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JOURNAL AND OTHER ARTICLES

- Schemenner, R.W., Huber, J.C. and Cook, R.L. (1987), "Geographic Differences and the Location of New Manufacturing Facilities," Journal of Urban Economics, Vol. 21, No. 1, pp. 83-104.

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ROBOT MANIPULATOR CONTROL USING INTELLIGENT CONTROL SCHEME

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ABSTRACT

An intelligent controller trained with inverse dynamics as well as kinematics neural network as well as Proportional-Integral-Derivative (PID) control for controlling a manipulator with n number of Degrees of freedom is presented. The controller design is built around the positive framework of Proportional-Integral-Derivative (PID) control with the added simplicity of neural network. The dynamic control technique in which the rigid-body dynamic model is inverted to compute the demand torque for the robot based on current joint angles and joint angle rates and demand joint angle acceleration. The neural network controller was trained for inverse dynamics of robot manipulator. Error converges to minimum swiftly by learning the inverse dynamics of manipulator. The performance of controller is simulated with acceptable outcomes.

KEYWORDS

PD/PI/PID Controller; Degree of Freedom; Radial Basis Function; Sliding Mode Neural Network; Backpropagation Network.

INTRODUCTION

By applying the PD as well as Proportional Integral Derivative (PID) controller, the stability of an industrial robot manipulator of 6 Degree of Freedom (DOF) has been investigated under model disparity. The position and velocity error upper bounds values are found by applying Craig's quadratic half-plane constraint analysis to guarantee the stability of the robot arm under Proportional Derivative (PD) as well as PID control [1].

A different design procedure and stability analysis for robotic variable structure controllers with PID like sliding surfaces has been presented with the help of two versions of the controller: regular and adaptive. Both controllers have shown robustness with respect to bounded external disturbances and some unmodeled dynamic effects. Testing results shown better stability, with minimum transient responses then traditional PD manifold controllers [2].

The PID tracking control problem of robotics manipulators have been solved with arbitrary small output tracking error and semiglobal stability by developing a different PID control configuration in terms of a parameter that is directly related with the size of the region of attraction and the size of the residual set. Tuning guidelines are extracted from the stability analysis [3].

Without solving the inverse Jacobian as well as inverse kinematics for deriving manipulator to a specified desired position and orientation in Cartesian space by using Lyapunov function with virtual artificial potential energy, a class of Complete transpose Jacobian-based nonlinear PID regulator is proposed for robot manipulators with uncertain kinematics on the basis of the set of all continuous differentiable increasing functions [4].

The position regulation problem of robot manipulators under constrained control input has been discussed. The robot system under a saturated linear PID control is semiglobally asymptotically stable, if the torque bounds are larger than gravitational torques, and if the proportional gain is large enough and the integral gain is small enough [5].

A sliding mode neural-network (SMNN) control system for the tracking control of an n rigid-link robot manipulator to achieve high-precision position control was presented to overcome some of the shortcomings of conventional robust controllers such as a model-based adaptive controller requires the system dynamics in detail; the fuzzy rule learning scheme has a latent stability problem; an adaptive control scheme for robot manipulator via fuzzy compensator requires strict constrained conditions and prior system knowledge. A neural network controller was developed to mimic an equivalent control law in the sliding-mode control, and a robust controller is designed to curb the system dynamics on the sliding surface for guaranteeing the asymptotic stability property [6].

To achieve high precision position control, an adaptive control system was proposed for the tracking control of an n -link robot manipulator. The adaptive control system was divided into three parts: a feedforward controller, a state feedback controller and an uncertainty alleviator. All online tuning algorithms in the adaptive control system are derived using Lyapunov stability analysis; so that system tracking stability can be guaranteed in the closed loop system whether the uncertainties occur. It has learning ability similar to intelligent control, but with a simpler control framework [7].

A scheme using a class of adaptive robust hybrid position/force control of robot manipulator with bound estimation and stability based on Lyapunov for nonlinear and time varying uncertainties was presented [8].

The extended controller as a computed-torque control with an external PID, whose gain matrices vary with the position and velocity of the robot joints was presented. In addition, in order to increase the controller robustness, an extension of the algorithms with saturation functions was carried out. The extension dealt with the resulting nonlinear equation of the closed loop error [9].

To study the motion of the robot it is necessary to identify the forward as well as inverse of dynamics in addition to kinematics of a robot manipulator. One can use already derived methods based on Denavit Hartenberg (DH) algorithm for forward as well as inverse kinematics plus the Lagrange method or Recursive Newton Euler formulation for calculating the forward as well as inverse dynamics of any robot manipulator [10].

Adaptive evolutionary switching PD control was proposed for iterative operations of robot manipulators. The proposed control method was a combination of the feedback of PD control with gain switching and feedforward using the input torque profile obtained from the previous iteration. The asymptotic convergence

of the control method is theoretically proved using Lyapunov method. The philosophy of the switching control strategy was interpreted in the context of the iteration domain to increase the speed of the convergence for trajectory tracking of robot manipulators [11].

A state space model free robust control approach was proposed for position control of robot manipulators. The control approach was verified analytically to be robust subject to uncertainties including external disturbances, unmodeled dynamics, and parametric uncertainties. The proposed control approach could guarantee the robustness of control system [12].

A population based adaptive tuning for dynamic position control of robot manipulators was proposed in which the PID controller parameters were tuned using cross-entropy optimization to minimize the error in tracking a repeated desired trajectory in real-time. As the dynamic behaviour of a robot manipulator is highly nonlinear, and the positional control is conventionally achieved by inverse dynamics feedforward and PID feedback controllers. The stability was achieved by switching the inappropriate settings to a stable default using a real-time cost evaluation function [13].

Since the model-based adaptive control can completely account for nonlinear structure of robot dynamics, the associations between the kinematics design and tracking performance of the model-based adaptive control were studied by convergence of the position tracking error of three serial manipulators with joint types of Revolute-Revolute (RR), Revolute-Prismatic (RP) and Prismatic-Prismatic (PP). The physical parameters and desired trajectories were assumed same for the proper comparison [14].

A neural network global PID sliding mode control method for the tracking control of robot manipulators with bounded uncertainties was presented by tuning the switching gain through a Radial Basis Function (RBF) neural network on the reachable condition of sliding mode. Due to this, the effect of chattering can be alleviated. Apart from this, global sliding mode was realized by designing an exponential dynamic sliding function. Stability and convergence of the control system was proved mathematically [15].

A new approach for the control of Two link robotic manipulator systems using Neural Network and PD/PID controller was presented, in which the first method is based on PD control and the second method is based on PID controller, the third method is based on artificial Neural Network based PD controller, and the forth method is based on artificial Neural Network based PID controller for control of Two link robot [16].

An output feedback PID controller for anti-windup design by using a one-order linear filter is employed to estimate the joint velocity of robot manipulators. By forcing the constraints on the integral action of PID controller, the problems raised from integrator windup was solved and robustness as well as asymptotic stability of the resulting system was guaranteed in the presence of Jacobian uncertainty [17].

An adaptive PID controller based on tuning of back propagation (BP) neural network was presented by keeping in mind that according to the requirements of system output performance, the BP neural network can auto adjust its weights to vary k_p (Proportional gain), k_i (Integral gain) and k_d (Differential gain) parameters. The simulated electro-hydraulic position servo control system using adaptive PID controller based on BP neural network showed that it can get better control characteristics and adaptability, strong robustness in the nonlinear and time vary system [18].

A self-tuning PID controller based on improved BP neural network to solve the difficult problem that how to reduce the overshoot and shorten the regulating time of the PID controller based on BP neural network was presented. The rand noise was added to the input to test the robustness. The parameters of the PID controller were calculated by an improved BP Neural Network according to the input and output and the error of the PID controller. The Fletcher-Reeves conjugate gradient method was used for the dynamic adjustment for learning rate to improve [19].

A saturated nonlinear PID regulator for industrial robot manipulators was presented. Mainly three problems were considered. Firstly, the natural saturation problem given by the output of the control computer, second was the saturation phenomena of the internal PI velocity controller in the servo driver plus and third was the actuator torque constraints of the robot manipulator was presented. An approach based on the singular perturbations method was used to analyse the exponential stability of the closed-loop system [20].

A neural network based chattering free sliding mode control (SMC) by incorporating a PID controller for robot manipulators was presented for structured and unstructured uncertainties in both manipulator and actuator dynamics. By doing this, the robustness property of SMC and good response characteristics of PID were combined together to improve performance of robot manipulator. Uncertainties were compensated by a two-layer neural network. External disturbance and approximation error were tried to neutralize by robust signal with adaptive gain [21].

ROBOT DYNAMICS

To describe more a robot consists of a set of moving rigid links which are connected in a serial chain and its motion equation is given by:

$$M(q)\ddot{q} + V(q, \dot{q})\dot{q} + G(q) = \tau \quad (1)$$

Where,

q : $nx1$ position vector,

$M(q)$: nxn inertia matrix of the manipulator,

$V(q, \dot{q})$: $nx1$ vector of Centrifugal and Coriolis terms

$G(q)$: $nx1$ vector of gravity terms

τ : $nx1$ vector of torques

By writing the velocity dependent term $V(q, \dot{q})$ in a different form, all the matrices become functions of only the manipulator position; in this case the dynamic equation is called configuration space equation and has the following form:

$$\tau = M(q)\ddot{q} + B(q)\dot{q} + C(q)\dot{q}^2 + G(q) \quad (2)$$

Where,

$B(q)$: $nxn(n-1)/2$ matrix of Coriolis torques

$C(q)$: nxn matrix of Centrifugal torques

$\dot{q}\dot{q}$: $n(n-1)/2 \times 1$ vector of joint velocity products given by:

$$\begin{bmatrix} \dot{q}_1\dot{q}_1, \dot{q}_1\dot{q}_2, \dots, \dot{q}_1\dot{q}_n, \dot{q}_2\dot{q}_2, \dot{q}_2\dot{q}_3, \dots, \dot{q}_2\dot{q}_n, \\ \dots, \dot{q}_{n-2}\dot{q}_{n-2}, \dot{q}_{n-2}\dot{q}_{n-1}, \dot{q}_{n-1}\dot{q}_{n-1}, \dot{q}_{n-1}\dot{q}_n \end{bmatrix}$$

\dot{q}^2 : $nx1$ vector given by:

$$\begin{bmatrix} \dot{q}_1^2, \dot{q}_2^2, \dots, \dot{q}_n^2 \end{bmatrix}$$

To derive the model of the robot arm started by generating the kinetic energy matrix and gravity vector symbolic elements by performing the summation of either Lagrange's or the Gibbs-Alembert formulation; these elements are then simplified by combining inertia constants that multiply common variable expressions. The Coriolis and centrifugal matrix elements are then calculated in terms of partial derivatives of kinetic energy, and then reduced using four

relations that hold on the partial derivatives. Finally, the necessary partial derivatives are formed, and the Coriolis and centrifugal matrices are found. A simplification step is then done by combining the inertia constants that multiply the common variable expressions.

PID CONTROLLER

Industrial controllers may be classified according to their control actions as:

- (A). Proportional controllers
- (B). Integral controllers
- (C). Proportional-plus-integral controllers
- (D). Proportional-plus-derivative controllers
- (E). Proportional-plus-integral-plus-derivative controllers

For a controller with proportional control action, the relationship between the output of the controller $u(t)$ and the actuating error signal $e(t)$ is:-

$$u(t) = k_p e(t) \quad (3)$$

Where $e(t)$ the error is signal and k_p indicates proportional gain. Proportional term is not sufficient to be a controller in practical cases to meet a specified requirement like small overshoot, good transient response, because the large proportional gain gives fast rising time with large overshoot and oscillatory response. So a derivative term is added to form Proportional Derivative (PD) controller, which is able to regulate the response as the process approaches the set point. The output of PD controller is calculated based on the sum of both current error and change of error with respect to time. The effects of PD give a slower response with less overshoot than a proportional controller. Mathematically, PD controller is represented as:-

$$u(t) = k_p e(t) + k_d \frac{de(t)}{dt} \quad (4)$$

Where k_d represents derivative gain.

Integral control if added to PD control, it reduces the effect of steady state error that may be caused by the proportional gain. The general form of the PID controller in continuous time is given as:-

$$u(t) = k_p e(t) + k_i \int_0^t e(t) dt + k_d \frac{de(t)}{dt} \quad (5)$$

Each of the three components of PID controller, is amplified by an individual gain, the sum of the three terms is applied as an input to the robot manipulator to adjust the parameters. It is important to see that the purely derivative or integral plus derivative variants never used. In all cases except proportional control, the PID compensator gives at least one pole and one zero.

The transfer function of the PID controller can be represented in serial as well as parallel form as follows:-

$$G_{series}(s) = \left(k_p + \frac{k_i}{s}\right) (k_d s + 1) \quad (6)$$

$$G_{parallel}(s) = k_p + \frac{k_i}{s} + k_d s \quad (7)$$

CONTROLLER STRUCTURE

The NN controller has been trained by the input as well as output data set of inverse dynamics of PUMA ROBOT manipulator. The NN controller can work alone as the controller if one wants to work for inverse dynamics of robot manipulator or it can be used in parallel with other controllers. First started with simple structure to get the satisfactory results and then by increasing the complexity of controller and solve the problem using trained NN controller. The first model is shown in FIGURE 1. After training the network with some known trajectories it was observed that the controller was not stable initially and couldn't trace the path. It seemed that the problem was very odd for the network to be solved and the NN controller needs lot of samples in order to learn the inverse dynamics of the system. With a simple calculation one can see that more than millions of samples are required in order to train the ANN for a 3 DOF robot.

