (B): For period 1991-2005.
Table 3. Stations are showing significant increase, decrease, and no change in mean maximum temperature.

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4.2. Zonal Analysis: A general progressive increase in mean minimum temperature with inter-zonal variations can be easily recognized across the country from period 1 to period 2. The variations observed in zonal analysis showed significant increasing trend for all zones except Zone C. Zone E clearly exhibits the highest increase of 0.61°C and standard error 0.20 among other zones. Although there are slight variations among the zones but the overall trend is increasing in minimum temperature.

Table 4. Zonal analysis of minimum and maximum temperatures

|---------------------|-------|---------|------|------------------|------------------|-----------|------------|------------|
From the data analysis shown in Table 4, it can be inferred that plain areas of the country showed a clear warming trend during the second period i.e., 1991-2005 compared to period1 (1976-1990). However the temperature variations in northern parts of the country i.e., Himalayan and Hindukush mountain ranges (Zone A) showed no significant change. Similarly in the south and southwest (Zone C) of the country variations are negligible but the southeast (Zone D) showed an increasing trend. Both these Zones C and D lies in the same latitudinal window but Zone C is mountainous region having moderate to cold climate, whereas Zone D lies near the ‘Thar Desert’ having hot climate. The p-value shows a decrease in the mean minimum temperature of Zone A (-0.33°C) during period2, which looks anomalous when compared with the increasing trend of other zones. A similar decreasing trend has been advocated by other workers for the western Himalaya (Kumar et al. 1994; Yadav et al. 2004). The overall increase in minimum temperature of the country is 0.29°C from 1976-90 to 1991-05 periods which can be inferred as 0.10°C per decade.

In similar manner, the maximum temperatures of the study area have also registered a temporal increase from the first half to the second half of the study period. Zones C and E exhibit increasing trend compared to the other zones. Although variations were noticed among the five zones but generally the overall trend was found increasing. The p-value for maximum temperature of the country is significant (p<0.05) for 0.36°C increase between the two time period or 0.12°C per decade.

It is evident from this study that all climatic zones of the study area show a consistently rising trend in the minimum and maximum temperatures except certain high elevation areas situated in the northern parts of the country. This study has also demonstrated an increase of 0.1°C per decade in mean minimum temperature and 0.12°C per decade in mean maximum temperature. These values are higher than the globally reported mean value of 0.018°C for minimum temperature and 0.050°C for maximum temperature (Easterling et al. 1997) but lower than 0.296°C, 0.287°C and 0.296°C per decade for mean, maximum and minimum temperatures respectively as shown by Russel et al (2004). Similarly in Pakistan, Afzaal et al., (2009) have reported a sharp increase of 0.06°C per decade and a cumulative rise of 0.64°C, between 1901 and 2007 by merging datasets of the Climatic Research Unit (CRU) of University of East Anglia and Pakistan Meteorological Department real time series (PMD). In the neighboring country India, an observational dataset compiled by Dash et al (2007), found an increase of 0.25°C per decade in minimum temperature of post monsoonal and winter seasons. For Nepal, Shrestha et al (2005), found an increase of mean temperature at rate of 0.04°C during the time period of 1975-2005. While, in Bangladesh Islam et al (2007), obtained a variation trend of 0.61°C from 1961 -1990 with comparison of observational data with PRECIS modeling data. A similar analysis was conducted by Zhou et al (2004), for southeast China for period 1979-1998. They show an increase of 0.6°C per decade of minimum temperature, a rate faster than that of maximum

<table>
<thead>
<tr>
<th>Zone</th>
<th>Zone A</th>
<th>Zone B</th>
<th>Zone C</th>
<th>Zone D</th>
<th>Zone E</th>
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<tbody>
<tr>
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<table>
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<th>Maximum Temperature</th>
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<tr>
<td>Zone C</td>
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<td>25.82</td>
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<td>0.20</td>
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</table>
temperature. It means the results of the rising temperature trends in Pakistan are in harmony with other published work in south Asian countries as well as in the globe.

5. Conclusion: Based on CDPC daily mean minimum and mean maximum temperatures from 1976-2005, the spatiotemporal trends and variations in temperatures were studied throughout the country. Analysis revealed that all climatic zones showed a consistent rising trend in minimum and maximum temperatures except Zone A and Zone C. The overall rising trend in minimum temperature for the country is observed approximately 0.29°C for the two time periods and 0.10°C per decade, which is found non-significant at p-value 0.05. Similarly, for maximum temperature we observed significant increase 0.36°C in temperature in the two time intervals and 0.12°C per decade. However, the average increase of 0.11°C/decade is less than the global mean (0.6°C), but its potential implications are far reaching and have been observed in the recent years. It is therefore, concluded that climate change phenomenon may be given key consideration in developmental schemes, food security, and disaster risk management sectors by the policy makers.

Acknowledgements: We gratefully acknowledge the contribution of Mr. Mushtaq Ali Shah, Director of Regional Meteorological Center, Peshawar, for his help in acquisition of climate data from Pakistan Meteorological Department.

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IMPACT OF FIRM SIZE ON PROFITABILITY: A COMPARATIVE STUDY OF ISLAMIC BANK AND COMMERCIAL BANK IN PAKISTAN

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Abstract: This article shows the impact of banking size on the profitability of commercial and Islamic banks operating in the Pakistan for the period 2008-2012. In Pakistan banking organizations provide fund for other organizational developments. This analysis is done in the context of firm size and profitability. Using data from 5 commercial and 5 Islamic banks, our observed study provides partial support to the hypothetical predictions. In study we use the measure the profitability of commercial bank and Islamic bank in Pakistan like return on assets and firm size of all banks like number of branches. The relationships between size and profitability measures are statistically show that Islamic banks become more profitable with the respect of small size because there is no relation between bank size and profitability. The regressions investigation that, there is optimistic association between Firm size and Profitability in Commercial Bank Ltd, but there is no relationship between firm size and profitability in Islamic Banks.

Key word: profitability, commercial bank, Islamic bank, firm size

1. Introduction: This study was conducted to provide experimental results & theoretical research on the topic of the firm size profitability: a comparative study of commercial banks vs. Islamic banks. In earlier there have been a lot of researches conducted regarding the firm size profitability. But the aim of this study is to analyze the size of firms on profitability, commercial banks vs. Islamic banks in Pakistan. The first Islamic bank started in Egypt in 1959 then Islamic banking was grown and was introduced in more than 60 countries. In Pakistan, Islamic banking was introduced during the year of general Zia in 1980 and then a lot of local and foreign commercial banks have started Islamic bank operation in Pakistan. Rabia is Arabic word which means raise, accumulation, growth. Islamic banking usually works as interest free banking and main purpose of Islamic bank is interest prohibition and avoids transaction. However, interest is the basic part in Commercial banking transactions. Commercial banking is the most popular and prevalent banking in all civilized countries. In Pakistan banks are established in form of partnership and Joint Stock Company, the kind of scheduled banks and non-scheduled banks. Quaid-e-Azam ordered to establish state bank of Pakistan on 12th may 1948 and he inaugurated it on first July 1948 in Karachi when Pakistan was facing serious financial crisis.

1.1 Background of the study: Normally, firm size of the banks and other financial institutions is measured by using a combination of financial ratio analysis, benchmark rate, performance against the budget and the mix of these methodologies. The relationship between the size and productivity for U.S. firms from 1970 to 1989, essentially finds the reverse relationship between the size and profitability of the firms (Dhawan, 2001).

Researchers revealed the coefficient of the growth rate of sales suggesting that factors on the demand side had a greater impact on profitability of the firm than any other supply side. There are a lot of predefined methods for the
performance measures of firms, but the problem in relying on these measures is that the difference in measures of performance can clash (Lumpkin & Dess, 1996).

Dess & Robinson (1984) reported the strong statistically significant relationship between the subjective & comparative assessment of five years performance of 18 businesses by the top management against other comparable business in the industries, the objective was to measure the return on assets & the sales growth. Generally the profitability of the firms depends upon the organizational growth. Whereas the growth had been considered the most significant measures of performance in small firms, it has furthermore been argued that financial performance is multinational in nature and the measure of financial performance & growth rate are diverse phase of performance that needs to be considered. It has to argue if the firms grow in many ways, such as the firm’s growth patterns are interrelated to age, size and industry.

The first Islamic bank was established in Egypt in 1963; later on many Islamic banks were established in Middle East and Asia. The growth of Islamic banks not only increased in terms of number of countries but it’s operating in terms of areas of finance too. Within the three decades the Islamic banking has increased in numbers and exhaustive size globally. Several countries such as Iran and Sudan have renewed their entire banking into Islamic banking system. Islamic banking operates in more than 60 countries. Islamic banking finance increased by 10 to 15 percent per annum, it worldwide assets exists round about $1 trillion and more than 160 financial institutions (Dar, 2003). Commercial banking are comparatively older and has been focused both extensively and intensively on literature as compared to the modern Islamic banking which was started before 4 decades but at a standstill, lacks in level of extensive and intensive literature. So that’s way the center of the discussion and focus of the study is Islamic banks and commercial banking.

1.2 Problem statement: Is firm size effect on profitability or not. Does the size of the firms influence on the firms profitability. What is the impact of size of the firms on firm’s performance? Improvement of banks versus market does not independent cause on bank profitability plus margin. The profit of bank in developed financial institution is not different, growth in bank lower bank profit margin. In under developed banking sector low resource and less aggressive pricing level, also high profit margin and growth in bank brings tough rivalry and high competence and low margin.

1.3 Research question:
- Why firm size effect on profitability?
- The major theme of this study is to examine the incident of commercial banks and compare with Islamic banks in respects of all operational framework of banking sector in Pakistan.
- Comparisons between Islamic banking and commercial banking, the impact of firm size on profitability?
- What is the prediction of profitability of Islamic banks vs. commercial banks in Pakistan?

1.4 Research objective:
- To find out the profitability of commercial and Islamic banking in Pakistan
- Investigate the impact of bank size and Gross domestic product on the profit of commercial bank and Islamic bank in Pakistan
- Identify the firm size
- The primary objective of this study is to examine the empirical relationship between the firm size and profitability of commercial banks and the Islamic banks in Pakistan.
- Find when firm size raise and plus how use assets for achieve profit.
- To determine the structural impact on profitability of commercial and Islamic banks of Pakistan

1.5 Significance of the study: This study is too worthwhile as literature reveals that the performance comparison of commercial banks vs. the Islamic banks have been focused. There is a serious shortage of contribution of Islamic banks performance evaluation will be a new literature. Bearing in mind the fact of this work is aimed to enrich the literature with inclusive comparative analysis of commercial banks and Islamic banks performance on the basis of riskiness and solvency.
1.6 **Scope of the study:** This study is beneficial for economist, this research find the gap between the firm size and profitability. Banking sector play the vital role in the economic development of any country. M Financial ratio is the financial strength of any sector. This ratio is not only for depositor people even in future routine for improvement of management activities plus point is to show full information and image about banking position to investor, management and shareholders.

This study will help to not only the banking sector but also those who lend or financial institutions, because banking sector of Pakistan has been growing slightly despite its social and economic problems. However not only customers perceive which made efforts to determine the crucial factors that in their choice banks but institutions.

2. **Literature review** Empirical investigation of the link between firm size and gain in industrial economies within the past has given variable outcome. Many studies have gotten either weak negative relationship or none in any respects (Marcus, 1969).

Decision making utility maximization may be a byproduct of the separation of possession from management in gift business. This division will rise through firm size creating giant firm a lot of susceptible social control utility maximization than minor companies. Decision making utility maximization provides abstract frame work for negative relationship between firm size and profit. The connection between firm size and profit is also positive over some firm size range (Wildor, 1985).

Another study has examined Profitability and marketability of commercial banks by applying data envelopment investigation (DEA) model. The method of data analysis was based on two stages. On the base of this study it was completed large banks performed better with respect to profitability than small size banks, while small size banks have better characteristic of marketability as compare to large bank size (Seiford, 1999).

Researchers also observed the factor that affected the profitability of banks in USA for the amount of 1985 to 1990 during which the quantity of the banks was found to be negatively related with productivity, the negative relationship of the dimensions indicate the diseconomies of scale (Noulas, 1997).