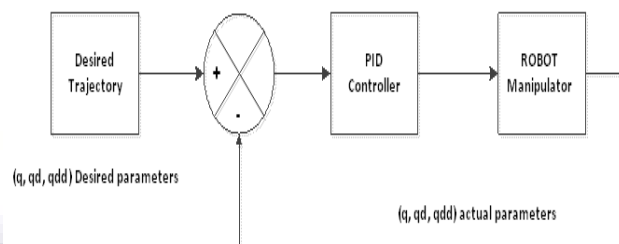


FIGURE1:Neural Network Control of ROBOT Manipulator

The problem is due to the fact that the search space for finding proper weights for neurons are very large and the NN controller inputs make a very wide dominance. To narrow the search space, first a simple but effective PID controller to trace the desired path is used. The PID accepts the angle and angular velocities of the joints and generates the required torque for the motors. Though PID controller generally doesn't perform well when the error is not within satisfactory range, but the data collected from the PID controller can be used for training the NN controller. After training the NN controller by input output data which was received from PID controller, the NN controller was used as a controller in parallel to PID and new data samples for training were generated. The sampled data from simulation of PID and ANN can be used to further train the ANN and increase its performance. With this configuration the NN controller tried to solve the inverse dynamics of the system within a close range to the desired path and it generates the torques that are required to be applied by the motors such that the robot manipulator follows the desired path. If the NN controller solves the inverse dynamics of the system without error then the output of PID is zero and the controller can trace the path without error. But if there is an error in the output of the NN controller, the PID controller will compensate it. Apparently maximum number of times the robot manipulator is doing a monotonous job and the path that joints are following is periodic. If period is define of the robot manipulator path as one cycle then the NN controller is trained in every cycle and the network recognizes the robot manipulator performance in more detail. It means that after completion of every cycle the performance of the robot manipulator improved and the error between desired trajectory path and the trajectory robot manipulator follows tends to minimum. After carrying out simulations, the results showed that the error converges to minimum and it can be reduced further to arbitrary value by applying enough number of trainings. FIGURE 2 shows the structure of this controller.

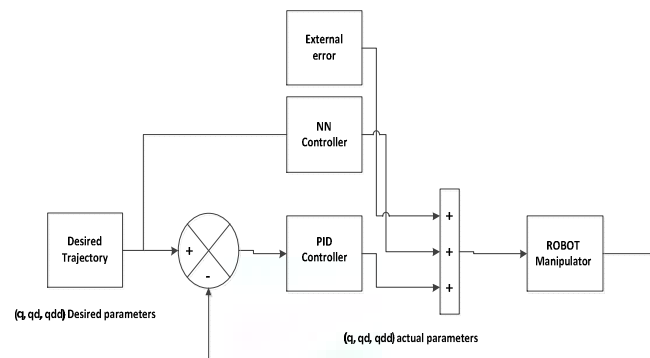


FIGURE2: PID+Neural Network Control of ROBOT Manipulator

A. Neural Network structure

1) Inputs and outputs

In order to simplify the problem of inverse dynamics for every joint one neural network was constructed. In other words every neural network outputs one torque for a motor and for an N DOF robot manipulator, the NNC (Neural Network Controller) consists of n separate networks. The input of every network is joint angle, angular velocity and angular acceleration of all the joints. The NNC in our case consists of 6 ANN with total 18 inputs and one output. Another candidate for the structure of the robot manipulator is having only one input per joint which can be the joint angle and developed the network as a dynamic network with delays in the first layer in order to rebuild the angular acceleration and velocity of every joint. The sample time of the controller loop must be fixed with the change in controller frequency to retrain the network from the start. For training neural networks with recursive layers was avoided due to need of longer time duration but these networks are more efficient for solving differential equations with nonlinearity.

2) Network structure

Neural network consists of two hidden layer was used in which the sigmoid function was used for first layer output function and linear function was used for the second layer output function.

3) Training Method

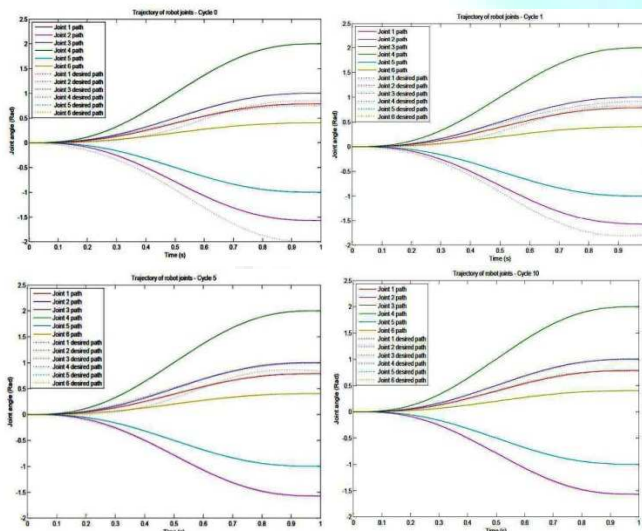
The data was received from the inverse dynamics of the system by the use of Simulink diagram created with the help of Matlab. The complete neural network was trained in the back propagation mode and all the weights were updated according to the new training data. Both the incremental learning and Back Learning were used but the incremental learning is very slow and more often the weights are trapped in the local minimum.

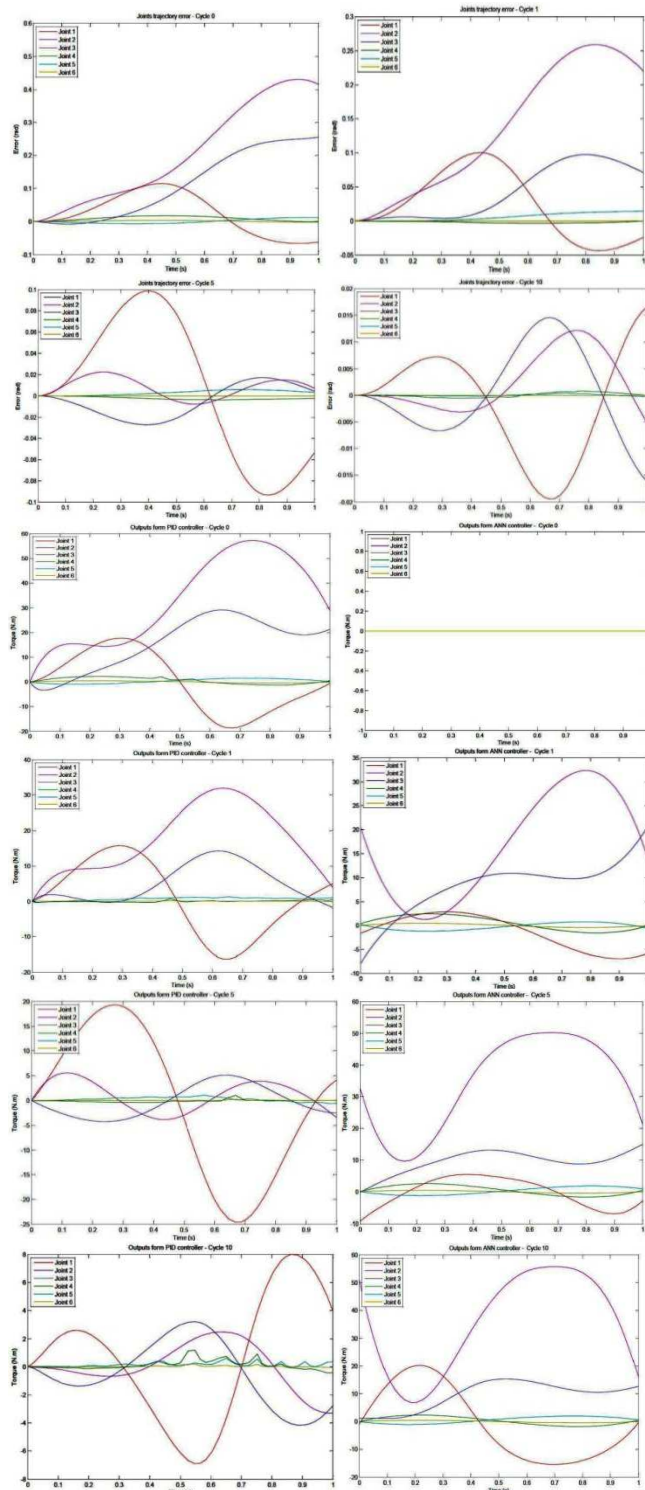
RESULTS AND DISCUSSION

Performance of the controller has been validated using 2 DOF as well as 6 DOF robot manipulators. First manipulator is a two DOF planner manipulator robot and second one is PUMA560. The parameters for both have been taken from [22].

The motion of robot between two points in joint space is illustrated in the following graphs. Robot manipulator path was generated by simulating the mathematical equations for computing joint space trajectory between two points of a path from [HYPERLINK \l "Lew93" 22] and is a polynomial to the order of 5. The values for the PID controller are $K_p = 100$, $K_d = 50$ and $K_i = 5$. In the graphs the trajectory path of the robot manipulator as well as error of the controller is shown. The other graphs show a comparison between the output of PID controller and the output of NN controller. It is shown that as the training continues the PID controller's output reduces and the NN controller generates the main signal for the robot manipulator control.

It was observed that after the first cycle of training the controller solves the inverse dynamics of the robot manipulator very fast. The performance of the system depends on the number of neurons in the controller network as while increasing the number of neurons increases, but on the contrary the error of the system decreases in same ratio and all it depends on amount of training data.





CONCLUSION

In this paper an efficient method for control of a manipulator with n degrees of freedom is presented. The Neural Network Controller (NNC) is used to identify both the dynamics and the kinematics of a manipulator. Though the controller is only getting fair results during the first cycles of a new path but later converging to minimum during repetitive performance of robot manipulator. The controller design is independent from parameters of the system and controller learns the system parameters during its operation.

REFERENCES

- [1] K. P. Valvanis, T. B. Larsson, and S. P. Gardner, "PD and PID model-based control stability analysis of the PUMA-560 robot manipulator under model mismatch," *Journal of Intelligent and Robotic Systems*, vol. 7, pp. 233-254, 1993.
- [2] Y. Stepaneko, Y. Cao, and C. Yi Su, "Variable structure control of robotic manipulators with PID sliding surfaces," *International Journal of Robust and Nonlinear Control*, vol. 8, pp. 79-90, 1998.
- [3] I. Cervantes and J. A. Ramirez, "On the PID tracking control of robot manipulators," *Systems & Control Letters*, vol. 42, pp. 37-46, 2001.
- [4] C. Q. Huang, X. G. Wang, and Z. G. Wang, "A Class of Transpose jacobian based NPID regulators for robot manipulators with an uncertain kinematics," *Journal of Robotic Systems*, vol. 19, no. 11, p. 527-539, 2002.

- [5] J. A. Ramirez, R. Kellyb, and I. Cervantes, "Semiglobal stability of saturated linear PID control," *Automatica*, vol. 39, p. 989–995, 2003.
- [6] R. J. Wai, "Tracking control based on neural network strategy for robot manipulator," *Neurocomputing*, vol. 51, p. 425–445, 2003.
- [7] R. J. Wai, C. Y. Tu, and K. Y. Hsieh, "Adaptive tracking control for robot manipulator," *International Journal of Systems Science*, vol. 35, no. 11, pp. 615–627, 2004.
- [8] I. C. Ha and M. C. Han, "Robust Hybrid Position/Force Control with Adaptive Scheme," *IJSME International Journal*, vol. 47, no. 4, pp. 1161–1165, 2004.
- [9] M. G. Ortega, M. Vargas, C. Vivas, and F. R. Rubio, "Robustness Improvement of a Nonlinear Ho Controller for Robot Manipulators via Saturation Functions," *Journal of Robotic Systems*, vol. 22, no. 8, p. 421–437, 2005.
- [10] M. W. Spong, S. Hutchinson, and M. Vidyasagar, *Robotics Modelling and Control*. John Wiley and Sons, 2005.
- [11] P. R. Ouyang, W. J. Zhang, and M. M. Gupta, "An Adaptive Evolutionary Switching Control For Robot Manipulators," in *Computers and Information in Engineering Conference*, Long Beach, California USA, 2005, pp. 24–28.
- [12] A. Izadbakhsh and M. M. Fateh, "A Model-Free Robust Control Approach for robot manipulator," *World Academy of Science, Engineering and Technology*, vol. 29, pp. 205–210, 2007.
- [13] M. Bodur, "An Adaptive Cross-Entropy Tuning of the PID Control for Robot Manipulators," in *Proceedings of the World Congress on Engineering*, vol. I, London, UK, 2007.
- [14] S. Kucuk, "Effects of Kinematics Design on Tracking Performance of MODEL based adaptive control," pp. 655–663, 2007.
- [15] T. C. Kuo and Y. J. Huang, "Neural Network Global Sliding Mode PID Control for Robot Manipulators," in *World Congress on Engineering*, vol. I, London, UK, 2007.
- [16] L. F. Araghi, M. H. Korayem, A. Nikoobin, and F. Setoudeh, "Neural Network Controller Based on PID controller for two link robot manipulator," in *World Congress on Engineering and Computer Science*, San Francisco, USA, 2008.
- [17] H. Chunqing and P. Xiafu, "Output-Feedback PID Controllers for Robot Manipulators with Jacobian uncertainty," in *International Conference on Intelligent Systems Design and Applications*, vol. 8, 2008, pp. 329–334.
- [18] B. Guo, H. Liu, Z. Luo, and F. Wang, "Adaptive PID Controller Based on BP Neural Network," in *International Joint Conference on Artificial Intelligence*, 2009, pp. 148–150.
- [19] K. Jiangming and L. Jinhao, "Self-Tuning PID Controller Based on Improved BP Neural Network," in *International Conference on Intelligent Computation Technology and Automation*, vol. 2, 2009, pp. 95–98.
- [20] V. Santibañez, K. Camarillo, J. M. Valenzuela, and R. Campa, "A Practical PID Regulator with Bounded Torques for Robot Manipulators," *International Journal of Control, Automation, and Systems*, vol. 8, no. 3, pp. 544–555, 2010.
- [21] S. E. Shafiei and M. R. Soltanpour, "Neural Network Sliding Mode PID Controller design for electrically driven Robot Manipulator," *International Journal of Innovative Computing, Information and Control*, vol. 7, no. 2, pp. 511–524, Feb. 2011.
- [22] F. L. Lewis, C. T. Abdallah, and D. M. Dawson, *Control of Robot Manipulators*. New York, US: Macmillan, 1993.