The performance of special kinds of Chinese banks for the amount 1999 and 2006 has observed. The end result counsel economic price added and therefore the web interest margin do improved than a lot of standard measure of profitableness, name come on the average quality and on the average equity and economics variable and money ratio square measure important with the predictable symbols. The sort of bank is powerful, bank volume isn’t neither the proportion of foreign possession bank listing contains a visible impact (Heffernan & Fu, 2008). The bank with higher total capital, deposit and credit or whole quality doesn’t continuously mean that there will be a higher profit routine. Money performance of the banks was powerfully and completely influenced by the operational potency and quality management and addition to the bank size (Tarawneh, 2006).

A study divided the bank in class. With the victimization statistical procedure analysis, the following result were determined of the plus management, operational effectiveness, and bank size on the money performance concerning industrial banks with twenty branches, the finding was; higher total capital, deposits, credit, or total assets don’t forever stand a stronger profit performance (Akhigbe & McNulty, 2005). A study find the some vital issue influence performance of the UAE Muslim and standard national banks kind 1996-2008 using the multivariate analysis, especially ROE and ROA as variable, investigator show the result liquidity and concentration were the foremost vital determinant of typical nation banks. Range of branches and value were the foremost powerful issue of Muslim bank performance (Al-Tamimi, 2010).

Researchers investigated the potency of Greek banks against size. They used their study multi criteria methodology to classify Greek banks in step with the come back and performance issue, show the distinction of the bank gain and potency between tiny and huge banks through this study (Spathis, Kosmidou & Doumpos, 2002). A study was conducted in Kuwait to see the important factor employed in Kuwait business consumer in domestic and foreign banks. Result show the best ranking bank in Kuwait by house size of bank assets, personal potency and banking expertise, friendliness of staff and reputation, goodwill and handiness of branches in foreign country (Edris, 1997).

Researchers studied the performance of Islamic and conventional banks through CAMEL test during the time of 2005 to 2009. They use sample for research 5 Islamic and 5 conventional bank and found the Islamic bank
performed better and high liquidity as compare to commercial banks and realized the commercial bank have strong in the management with high quality earning capacity (Jaffar & Manarvi, 2011). Some studies have also conducted to gauge the perceptions of employees regarding Islamic products and services. It has found that Islamic banking employers has more positive perception about the Islamic products and services (Arshad et al, 2011).

Researchers also observed the strong relationship between rates of interest on deposits at commercial bank with rate of profit of deposit cash in Islamic bank and realized the effect of interest rate on deposit cash at commercial bank and Islamic bank through adaptive expectation model. They found negative relationship between rates of interest of commercial bank with the interest free bank (Haron & Ahmad, 2000). Interest rates also have some relation with ROE and ROA (Ali et al., 2012a).

A study measure the performance and market power of the Saudi banking sector. They use market concentration ratio and explain the structure performance. They collect data form monopolistic competitive market and apply regression model for the independent variable. Their result from this model business risk and bank size were main variable determine bank profitability (Ahmad & Khababa, 1999). A study also revealed the positive relation of bank’s profitability with Equity and number of shares (Ali et al., 2012b).

3 Hypotheses: Firm size has an impact on Banks’ profitability

3.1 Data and methodology: In this research use secondary data for measure the firm size and profitability. Data and financial statement collected form websites of all bank and state bank of Pakistan. During this study 5 commercial bank and 5 Islamic banks are selected for the period of 2008 to 2012. Data process and measure result by using software “statistical package for social science” and in excel sheet. Dependent variable use return on assets and independent variable is firm size. Some test and techniques use for outcome purpose. Regression and T-Test run for checking the independent variable on dependent variable and comparison of both bank plus descriptive statistics. Regression shows relationship between the independent variables and dependent variables. Return on assets use as a dependent variable and firm size use as an independent variable. When only one dependent variable run is called regression analyses-Test use for comparison of commercial and Islamic bank by using data and then compare of both bank.

4.1 Empirical Results

Commercial bank

\[\text{(Table4.1.2) Coefficients}^a\]

<table>
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<th>Model</th>
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<th>Standardized Coefficients</th>
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</tr>
<tr>
<td></td>
<td>(Constant)</td>
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Islamic bank

\[\text{(Table4.1.4) Coefficients}^a\]
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<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
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<td>.535</td>
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<td>Firm Size</td>
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<td>.009</td>
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</table>

a. Dependent Variable: ROA

Regressions coefficients model explanation is given blow. The hypothesis of this study with the two variables is significant and insignificant results. Commercial banks value of B is 0.678, Std. Error 0.189 but Islamic banks Beta 0.303 STD 0.535 but there are significant and insignificant relations between commercial bank and Islamic bank.

4.2 T-Test

(Table4.1) Group Statistics

<table>
<thead>
<tr>
<th>codes</th>
<th>N</th>
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<td>-.57480</td>
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<td>.227508</td>
</tr>
</tbody>
</table>

T-Test shows the size of the firm has greater impact on profitability in commercial banks rather than Islamic banks. The positive or greater values of commercial banks express the positive impact on profitability of firm’s size. The negative ROA express the insignificant impact of size on profitability of Islamic banks. The firm size has impact on profitability of commercial banks but not on Islamic banks profitability.

(Table4.2.2) Independent Samples Test
The result of this table show that the relationships between firm size and profitability significant in case of commercial bank but insignificant in case of Islamic bank. Only one variable has significant impact of commercial bank. The significant result of commercial bank is 48 but 24.194 of Islamic which show that the relationship has a positive impact on the profitability.

In ROA of the commercial bank are 48 but Islamic banks 35.192 which is smaller than commercial banks. That’s mean the firm size has greater impact on commercial banks but not on Islamic banks profitability, so that way the values of commercial banks are greater or positive.

### 5 Limitations of this Research:
Limitations of this study represent the whole study. Following are the limitation mention below.

**Time Duration and variable:** In this research five years’ data has been used to get the finding and relationship of firm size and profitability. This study used only two variables though more variable can be added to increase the reliability of the study.

### 6. Conclusion:
In this study we use five year data from 2008 to 2011. The data used of 10 banks by which 5 commercial banks and 5 Islamic banks. The result shows that commercial banks have significant impact and Islamic banks insignificant impact of firm size on profitability. This research show the sound effects of the firm size on profitability of commercial bank Ltd and Islamic bank in Pakistan. Regression analysis shows that, there is positive effect of Firm size on Profitability in Commercial Bank., but there was no effect between firm size and Profitability in Islamic banks.

Regression test express the significant impact (commercial bank) and insignificant impact (Islamic bank) of firm size on banks profitability, but the firm size’s greater impact on commercial banks profitability than Islamic banks. The relationship between firm size and profitability are significant or positive. T-test shows larger impact of firm size on commercial banks profitability but have no effect on Islamic banks profitability. Negative value of ROA describes the insignificant on Islamic bank, in Islamic banking size or number of branches doesn’t have impact on profitability but in commercial banking size or number of branches have positive impact on bank profitability.

**Recommendations:** The model size can be increased of all banks like increase the bank for finding the empirical result in this sector. In Pakistan full-fledged Islamic bank is low and initial stage as compare to commercial bank, require more research about banking performance for taking correct decision on the right time in Pakistan. This study is restricted only five commercial bank and Islamic bank, it is recommend the all commercial bank and all Islamic bank be carry out or analysis Islamic and commercial banks with collect more data, and then find result and compare with each other in the country, because the outcome and finding is not provide full information to investors and not help for decision making. Investors also check each and every think like fact and figure before deal and investment

**Result of this research creates some question in researcher brain:**

<table>
<thead>
<tr>
<th>firm size</th>
<th>Equal variances assumed</th>
<th>Equal variances not assumed</th>
<th>ROA</th>
<th>Equal variances assumed</th>
<th>Equal variances not assumed</th>
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<td></td>
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<td></td>
<td>7.41</td>
<td>35.192</td>
<td>0.254101</td>
</tr>
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</table>

Result of this research creates some question in researcher brain:
• Why no differentiation between profitability of commercial and Islamic bank.
• Why operational department of Islamic bank is perform better than commercial bank.
• Why fewer dangerous Islamic bank as compare to commercial bank and why Islamic bank is much liquid as compare to commercial bank.

REFERENCES


AUTOMATED WEB-BOT IMPLEMENTATION USING MACHINE LEARNING TECHNIQUES IN ELEARNING PARADIGM

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ABSTRACT. E-Learning is very powerful tool and technique that is used to train and educate the people in these days. A lot of world ranking degree awarding universities are begun offer to deliver numerous courses lectures for high school grade education to degree level and even at post-graduation level through eLearning and distance learning paradigm. This research paper extensively concentrates supervised and unsupervised learning methods & strategies which are helpful for the e-Learning framework to automated answer of learners and student inquiries. Primary disadvantage of e-Learning paradigm is not in time answers of learner’s questions, which decrease the learning curve of the student. The key demand in e-Learning environment is to dealing with Machine Learning classification can give higher to learning techniques but not fully automated with this paradigm. Training data set is used for training the machine and then test data set is used to validate this approach. This paper analyzes the different machine learning technique and proposed a solution from using these techniques.

Keywords: Artificial Neural Networks (ANN), Supervised Machine Learning (SML), Machine Learning (ML), Support Vector Machine (SVM), Web bot.

1. Introduction. Machine learning has to main approaches for the learning purposes, first is inductive machine learning and second deductive machine learning. Both techniques have the different data sets like training data set, target data set and test data set. The principal step is gathering the dataset. In the event that an essential master is accessible, then s/he could propose which fields (properties, gimmicks) are the most useful. If not, then the least complex technique is that of "beast energy," which means measuring everything accessible with the expectation that the right (educational, significant) gimmicks might be segregated. Be that as it may, a dataset gathered by the "animal energy" strategy is not specifically suitable for prompting. It holds much of the time commotion and missing gimmick qualities, and in this manner requires huge preprocessing [9]. The second step is the information planning and information preprocessing. Contingent upon the circumstances, scientists have various systems to look over to handle missing information [10]. (Hodge & Austin, 2004) have as of late presented a review of contemporary strategies for outlier (clamor) identification. These specialists have recognized the methods' focal points and disservices. Example choice is utilized to handle commotion as well as to adapt to the infeasibility of gaining from substantial datasets. Occurrence determination in these datasets is an improvement issue that endeavors to keep up the mining
quality while minimizing the specimen size [8].

It diminishes information and empowers an information mining calculation to capacity and work adequately with expansive datasets. There is an assortment of strategies for inspecting occurrences from an extensive dataset [9]. Characteristic subset choice is the methodology of recognizing and evacuating whatever number unimportant and excess peculiarities as could be expected under the circumstances [11]. This lessens the dimensionality of the information and empowers information mining calculations to work speedier and all the more adequately. The way that numerous gimmicks rely on upon each other regularly unduly impacts the precision of directed ML order models. This issue could be tended to by developing new gimmicks from the essential list of capabilities [12]. This strategy is called gimmick development/conversion. These recently created peculiarities may prompt the making of more succinct and exact classifiers. What's more, the finding of serious gimmicks helps better understandability of the handled classifier, and a superior understanding of the scholarly idea.

Figure 1: Supervised Machine Learning Work Flow
Some cases, where it is might be necessary to provide the pre-determined classifications to every single occurrence of a problem. If the moderator is so powerful which can grind out the groupings for him? This would stand a model of unsupervised learning in a classification perspective. Unsupervised Learning about the occurrences is unmarked. By smearing these unendorsed (clustering) algorithms, scholars have expectation to determine the unidentified, but valuable, types of entities [9].

2. Most Relative Paradigms for ML: Machine learning is an assorted field, detained together by basic objectives and comparable assessment techniques. The general point is to enhance execution on some job, and the general methodology includes discovering and manipulating regularities in preparing data. Most assessment is investigational types, pointed at indicating that the learning in system prompts execution on a different test data sets, in one or more sensible areas, that is superior to execution on that test data set without learning. It is denoted that in-spite of these similitudes, scientists in machine learning have a tendency to link themselves with in the range of one five fundamental ideal models or paradigms, each model imparts essential suppositions about representation, execution strategies, and learning procedures.

Neural Networks: One significant standard is related with the field of neural network systems, speaks to learning as a multilayer system of units which manages to start from data input by inner elements to yield outputs. Evaluates on the connections figure out the amount enactment data is passed on. The initiations of yield outputs could be deciphered into numeric forecasts or discrete choices about the class of the data.