SECURITIZATION AS A FACTOR OF ECONOMIC INTEGRATION

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ABSTRACT

This paper is aimed to show that securitization, a concept of the State security theory provide some elements to obtain a more complete vision linked to other sciences about the economic integration processes. Until now, economic integration is studied by diverse strands of economic thought, exhausting the conceptual frameworks in reinterpretations impeding progress in the explanation of motivations of Nations to be economically linked. Here it has been linked to the categories of economic integration and the State security theory, to give an answer to the question of whether economic integration is a process that is explained by it or if it is determined by the search for security of States. As a conclusion of the study, it proposes a conceptual model of economic integration and economic regionalization, as resulting from the process of securitization.

KEYWORDS

Economic integration, State security, securitization.

JEL

F15, F41, F49.

INTRODUCTION

It calls the attention that international policy experts refer to Mexico as a nation member of the *Northern command* in issues of safety and security of the United States of America, rather than a partner of the North America Free Trade Agreement in the commercial field. This is due to that according to the authors of the security theory (Buzan, 2001 and Lipschutz, 1995) the motives of security of States are put before the economic and even more, the economic aspects coalesce to the spectrum of security. This essay aims to propose an analysis of the formation and transformation of economic integration zones starting from the approach of securitization of the theory of security, in congruence with changes in globalization after the Cold War and the intensification of international economic exchange.

While the authors of economics profile (Balassa, 1964, and Meade, 1957) consider that economic integration precedes political integration, in a way that economic communities evolve into political unions over time, in this essay is considered the assumption that at the international level, politics - in this case the security of States — is a factor in economics and not vice versa. In the first part of the work, is noted the background of the case studied, exposing it as a problem of methodological approach, as theorists of economic integration have not addressed it from new approaches, only limited to economic schemes.

A second part corresponds to the analysis, which conforms at a time of four points. On the first point of the analysis it is set out the basic elements of the securitization, key concept built by the recent contributions of the Security Theory (ST), drawing in particular on the approach to integration, which is the concept of bonding with the theory of economic integration (TEI). This theory is taken to continue the analysis of its main authors which refer to different forms of economic integration. In this analysis, special emphasis is placed in that the TEI notes isolation from the political, military, cultural and environmental phenomena occurring in the global context.

The model of economic integration under the focus of the securitization is proposed as penultimate paragraph of the analysis. Finally, this essay ends with the analysis by applying the securitization model to show the implementation of the proposal in two examples: the Treaty of the North American free Trade Agreement (NAFTA) and other of the European Union (EU). At last, it is concluded that it has been inferred as a finding of this research, new elements for analysis and better understanding of the formation and development of the areas of economic integration from the securitization.

Determinants in this essay have been the constant and timely observations of José G. Vargas-Hernández MBA; Ph.D., on methodological aspects as well as those of the Master María Luisa Andrea Concha Gutiérrez for her insistence on the right frame of reference of securitization.

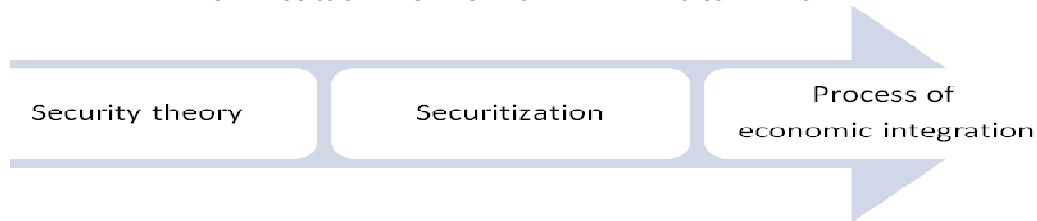
BACKGROUND OF THE PROBLEMATIC ECONOMIC INTEGRATION STUDY

Economic integration, understood as the link between two or more economies in order to intensify the exchange of economic factors, whether it is goods, services, capital, technology, etc., (Carbaugh, 2009, Martinez, 2000, and Samuelson, 2006) has so far been explained in isolation to other processes. The securitization, as a process to remove the threat to the State, or to the interests of dominant groups in society, provides a set of conceptual tools to put in context economic integration as a process that takes place at the same time inside the other larger process (Buzan et al)(1998, Wæver, 1998; and Larrechea, 2008).

Theorists of economic integration (Balassa, 1964, and Tamames, 2003) so far have limited the linkage between the States to grounds of motives and ends of purely economic purposes, which contrasts with the most recent work of theorists of security (Buzan, 2001, and Lipschutz, 1995) who in the recent developments have been considered as possible means or result of the process of security (securitization), integration in other fields. The studies that make up the TEI have being conducted out of the work of Viner (1950), in some cases on the basis of previous proposals that relate to other theories such that of capitalist development, imperialism and underdevelopment, among the most important.

In this work it is proposed as an assumption that the securitization of the interests of hegemonic national groups, is of course one of the main reasons for the economic integration between States. Therefore, the objective is to propose the analysis of the formation and transformation of areas of economic integration from the approach of securitization of the theory of security, in keeping with changes in globalization after the Cold War. Figure 1 shows the most relevant aspects of the integration process driven by the securitization.

FIG. 1: PROCESS OF INTEGRATION MOTIVATED BY THE SECURITIZATION



Source: Own drawing

The problem is addressed with the review and comparison of the literature on the various approaches of *integration* from the perspective of the TEI with the approach of the *securitization* of the ST and the formation of Regional Security Complexes (RSC) and Overlay processes (both are described in the following sections). Once built the proposal for a conceptual model, applies two examples with the cases of North America Free Trade Agreement (NAFTA) and of the European Union (EU) as resources for review if there are elements defined by the securitization to the case of economic integration which for the ST is the North America subsystem. The above does not mean that throughout the review and comparison are rescue the elements that allow achieving the goal.

ECONOMIC INTEGRATION AS PART OF THE SECURITIZATION PROCESS

Though many of the theorists of economic integration (Scitovsky, 1959 and Tamames, 2003) they believe that the reason for such linkage is economic and its aims are purely economic. Other theorists considered implicitly that the purposes may be political, as the case of Balassa (1964), for whom the political purposes can be achieved by economic integration. Recent authors, however propose a clearer line by saying that unlike the experience of the regional integration of the 1930s, in the 1990s everything indicates that United States is tilted in favor of the use of a combination of commercial and financial instruments, but subsumed in a geopolitical conceptualization of national security (Rosas, 1996: 1).

A. Security theory (ST)

The intensification of globalization from the seventies of the last century and the end of the Cold War, gave way to a new vision on the security of nations, as well as studies on it. These studies on the safety of the Nations were conducted mainly at the Research Institute for the Peace of Copenhagen, leading to the development of the ST, as part in turn of a more general theory of international relations.

It is the so-called Copenhagen School - which is named after the specialist in the subject Mc Sweeney (1999) - from which are prominent driving authors as Barbé, (2007); Solomon (2002); Weaber (1998) and in particular Buzan et al (1998). According to Lerrachea (2008), the Copenhagen School is the new stream of academic studies on security, whose purpose is the State. Hence, in the case relating to safety or security of the State, which can be understood as the protection of the State against external aggression and internal movements that could jeopardize it (Orozco, 2006: 144). Protection is carried out using military force to deter or suppress any threat to security.

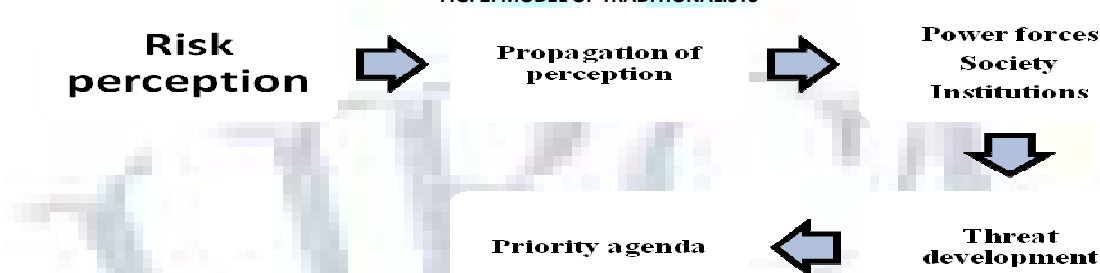
For these reasons, the studies on the subject correspond to political science, the science of international relations or to the military sciences, which somehow explains the reason that the international economy lacks these approaches. The ST does not define the State, so it takes the idea that this is the settlement of interests of the dominant entities (individuals or groups) - or real forces of power- such as the economic oligarchy, high bureaucracy, the high clergy, etc. Therefore, the protection that the State is looking for can be understood as the protection of the interests of the dominant entities or dominant forces. On the other hand, the aggression will be understood as a perception of dominant subjects or ruling bodies, in relation to the interests which are under threat.

Another important aspect of this theory is that related to the international level with the existence of many States, a little more than two hundred to be exact. Each one of the subjects of these States is aware to protect its interests in the territory, as well as the interests of social groups on which enforce its power. This makes then more complex relations between those States, and even to consider that some of them exercised hegemony over others. The complexity of these relationships gives an anarchic character to the international as a whole. But, as there are some mutual threat perceptions generated between different subjects, they are required to settle in a whole community of purposes before the attack on their interests, i.e. to create a Security Complex.

1) Aspects of the security Theory (ST)

There are five streams which in turn make up the ST models, each one comes in a given historical moment, namely: The Independent Complex, the Security Regime, the Integration Theory (IT), the model of Collective Security and finally the Democratic Peace (Orozco: 153). The last three models are these that contribute with more elements to the explanation of economic integration. Some other authors consider that there are three schools in the ST: traditionalists, critical, and the widening (Sisco y Chacón, 2004: 132). The most relevant elements of the model of the traditionalists are explained in Figure 2.

FIG. 2: MODEL OF TRADITIONALISTS



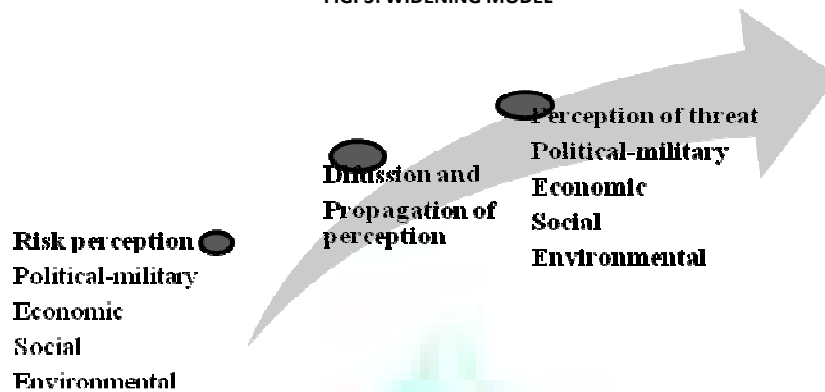
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The most prolific specialist in this area is Barry Buzán (2001), who began at the Copenhagen School and continues his work by adopting many criteria of the so-called English School of security. This school describes the transition from liberalism and realism (Buzán, 2001: 11) for the independent complex models and the security system.

From this point and considering the fading of the bipolarity of international forces, he develops new ideas that constitute the model called the Integration Theory (IT) as a guideline for the Widening Stream. The Widening Stream considers that it decreases the importance of the military in the perceptions of States with the end of the cold war, and thus they become important issues such as international economic relations, the environment, and the living conditions of the population and others that become factors of safety in the new academic constructs.

With the emergence of the Widening Stream those who consider it necessary to take into account not only the political and military factors as observed by the traditional studies of security, but also to incorporate economic, environmental and social matters as factors. Thus, the Widening Stream conceptualize security as the achievement through which situations of conflict or threat vanish by means of the State's emergency mobilization, threats that can be different to the possibility of a military attack. It can be also treated economic, social and environmental problems that may endanger the survival of a group. (Orozco: 151), which opens a possibility for the studies of Economic Integration.

FIG. 3: WIDENING MODEL



Source: Own drawing

The possibility of integration between States begins with the fact that there are aspects of security that States, especially those who observe geographical proximity, they cannot solve independently, and they necessarily have to seek a solution in a general manner (Buzan et al., 1998: 168). This is so because the interdependence developed among the States when there is a threat perceived as common, so ceases to be an anarchic set of countries to conform to a regional security complex, that is, to form a complex integrated regionally developed between the States. In this line of submitted ideas, economic integration is part of a broader process of integration.

2) The elements of the model of the integration theory (IT)

To identify the actors of the securitization, the integration theory (IT) has four basic elements: Actor securitize, referential object, existential threat, and likely real object. Actor securitize refers to the State that calls to promote the securitization. The reference object includes the levels and actors among which promotes the security, including who takes action. The existential threat is the entity or the situation from which emanates the threat; and, finally the likely real object that is the threatened element, generally the interests of one or all the groups that make up the State and especially of the convener or the actor securitize (Concha, 2010).