Methodologies to adapting inside the neural net structure is commonly enhance order or forecasts correctness by changing the weights on the associations. One typical learning techniques in among the numerous that have been investigated, brings out ascent look through the weighted space by altering them, trying to minimize the failures which the system creates on preparing data set training. Rumelhart, Lehr and Widrow [15] sum up current research on neural network systems and portray a few provisions of this methodology.

Instance-based or Case-based Learning: A second structure or framework is called as case-based learning or instance-based learning, denotes to learning as expressions as particular cases or skills and depends on adaptable similar strategies to recover these cases and implement these to new circumstances. A typical plan which is known as nearest neighbor, basically discovers the already saved cases closest (as per few distance metric) to the recent circumstance and used for categorization or forecast. Case-based adaptive learning normally saves the formulating occurrences in memory; Uses of Machine Learning generalization happens at recovery time, a significant share in the indexing plan, the similarities metrics used to distinguish important examples (cases), however more modern variants may adjust a recovered case to the current states. Allen (1994) portrays this methodology, along some latest requisitions and implementation.
Genetic Algorithms: Third paradigm in machine learning is known as Genetic algorithms, commonly presents knowledge and information through Boolean or binary peculiarities, off and on again utilized as the conditions and activities guidelines. A well-known translator for this learning utilizes an all-or-none matching procedure, utilizing qualities linked with guidelines to resolution of clashes. In a few cases, creation framework structural design allow to runs discussed rules in grouping, transforming multi-step behavior. Learning administrators in Genetic algorithms, called hybrid and transformation in similarity to natural genetic systems which create new applicant principles from parents which possess best qualities, where each quality or "fitness" reveals the degree of efficiency on training cases. Basically, Genetic routines do parallel hill climbing which holding data struggling and frequently balancing depictions in memory. Goldberg [13] surveys genetic methodologies for the both optimization problems and machine learning.

Rule Induction: Rule induction is known as fourth paradigm, in which apply decision trees, condition-action rules, or comparable knowledge learning structures. In this paradigm, the efficiency component order cases down the extensions of the decision tree or discovers the first code whose conditions match the example, commonly utilizing an all-or-none comparing procedure. Data about classes or forecasts are saved in the execution sides of the condition al rules and standards or the leaves of the tree. Learning procedure in the rule-induction skeleton generally help out a ravenous pursuit through the space of decision trees or tenet sets, ordinarily utilizing a factual assessment service to select traits for coping into the learning structure. Most techniques for the preparation data for information recursively into disjoint sets, endeavoring to outline every set as a conjunction of coherent rules. Quinlan [14] depicts a similar rule-induction procedure in some refined element.

Analytic Learning: A last method is in some cases labeled analytic learning that presents knowledge by means of guidelines in sensible structure and normally utilizes an efficient framework that settles multi-step issues utilizing some exploration methods. A typical method is to denote knowledge as Horn clauses as used in ROLOG and then to phrase issues as "hypotheses" and to scan for confirmations. Learning instruments in this paradigm by utilized basic knowledge develop confirmations or "clarifications" of experience, then aggregate the verifications into more multifaceted rules which can tackle comparative issues either with less inquiry utilizing neighborhood ""search-control rules" or in a solitary step by utilizing "macro-operators". In analytical learning, mostly work has concentrated on enhancing the performance of search, however a few has managed enhancing precision on categorization jobs. The logics behind the different characters of these behaviors are more chronicled than investigative and scientific. The distinctive groups had their beginnings in diverse conventions and depend on diverse fundamental symbols.

In Fact an instance, exponents of neural network systems focuses correlations to neurobiology, case based learners to humanoid memory, researchers of genetic algorithm to advancement, authorities in rule induction inducing to heuristic search and supporters of analytic strategies to thinking in formal rationale. Someone can ask that this categorization profits the area, as dissimilarities of documentation and rhetoric frequently vague critical essential similarities.

3. Problem Statement: In eLearning paradigm learners and students confront the numerous issues that prompts the traditional structure is better education training framework to those individuals which can access it. Among these issues, late answers of the student inquiry are a real problem. In an eLearning environment learner is continually pushing for the right and in time replies. This issue prompts a hurdle for the learners in eLearning paradigm. In eLearning paradigm, learner and educator cooperation is actually least level that is obstruction for the students to accept this paradigm. This problem could be resolved by implementing the diverse machine learning techniques and methods. These approaches are exceptionally useful for eLearning nature's domains.

4. Possible Solutions: The identified problem can be solved with machine learning by making a chat-bot and training it with required material of the specific course and with semantic web; the responses from the semantic web system will be produced using a reasoner of the semantic web. The major difference between these two solutions will be the response; as the response of the chat-bot will be like human [1] and with semantic web reasoner the response will be document driven [figure 1].
Faqbot is a great thought to begin with search and application of the web-bot in eLearning paradigm. Chatter-bot for the execution of Turing test with $100,000 was a buzz and acquired win by the group of designers & developers working under the rules of Dr. Wallace for 3 times on yearly premise [2] [3] [4].

Regularly made inquiries placed on the internet in stagnant structure don't give the learner a contentment which somebody is leading him, therefore it’s a great idea to develop web-bot to reply queries and FAQs in a dynamic style[16]. Thusly the inquiry which are not recorded in the FAQs could be tended to future by adding answers with explanations for the bot. Thus marketing or advertising group can work all the more successfully by knowing the issues of the clients as the logbook documents of bot give the data and information [1]. The need for the markup language emerges that is suggested by ALICE as Artificial Intelligence Markup Language (AIML) [5]. AIML is really straightforward and basic language that is focused around XML punctuation [1] [3]. (Atwell and Abu Shawar, 2004) has built a software for the transformation of plain content to AIML yet this software isn’t accessible[6], therefore this conversion process requires to be completed, although the usage could be seen Pandora bots at World Wide Web.

5. **Machine Learning Approach**: Numerous machine learning methodologies have been portrayed in the research article, there is no technique that is best performs in all situations. Some comparative revisions are available, yet have not typically been performed sensibly and may lead to wrong results and conclusions. In (Table1) discussed the different approaches and their characteristics, which elaborates the suitability of the theses techniques for the machine in eLearning paradigm. This comparison gives a broad survey of studies identified with expert evaluation of advancement utilizing Machine-Learning Techniques (MLT).

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Decision Tree Learning</th>
<th>Association Rule Learning</th>
<th>Artificial Neural Networks</th>
<th>Genetic Programming</th>
<th>Inductive Logic Programming</th>
<th>Support Vector Machines</th>
<th>Clustering</th>
<th>Bayesian Networks</th>
<th>Reinforcement Learning</th>
<th>Representation Learning</th>
<th>Sparse Dictionary Learning</th>
<th>Ontology Driven Semantic Web</th>
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<td>1 Books, Handouts and lecture slides</td>
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Machine adapting in current era is exhibiting the guarantee of generating reliably faultless appraisals. Machine learning framework adequately "realizes" how to gauge from training set of complete actions. The fundamental objective and commitment of the research is to help the exploration on expert estimation to studies utilizing machine learning methods.

This research exhibits the most typically implemented machine learning procedures; for example, case based reasoning, neural networks systems, rule induction, regression and classification trees and genetic algorithm. More over these machine learning techniques are show the comparative fulfilment of proposed solution of web bots. Techniques which are most suitable will be adopted for the automation of the query answer in electronic learning. The proposed solution will use the mining techniques as well as machine learning techniques to answer the learner queries, so for the generations of candidate solution machine learning techniques are used. The accuracy of these learning techniques is different in various paradigms.

6. Proposed Solution: Components of the web-bot system are: NLP tools, Data Mining techniques, Machine learning technique, Web-bot, Reasonor, Knowledge Base and Teacher. Natural language processing deals with understanding, analyzing and producing the human context based language that people utilize regularly within request to interface with machines in both composed and spoken settings implementation characteristic human language rather than computer codes. One of the difficulties characteristic in natural language processing, to instructing computers to analyze it as the same fashion as people learn and use languages. Over the span of human correspondence, the significance of the sentence relies on upon both the connection in which it was imparted and every person’s understanding of the uncertainty in human language. This sentence postures issues for software which first modified to comprehend contexts and etymological structures. Natural language tool provides the facility to understand the semantic of the question. Three significant parts of any common language in understanding hypothesis: are Sentence structure, Semantics and Pragmatics.

The sentence structure depicts the manifestation of the language. It is normally indicated by syntax. Regular language is considerably more entangled than the formal language utilized for the manufactured language of rationales and workstation programs. The semantics gives the significance of the articulations or sentences of the language. Albeit general semantic hypotheses exist, when we fabricate a common language understanding framework for a specific provision, we attempt to utilize the least complex representation we can. Case in point, in the improvement that takes after, there is a settled mapping between words and ideas in the learning base, which is wrong for some spaces yet disentangles advancement. The practical segment clarifies how the articulations identify with the world. To comprehend language, an operator ought to consider more than the sentence; it need to consider the context of the sentence, the state of the world, the objectives of the speaker and the audience, uncommon meetings, and so on. Data and Information Mining is a class of database applications which search for shrouded examples in group of collected information that could be utilized to forecast future behavior. Mining technique will be used to find the most relevant data for the solution of any question answer.

Machine learning technique will help the reasonor to producing the candidate solution and enhance the learning after every query. Machine learning includes streamlining a loss function on unlabeled information focuses given samples of marked information facts, where the loss function capacity measures the efficiency of learning algorithms. A review of methods that is called reductions for transformation of a problem reducing one loss function to problem of reducing an alternate, less difficult loss function.
Web-bot interact with student for the clear understanding of the student / learners question. The need for the markup language emerges that is suggested by ALICE as Artificial Intelligence Markup Language (AIML).

AIML is really straightforward and basic language that is focused around XML punctuation. Researcher has built a software for the transformation of plain content to AIML yet this software isn’t accessible, therefore this conversion process requires to be completed, although the usage could be seen Pandora bots at World Wide Web. Programmed framework for utilizing Word Intelligent Handler is introduced along with 3 layered methodology.

Where \( i=1 \ldots \ldots N \) and \( P_0 \) denoted the coefficient of weighting, and this process starts with 1 to N where N is a natural number.

Reasonor provides the facility to answer the question on the basis of already understood semantics of the question. It can work only if and only if the data is well prepared and in process able format. Natural language annotation can also help the reasoner in providing such text. Annotation in the form of sentence structure and language linguistics. Enhancing the capabilities of the reasoner is also possible. This can be achieved by making the interaction of different reasoners in the particular scenario.

Knowledge base will help through already stored questions and answer of some specific queries and simultaneously for the new question answers. Knowledge base may contain the following components that help in find the answer of the query. It has most frequent questions of the student and answers with reference to there context. These question answers may be formatted in different Markup languages and called Knowledge Base Markup Language (KBML). It is somehow similar to HTML but special feature customized to satisfied the requirement of Knowledge Base. It also contains the full text search engine written in Perl or other language. A number of load balanced servers control the intelligent infrastructure paradigm.
The back end server’s tiers handling the data, information and logics while presentation servers dealing with running Ubuntu Linux, Graphical User Interface and Web Interfaces, attached with numerous databases like MySQL, which contains the meta data and contents. Editing and revision history logs on all types of files and maintenance are controlled by Revision Control System (RCS). Extra utilities incorporate an apparatus to study the hunt strings really presented by clients, and apparatuses for adding and uprooting connections to other KB content and for evolving metadata. KB records are composed in KBML however deciphered into XML before being put away in the database and conveyed to the presentation framework. The KB additionally has web and order line apparatuses for concentrated pursuits, and an online synergistic workflow framework.

As the time passes the system will be more mature and capable because the candidate answers present in the knowledge base will also increase in such cases where no suitable answer is found. If suitable answer is not found in the knowledge base then the system has two possibilities. One of them is all candidate answers will be searched and a new candidate answer will be produced after merging the candidate answers so a new answer will be added to the knowledge base. If the question is too vague or it is not possible to make a new answer after merging the candidate answers then instructor has to intervene.

Here comes the role of the teacher. This interaction is possible in such cases where insufficient data is provided to the web-bot or the question is out of the domain or question is so vague. Such scenarios arise in the beginning of the process [figure 4]. Teacher can also be help full for the automated system as he or she put some pre-defined questions about the lectures which are currently delivered in eLearning paradigm.

7. Conclusion: Our vision is that by using machine learning vast area of research through which the e-learning may be boosted up to limits. This research paper proposes an environment in through student can get answers in a better and efficient manner. It is only possible if the web bot is working up to the extent that needed to reply the student without any issue. There are number of machine learning techniques which are discussed with their pros and cons, so that produce an extraordinary solution of the student queries. In future we will try to solve the automatic answering by using web semantic techniques. Web-bot implementation is possible by preparing the dataset of annotated natural language text. Replying through web semantic web bot may results in better solution. Classic web provides millions of webpages e.g. google search. By using our technique the students of the users will get only concise answers or search results.

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ANALYZING PREDICAMENTS OF USING CELLULARPHONE CAMERAS FOR OPTIMIZING MOBILE TELE-DERMATOLOGY

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Abstract — patients with skin diseases are not treated in casualties however, it requires physical meeting between patient and doctor for better diagnosis and cure procedures. Mobile Tele-dermatology (MTD) was developed to overcome the challenges of accessing the consultant and getting treatment at a distance, mainly targeting the underserved areas. It is notable even today that, established MTD infrastructure requires equipment and expertise both, at patient’s site. Now, for a population of 7Billion (67% of which is mobile subscribers) 35% population is effected of skin diseases, the optimism in MTD is about sending patient’s lesion images to remote site for diagnostic and getting treated by expert dermatologists. Hence, this research focuses in achieving the optimized concordance rate in accurate diagnosis of the lesion images taken by patients themselves, with the most common gadget i.e., mobile phone cameras. The lesion data for this research is directly collected from rural and urban areas using different cameras of varying parameters (i.e., resolutions, distances and light-conditions). This helps to get the level of randomness required in carrying out the research. Lots of interesting facts in the diagnostic process are observed and discussed during the pilot demonstration of MTD. Later, by assuming various data transmission bottlenecks and analyzing the rate of concordance between physical and image based diagnosis of the lesion, the statistics are compiled. The results of our MTD demonstration refute many established assumptions / research work in the field of MTD. In short, the work consists of i) compiling an innovative way of cataloguing the patients’ selfie and ii) presents result statistics of physical (on-site) as well as image-based diagnosis.

Keywords - Tele-dermatology, mobile dermatology, lesion, cellular phone cameras, camera resolution

Introduction: Dermatology is a major field now a day’s and becoming more challenging due to increase number of skin diseases in Pakistan as well as in South Asia and Middle East. Correct lesion diagnosis and skin treatment is very challenging task, especially in remote areas. The lack of available dermatologist in rural areas makes it difficult or almost impossible to attain skin-related casualties [1] [2] [3]. The nearest dermatologist is hundreds of miles away and the resulting effects on health care are upsetting for rural physicians and patients equally. In rural areas, skin patients have very limited health care facilities and may not receive treatment without long and expensive travel to the nearest city health care center or hospital [1-4]. Also, well-trained care providers at times become unable to provide adequate dermatologic care and have no resources to improve their diagnostic skills. The ratio of dermatologist to skin patients is 1:226,000. All such factors necessitate Tele-dermatology effectively [4] [5]. Tele-dermatology has become an increasingly important and impacting subject of study during last decade. The dermatology services can become accessible through Store-and-forward or Real-time Tele-Dermatology, by using available communication link, as shown in figure 1 [6] [7].
Motivation: Mobile Tele-Dermatology is a reliable method of accessing dermatologic expertise in underserved regions where access to the connected world is limited. When primary care physicians are faced with unusual or complicated skin problems, a high-resolution camera at any magnification will then be used to take digital image of the affected skin lesion. These images are then transferred using available communication resources to the expert dermatologist, present at far site. Population of World exceeded 7 billion in 2012 where 7 million are the mobile subscribers (statistics released by Global Telecom Indicators for the World Telecommunication Service Sector in 2012). Thus, this research has been motivated to see if the mobile Tele-Dermatology is feasible in countryside or not and what results we obtain for diagnostic concordance between Mobile Tele-Dermatology and face-to-face consultation. And to find out the standards to be followed while taking patient’s images of affected lesion and to find the share of Image Processing and Enhancement tools in successful diagnosis via images [8][9][10][11][12].

Literature Survey: Mobile Tele-Dermatology may provide a triage service aimed toward management of patients with emergent skin disease or for follow-up with patients requiring systemic treatment. Mobile Tele-dermatology enables rapid transmission of affected lesion images via e-mail or specific web-application and studies have demonstrated a high, 91%, concordance between face-to-face diagnosis and remote diagnosis of such images [13][14][15]. Thus, Mobile Tele-Dermatology may be implemented as a tool to facilitate early detection and diagnosis of affected skin lesion as well as malignant skin tumors, to improve patient outcomes [16][17][18].Thirty patients with variety of skin diseases were diagnosed by junior dermatologist via face-to-face consultation in Cairo, Egypt. Similar patients were then diagnosed using store and forward mobile Tele-Dermatology by the senior dermatologists. The mobile phone used with built-in camera of 5 Megapixels and java based mobile application called ClickDoc™ for transmitting patient information and images of affected skin areas. The senior dermatologists are able to view all 30 cases via the World Wide Web based interface called Telederm Click™. The study stated that diagnostic agreement was achieved in 70% of cases. The study demonstrates the feasibility of Tele-dermatology using mobile telephone cameras with specialized software and amplified access of patient data too [19].

Limitations- The mobile phone used in this study with camera of 5MP resolution only and photographs were taken by the on-site junior Dermatologist. Also mobile phone is enabled with java-based application called Click Doc™ which can only be used by an expert person who is trained in using that application. Diagnoses made by the on-site junior Dermatologist and two Senior Dermatologists only. Study has been conducted for category of common skin diseases only, 70% success rates occurred which are not sufficient for 30 patients. In-sufficient history was one of the reasons for 30% un-successful diagnoses, as no particular criteria was define for history of each patient to be taken and In-correct diagnosis and poor quality image were other reasons for un-successful diagnosis

Model of Mobile Teledermatology: The traditional model of MTD is in the figure 2. This model is capable to fulfill the need of patients and doctors with basic Tele-medicine’s infrastructure intact.
For sake of idealism in MTD, the proposed model in this paper does not demand patient side infrastructure for image acquisition.

Step-I: Various methods of transferring the images taken by patients’ cellular phones / through in-expensive cameras of certain resolutions. These methods include transfer through internet, phone multimedia messages and SD-cards. Criteria recommended for taking images includes:

- Non-expert photography by patients themselves / people around
- Varying resolutions of cellular phone cameras
- Varying distance between the object (patient) and camera

Step-II: Initial Diagnosis is given as a result of physical examination of the patient by the Dermatologist on patient’s site because the same patient image is then evaluated by the Panel of Dermatologists.

Step-III: The figure also shows the procedure of image cataloguing to be performed at doctor’s site before final diagnosis. Image catalogue contains both raw and processed images. Images can be processed by using available software applications like MATLAB/ Adobe Photoshop/ Lab-VIEW etc.

Step-IV: Final diagnosis is the diagnosis based on image evaluation only by the panel of Experts available and they are blind from each other diagnosis

A. The deployed / pilot model: Our actual model of “Mobile Tele-Dermatology” consists of four different phases as shown in the figure 3. It depicts the way we conducted our research for Mobile Tele-Dermatology. Our deployed model of Tele-dermatology consists of four distinct phases. Each of these phases is mentioned here with respective details.
Phase-1: In actual, we have selected three different patient sites to get diversity skin diseases, from where we collected patient data which includes complete patient history and skin images of affected areas. Patient sites include:

- Al-Shifa Medical Centre, Mirpurkhas
- Dermatologists’ private clinics, Hyderabad
- Liaquat University of Medical and Health Sciences Hospital (LUMHS), Hyderabad

Phase-2: In Phase-II, with the consultation of senior dermatologist – based on the nature of lesion - sixty (60) patients are diagnosed via face-to-face consultation. These consultations are made at three different sites, mentioned in Phase-I and shown in figure 3. Dermatologists were given a Performa for patient evaluation with complete history which is shown in Appendix-I. Patient’s history for each patient includes Patient name, Age, Occupation, Address (geographical consideration), and Duration of disease, other symptoms in lesions, Family history and Seasonal Variations.

After physical examination, Images of affected lesions of same patients have been taken in an uncontrolled environment to set some standards for mobile Dermatology, such as:
- Cellular phone camera resolution taken: 3, 5, 8MP
- Distance b/w patient and image taken: 3/6 in focal length
- Images taken by: Non-expert/ patient himself
- Images taken under natural light effects

Phase-3: From the figure 4, six (06) images obtained for each patient then processed using Default image enhancement tool i.e., Microsoft Office Picture Manager. To apply any special software for image processing is beyond our Project. So we opt for timely and inexpensive procedure for processing images. Thus, after processing the total number of images for each patient is twelve (12) and total number of images for 60 patients becomes 720. That’s why we have done Image cataloguing, shown in the figure 4.
Phase-4: After Image Cataloguing, patient images are then diagnosed by the Panel of Expert Dermatologists. Out of 720 images, 96 random images, as recommended by the Experts, are shown to Panel of Dermatologists using three different ways, namely the Mobiles, the Laptop and the Projector.

**Analysis of Results:** Physical Diagnosis: After Initial Diagnosis of sixty patients by the on-site Dermatologists at three different locations, the total numbers of diverse diseases we get were Thirty Six (36). Total diseases have been categorized in different categories depending on their no: of occurrence as suggested by the senior Dermatologists, as shown in figure 5.

![Categories of Disease](image5.png)

The last category is extremely rare and in most cases these diseases are hard to identify through images, for this reason images of this category remain un-analyzed as suggested by the Panel of Dermatologists. Thus, the remaining four categories then analyzed through images. Total number of diseases that have been analyzed becomes 32.

Image Only Diagnosis: For Image only diagnosis, the images are selected randomly by the Panel. Selected images then showed to the Dermatologists for each category in random order. The Results we get have been analyzed through categories as shown in figure 6.
Image Diagnosis with History: After completion of formulating diagnosis for images only, Dermatologists have been exposed to same images but including history of patients. History includes patient’s gender, age, affected area and disease on-set. The images showed in random order for each category. The Results has been improved in comparison to Image only Diagnosis as shown in figure 7.

The final comparison gives us results of Image only diagnosis with Image diagnosis w/History to achieve the final conclusion. The concordance rate between aforementioned diagnosis techniques is shown in figure 8.
If we look at figure 8, we will see the significant progress in results of image diagnosis with History. Hence image along history is mandatory for Dermatologist to diagnose. Moving on to our next analysis, see figure 9. As mentioned above that when history included with images, results got improved so in the following graph we have analyzed image with history results only for Different Disease ‘Categories’ and varying cellular phone ‘Resolution’.

From the figure, it can be analyzed that, if we look at 4 disease categories then the LC (Less Common Disease Category) has the highest concordance rate, i.e., 90 at 3 & 8 MP respectively, and RC (Rare Common Disease Category) has the highest concordance rate as 80 at 5 MP, while remaining two categories i-e: CD (Common Disease Category) and MC (Moderate Common Disease Category) has lower concordance rate in comparison to LC and RC. So, it can be concluded that disease diagnosis doesn’t depend on the categories they belong to but on their appearance. Thus, Disease categories don’t affect the image diagnosis and image diagnosis can involve all types of skin diseases. Secondly, we observed that there is no significant trend if we compare the concordance rate with respect to varying cellular phone Resolution.

After profound analysis, with respect to mentioned image categories and resolution, we move towards the ‘Distance’ concordance rate between patient and camera, see figure 10.
As shown in the figure, it was 3 and 6 inches which don’t follow any concordance trend. Thus, it be concluded that distance between patient and camera doesn’t affect the diagnosis but image must be taken at a distance that the affected skin lesion is completely visible. Now for ‘Quality’ of an Image i-e: original and autocorrect, results have been concluded next in the figure 11.

![Image Diagnosis with History (Image Quality)](image)

**Figure 11- Total concordance with respect to image quality**

From the figure 11, it can be analyzed easily that at 3MP, concordance of original image is lower than concordance of auto-corrected image, i-e: image enhancement has improved result over here. But if we look at 5 & 8MP the original concordance rate is greater than auto-corrected concordance in comparison, thus, image enhancement has not given any significant improvement in these two resolutions specifically.