To systematize the analysis, the approach to security of the model of Buzán (2001) proposes five levels of analysis: the *international system*, *subsystems*, *units*, *subunits* and *individuals*. The international system is the set of global relationships, which from the territorial point of view is made up of subsystems. The subsystems are each of regions consolidated as such by the relations of higher or lower cohesion and also the not neighboring sets between each other but coherent by any common interest. The units are the integrated by each of the States or Nations of the world. The subunits are groups that operate with influence in units, which in the case are the real forces of power. Finally, the individuals, i.e. the citizens of each nation (Buzan et al., 1998).

The basic elements annotated and levels mentioned earlier make up for this analysis the participating elements in economic integration, same that act in the international scope in their national-level units and subsystems.

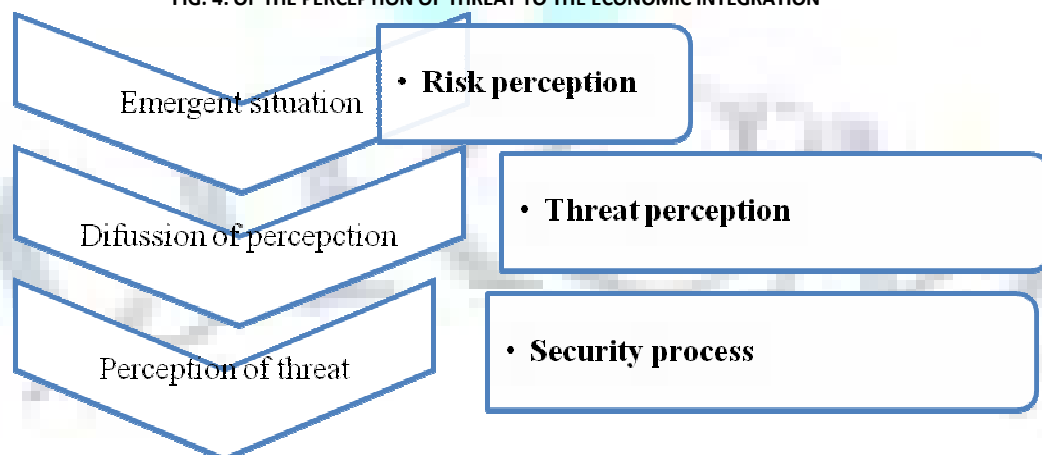
(3) The securitization

The process or set of actions to achieve the emergency measures to deal with a situation or a set of actions perceived as a threat to the existence of a person or a group of persons or their interests, or an institutional entity that represents interests of people, is called securitize. The securitize term is a neologism which corresponds to the word in English securitize.

Buzan et al. (1998: 25) precise the concept of securitization. They pointing out that the exact definition and criterion of securitization is constituted by the establishment of inter-subjectivity of an existential threat, the one with enough projection to have substantial political effects. This is to say that the perception of the threatened entities is shared enough as to justify an emergent action and often outside the conventional frameworks.

The securitization process consists of three main phases, same which are pushed by the group or groups of interest or subunits: "... existential threats, urgent action, and effect on relations inter-unities to breaking the rules" (Buzan et al., 1998: 26). When the process of securitization is followed by a set of States, usually culminate in the formation of Regional Security Complexes (RSC), that is to say, a set of States with a shared perception of threat and the decision to take all necessary measures – military, political, economic, etc.-to neutralize the threats that are the subject and object of the perception they have. It is then that this process of securitization encourages economic integration, which in turn, goes in parallel with the process of neutralization of threats. Figure 4 tries to model this process.

FIG. 4: OF THE PERCEPTION OF THREAT TO THE ECONOMIC INTEGRATION



Source: own drawing

(4) The security complexes and regionalization

The integration of States who share a perception of threats may be called, in principle, Regional Security Complexes (RSC). More properly are defined as a set of States or units - or a subsystem - with processes of securitization or desecuritization so interrelated that their security concerns may not be reasonably analyzed or solved separating a few units of others, creating a subsystem in which most of the interaction of security is internal. (Concha, 2010: 3).

The formation of a Regional Security Complex (RSC) can be integrated by units - or States-whose perceptions of threats respond to different factors (military, political, economic, cultural or environmental), but who share a priority of dominant securitization on the others. It's so in "... this measure, its prospects for security, even though they may present diversity and nuances - yet tensions - tend to converge, rather than defer" (Larrechea, 2008: 12).

Certainly not in any case we can talk about integration of States in the form of RSC, because there are situations in which States do not have the significance to the exterior because their weakness, which means that they do not permeate their perceptions to the rest of the States. Similarly is not assigned the term in question, but the Overlay when one of the integrated States wields hegemony such that within its radius of power void, limiting or significantly modifies the development of the securitization between the surrounding States (Buzan et al., 1998: 12). The dust jacket, overlap or Overlay, in the same way explains many of the processes of integration imposed studied by specialists in the underdevelopment theory and dependency theory.

The formation of a complex or an Overlay shows a set of characteristics, being one of them the availability of the units to their integration. Another one is the difference of these units. There certainly is also friendly or unfriendly character between units, not limited to the States to recognize the existence of highly threatening common problems, which are imperatives to join and integrate. Finally, and not least, there is an asymmetry of power to the units together.

Dynamic entities as they are the components of the units can observe changes in its dimension and performance. If these changes are significant, it will lead to changes in the dynamics of the complex. The above is not valid for the Overlay unless the changes are observed in the hegemonic unit components.

Changes in the structure or the dynamics of the international organization, either Overlay or SCR is an aspect that can explain at the same time the modification of the forms of regional economic integrations or its degree of integration. Buzán et al. (1998) propose four processes that can be observed in the Organization: when the structure remains unchanged and maintained the status quo; When amending the relationship of forces within the complex; When the integration or separation of one (s), or the modification of the internal distribution of power or internal patterns of friendship or enmity give way to changes in the relations of the organization with the rest of the world.

The above stated can allow to understand the rapid advance of the European Union, which before being characterized by their degree of total economic integration it was customs union first and later common market. It also provides the methodological elements to explain how are complicated in trying to have a single currency or in the integration of Turkey.

(5) The threat as the reason for the economic integration

When the subunits are faced with a situation that they perceive as a threat to their interests, they carry out the actions necessary to achieve share that perception among individuals. The perception of risk takes place between them. The same happens to the institutions politically representing the State. When this is achieved, the risk has been threat, as it can be determined by the process described, has a cultural character. The threat is of priority in the social and political agenda (Buzan, 2001).

If the threat is as such in the perception of individuals and other subunits, units interact to shape around it and from the same link to assume a position and to develop actions which in turn are perceived as necessary to suppress the corresponding risk. This risk may well have originated in economic, social, cultural or environmental aspects to be transformed into a problem that requires different actions, from the military, policy, or a set of them. It is then when it is securitizing a threat; and if the agenda includes economic issues, be they commercial, financial or technological, integration is also economic.

It is time to reflect that full recognition of threats is an important step for the securitization and for the purposes of analysis is also a key element to explain the economic integration. While in the bipolar context at the end of the last century the determinant threats were military and political issues, the specialist incorporate other more as they are the environmental and trade issues, such as the following are noted:

☐ Political-military threats

☐ Threats contemporary economic, environmental and cultural in nature

☐ Emerging, such as the advocacy threats of violence, ideological crisis, politicization of the crime, conflicts of low intensity and socialization of the corruption.

☐ Transverse threats such as social conflicts, terrorism, drug trafficking, international criminal networks, poverty, exclusion, atrophy of the capacity for economic growth and emigration.

Previous sources of threats give the perception of security and as a result the integration processes either political-military, economic, environmental or social, as describes it the figure 5.

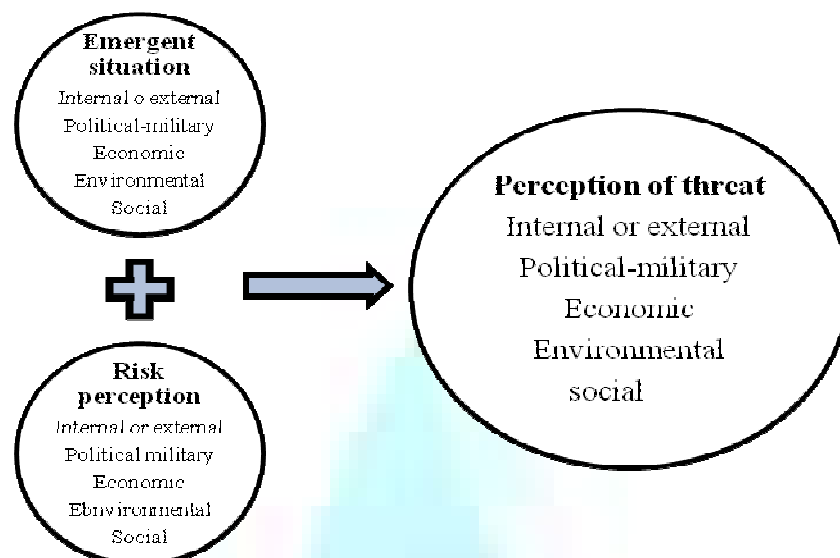
FIG. 5: PROCESS OF INTEGRATION FROM THE PERCEPTION OF SECURITY



Source: own drawing

On the other hand, we need to reflect that the perceptions, as subjective processes, are not necessarily uniform, so that the transition from the perception of the risk to the perception of the threat may not correspond and in on the other hand can be modified the process of construction and development both in the origin and on the characterization of risk and threat. In the following figure, the number 6, the different sources of perception of risk are shown schematically.

FIG. 6: DIFFERENT SOURCES OF PERCEPTION OF RISK



Source: own drawing

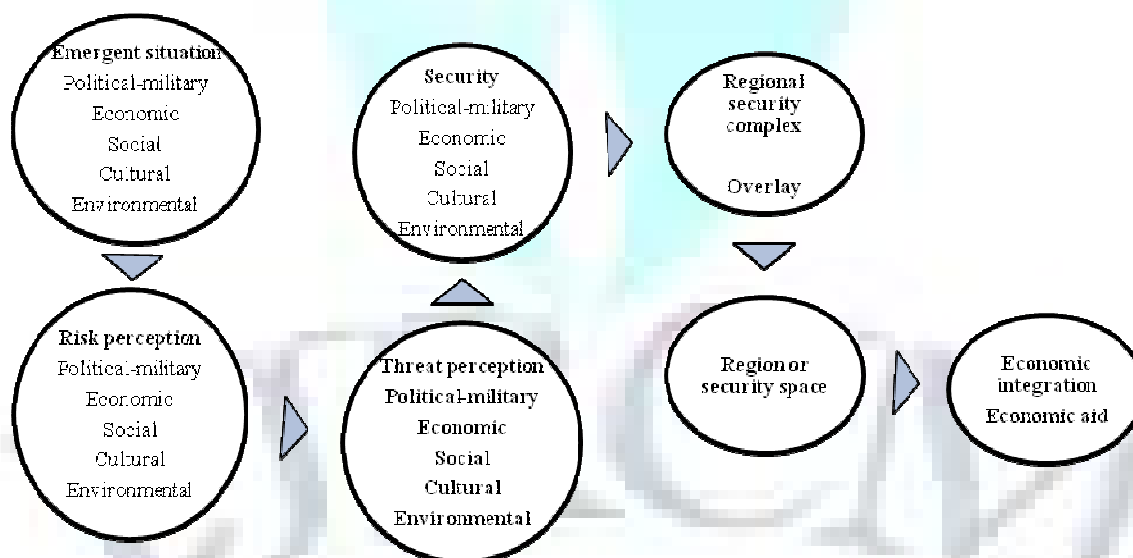
With the addition of new criteria for security, studies have been developed to generate models of variables and indicators of such factors, which can be classified as indicators of the evolution of threats to those that are considered as preventive or indicators of early warning in the area of human security. Some of the variables of these indicators are food security, economic security, political security and community safety.

The security food guarantees a daily calorie supply, food production and dependence on food imports. Economic security serves real income, inflation, unemployment and income distribution. The Political security deals with aspects relating to the violation to human rights, military spending in relation to spending on education and health. Community safety services to ethnic, religious and cultural conflicts (Sandoval, 2005: 13). These criteria lead to the formation of sets of regional security complexes as determinants of economic integration as it is shown in Figure 7.

B. Concept of economic integration

There are various conceptualizations of what is economic integration without having a consensus thereon. Many of them relate to particular forms of the phenomenon. Others are more generic, as in the case of the following: "Process of elimination of restrictions on trade, payments and factor mobility of factors" (Carbaugh, 2009: 546). This work proposes that economic integration can be understood as imposed, voluntary or inertial linking of two or more economies, with the aim of facilitating their economic exchange. The link leads to the interaction between the residents of a country with residents of the rest of the world, under criteria agreed in the framework of the integration.

FIG. 7: THE ECONOMIC INTEGRATION WITHIN REGIONAL SECURITY COMPLEXES



Source: own drawing

However, most authors agree at the point which points out that, once you reach the formation of a geographical area of countries with some degree of integration, participating economic agents note that this facilitates the transit of economic factors through the territories of integrated countries. In this way, the integration process is a mechanism for opening economies and consequently for the mutual availability of factors. Sometimes it refers to some factor in particular and therefore as a commercial integration, financial integration, monetary integration, technology integration. Alternatively, it refers to commercial and financial, integration commercial and monetary, financial and technological integration. At another level, it refers to any other combination of integrations.

(1) Some proposals on the economic integration

One of the most prominent authors in the theme is Jacob Viner (1950) whose work *"The customs unions issue"*, says the effects of the agreements on the formation of customs unions, one of the forms of economic integration observed in practice. In his explanation, Viner (1950) sets out the concepts of *trade diversion* and *creation of trade* as resources to analyze each one of the economic integration, the first to explain the change in trade flows and the second for the expansion of the exchange as a result of the signing of a tariff agreement. On the same line of ideas, another author is Meade (1957), who with support in the arguments of Viner, develops the effects on the exchange, especially in the balance of payments.