**Conclusion:** The statistics presented in this paper helps to conclude that, there is no optimized strategy exists for Mobile TD using cellular phone cameras. Instead of, our proposed and deployed model is a real test model for MTD Mobile Tele-dermatology. Based on the figures compiled, we conclude that mandatory elements of patient’s history, in addition to patients’ selfies, include gender, age, precise description of affected region, and the disease on-set for correct diagnosis. It is also evident that categorization of diseases, on the basis of its occurrences, is not considerable in MTD. Also, the default image-enhancement applications in cellular-phones with auto-correct features are truly unreliable. The parameters including resolution of camera (tested for 3/5/8 MP) and distance from object (3 & 6 inches) don’t have significant impact but, with an error of 10% in correct diagnosis. Hence, it is recommended that further research, in this direction, should be performed by developing / embedding different image-enhancement tools in cellular-phones for further improvement in diagnostic concordance. An optimized MTD can only be then sought. Our image catalogue is now made public to revise and extend the future study in various MTD projects.

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THE SERVICE-CENTRIC PERSPECTIVE OF INFRASTRUCTURE SHARING FOR MULTI-OPERATOR CORE NETWORKS

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ABSTRACT: The number of cellular networks subscribers has always been increasing and opt to new services contracts. The contracts commit, with subscriber, to provide high data rate, optimized network efficiency, data streaming services, and are held among mobile operators (MO). However, the management and technical issues to implement these contracts are challenging for MO which demands optimized approaches for infrastructure sharing among MOs. In this paper, we analyze and compare infrastructure sharing approaches such as, Multi-Operator Core Networks (MOCN) and Multi-Operator Radio Access Network (MORAN). The parameters like, bandwidth, quality of service and coverage continuity are analyzed, for vendor-specified equipment, at MOs. Based on the statistical analysis, it is evident that adopting service-centric perspective of infrastructure sharing helps MOs utilize any Nth generation network at its full potential but, also can save their capital cost. In short, the paper serves a thorough review of infrastructure sharing approaches and proposes a way forward to achieve expectations through service-centric perspective, valid in all generation of mobile networks.

Keywords: Infrastructure sharing, Network resources sharing, Mobile operators, service centric, multi-operator core network

1. Introduction: Increasing worldwide, the subscribers demand for several services (incl. video streaming, high data rates, optimized cellular network efficiency etc), leaving the technical and regulatory issues at mobile operators. This mentioned trend of subscriber has always been challenging for Telco-Industry. The ICT (Information and Communication Technology) industry is already facing critical energy issues or budget overheads particularly, in Pakistan. According to the global statistics, the existing energy requirement of 600 TW by ICT industries will be increased by almost 1700 TW by 2030 [1] [2].

The huge energy consumption in cellular infrastructure is also a frightening factor in regular network services today. However, the energy management of cellular network infrastructure is a serious issue which directly relates to their revenue. The migration of next generation network also increases the hardware devices on site levels and number of subscriber is meant of higher energy consumption. The telecom-industry also has some limitations to provide high data rate services in the metropolis and remote areas. High data rate services offered in metropolis, but it is evident that coverage, quality of services, broadband services over cellular networks is either limited or does not even exist in small villages. The (CAPEX) capital cost of the infrastructure and spectrum costs also becomes tentative. The time is coming when operators have to decide to either evolve or go out of business being swallowed by bigger rivals. The days when a voice-centric network is paid for is it gone as the data-centric network evolves it has to be supplemented with the value added services like apps, faster download speed etc. It would be wonderful if we could do multiple things with our phones (watch sports, control the home appliances, control work computers, GPS, do video chat on demand etc and all of above on one flat rate! This is going to be the reality in next 5 to 7 years as vendors are looking to provide these services in collaboration with operators and smart phone.

Hence, In developing countries, like Pakistan, the said transform from 2/2.5G to 3G and an Nth Generation demands the need of radio network co-operation among multiple cellular operators because an advent of next generation networks is only a time based solution to accomplish the subscribers demand of providing more services economical.

The section 1 of this paper is introduction, section 2 is problem formulation, and sections 3 presents consists of fundamental issues exist in nth generations networks. Section 4 discusses the multiple cellular operators of Pakistan and the proposal of network resource sharing based on service-centric approach. In section 5, we perform analysis of MORAN and MOCN for vendor-specific equipment and conclude in the last section.

2. Problem formulation: The Teledensity of Pakistan including fixed, wireless local loop and mobile phone subscribers has reached in all the time high level of around 73% while total mobile service subscribers have reached 129.6 million across the country [2]. The Teledensity reached all time high level of 72.3 %, up from 71% in July 2013 as shown in fig. 1.

The total number of cellular subscribers’ count stood at 129,583,076 with Mobilink topping the market at 37,37 million subscribers. Telenor recorded 32,44 million subscribers while Ufone said that it had 24,80 million subscribers at the end of September 2013. Zong is fast catching the Ufone with 22,28 million customers, while Warid managed to grab 12,79 million customers at the end of September 2013. Now the cellular subscribers in Pakistan reached 132,333,853 at the end of November 2013, as per stats made available by Pakistan Telecommunication Authority. All five operators have added 800,071 subscribers during the month of November 2013, while around 2 million subscribers were added during October 2013. Zong remained the major contributor for both the months, with over one million subscribers’ addition during October 2013 only, which is quite amazing but it’s surprisingly strange. Fig. 1 shows the Teledensity for cellular
subscribers reached all time high at 73.5 % which is now have been reached up to 75% in March 2014. Mobilink still leads the market with 37.72 million subscribers, while Telenor remains at second slot with 33 million subscribers. Ufone came along on third position with its 25 million subscribers. Zong is fast catching up with Ufone with 23.72 million subscribers [2] [3] [4].

This rapid growth of the subscribers demands the different network services with the passage of time. The cellular operators have to upgrade their networks in terms of hardware, spectrum the land as well to deploy the new infrastructure. This would be after now an expensive decision for the cellular operators in the near future. The optimum solution for cellular operators is network resource sharing. The network resource sharing ideas and proposals for different approaches started to appear after the UMTS licenses were granted in Europe in the 2000s. Although both academia and industry have contributed relevant ideas and focus directions, most of the works focus on one or few single aspects of infrastructure sharing. The 3GPP has prepared a technical report on the viability of network sharing. In 2001, TIA (Telecom Industry Association) Europe drafted a report on the state of shared 3G network infrastructure in Europe. It introduced the places where the infrastructure sharing started in Europe [5] [6].

3G (3rd generation) and 4G-LTE (4th generation- Long Term Evolution) networks have been launched recently in Pakistan by multiple cellular operators. The cellular operators have been upgraded their networks to provide the immense benefits by adopting the next generations networks in terms of services incl. (video calling, browsing during establishing the call, efficient bandwidths etc). The Telecom-industries has been constantly facing the fundamental issues by adopting all types of next generation networks. The service discrimination (remote and metropolitan areas) due to the short number of subscribers, management of energy while deploying the infrastructure, efficient bandwidth utilization, equipped cost through deploying the new hardware to upgrade the networks, pressure on total cost of ownership and return on the investment etc. Taking the case study of Pakistan, we come to know that these are the current issues which occur in every nth generation’s networks.

3. Related Work: With the passage of time, the subscriber demands for more services on the high data rates. Presently, cellular operators are enhancing the frequency-bands for accommodating more services and the subscribers. This services and subscribers’ accommodation demands new sites and broadens spectrum. The expansion needs huge budget for per site development. Therefore, to keep the expenses in control, the resource sharing of network has been in place. Few operators in the world with their technology partners are already in the process of implementation of different network resource sharing solutions in order to cut their per site operational cost [2][4]. Nevertheless, a not a single country-wide test-case exists for effective network-resource sharing for developing or developed countries which have been quickly advancing their telecommunication sector, e.g., China, Australia, Pakistan, India, U.A.E, or in Central Asia Europe or Africa [5] [6].

Network resource sharing may also enhance competition between mobile operators and service providers, at least where certain safeguards are used, without which concerns of anticompetitive behavior could arise. Ultimately, mobile network sharing can play an important role in increasing access to information and communication technologies (ICTs), generating economic growth, improving quality of life and helping developing and developed countries to meet the objectives established by the World Summit on the Information Society (WSIS) and the Millennium Development Goals established by the United Nations. Different forms of infrastructure sharing are possible, ranging from basic unbundling and national roaming, to advanced forms like collocation and spectrum sharing. In the MENA (Middle East and North Africa) region, National roaming is used extensively in countries like Jordan, Morocco, Oman, Saudi Arabia and the United Arab Emirates. Unbundling is now starting to gather pace, with Egypt and Saudi Arabia as leaders. Other forms of sharing are bound to develop, given the expected returns to incumbents and new entrants alike. While infrastructure sharing is the most cost-efficient design principle for any new roll-out in emerging markets and the best approach for technology migration and consolidation, the cost savings potential from infrastructure sharing are earned through sacrificing some of the control that the standalone operator has over its network, thereby impacting the ability of operators to compete and differentiate themselves based on network quality. This is why, considering both the appeal of sharing to the operators, and their strategic interests, the stronger forms of sharing are usually recommended for coverage-driven roll-outs in rural areas that have limited business potential, and where differentiation (which requires autonomy) is less important [7] [8] [9] [10].

In addition, obligations relating to network sharing may influence the willingness of operators to make efficient investments in infrastructure and innovative services. The network resource sharing between two or multiple operators will become a reality in the near future. It becomes a vital approach for organizations and businesses to have access to high-speed communications networks in order to maintain a competitive edge in today’s fast-moving global market. The network services not only need to be fast and reliable but also affordable for the average ICT consumer.

The concept of the converged networks which delivers voice image, video and generalized data types over the same networks using IP (internet protocol) has become a major part of the solution to speed up and low-cost public networks. Research in to converged networks includes ways to make them simpler better and cheaper for the end-users as well as technology developers making more effective use of the infrastructure and minimizing operational costs for service providers. Furthermore, user-centric networking enables the creation, compositions and dynamic management of services demanding high degrees of availability of network resources. The cellular operators’ requires primary resources for providing the high data rate services in nth generations’ network.

- New investment for an operator on hardware infrastructure upgrade
- More space and power
- More capacity in terms of bandwidth and spectrum

There are two ways now for an operator either chose the upgrade path or become obsolete. The third ways comes in the form of network resource sharing where operator 1 shares their resources with the network operator 2, as pooled the resources means greater reach in terms of coverage and capacity. In terms of capital cost approximately 75% of the overall budget involves acquiring the sites, access equipment, civil works (i.e. construction of the site, installation the equipment and laying the transmission networks) [11] [12] [13].With the next generations networks these fundamental issues will be further more complicated because of the lack of the sites, varying environmental challenges, health concerns regarding hazards of the radiations. In order to view these challenges faced by the licensed holders, an optimum solution is the network resource sharing in order to reduce the financial risks facing by the industry and thus improve time to time revenue. Hence, an advent from 2G to 3G or 4G and nth generation networks demands the need of dynamic management of network resource sharing among mobile operators.

The dynamic management network resource sharing is a very multiple process. There are variety of options of network resource sharing which ranges from sharing of towers and the other infrastructure facilities to share entire mobile networks. The network resource sharing is divided into three basic categories (a) passive site sharing (b) active site sharing (c) roaming based sharing as shown in the Fig. 2.

Fig 2: Dynamic management of network resources and business opportunities

- Areas with high business potential
- High competition between (Operators)
- Full control of own network assets
- High potential need for site acquisition
- Starting point for network consolidation

- Areas with moderate business potential
- Partial control of network assets
- Performance differentiation

- Areas with low business potential
- Lowest-cost approach to fulfill regulatory coverage requirements
- No service or performance differentiation
Passive sharing refers to the sharing of physical space to deploy the infrastructure elements includes (building, premises, site, mast).

Active sharing is more complex where the mobile networks share their network elements includes (antenna, power supply units, radio nodes, node controller, core networks (such as switches), back bone transmission).

Roaming based sharing in the context to network resource sharing refers when one operator relies on the coverage to another operator for a certain defined footprints on permanent basis.

The network resource sharing is undoubtedly leads to the reduction of investment by each operators involved in the network sharing process. Network resource sharing is critical for Telco-industry and also a feasible solution which customized to meet the demands of users as well from the prospective next generation’s networks. The available solutions are MORAN (Multi-operators radio access networks) and MOCN (multi-operators core networks) which comes in the active site sharing category where multiple mobile operators share their network elements on different levels as shown in Table 1.

### Table 1. The network infrastructure sharing in MORAN and MOCN

<table>
<thead>
<tr>
<th>MORAN</th>
<th>MOCN</th>
</tr>
</thead>
<tbody>
<tr>
<td>In NodeB, the radio and power amplifiers remain physically independent in order to allow operators to use their assigned frequencies.</td>
<td>Device dependent, requiring 3GPP release 6</td>
</tr>
<tr>
<td>The RNC and parts of the NB are partitioned between the sharing parties.</td>
<td>Share both RNC and NB and pool their frequencies</td>
</tr>
<tr>
<td>Frequencies are dedicated</td>
<td>Frequencies can be shared</td>
</tr>
<tr>
<td>There are common site level parameters but operators can control the cell level parameters. This allows the service differentiation. This may a regulator prerequisite for network sharing.</td>
<td>Spectrum sharing is the major limitation of this approach</td>
</tr>
</tbody>
</table>

The MORAN supports the network sharing at site level parameters which includes (base transceiver station, NodeB/eNodeB, radio network controller, Iub interfaces, sharing of an antenna, feeder cables, racks power supply at NB level) while having separated core networks (Circuit switched or packet switched) but frequencies are dedicated as shown in Fig 3 (a).

Another popular approach is MOCN where, frequencies can also be shared with the site level parameters. The same is shown in Fig 3 (b).

In the MORAN each operator can separately configure cell parameters and perform feature configuration and optimization to achieve the independent cell specific service management. On the contrary, with MOCN all operators configure parameters and perform feature configuration and optimization in a unified way to achieve the complete sharing of RAN resources.

### 4. The Win-Win perspective with MORAN and MOCN:

The innovation, business and needs have been converted from product-centric to consumer-centric. Now a day, the people’s choice is always given priority. Even motivating a group of through today revolves around a central point i.e., public demands. This section provides a new perspective to look in adoption of strategies as consumers’ demands. Subscribers of any network operators look for services committed to them through advertisements and publicity. Generally, people want to dive deeply in to micro details of penny calculations in billing unless operators compromise on quality of services. Hence, we analyze the radio network resource sharing solutions according to the win-win perspective for operators and subscribers. The model case is Pakistan’s telecom industry and services which has emerged as the fastest growing telecommunication industry in the World.
The Table 2 shows the general features information of network sharing resources in 3G and 4G-LTE. The MORAN and MOCN supports the common shared network resources at RNC levels and NodeB and eNodeB levels having the shared interface units Interface unit nodeB (Iub) used to connect the NodeB hardware to the radio network controller (RNC).

<table>
<thead>
<tr>
<th>Table 2 Shared network resources for deployment of MORAN and MOCN as last-mile solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>MORAN solution</td>
</tr>
<tr>
<td>Shared resources</td>
</tr>
<tr>
<td>Radio Network Controller (RNC)</td>
</tr>
<tr>
<td>Iub interface (Interface unit nodeB) Connect the shared nodes to RNC</td>
</tr>
<tr>
<td>NB HW (Node B hardware) - base transceiver station</td>
</tr>
<tr>
<td>Sharing of antenna @ NB level</td>
</tr>
<tr>
<td>Racks @ NB level</td>
</tr>
<tr>
<td>Power supply / Feeder cable @ NB level</td>
</tr>
<tr>
<td>X</td>
</tr>
</tbody>
</table>

The licensed frequencies/ spectrum sharing will not be supported by MORAN approach but with MOCN solution all the frequencies can also be shared at the cell levels. Each solution supports radio infrastructure sharing from two up to six operators and even more for specific situations. These solutions apply on different scenarios based on the customers’ requirements.

5.1 Basics of the win-win perspective: As obtained earlier every country that every country/ regions has varying subscribers requirements and different regulatory policies. Therefore the adoption of MORAN and MOCN requires a fresh study. In this research it has been thoroughly reviewed the different existing challenges faced by the cellular operators as well for subscribers. The proposed win –win perspective facilitates the both the subscriber as well the operators. In the case of existing cellular network, there is the variations in the demands of operators as well the subscribers; some constraints have to be analyzed as shown in the Table 3.

<table>
<thead>
<tr>
<th>Table 3. Analyzing summary of subscribers and cellular operators in the Win-Win perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subscriber</td>
</tr>
<tr>
<td>Always connected: Broader network services</td>
</tr>
<tr>
<td>Services’ mobility: Seamless network portability</td>
</tr>
<tr>
<td>Last mile services: Promised last mile solution</td>
</tr>
</tbody>
</table>

It is clear that the value of services/ goods is a major factor for people to make decision of subscribing. The subscriber/user relies on cellular services according to the data statistics all over the world and they always demands for more services on higher data rates at the minimum cost with the satisfactory quality of service. On the contrary, the focus for all network operators now is getting revenue from their large investment by an advent of the next generations networks. Cellular operators needs the effective utilization of their resources (bandwidth utilization in terms spectrum, cells/sectors per site for accommodate number of user in an allocated channel etc) and providing high quality of services to the subscriber but above all they desire to get the high revenue as shown in the table.

The Fig 4, shows the primary needs of subscribers as well the operators in terms of win-win situation. The subscriber desires for high data rate services with their mobility is the meant of always connected while avail the services of any cellular operators. The focus of the operators is on generating revenue, effective utilization of their resources in terms of spectrum at cell levels and other hardware elements of infrastructure and all of above the optimized network services which fulfill the desires of a subscriber.

6. Analysis of MORAN and MOCN for win-win perspective: The objective of this section is to evaluate the different operators sharing resources at different levels of the infrastructure. As we have seen the technical approaches that appears viable from today’s perspective, considering currently available technology and showed how to align these concepts with business and geographical strategies. The economical impact of described approaches on operational and capital expenditure of operators is significant. The Table 4 shows the current status of 5 MOs having different vendor specific equipment.
Network sharing opportunities as per view of vendor

Adoption of the MORAN approach for network resource sharing model the vendor specified operators can share their network elements on different levels of infrastructure as shown in the table. The hardware resources like base transceiver stations, antenna at the NodeB level and the radio network controller equipment can also be shared, while the core network is separated and maintain by each operator with using the MORAN approach.

Table 4. Network sharing opportunities as per view of vendor-specific equipment in Multiple Operators for MORAN

<table>
<thead>
<tr>
<th>OPERATOR VENDORS</th>
<th>ZONG (4G) (V-D)</th>
<th>MOBILINK (3G) (V-A)</th>
<th>TELENOR (3G) (V-B)</th>
<th>UFONE (3G) (V-C)</th>
<th>WARID (4G) (V-A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core elements</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>NodeB</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Spectrum sharing</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>Cells/Sectors</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>RNC</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

Using the MORAN approach for network resource sharing model the vendor specified operators can share their network elements on different levels of infrastructure as shown in the table. The hardware resources like base transceiver stations, antenna at the NodeB level and the radio network controller equipment can also be shared, while the core network is separated and maintain by each operator with using the MORAN approach.

Table 5. Network sharing opportunities as per view of vendor-specific equipment in Multiple Operators for MORAN

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<tr>
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<th>TELENOR (3G) (V-B)</th>
<th>UFONE (3G) (V-C)</th>
<th>WARID (4G) (V-A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core elements</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
<td>✗</td>
</tr>
<tr>
<td>NodeB</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>Spectrum sharing</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
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</tr>
<tr>
<td>Cells/Sectors</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
<tr>
<td>RNC</td>
<td>✗</td>
<td>✓</td>
<td>✗</td>
<td>✗</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 4

The table shows the different operators vendors having shared network resources. The country is divided into three main areas Urban – sub urban and rural having different number of users and service profiles. The traffic from each region will be associated to the independent RNC. Taking the case study of Pakistan if the multiple cellular operators are followed by the same vendor then the operators can share their network resources as well at different infrastructure levels. The spectrum sharing of MOCN with core network sharing between similar vendors’ product makes MOCN, an optimized solution for the countries which are rapidly growing in telecom sectors. The adoption of MOCN in 3G / 4G LTE, as stated in the proposal, may eliminate financial risks and remove barriers of service areas of the network operators. Now operators can utilize our findings while developing economics of next generation of network in rural and metropolitan areas without the services’ discrimination.

The radio access sharing approaches also mean that there will be a loss in revenue to infrastructure vendor like Ericson, Nokia Siemens, and Alcatel etc at site level hardware but any such saving could be passed on the subscriber in the form of better users experiencing, capacity expansion where needed and better service level agreements in terms of performance degradation.

The MORAN and MOCN are two different sharing models are used for network resource sharing among multiple mobile operators. In the UK T-Mobile and Hutchison 3G are currently combining their networks using MORAN solution from Nokia Siemens Networks (NSN). They are the first companies in the UK to use this technology. MORAN solution allows the sharing of antenna system, base station and radio network controllers while having separate core networks. This technology can support up to four carriers (Four network operators) in a single base station thus allowing the possibility to rollout in remote areas at a substantially reduced costs. As opposed to MORAN solution, where multiple carriers are required to support different operators, this allows RAN sharing with a single carrier. MOCN is currently offered as a solution by NSN but has not gained much interest from the network operators. Sharing spectrum and core network is expected to provide significant cost savings compared to the MORAN solution. In the rural areas this may be the technology that offers high speed broadband capabilities as a commercially viable solution.

Adoption of these different approaches depends upon requirement of subscribers in the region. Taking the case study of Pakistan, in this paper, we observe that MOCN is an optimized solution for radio network optimization in 3G among cellular operators. This is because of the sharing opportunities, e.g., frequencies/ spectrum sharing at cell levels with the sharing hardware at NB level. As a result of an adoption the 3G MOCN approach for network resource sharing in cellular operators can offer high data rate services, optimized network efficiency, avoid service discrimination, reduced energy consumption, reduced operational cost, wide cellular coverage, effective sharing of network resources, lower service tariff.

7. Conclusion and future work: This paper helps to present a drill-down the rapidly advancing telecommunication sector of Pakistan. A thorough review has been made of famous optimized network resource sharing schemes for 3G and 4G. Here, an impact analysis of the facts, in countries with similar telecom infrastructural growth, is taken into consideration. Our analysis proposed new perspectives of rephrasing the current problems and reviewing solutions to the world’s telecom industry. Based on the analysis, discussion and statistics from cellular operators, the MOCN (Multi-operator core network) is recommended as only advanced feasible solution. The reduction of operational/ recurrent expenses is also huge. The adoption of the proposed strategy is beneficial for operators and subscribers as it’s meant for the economy. MOCN is capable to keep the operational cost low without compromising the services discriminations among rural and metropolitan areas. This would not only serve the subscribers with desired quality at par, but would definitely increase the operator’s revenue proportionally. Adoption of MCON at the eve of 3G and 4G generation in Pakistan shall surely help operators to overcome the existing challenges. The adoption of the proposed strategy is beneficial for operators and subscribers in terms of economy. The reduction of operational/ recurrent expenses is also huge due to
dynamic resource sharing. The research aims to the current policy infrastructure by the Telecommunication Authority offered to cellular operators. This can also be useful for drafting resource sharing frameworks among cellular network operators.

Currently, we are engaged in statistical evaluation for the 3G-MOCN approach for dynamic network resource management using case study of Pakistan. The country is divided into three main areas Urban – sub urban and rural having different number of users and service profiles. The traffic from each region will be associated to the independent RNC. The same model can be applied in existing telecom developing countries effectively based on their environmental parameters such as regulatory policy, vendors’ equipment, users’ requirement, etc.