For Balassa (1964) there are two meanings of economic integration, as a *situation or process*, both totally related because of one existent situation leads to another through a process. This new situation consists on measures to *eliminate some* forms of discrimination to the companies of the different nations, at the same time that the situations with this abolition are the processes of integration through free trade zones, customs unions, common markets and total economic integration. In addition, Balassa (1964) proposed to differentiate between *integration* and *economic cooperation*. Economic cooperation is a measure to *reduce* the discrimination between the linked Nations.

For its part, Tamames (1968) holds that economic integration is a process whereby two or more national markets, previously separate, and unitary dimensions are considered little appropriate, join together to form a single market of a most appropriate and larger dimension.

Expressions of *voluntary, imposed or inertial relationship* are recorded previously. Voluntary integration is what gives so agree to the mutual interests of the signatories. In contrast, the imposed link is the one in which interests that the agreement attends are those of the economy or economies exercising hegemony over the rest of the signatories. Finally, it is the inertial link in which the participants have developed economic interaction without there was no formal agreement, but that own commercial, financial, monetary and technological practice have led to this link, as it is the case of the so-called Tex Mex region formed by some of the Southern border States of United States and some of Northern Mexican States.

As it can be observed, the type of link allows the explanation to the integration. When referring to imposed linkage, it refers to asymmetric economies in which one or some of them depend on power of others, it would correspond to the theory of imperialism written in 1916 (Lenin, 1978) and the underdevelopment theory (Marini, 1991 and Amin, 2001). These explain the integration as a means for the realization of extraordinary profits. Also, could happen in the case of inertial bonding, in which the process of dependency theory (Prebisch). In the case of the voluntary link, various versions of economic globalization processes are explanatory.

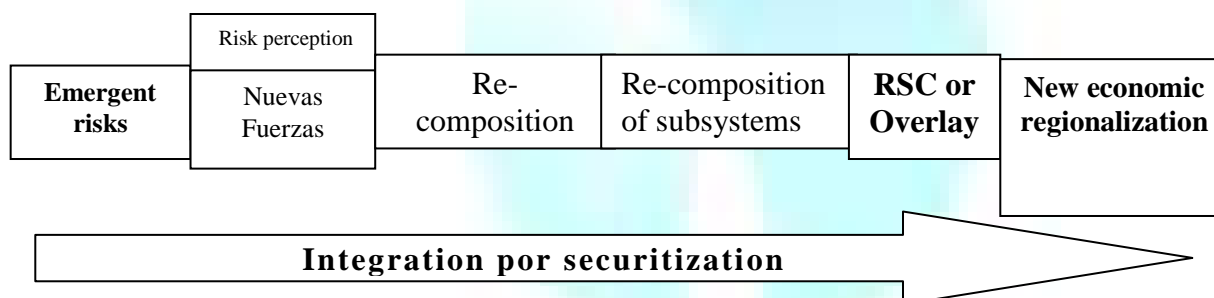
Finally, there are more specific conclusions in Sánchez (2004) who points out three basic problems of integration. The first problem is the search for economic efficiency in the use of resources. Another problem to improve is the distribution of income among economic agents. The third problem is the stability to prevent imbalances that affect the growth of economies. In addition to considering a historical constant in the initiatives of unification of the countries, whether can be for military, political, religious or economic reasons. However, so far there are not sufficient explanations on integration. To contribute to the debate, this analysis proposed the security theory (ST) and the process of securitization, as a more structured explanation of the phenomenon of economic integration processes.

ECONOMIC INTEGRATION FROM THE APPROACH OF THE SECURITIZATION

The argument presented previously allows inferring that considering the elements of the ST and the TEI, it is possible to propose a model of process of economic integration from the perspective of the securitization.

For the model proposed, the process of security of the States or securitization is a factor of the process of economic integration. This new model can explain lots of facts on the issue occurred either predictable, it forms the trends of emerging risks, such as the worsening of global environmental imbalance, the tendency to rigid regulations on environmental issues, growing migration towards urban centers and especially the more developed economies, the emergence of new economic powers, the growing citizenship as a new form of governance, etc. These are only some of the trends that flow into the re-composition of political, economic and military forces both at the level of units as subsystems and in consequence of the international system. Figure 8 shows a process of economic integration, motivated by the securitization.

FIG. 8: THE ECONOMIC REGIONALIZATION MOTIVATED BY THE SECURITIZATION

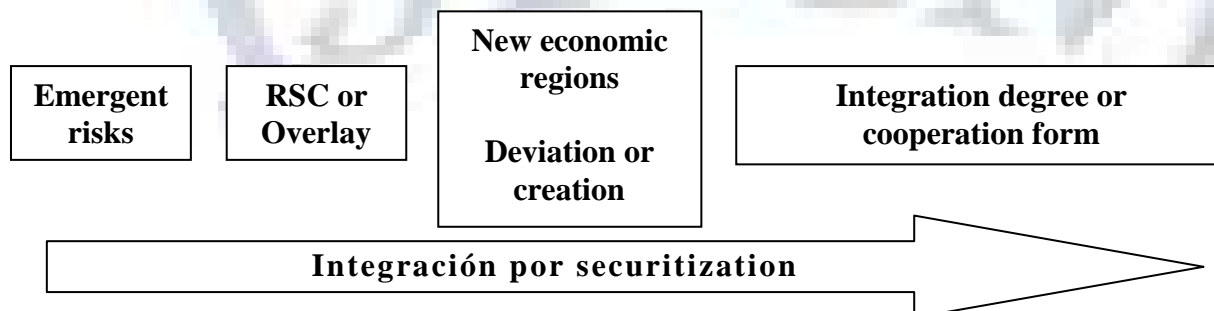


Source: own drawing

From considerations of Viner (1950), it can be analyzed if these forms of integration are diversion or creation. I.e., the orientation of the forms of integration can be inclusive or exclusive between the subsystems (regions). Following to Balassa (year) to define the stage of the process or form of integration is the subsystem, which can achieve different degrees of economic integration. As mentioned, the essentials in the process of economic integration are that they are at the same time of inclusion and exclusion.

They are processes of inclusion with regard to integrated States, but of exclusion of the other States that are not integrated. The above takes relevance when it has as a consequence the formation of an exclusive geographical area for the integrated States and for agreements which they deal, with or without prejudice to the statements of the rest of the world. However, when there is some damage to the exterior of the space it is perceived as threat to any or some States, then it can be generated a defensive response from their own part.

FIG. 9: DEGREES OF ECONOMIC INTEGRATION OF ECONOMIC REGIONS OR BLOCK



Source: Own drawing

ANALYSIS OF CASES

A. The North American Free Trade Agreement (NAFTA)

Form of securitization: Overlay

The observers, among other Hirst (2004), recognized that in America it can be observed the following regions. First of all, a geo-economic sub-region in the North, even though it involves Canada, United States and Mexico, generates an effect spill, quite questionable, in Central America and the Caribbean. Secondly, an Andean sub region, and an area in the Pacific region. In the case of Mexico, is more integrated economically the Northern sub-region, while is it culturally more identified with the Latin American bloc than with the Anglo-Saxon.

On the other hand, before a block emerged by the mutual search for economic a benefit, the block is generated from the risk perceived by United States subunit. In the case of Canada and Mexico, soon are sharing the unit with United States, who is the promoter of the Overlay in part due to the perceptions of risk in that country, plus their own characteristics characteristic of sub-units and units. As a result of these perceptions of risk, Canada and Mexico are soon added to United States. Therefore, it is true that since the signing of NAFTA, Mexico is more and more linked to United States and Canada (Perroti, 2000). In addition, Mexico is part of the so-called "Northern Command", and has entered in the Homeland Security of the United States, as well as countries of Central America and the Caribbean.

B. European Union (EU)

The European Union is the result of an evolution process in international economic integration that begun in 1952 by six Nations that formed the European Community of Steel and Coal (ECSC) based on an agreement for the exchange of raw materials that led to the development of the heavy industry in the region, up to get through multiple transformations in its organization, in 2010 with 27 Member States that form the global structure more evolved in the history of mankind, with agreements of cooperation and mutual support in the political, military, cultural, environmental, economic and scientific.

Table 1 shows the main features of the two major cases of economic integration with a focus on the model of securitization.

CONCLUSIONS

This paper proves the validity of the proposed model of economic integration under the focus of the securitization. The aim of proposing the analysis of the formation and transformation of areas of economic integration from the approach of securitization of the security theory are also met. This study confirms that Regional Security Complexes and the Overlay contain as subsidiaries of security to various areas of economic integration in the world, in accordance with the process of diversion and creation which proposes the classic author Viner (1950) in their contributions to the TEI. Similarly, it is possible to construct new concepts on economic integration, taking advantage of their own economy and the security theory.

Finally, there are the findings of new elements to understand the formation and development of the areas of economic integration from the securitization. This allow us to analyze and better understand the above mentioned process, such as the need for the States to protect themselves against perceived threats, and as an explanation to the integration and the formation of regions. Similarly to economic integration may be answer to non-economic problems as they are the military-political, environmental, cultural and even the ethnic problems.

TABLE 1: ANALYSIS OF CASES OF ECONOMIC INTEGRATION FROM THE PERSPECTIVE OF THE MODEL OF SECURITIZATION

Model securitization Subsystems:	The North American free trade agreement	European Union
Form of securitization:	Protection of North and South borders of United States, access to Mexican and Canadian resources and raw materials (resourcing) and possibilities of deslocation of production processes in Mexican and Canadian territory (outsourcing)	Political, military, economic, scientific and environmental cooperation
Actor securizer	United States (US)	Germany, France and England
Reference object:	Border territories of United States, neighboring States to United States, Canada and Mexico.	European area
Existential threat:	Loss of world leadership by United States - military, political and economic - to the consolidation of the European Union; possible shortages and higher prices of oil to the collusion of the producers of OPEC.	Hegemony of United States of America throughout European territory that threatens with a permanent military presence and pushes for the imposition of the American political model; instability in the Balkan region of Europe
Real object:	Interests of oil companies of United States-interests of manufacturers of United States	Interests of the monarchies and European oligarchies.
Agenda:	Border security, migration towards United States, trade liberalization, financial openness, openness of services.	Regional border security, African migration to the European area, internal migration in the European Space towards the area of the Union, development of the member States.

Source: Own generation based on Concha (2010)

QUESTIONS

The findings open new routes to future research with new questions of relevance. Among other questions, can initially be formulated by the transcendence and administrative implications for the development of the economic and managerial sciences:

In determining the competitiveness or the factors of success, either of the company, industry sector or the economy as a whole, is relevant to consider the securitization as a factor of competitiveness?

In studies for the characterization of country-risk for investment purposes in accordance with the criteria of Moody's, Standad & Poor's, and J.P. Morgan (Anzil, 2010) is it possible to apply criteria of securitization to develop an agenda for the annulment of risks?

REFERENCES

- Amir, S. (2001). *Crítica del nuestro tiempo* Revista Mexicana de Política Exterior, 59, 9-31. . México: Siglo XXI: México
- Anzil, F. (2010). *Riesgo país*. www.cononolink.com.ar/defibnicin/riesgopais. Recuperado: 10/11/2010
- Barbé, E. (2007). *Relaciones internacionales*. (3ra.Edición)Madrid: Tecnos
- Balassa, B. (1964). *Teoría de la integración económica*. Madrid: Biblioteca Uthea de Economía.
- Bárcena, M. (2000). *La reconceptualización de la seguridad*: El debate contemporáneo.
- Buzan, B. (2001). *Introducción a los estudios estratégicos: Tecnología militar y relaciones Internacionales*. (5ª Ed. en español). Madrid: Ediciones Ejército.
- Buzan, B., Wæver, O. & de Wilde, J. (1998). *Security: A new framework for analysis*. Boulder: Lynne Rienner.
- Carbaugh, R. (2009). *Economía internacional*. 12ª edición. México: CENAGAGE.
- Concha, L. (2010). *Complejos de seguridad nacional*. Xalapa: Colegio de Veracruz.
- Hirts, M. (2003). *Los claroscuros de la seguridad regional en las Américas*, en Nueva Sociedad, Nº 185, Caracas, 2003, pp. 83-101.

- Larrechea, (2008). *Complejos de seguridad e integración: perspectivas convergentes sobre defensa y seguridad en América Latina*. Rosario: Universidad de Rosario.
- Lenin. (1978). *El imperialismo, fase superior del capitalismo*. 7ma. edición. México: Progreso.
- Lipschutz, R.(1995). On security [Versión electrónica]. New York: ColumbiaUniversity Press. Obtenido en <http://www.ciaonet.org/book/lipschutz/index.Html>
- Martínez, A. et al (2000). *Economía política de la globalización*. Barcelona: Ariel Economía.
- Marini, R. (1991). *Dialéctica de la dependencia*. Decimoprimer reimpresión. México: Era
- Meade, J. (1957). *Problemas de una unión económica*. Madrid: Aguilar
- McSweeney, B (1999). *Security, Identity, and Interests: A Sociology of International Relations*. Cambridge: Cambridge University Press
- Orozco, G. (2006). *El aporte de la escuela de Copenhague a los estudios de seguridad*. Santiago de Chile: Revista Fuerzas Armadas y Sociedad. Año 20. No.1.
- Prebisch, R. (2001). *Cinco etapas de mi pensamiento sobre el desarrollo*. Santiago de Chile: Revista de la CEPAL no. 75. Diciembre 2001
- Perroti, J. (2008). *La globalización y la regionalización de la seguridad internacional*. Mendoza: Centro Argentino de Estudios Internacionales.
- Rosas, C. (1996). *México ante los procesos de regionalización económica en el mundo*. México: Universidad Nacional Autónoma de México.
- Salomón, M. (2002). *La teoría de las relaciones internacionales en los albores del siglo XXI: Diálogo, disidencias y aproximaciones*. Revista electrónica de estudios internacionales. Recuperado 09/11/2010.
- Samuelson, P. et all (2006). *Macroeconomía con aplicaciones a Latinoamérica*. Decimoséptima edición. México: Mc Graw Hill.
- Sandoval, M. (2005). *Análisis de la pobreza desde la óptica de la Seguridad*. Madrid: Instituto de Cuestiones Internacionales y Política Exterior.
- Sánchez, C. (2004). El crecimiento en la teoría de la integración económica. Universidad de Salamanca. Departamento de Economía e Historia Económica. Cuadernos de Estudios Empresariales núm. 14 271-278
- Scitovsky ,T(1959). *Teoría Económica e Integración Europea Occidental* . París: Revue Économique, 1959, vol. 10, número 3.
- Sisco, C. y Chacón, O. (2004). Barry Buzan y la teoría de los complejos de seguridad. Revista venezolana de Ciencia Política. Núm. 25(Enero-junio).125-146
- Tamames, R y Huerta, B. (2003). *Estructura Económica Internacional*. Madrid: Alianza Editorial
- Viner, J. (1950). The Customs Union Issue. New York: Carnegie Endowment for International Peace
- Waever, Ole (1998). *Securitization and desecuritization*. New York: Columbia University Press.

E-GOVERNMENT - TRENDS AND CHALLENGES FROM THE PERSPECTIVE OF DEVELOPING NATIONS WITH FOCUS ON PAKISTAN

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ABSTRACT

Efforts to create e-governments are going on in different countries of the world at varying pace. Some countries are the leaders while others are followers of this technology. The promises made by the proponents of this system are yet to materialize. The spread and usage of this technology is uneven mainly because of the digital divide amongst the IT haves and have not's. The cost-benefit equation is not yet clear even to the leaders of this technology. Developing countries face certain challenges which are not there at all or are very minimal in developed countries. Different hurdles on demand as well as supply side of e-government exist; as a result developing countries lag far behind developed countries in this form of governance. A careful analysis of these impediments shows that the supply side constraints are relatively easier to address as compared to the demand side constraints.

KEYWORDS

Benefits, Developing countries, E-government, Impediments, Pakistan.

INTRODUCTION

E-government is not a very old phenomenon. It became a buzz word in the early 90s when the governments started placing some information on the web for public use. Major advancements in the field of e-government were made during the current decade and the key players contributing in its' development had been United States and some countries of Europe. United Nations e-Government survey 2008 rated Scandinavian countries (Sweden, Denmark and Norway) as number one in e-government readiness followed by the United States, Netherland and South Korea (UN, 2008). Other notable contributors in E-government development are Canada, Australia and France. United Kingdom, Japan and Switzerland have also made good quality progress in this field.

Different authors have defined E-government differently. Some have defined in narrow terms while others have looked at this new form of governance from a broader perspective. Bekkers & Homburg (2007) defined E-Government as the "use of modern Information Communication Technologies (ICTs), especially Internet and web technology to support or redefine the existing and/or future (information, Communication and transaction) relations with stakeholders in their internal and external environment". These stakeholders include Government organizations, companies, citizens, civil servants and social organizations (Chadwick & May, 2003).

Siau and Long (2009) have defined four major areas of e-government development:-

- a. Government to Consumers (G2C) – Which include all such services provided by the government to its citizens to improve government-citizenship relation.
- b. Government to Business (G2B) – Include services targeting reduction in government cost of purchasing and creating better ties with the businesses.
- c. Government to Government (G2G) – The objective here is to achieve better collaboration and integration of federal, state and local government.
- d. Government to Employee (G2E) - Here the emphasis is to improve the quality of work as well as the efficiency of employees in the government organizations.

Lee et. al (2005) have defined G2E little differently. They have used the term government internal efficiency and effectiveness (IEE) instead of G2E. The objective of IEE is to improve internal efficiency and effectiveness of operations. Another category of e-government defined by them is cross cutting where the target is to produce infrastructure to enable interoperability among different e-government operations. They have also drawn similarities between these categories of e-governments and the terms used in business world e.g. activities and objectives of G2C and G2B are similar to Customer Relationship Management (CRM), G2C similar to Supply Chain Management (SCM), IEE similar to Enterprise Resource Planning (ERP) and cross cutting similar to Enterprise Application Integration (EAI). The proponents of e-government exert that the use of ICTs (especially Internet technology) by the governments will result in improvement in quality of services provided to the citizens. The citizens will have better access to information, the data will be more transparent and tasks will be performed efficiently -the overall result will be a new and better government. Bekkers & Hamburg (2005) states this new and better government to be more efficient, more democratic and more responsive to the need of citizens and enterprises. According to Heeks (2001) there are three main domains of e-governance: e-Administration (improving government processes), e-Citizens and e-Services (connecting citizens), e-Society (Building interactions with and within civil society). Some of the governments are using the slogan YQ (why Queue) for promoting e-government indicating that the use of this technology will save citizens from standing in queues for getting services. Because of this technology citizens can have access to government information and services 24 hours a day, 7 days a week (Holden et. al, 2003).

MODELS OF E-GOVERNMENT

Literature of e-government contains different models of e-government development and progression. Gartner Research (2001) presented a four stage model of e-government development. The four stages identified in this model are: web presence, interaction, transaction and transformation. In another model (Layne & Lee, 2001) the following four stages of e-government are discussed: catalogue, transaction, vertical integration and horizontal integration. A five stage model was presented by Moon (2002) where he defined the five stages of e-government development as simple information dissemination, two way communications, service and financial transaction, vertical and horizontal integration and political participation. Another model worth mentioning here is that of Deloitte's six stages model where the following six stages of e-government development have been mentioned (Deloitte and Touche, 2000):

- a. Information publishing/dissemination.
- b. Official two-way transaction.
- c. Multipurpose portals.
- d. Portal personalization.
- e. Clustering of common services.
- f. Full integration and enterprise transaction.

All of these models discussed here have their own strengths and weaknesses (Siau & Long, 2009) and we cannot say that anyone of them is a perfect model. Models discussed here show different stages of development of E-government but one thing is common among all of them – they all show a linear and a step-wise development. The first step is the web presence by means of a website, which then leads to two way communications between the users and service providers. Next step is the vertical and horizontal integration and the final step is a seamless and fully integrated web presence. Although these models show step-wise progression, none of them define a time line for moving to the next level.

UNITED NATIONS (UN) E-GOVERNMENT READINESS INDEX

To measure and compare the E-readiness of its 192 member states United Nations has developed a tool called “Global E-Government Readiness Index”. This index is designed to measure usage of internet & World Wide Web (www) by the member states as well as infrastructure development of telecommunication and human capital. These measurements are done by means of the following three indices:

a) Telecommunication (Connectivity) Infrastructure Index:

The usage of the five main information and communication (ICT) tools i.e., PC, Internet, telephone, mobile and broadband provides the basis of calculation of this index.

b) Human Capital Index:

It is derived from the UNDP education index. The factors considered are adult literacy & gross enrollment ratio.

c) Web Measure Index:

It is based on the web presence and features. The primary consideration is given to official home page of the government followed by the websites of five key Ministries (finance, education, labor, health and social welfare)

UNS FIVE STAGE MODEL OF PROGRESSION

UN has also outlined a five stage model depicting the progression of E-government (see figure 1). These Five stages are:

1) Emerging Presence:

In this stage information about government- its policies, laws & regulations, newsletters and reports, etc., is provided through Internet.

2) Enhanced Presence:

Next level is to provide enhanced information & e-services through Internet e.g. downloadable forms.

3) Interactive Presence:

Two way communications between Government and citizens is carried out in this phase e.g. e-mail Communication.

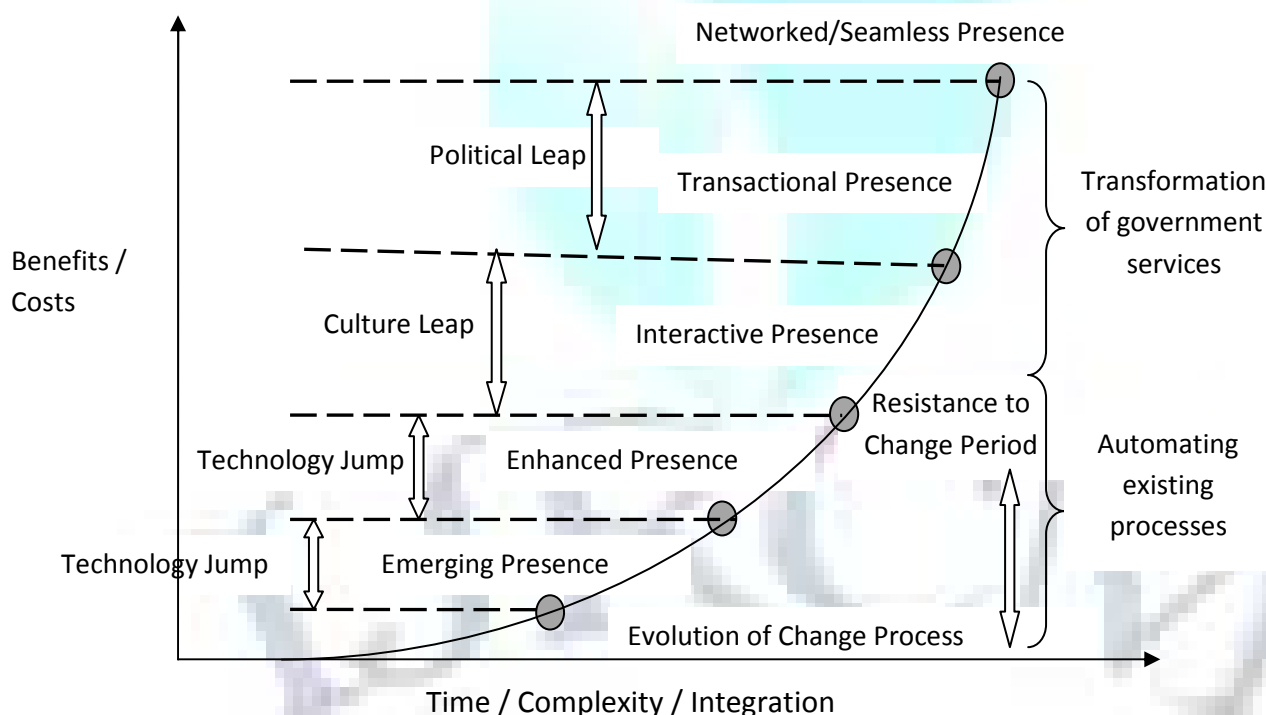
4) Transactional Web Presence

In this stage the citizens can complete transactions online e.g. payment of public utilities, online filing of tax returns, processing of applications for birth certificates, licenses, etc.

5) Seamless or Fully Integrated Web Presence:

This requires horizontal and vertical integration between federal, state and local governments. It also requires connections among different stakeholders (including government organizations, companies, academia, NGOs and private sector).

FIGURE 1: FIVE-STAGE MODEL OF E-GOVERNMENT INTEGRATION



Source: Adapted from (Siau & Long, 2009)

Previous researches indicate that mostly the countries have achieved the third level of e-government development i.e. interactive presence (UN, 2003; Vintar et.al, 2003). This level is comparatively easy to achieve as providing information online, providing downloadable material and forms and communicating via email is not very challenging. But things get complicated beyond this stage and the development gets slow down significantly (Accenture, 2004; Cap Gemini Ernst and Young, 2004). According to a survey conducted among EU countries, only 10% of the government department's websites had at least one transactional service (West, 2003).

E-GOVERNMENT BARRIERS IN DEVELOPING COUNTRIES: PAKISTAN IN FOCUS

Almost 80% of the world population is living in developing countries which show enormous potential of e-government development. But there exist a plethora of barriers that hinder the way of e-government in developing countries. Developing countries face certain challenges which are not there at all or are very

minimal in developed countries e.g., institutional weakness, shortage of qualified staff, lack of funds, unsupportive local environment leading to implementation problems, inability to keep pace with changing technology and lack of legal framework (UN, 2002).

Pakistan is a country located in South Asia having a total area of 796,095 square kilometers. It is the sixth largest populated country in the world having an estimated population of 174 million (CIA, 2010). Pakistan is a country that has a tremendous potential for development in the field of information technology (IT). Realizing this potential, the Government of Pakistan (GOP) made first serious effort in developing IT sector in the start of current millennium when it announced National IT Policy and Action Plan in August, 2000. Some of the key areas for the development of IT sector and IT usage in the country were identified which included: Human Resource Development, Infrastructure Development, Software Industry Development, Hardware Industry Development, Internet and IT usage and legal and regulatory framework (National IT Policy and Action Plan, 2000).

In October 2002 Government of Pakistan established E-Government Directorate (EGD) with the purpose of facilitating and promoting provision of e-services by various government agencies and departments. 14 projects have been completed by EGD so far and there are 19 projects in various stages of completion. Those projects completed by EGD include:

1. Online processing and status tracking of hajj (pilgrimage) applications.
2. Online submission of documents at Securities and Exchange Commission of Pakistan (S.E.C.P.)
3. Salary disbursement of government employees through ATM's.
4. Development and installation of Internal E-mail system at seven Federal Government Divisions.
5. Automation of Patent Office at Karachi.
6. Online access to Statutory Case Laws at District Bar Associations.