REFERENCES

DETERMINANTS OF COMMERCIAL BANKS PERFORMANCE: EMPIRICAL EVIDENCE FROM PAKISTAN

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ABSTRACT: Financial sector has always been considered as the back bone for a sustainable economic growth in any country. This study aims to scrutinize the impact of bank-specific and macro-economic determinants on Pakistani commercial bank’s performance. There has been an extensive literature focusing on the determinants of bank profitability and results showed a strong association between some banks specific variables and profitability. Since 80’s few value-based measurement models like market value added, cash flow return on investment, cash value added, shareholders value added, shareholders value analysis and economic value added have been emerged as an alternative to the conventional accounting-based measures. Supporting these concepts, the bank valuation requires a model able to adjust the bank-specific characteristics of valuation. EVA is a measure that captures true economic profit of an organization earned over time for its owners. Despite the extended amount of literature on EVA implementations on firms, there is a lack of EVA computation on banking industry. The research objective of this paper employs EVA theory to validate the claim to be true performance indicator. To test this claim, the analysis will be conducted on commercial banks listed on Karachi Stock Exchange by using Pooled OLS techniques for the period 2009-13. In this regard, using two regression models, EVA will be compared with one of the traditional measure, ROE as a dependent variable. The independent variables include the standard financial ratios like asset quality, capital adequacy ratio, operating efficiency; total debt to total asset ratio and macroeconomic variables includes gross domestic product and inflation rate. Results of this study show that EVA model is superior than ROE and CAR, EFF, ASQ and GDP are strong determinants of commercial banks performance in Pakistan.

Keywords: EVA; ROE; CAR, EFF, GDP, Inflation
1. Introduction: Financial intermediaries have an imperative financial role in the economy and their efficiency influence economic growth. Banks are the financial intermediaries that play an important role in the economy by providing different services. Banking sector plays an important role in strengthening the economic activities and growth and considered as the backbone of an economy (Khan, Anuar, Choo, & Khan, 2011). Countries having sound and profitable banking system play an important role in the stability of financial system and can easily cope up financial distress (Bilal, Saeed, Gull, & Akram, 2013). For that reason it is crucial to determine all those factors which influence bank’s performance.

Banking sector is exposed to diverse internal (bank specific) and external (macroeconomics) factors that have an effect on their performance. Factors which are in control of bank’s management are internal whereas all those factors which are beyond the control of bank’s management are external factors (Raza, Jawaid, & Shafqat, 2013). Pakistan’s banking sector consists of 38 Scheduled Commercial banks; including 5 public sector banks, 22 private sector banks, 4 specialized banks and 7 foreign banks at the end of 2012. State Bank of Pakistan (SBP) is the Central Bank of the country and has authority to regulate and supervise all banking companies operating in Pakistan. Commercial banks need to be aware of all those factors (internal and external) that affect their financial performance. Guru, Staunton, and Balashanmugam (2002) explained that internal factors presented in balance sheet demonstrate strategies and decisions of banks management regarding the sources of funds and their utilizations. Whereas, internal factors related to profit and loss account shows that how competent bank’s management is in creating revenues and controlling costs.

So, this paper endeavors to determine the factors that impact the performance of commercial banks listed in Pakistan for the period of 2009-2013. A few researches has been conducted in Pakistan to examine the determinants of banks profitability by using different accounting measures i.e. return on assets (ROA) and return on equity (ROE). This study examines the performance of banks with both; accounting based measure (ROE) and value based measure (EVA) in order to determine the best performance measure. So, the foremost intention of this paper is to employ EVA theory to validate the claim of true performance indicator.

1.1 Objectives of the study. The primary objective of this study is to empirically determine the factors (internal and external) that affect banks performance in Pakistan and the emphasis is to identify which one of the two measures of performance i.e. Accounting based measures (ROA and ROE) and Value based measure (EVA), if any, is superior. Following are the main objectives of this study:

- To determine the main internal factors (bank specific) that effect performance of commercial banks in Pakistan.
- To determine the main external factors (macroeconomics) that effect performance of commercial banks in Pakistan.
- To determine the best performance measure i.e. accounting based or value based, in relation to internal and external factors.

1.2 Significance of the Study. Results of this study will help banks management to effectively manage their internal factors and to anticipate all external factors that contributes in boosting banks performance. Worth of this research is not limited to banks management only; other stakeholders will also get benefit from it. They can predict banks performance. Bank’s regulators and policy makers can anticipate the performance to plan rules and strategies in order to improve profitability of banks as they are concerned with the stability of banking system.

The rest of this paper is arranged as follows: Section 2 provides review of previous studies, Section 3 presents the research hypothesis of the study, Section 4 explains variables of the study and research methodology, Section 5 presents the results of the study and Section 6 provides conclusion and recommendations.

2. Literature Review: In literature we found many studies that determined impact on banks profitability by internal and external factors in the context of different countries. In this section some literature is reviewed regarding the

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1 EVA is a measure that captures true economic profit of an organization earned over time for its owners.
determinants of banks profitability. In Turkey, Moussa (2012) investigated the impact of different determinants of banks profitability i.e. bank specific and macroeconomic factor\(^2\) for the period of 2001 – 2010 and banks profitability is measured by ROA and ROE. Study concluded that capital ratio (CAR), bank size and economic growth are positively associated with banks profitability whereas inflation has an inverse relation. Further it provides evidence for the efficiency of foreign banks in Turkey. In another study Alper and Anbar (2011) proposed that in Turkey profitability of banks can be inflated by increasing bank size and non-interest income and higher interest rates (real) can accelerate higher profit for banks.

In Indonesia, Syafri (2012) explored the effect of internal i.e. bank size, bank loans, capital, credit risk, non-interest income and cost to income ratio and external factors i.e. economic growth and inflation on banks profitability. For profitability measurement ROA is used as a dependent variable. Result shows that both external factors are insignificant for Indonesian banks. However loans and equity of banks are significant and have a positive relation with profitability.

Dore (2013) determined the bank specific and macroeconomic factors of commercial banks profitability in Ghana and concluded that profitability of commercial banks in Ghana is positively related with bank specific variables i.e. Capital adequacy and liquidity of banks and macroeconomic variables i.e. GDP and inflation are negatively associated with profitability. Bilal et al. (2013) in their study analyze the effect of bank specific i.e. deposit to asset, bank size, capital ratio, net interest margin and non-performing loans to total advances and macroeconomic factors i.e. inflation, real GDP and industry production growth rate on profitability measures (ROA and ROE) of all commercial banks. Results shows that bank specific factors (bank size, net interest margin, industry production growth rate and non-performing loans to total advances) are significant and positively effect ROA and ROE except NPL that shows negative relation with both profitability measures. Capital ratio is also found significant and positively related in relation with Return on Equity (ROE) only. Among macroeconomic factors only real GDP has significant positive relation with Return on Assets (ROA).

Perera, Skully, and Chaudrey (2013) examined the determinants of commercial banks profitability of four South Asian countries (India, Pakistan, Bangladesh and Sri Lanka). Return on Assets (ROA) is used as profitability measure. Commercial banks of different countries are taken into account for analysis, so the differences across countries are considered by adding factor of Corruption and law; measured by Control of Corruption index (CORR) and Rule of Law index (ROL) respectively. It was found that well capitalized, efficient and low risk south Asian banks are more profitable as management efficiency and equity capital level are significant and positively related with profitability whereas loans to deposit ratio is significant but negatively related with banks profitability. South Asian bank also show economies of scale affect as banks (larger in size) are found more profitable. However, competition in negatively related with profitability.

Taha (2013) examined the profitability of banks in Jordan and revealed that bank specific factors are more important than macroeconomic factors. Capital adequacy (CAR), assets quality, bank size and management efficiency; all these internal factors are significant and positively related with banks profitability. In Malaysia, Guru et al. (2002) conducted a study to recognize all determinants of profitability; that are in the jurisdiction of management of banks i.e. internal factors and others that are related to environment i.e. external factors.

Mamatzakis and Remoundos (2003) examines the determinants of ROA and ROE i.e. profitability measures of commercial banks in Greek. Study found that management related factors i.e. loan to asset ratio, equity to assets ratio and personal expenses primarily elucidate profitability. Heffernan and Fu (2008) evaluates the performance of Chinese banks by considering four different measures of performance\(^3\) to select the best measure and found that best measures of performance are EVA and NIM.

Many studies have been conducted in determining the internal and external determinants of banks profitability in the context of Pakistan. Khan et al. (2011) conducted a study to examine banks profitability and explores the impact of internal (bank specific) factors on profitability of Pakistani banks over the period of 10 years and found that Deposit

\(^2\)Bank specific factors are Capital ratio, Assets quality ratio, Management efficiency ratio, Liquidity ratio and bank size and Macroeconomic factors are Inflation and GDP growth.

\(^3\)Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM) and Economic value Added (EVA).
to asset ratio, Deposit to loan ratio, loan to assets ratio, loan growth, Non-performing loans, Net interest margin, tax and return on assets significant. However NPLs and tax are negatively related with banks profit.

Bukhari and Qudous (2012) conducted the same study and found that only advances and credit risk are significant and positively related with banks profitability. Whereas other variables i.e. bank size, non-interest income (NONII), expenses, import export, CPI and discount rate are found insignificant. Azam and Siddiqui (2011) in their study find out that foreign banks in Pakistan are more efficient; have high profitability than domestic banks and have less effect of macroeconomics factors.

Gul, Irshad, and Zaman (2011) analyzes the relationship of bank specific and macroeconomics factors with the profitability of banks in Pakistan and showed that both these factors have a strong relationship with banks profitability. Rasool, Aamir, Hussain, and Attique (2012) examines the impact of bank specific and macroeconomics variables on profitability of commercial banks in Pakistan by taken ROA, ROE and NIM as profitability measures. Study found that banks should enhance their assets quality, operational efficiency and capital adequacy to increase their profitability.

Riaz and Mehar (2013) explored the impact of both factors (bank specific and macroeconomic) on commercial bank’s profitability in Pakistan for the period of 2006-2010. Profitability is measured by accounting measures i.e. ROA and ROE and found that credit risk and interest rate are strong determinants of profitability. Azam and Siddiqui (2011) compare the domestic and foreign bank’s profitability in Pakistan and found that foreign banks are more profitable as compared with domestic banks as external factors of the country has less effect on foreign banks.

3. Hypothesis of the Study: Following Hypothesis are formed in the fulfillment of research objectives of this study.

H1: There is a significant relation between bank specific factors and banks performance.
H2: There is a significant relation between macroeconomic factors and banks performance.
H3: Value based measure performs better than accounting based measure.

4. Data and Methodology:

4.1 Sample Size. In the final sample, data related to banks performance, internal and external factors is collected for 16 banks for the period of 2009-2013.

4.2 Data Source. Secondary data source is used for the study. Data related to internal factors (bank specific variables) is collected from audited annual reports (Balance Sheet and Profit and Loss account) of selected commercial banks.

4.3 Variables of the Study. In order to examine the determinants of Banks performance total 9 variables are included in this study on the basis of literature reviewed. Two of them are Dependent variables; (i) EVA (value based measure) and (ii) ROE (accounting based measure). Remaining 7 variables are further divided into two groups i.e. internal determinants (bank specific) and external determinants (macroeconomics).

4.3.1 Dependent Variables. In this study, two dependent variables are used in order to know that which measure; either accounting based or value based can better explain banks performance.

\[
\text{Return on Equity} = \frac{\text{Net Profit after tax}}{\text{Total shareholders’ equity}} * 100
\]

According to its inventor – Stern Stewart, EVA is computed by deducting appropriate cost of capital from net operating profit. Thus, the model in its simple form is:
EVA\(^4\) = NOPAT – (Invested Capital × Cost of Capital) where;

Capital Invested = Book Value of Equity + Capitalized R&D Expenses + Long Term Loans

### 4.3.2 Independent Variables

Independent variables are further divided into two categories i.e. Bank specific and Macroeconomic variables. Table 1 shows the details of selected variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Measurement</th>
<th>Notation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank Specific (Internal Factors)</td>
<td>Capital Adequacy</td>
<td>CAR</td>
</tr>
<tr>
<td>Asset Quality</td>
<td>(Tier 1 Capital + Tier 2 Capital) / Risk Weighted Assets</td>
<td>ASQ</td>
</tr>
<tr>
<td>Deposits</td>
<td>Total loans and Advances / Total assets</td>
<td>TDTA</td>
</tr>
<tr>
<td>Efficiency</td>
<td>Interest income / Interest expense</td>
<td>EFF</td>
</tr>
<tr>
<td>Operating Efficiency</td>
<td>Operating Expense / Interest Income</td>
<td>OPEFF</td>
</tr>
<tr>
<td>Macroeconomics (External Factors)</td>
<td>Inflation</td>
<td>INF</td>
</tr>
<tr>
<td>Economic growth</td>
<td></td>
<td>GDP</td>
</tr>
</tbody>
</table>

Table 1. Measurement of Independent Variables

### 4.4 Model Specification

Following 2 models are estimated in this study:

\[
\text{ROE}_it = \alpha_0 + \alpha_1 \text{CAR}_it + \alpha_2 \text{ASQ}_it + \alpha_3 \text{TDTA}_it + \alpha_4 \text{EFF}_it + \alpha_5 \text{OPEFF}_it + \alpha_6 \text{INF}_it + \alpha_7 \text{GDP}_it + e_{it} \quad \text{Model (1)}
\]

\[
\text{EVA}_it = \alpha_0 + \alpha_1 \text{CAR}_it + \alpha_2 \text{ASQ}_it + \alpha_3 \text{TDTA}_it + \alpha_4 \text{EFF}_it + \alpha_5 \text{OPEFF}_it + \alpha_6 \text{INF}_it + \alpha_7 \text{GDP}_it + e_{it} \quad \text{Model (2)}
\]

### 4.5 Analysis Techniques

Balanced data set is used for the analysis. Descriptive analysis is performed to know the basic characteristics of dependent and independent variables and correlation analysis is performed to measure association between them. Simple pooled regression analysis is applied then, to know the significant determinants of banks performance.