Some of the important ongoing projects of EGD include:

1. Providing online recruitment services for Federal Public Services Commission (FPSC).
2. Arranging E-services for Capital Development Authority (CDA) and Islamabad Police.
3. Enabling the Ministry of Interior, Ministry of Health and Ministry of Population Welfare to offer e-services.
4. Automation of District Courts, Federal Investigating Agency (FIA), Prime Minister Secretariat and Establishment Division (EGD, 2010).

Although governments in developing countries including GOP are serious in developing e-government but their efforts are not so successful so far due to the existence of many barriers both on the demand side as well as the supply side. Some of the major hurdles in e-government development in developing countries are discussed below:

DEMAND SIDE IMPEDIMENTS

DEMOGRAPHIC FACTORS

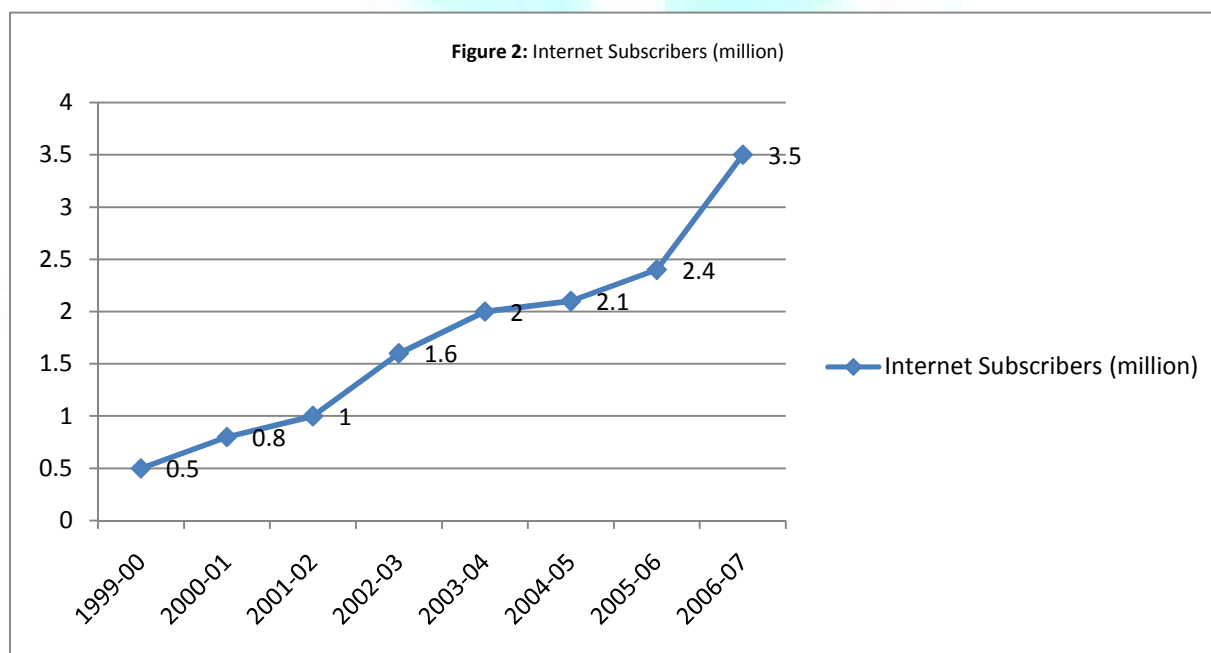
In a research conducted by Belanger and Carter (2009) to find out the demographic characteristics of the population using e-government services, age, income and education were found to be significant predictors for e-government usage. Internet usage and experience of searching online information were also found to be important skills for predicting the intentions to use e-government services, whereas computer and prior online purchasing experience were not found to be significant indicators. Low purchasing power makes ICT less accessible and less affordable to the general public thus resulting in a low level of demand for e-services. Pakistan has a Gross Domestic Product (GDP) per capita (purchasing power parity) is \$2,600 which is 171st in the world (CIA, 2010).

DIGITAL DIVIDE

Almost all the societies are facing problem of digital divide - the separation between the information have's and have not's. This digital divide is because of two main factors i.e. accessibility and skills (Belanger & Carter, 2009). There is a certain portion of population who has access to internet technology whereas there is another portion that does not enjoy this access. Also there is a large section of population who do not have the necessary skills to get benefit from online services.

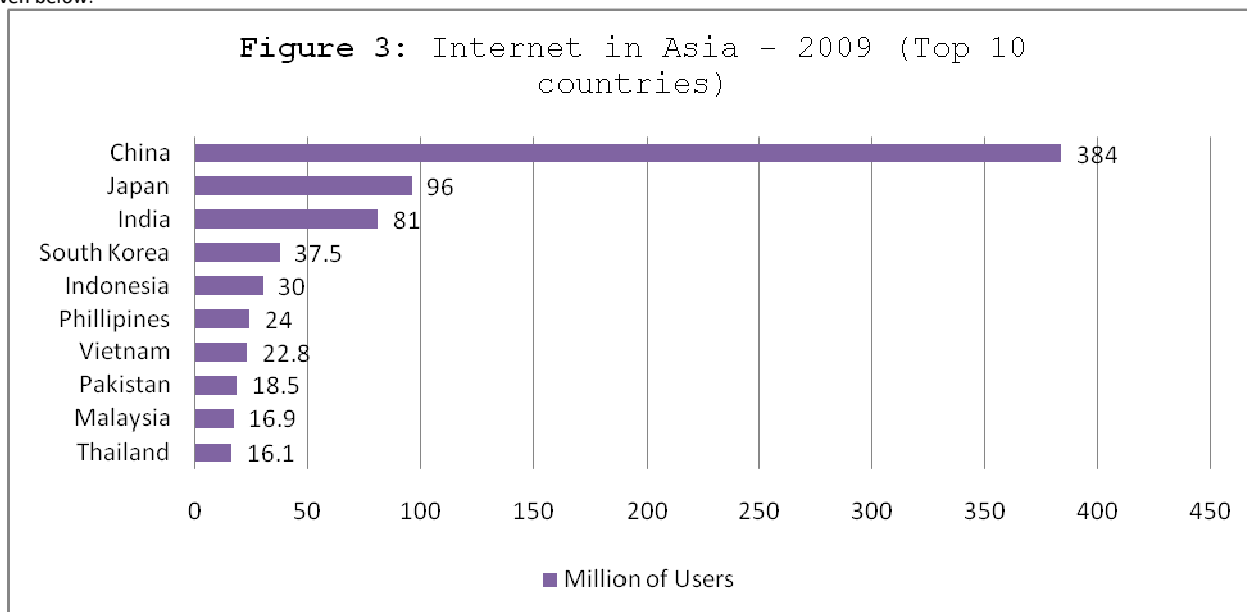
The problem of digital divide in developing countries is more serious as compared to developed countries. There is a tremendous difference in the standard of living of those living in rural and urban areas; those living in rural areas are deprived of some of the basic necessities of life e.g., electricity. In case of Pakistan, almost 36% population of the country lives in the urban areas whereas the remaining 64% belongs to the rural areas. This uneven distribution of population means any initiative taken by the government in the direction of e-government would be biased, favoring the 'IT have's' living in urban areas (Basu, 2004).

Pakistan in one of those countries where the number of internet subscribers and internet users is very low as compared to those of developed and technologically advanced countries. Although the number of internet subscribers/users is increasing but still it is very low i.e. less than 5% of total population of the country.



Source: Pakistan Telecommunication Authority (PTA)

It can be seen in the above figure that the total number of internet subscribers in 1999-00 were 0.5 million which increased to 3.5 million in 2006-07. The number of internet users (those having access to internet at home, office or commercial areas) are much more than internet subscribers as can be seen in the table given below:



Source: (Internet World Stats, 2010)

The above figure shows that there are 18.5 million internet users in Pakistan as per the data collected in 2009. According to the UN e-Government survey 2008, Pakistan holds 131st position for e-government readiness among the total 192 member states. The following table shows e-government readiness of some of the developing countries:

TABLE 1: E-GOVERNMENT READINESS RANKINGS OF SOME DEVELOPING COUNTRIES

Country Name	China	India	Malaysia	Russian Federation	Pakistan
2008 Ranking	65	113	34	60	131

Source: (UN, 2008)

SOCIO-POLITICAL FACTORS

LOW LITERACY RATE

A very serious impediment in e-government development in developing countries, as far as the demand for e-services is concerned, is the low literacy rate. Those who cannot read and write cannot get benefit from the e-services. In case of Pakistan, literacy rate (age 15 and above that can read and write) is approx 50% (CIA, 2010) which makes e-government services meaningless to almost half of the population of the country.

LOW LEVEL OF TRUST IN E-GOVERNMENT

Collection of citizen's personal information is a prerequisite for providing e-services. Implementation of e-government cannot be separated from collection of citizen's personal information (Yu, 2005). Often a citizen is asked to provide his or her personal information to the government which could be of sensitive nature. Some studies have suggested the gathering of sensitive personal information related to income, credit card numbers, ID card numbers, hobbies, preferences, etc. and storing them at a central location (McDonagh, 2002). Not only is this information gathered but also distributed and used by different departments or agencies of the government and the private sector. Unless the citizens have confidence that their personal information will not be misused in any way, they will not be interested in using e-services. Trust in government is a decisive factor for the success of e-government web sites (Teo et. al, 2009).

LOW QUALITY OF E-SERVICES

People living in developing countries are sometimes not interested in using the e-government services because of the poor quality of these services. In case of Pakistan, in most cases the government web sites serves only as a show case to portray information about different government departments and agencies and do not offer any transaction facility. In many cases there are complaints of missing links on government web sites and frequent web site breakdowns. Mostly these web sites do not have any information available in local languages.

PREFERENCE TO GET WORK DONE BY PERSONAL CONTACTS

Another important hurdle reducing the demand for e-government in developing countries is the culture to get work done through personal contacts rather than following the laid down procedures. Corruption in bureaucratic setups of developing countries is a well known fact and citizens sometime find it convenient to meet their needs using short cut methods. E-Government can be an effective tool to reduce corruption as experienced by several countries such as Argentina, Chile, India, Russia and South Korea (Bhatnagar, 2001; Im, 2001).

SUPPLY SIDE IMPEDIMENTS

TECHNOLOGY AND LACK OF MANPOWER

A study was conducted to investigate the impact of information and computer technology (ICT) and the level of human development index (HDI) on the development of e-governments (Siau & Long, 2009). The research concluded that both technology and social factors (ICT and HDI) are important for the development of e-government and the higher level of IT and human development will result in advanced development of e-government.

FINANCIAL CONSTRAINTS

There is a general consensus among the researchers that the governments are gearing up to enter the transactional stage of e-government development (Reddick, 2004; West, 2004). Financing online transactions has been identified as one of the most significant hurdle in the way of development of e-governments (Norris & Moon, 2005; Robbins & Miller, 2004).

LACK OF LEGAL AND REGULATORY FRAMEWORK

E-government initiatives of any government would not be successful unless they are not properly backed by the legal and regulatory steps to ensure the security of information and protection of intellectual property. In order to achieve these objectives government of Pakistan took the following steps:

2002: Electronic Transactions Ordinance (ETO): This ordinance deals with the protection of official and commercial documents in accordance with the United Nations Commission of International Trade Law (UNCITRAL). It also deals with the electronic signatures as detailed in Model Law on e-signatures (2001).

2004: Electronic Crimes Act (ECA): This Act is designed to deal with e-fraud, cyber crimes, e-forgery, pornography and spamming.

2005: Data Protection Act (DPA): It deals with disclosure and dissemination of data as well as resolution of disputes.

2005: Payment Systems and Electronic Funds Transfer Act (PSEFTA): It is a comprehensive act dealing with transfer of funds and e-payments promulgated by the central bank i.e., State Bank of Pakistan.