Coefficient of determination (R\(^2\)) is used to know the explanatory power of EVA model and ROE model. Model with highest R\(^2\) will be selected as the best model to explain performance of banks and their determinants.

### 5. Empirical Results

Results of the study are explained in this section.

#### 5.1 Descriptive Analysis

Table 2 shows the descriptive statistics of dependent and independent variables, during the period of 2009 - 2013. It presents mean, median, minimum value, maximum value, standard deviation and number of observations. Minimum and maximum values mean the smallest and highest value of the selected variables in entire data set.

<table>
<thead>
<tr>
<th></th>
<th>EVA</th>
<th>ROE</th>
<th>CAR</th>
<th>ASQ</th>
<th>EFF</th>
<th>OPEFF</th>
<th>TDTA</th>
<th>INF</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>-0.0110</td>
<td>-0.1480</td>
<td>15.3915</td>
<td>0.4683</td>
<td>1.6369</td>
<td>0.9408</td>
<td>0.7502</td>
<td>11.4851</td>
<td>2.9008</td>
</tr>
<tr>
<td>Median</td>
<td>-0.0123</td>
<td>0.1032</td>
<td>13.3650</td>
<td>0.4508</td>
<td>1.5604</td>
<td>0.9221</td>
<td>0.7709</td>
<td>11.9708</td>
<td>3.5900</td>
</tr>
<tr>
<td>Maximum</td>
<td>0.6228</td>
<td>0.2751</td>
<td>57.0400</td>
<td>1.0397</td>
<td>3.2591</td>
<td>1.4549</td>
<td>0.9083</td>
<td>13.9383</td>
<td>4.3600</td>
</tr>
<tr>
<td>Minimum</td>
<td>-0.1662</td>
<td>-14.7427</td>
<td>0.5600</td>
<td>0.2989</td>
<td>0.8223</td>
<td>0.1384</td>
<td>0.4513</td>
<td>7.6800</td>
<td>0.3600</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>0.0840</td>
<td>1.7493</td>
<td>9.5406</td>
<td>0.1201</td>
<td>0.4406</td>
<td>0.2129</td>
<td>0.0989</td>
<td>2.4179</td>
<td>1.4123</td>
</tr>
<tr>
<td>Observations</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
<td>74</td>
</tr>
</tbody>
</table>

Table 2. Descriptive Summary

\(^4\) EVA (Economic Value Added) is basically a value based measure that takes in to account charge for opportunity cost of capital (Heffernan & Fu, 2008).
EVA is not presented in absolute terms of Pakistani Rupees in fact it has been standardized by dividing it by Invested Capital. Its Mean for all 16 banks over the period of 5 years is -0.011. Its standard deviation is estimated 0.084 over this period. This negative EVA means that nothing has been added to the owners’ worth during the period - loss of net worth of the owners. ROE has a mean value of -0.148 for all the 16 banks over the study period of 5 years. The standard deviation of ROE is estimated at 1.749 over the same time period.

Asset Quality (ASQ) has a mean value for 0.468 for all the 16 banks over the study period of 5 years. The standard deviation is estimated at 0.120 over the study period of 5 years. The standard deviation is estimated at 9.541 over the same time period. Mean value of efficiency (EFF) is 1.636 for all the 16 banks over the study period of 5 years. The standard deviation is estimated at 0.44. Operating efficiency (OPEFF) is 0.94 for all the 16 banks over the study period of 5 years on average. The standard deviation is estimated at 0.212 over the same time period. Mean value of Deposits (TDTA) is 0.75 for all the 16 banks over the study period of 5 years. The standard deviation is estimated at 0.099 over the same time period.

Inflation (INF) has a mean value of 11.485 for all the 16 banks over the study period of 5 years. The standard deviation is estimated at INF 2.418 over the same time period. Mean value of GDP is 2.901 for all the 16 banks over the study period of 5 years. The standard deviation is estimated at 1.412 over the same time period.

5.2 Correlation Analysis. Table 3 presents the correlation coefficients of dependent and independent variables. It shows that there is a positive correlation between EFF and EVA having correlation coefficient of 30.4 %. It also indicates positive relationship between ASQ and EVA, TDTA and EVA having coefficients of 9.1 % and 2.7 % respectively. OPEFF is negatively correlated with EVA at 13.9 %.

It also shows that there is a positive correlation between CAR and ROE having correlation coefficient of 21.42 %. It also indicates positive relationship between EFF and ROE having coefficients of 25.2 %. GDP is positively correlated with ROE at 24.4%.

<table>
<thead>
<tr>
<th></th>
<th>EVA</th>
<th>ROE</th>
<th>CAR</th>
<th>ASQ</th>
<th>EFF</th>
<th>OPEFF</th>
<th>DEP</th>
<th>INF</th>
<th>GDP</th>
</tr>
</thead>
<tbody>
<tr>
<td>EVA</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ROE</td>
<td>-0.0769</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAR</td>
<td>0.5152</td>
<td>0.0969</td>
<td>2142</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASQ</td>
<td>0.0411</td>
<td>0.0910</td>
<td>-0.0270</td>
<td>-0.3019</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EFF</td>
<td>0.4407</td>
<td>0.3040</td>
<td>0.2524</td>
<td>0.3290</td>
<td>-0.1764</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OPEFF</td>
<td>0.0084</td>
<td>0.0013</td>
<td>0.0300</td>
<td>0.0042</td>
<td>0.1327</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDTA</td>
<td>0.2359</td>
<td>0.0273</td>
<td>0.0237</td>
<td>-0.5321</td>
<td>0.1019</td>
<td>0.0599</td>
<td>-0.1823</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>INF</td>
<td>0.8174</td>
<td>0.1301</td>
<td>-0.1515</td>
<td>0.0339</td>
<td>0.2059</td>
<td>0.0241</td>
<td>0.0982</td>
<td>-0.1934</td>
<td>1</td>
</tr>
<tr>
<td>GDP</td>
<td>0.8174</td>
<td>0.1301</td>
<td>-0.1515</td>
<td>0.0339</td>
<td>0.2059</td>
<td>0.0241</td>
<td>0.0982</td>
<td>-0.1934</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3. Correlation Matrix
5.3 Regression Findings. Results of model 1 are presented in Table 4, with taking EVA as dependent variable. It shows that Capital adequacy ratio (CAR) is significant at 1% level of significance and positively associated with EVA. Efficiency and asset quality are also significant at 10% level of significance and have positive relation with dependent variable i.e. EVA. All other internal factors (bank specific) are insignificant. In external factors GDP is significant and positively associated with EVA; whereas INF is insignificant.

R² of the model is 0.2831 and adjusted R² is 0.1961. It shows that 28.3% variation in the dependant variable (EVA) is explained by the explanatory variables. Further, it is found that F-statistic for the model is highly significant which shows that overall model is significant.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficients</th>
<th>Std. Errors</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>0.04304</td>
<td>0.00154</td>
<td>0.007</td>
</tr>
<tr>
<td>ASQ</td>
<td>0.16567</td>
<td>0.09925</td>
<td>0.09</td>
</tr>
<tr>
<td>TDTA</td>
<td>-0.0425</td>
<td>0.14026</td>
<td>0.763</td>
</tr>
<tr>
<td>EFF</td>
<td>0.07724</td>
<td>0.03992</td>
<td>0.057</td>
</tr>
<tr>
<td>OPEFF</td>
<td>0.11633</td>
<td>0.07695</td>
<td>0.135</td>
</tr>
<tr>
<td>INF</td>
<td>0.00291</td>
<td>0.00634</td>
<td>0.648</td>
</tr>
<tr>
<td>GDP</td>
<td>0.02746</td>
<td>0.01094</td>
<td>0.014</td>
</tr>
<tr>
<td>C</td>
<td>-0.35204</td>
<td>0.19278</td>
<td>0.072</td>
</tr>
<tr>
<td>R² - squared</td>
<td>0.2831</td>
<td>F-statistic</td>
<td>3.42</td>
</tr>
<tr>
<td>Adjusted R - squared</td>
<td>0.1961</td>
<td>Prob(F-statistic)</td>
<td>0.0035</td>
</tr>
</tbody>
</table>

Table 4.

Results of model 2 are presented in Table 5, with taking ROE as dependent variable. Results presented in table shows that only two internal factors are significant. Capital Adequacy Ratio and Operating Efficiency are significant at 5% and 1 % level of significance respectively. CAR is positively related with ROE whereas OPEFF is negatively associated with ROE. All other internal factors (bank specific) are insignificant. Inflation (external factor) is insignificant whereas GDP is significant at 5 % level of significance and have positive association with ROE.

R² of the model is 0.259 and adjusted R² is 0.1815. it shows that 25.9% variation in the dependant variable (ROE) is explained by the explanatory variables.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Coefficients</th>
<th>Std. Errors</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR</td>
<td>0.05936</td>
<td>0.02587</td>
<td>0.025</td>
</tr>
<tr>
<td>ASQ</td>
<td>2.2583</td>
<td>1.66856</td>
<td>0.18</td>
</tr>
<tr>
<td>TDTA</td>
<td>1.53784</td>
<td>2.35803</td>
<td>0.517</td>
</tr>
<tr>
<td>EFF</td>
<td>-0.66142</td>
<td>0.67118</td>
<td>0.328</td>
</tr>
<tr>
<td>OPEFF</td>
<td>-3.87925</td>
<td>1.29369</td>
<td>0.004</td>
</tr>
<tr>
<td>INF</td>
<td>0.0683</td>
<td>0.10651</td>
<td>0.524</td>
</tr>
<tr>
<td>GDP</td>
<td>0.37704</td>
<td>0.18383</td>
<td>0.044</td>
</tr>
<tr>
<td>c</td>
<td>-0.42806</td>
<td>3.24085</td>
<td>0.895</td>
</tr>
<tr>
<td>R² - squared</td>
<td>0.259</td>
<td>F-statistic</td>
<td>3.34</td>
</tr>
<tr>
<td>Adjusted R - squared</td>
<td>0.1815</td>
<td>Prob(F-statistic)</td>
<td>0.0041</td>
</tr>
</tbody>
</table>

Table 5.
6. Conclusion: The purpose of this study is to scrutinize the impact of bank-specific and macro-economic determinants on Pakistani commercial bank’s performance. For the performance measurement, two different measures are used i.e. accounting based measure (ROE) and value based measure (EVA). The study also aims to identify that which measure is superior in explaining performance of banks. Pooled regression is applied on balanced data set. Assets quality (ASQ), Efficiency (EFF), Capital Adequacy ratio (CAR), Deposits and assets ratio (TDTA) and Operating efficiency (OPEFF) are taken as bank-specific variables whereas Economic Growth (GDP) and Inflation (INF) are taken as macro-economic variables.

Results of the study show that CAR and GDP are significant and positively related with both the measures i.e. EVA and ROE. Other than these variables, EFF and ASQ are significant and have positive association with EVA. Inflation and TDTA are found insignificant in both models.

Overall results show that EVA has more significant results as compared to ROE. Further, explanatory power (R²) of value based measure (EVA model) is more i.e. 28.3 % as compared with accounting based measure (ROE model) i.e. 25.9 %.

Findings of the study are helpful for the banks management as they can anticipate and effectively manage their internal factors and external factors that contributes in boosting their performance.

REFERENCES