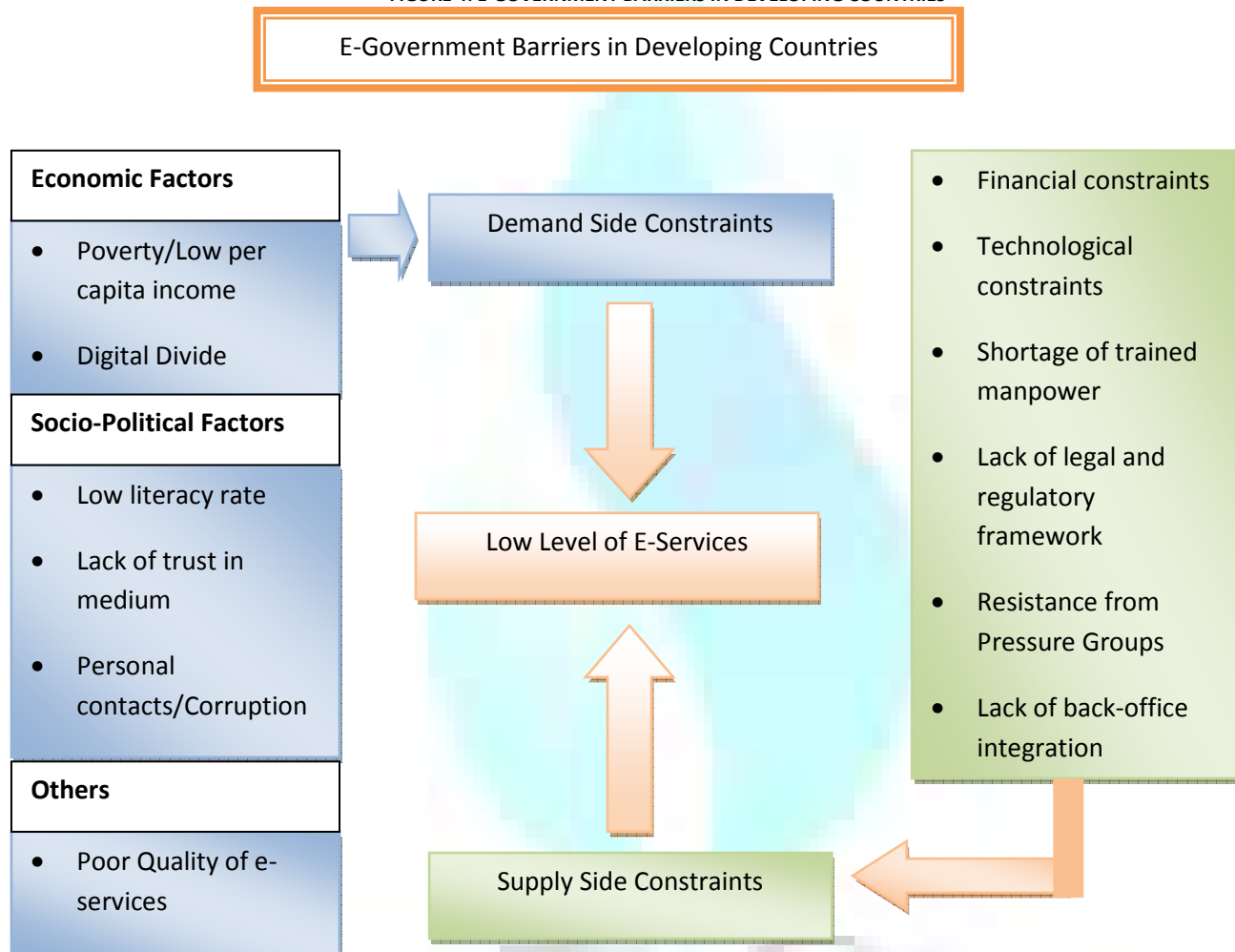
LACK OF BACK-OFFICE INTEGRATION

Another obstacle cited in literature on e-government is the co-operation between front office and back office operations (Bekkers, 2007). E-services cannot be effectively and efficiently delivered without consolidating the back end systems (UN, 2008). Back office integration should take place side by side front office development (Kunstelj & Vintar, 2004). Integrating back office operations is much more difficult than developing front office as a result most e-government sites offer only information or one way communication but very few offer two way communication and transaction facilities.

RESISTANCE FROM PRESSURE GROUPS

There are some pressure groups in government setup that resist change. These groups have their own vested interests in maintain a status quo and they fear a decrease of number of jobs due to use of technology. Lack of support from politicians and high level bureaucrats is also an important barrier on supply side of e-government (Schwester, 2009).

FIGURE 4: E-GOVERNMENT BARRIERS IN DEVELOPING COUNTRIES



IMPLEMENTATION ISSUES AND GUIDELINES FOR LATE ADOPTERS: CONCLUDING REMARKS FROM THE RESEARCHERS

Although we have discussed several models of e-government development in this paper, all of which predict a linear and stepwise progression of e-government. But it does not suggest that any country which is late adopter of this modern tool of governance need to take start from step one. Late adopter can learn the lessons from early adopters and instead of leaping forward can jump towards the next step of e-development.

One common observation about e-government is that many e-services are offered on the hope that the citizens will use it. There exists a "field of dreams" that if we build it they will use it. But generally government officials admit that there is lack of demand for e-government from the public side. It is a technology which is driven from top-down i.e., by the government themselves (Kunstelj & Vintar, 2004).

We have discussed several barriers in the development and progression of e-government. Keeping these factors aside, organizational and political factors are and will remain the main barriers towards this new and better government at least in the developing nations. The governments who are able to handle the red tape and political pressure will be guaranteed leaders in this form of governance. In future researches, the model proposed in this paper can be operationalized to narrow down demand and supply side barriers to develop a suitable strategy to further promote this form of governance. Moreover, more country specific studies can be conducted to further improve upon the proposed model.

REFERENCES

- Accenture (2004). *e-Government Leadership: High Performance, Maximum Value*, E-Government executive series, viewed on July 12, 2011 <http://www.govexec.com/pdfs/AccentureEGovStudy.pdf>.
- Basu, S. (2004), "E-Government and Developing Countries: An overview", *International Review of Law Computers and Technology*, 18(1), pp.109-132
- Belanger, F. & Carter, L. (2009), "The Impact of the Digital Divide on E-government Use", *Communications of the ACM*, 52(4), pp.132-135.
- Bekkers, V. (2007), "The governance of back-office integration", *Public Management Review*, 9(3), pp.377-400.

- Bekkers, V. & Homburg, V. (2007), "The Myths of E-Government: Looking Beyond the Assumptions of a New and Better Government", *The Information Society*, 23(5), pp. 373-382.
- Bekkers, V.J.J.M., & Homburg, V.M.F. (2005), "The information ecology of e-government: Background & concepts", In *The information ecology of e-government: E-government as institutional and technological innovation in the public sector*, ed. Bekkers, V. J. J. M. and Homburg, V. M. F., 1–20. Amsterdam: IOS Press.
- Bhatnagar, S. (2001). E-government and access to information, Viewed on March 05, 2011 <http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN008435.pdf>
- Chadwick, A., & May, C. (2003), "Interaction between states and citizens in the age of the internet: 'E-government' in the United States, Britain and the European Union", *Governance* 16(2), pp.271–300.
- CIA (2010). Central Intelligence Agency, USA, The world fact book, Viewed on May 08, 2011 <https://www.cia.gov/library/publications/the-world-factbook/geos/pk.html>.
- Deloitte and Touche (Dec2000/Jan2001), "The Citizen As Customer", *CMA Management*, 74(10), pp.58.
- CapGemini Ernst and Young (2004). Online Availability of Public Services: How is Europe Progressing? (Web-based Survey on Electronic Public Services: Report of the Fourth Measurement, October 2003), European Commission DG Information Society, 2004.
- EGD (2010). E-Government Directorate Government of Pakistan, Viewed on March 02, 2011 <http://www.e-government.gov.pk/>.
- Gartner Research (2001). E-Government: What are Citizens Really Looking For? *Gartner Research Report COM-13-3960*, London, 2001.
- Heeks, R. (2001). Understanding e-Governance for Development, *Working paper series: Paper No. 11*, Institute for Development Policy and Management, Viewed on April 25, 2011 http://www.sed.manchester.ac.uk/idpm/research/publications/wp/igovernment/documents/igov_wp11.pdf.
- Holden, S. H., Donald F.N., & Patricia D.F. (2003), "Electronic Government at the Local Level: Progress to Date and Future Issues", *Public Productivity and Management Review* 26(3), pp. 1–20.
- Im, B. Y. (2001), "Strengthening Government Citizen Connections: A Case Study of Korea", *Special Session, Anti-Corruption Symposium 2001: The Role of On-Line Procedures in Promoting Good Governance*, Seoul, South Korea, 2001.
- Internet World Stats (2010), retrieved from <http://www.internetworldstats.com/stats3.htm> on March 11, 2011.
- Kunstelj, M. & Vintar, M. (2004). "Evaluating the progress of e-government development: A critical analysis", *Information Polity*, 9 (2004), pp.131-148.
- Layne, K. & Lee, J.(2001), "Developing Fully Functional E-Government: A Four Stage Model", *Government Information Quarterly*, 18 (2), pp.122-136.
- Lee, S.M., Tan, X. & Trimi, S. (2005), "Current Practices of Leading E-Government Countries", *Communication of the ACM*, 48(10), pp.99-104.
- McDonagh, M. (2002), "E-government in Australia: the challenge to privacy of personal information", *International Journal of Law and Technology*, 10(3), pp.327-343.
- Moon, M.J.(2002), "The Evolution of E-Government among Municipalities: Rhetoric or reality?", *Public Administration Review*, 62(4), pp.424-433.
- Norris, D.F. & Moon, M.J. (2005), "Advancing E-Government at the Grassroots: Tortoise or Hare?", *Public Administration Review* 65 (1), pp.64–75.
- National IT and Action Plan (2000), Viewed on April 04, 2011 http://www.pseb.org.pk/UserFiles/documents/National_IT_Policy.pdf.
- Reddick, C.G. (2004), "Public-Sector Ecommerce and State Financial Management: Capacity versus Wealth", *Social Science Computer Review*, 22(3), pp.293–306.
- Robbins, D. and Miller, G. (2004) "Financing E-Government Technology Expenditure to Maintain Equity and Efficiency", *Paper presented at the Annual Conference of the Association for Budgeting and Financial Management*, October 7–9, Chicago.
- Schwester, R. W. (2009), "Examining the Barriers to e-Government Adoption", *Electronic Journal of e-Government*, 7 (1), pp.113 - 122, retrieved from <http://www.ejeg.com/volume-7/vol7-iss1/Schwester.pdf> on May 15, 2011.
- Siau, K. & Long, Y. (2009), "Factors impacting E-Government Development", *Journal of Computer Information Systems*, Fall 2009, pp.98-107.
- Teo, T.S.H., Srivastava, S.C. & Jiang, L. (2008) "Trust and Electronic Government Success: An empirical Study", *Journal of Management Information Systems*, Vol. 25, No.3, pp.99-131.
- UN (2002). Benchmarking e-government: a global perspective – assessing the UN Member States', *United Nations, DPEPA, ASPA*, pp. 22
- UN (2003), UN Global E-government Survey, UN, 2003, Viewed on March 21,2011 <http://www.unpan.org/egovment2.asp#survey>.
- UN (2008), UN E-Government Survey 2008, Viewed on March 06, 2011 <http://unpan1.un.org/intradoc/groups/public/documents/un/unpan028607.pdf>.
- Vintar, M., Kunstelj, M., Dečman, M. & Berčič, B. (2003), "Development of e-Government in Slovenia", *Information Polity* (8), pp.133-149.
- West, D.M.(2003), "Global E-Government 2003", Centre for Public Policy, Brown University, Providence, 2003, Viewed on March 10,2011 <http://www.INSidePolitics.org>.
- West, D.M. (2004), "E-Government and the Transformation of Service Delivery and Citizen Attitudes", *Public Administration Review* 64 (1), pp.15 – 27.
- Yu, J.W.K. (2005), "Electronic government and its implication for data privacy in Hong Kong: Can personal data (privacy) ordinance protect the privacy of personal information in Cyberspace?", *International review of law computers and technology*, vol. 19, No. 2, pp.143-163.

INFLUENCE OF INTERNATIONAL LABOR MIGRATION AND REMITTANCES ON POVERTY REDUCTION IN BANGLADESH

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ABSTRACT

This paper focuses on the perspective of labor migration and remittances and its influence on poverty reduction. This paper however mainly reviews the recent studies carried out in the respect both globally and locally. For preparing this paper, Secondary data and information have been collected and analyzed from published books, different articles published in different journals and magazines, various publications of Bureau of Manpower Employment & Training, Bangladesh Bureau of Statistics (BBS), Export Promotion Bureau (EPB), Bangladesh Bank and World Bank. Both international migration and remittances significantly reduce the level, depth and severity of poverty in developing world. International migration widens individual choices in terms of employment opportunities and for being more productive and creative. Further research is required to fully understand the nature, extent and processes of the impact of international migration and remittances on poverty reduction in Bangladesh.

KEYWORDS

Labor migration, Poverty reduction, Remittances.

INTRODUCTION

This paper focuses on the context of labor migration, remittances and poverty reduction. The study looks into the extent and processes through which international labor migration, contributes to poverty reduction in Bangladesh. This paper however has mainly reviewed the recent studies carried out in this respect both globally and locally. It has also presented the recent trends and patterns of international migration, flow of remittances and poverty situation in Bangladesh. Based on this, the paper has tried to identify the areas where further research is required to fully understand the nature, extent and processes of the impact of migration and remittances on poverty reduction.

In 2005, an estimated 190 million people of the world lived outside their country of birth. Among them, 49.6 percent people were women and 50.4 percent people were men. Of the world's migrants, 82 percent come from developing countries with Bangladesh, China, India, Mexico, Russia and Ukraine sending the largest numbers (World Bank, 2006a). International labor migration has become an increasingly vital feature in a globalizing world in which not only more people are on move, but also the frequency and the different modes, channels and directions of mobility have expanded and extended into every corner of the world. This trend is not only set to continue but to increase. The migration of workers across international boundaries in search of economic opportunity has enormous implications for development. It can have significant positive impacts on household well-being and economic growth through improved income opportunities, knowledge transfers and increased integration in the global economy (World Bank, 2006b).

OBJECTIVES

The main objective of this paper is to explore the effect of international labor migration and remittances on poverty reduction in Bangladesh. This paper also aims to identify the areas for policy intervention to increase the international labor migration and remittances.

METHODOLOGY

This paper is prepared mainly based on secondary data. Data and information have been collected and analyzed from published books, different articles published in different journals and magazines. Moreover, the secondary data for the study have been gathered especially from the various publications of Bureau of Manpower Employment & Training, Bangladesh Bureau of Statistics (BBS), Export Promotion Bureau (EPB), Bangladesh Bank and World Bank. This paper contains four sections. The first section is an introductory one. Global and local studies reviews have been done in the second section. The third section is an over view of international migration, remittances and poverty reduction in Bangladesh. The final section has drawn conclusions and major policy implications.

LABOR MIGRATION AND REMITTANCES AFFECT POSITIVELY ON POVERTY REDUCTION: EVIDENCE FROM SOME RECENT STUDIES

i) GLOBAL STUDIES

This section reviews literature concerned with the impacts of international migration and remittances on poverty reduction in the contexts of different economies.

Adams and Page (2005a) have focused on the positive side of remittances resulting from migration, which reduce poverty. Adams and Page have used cross-country regression based on 74 countries and found that a 10 percent increase in the share of remittances in a country's GDP can lead to an average 1.2 percent decline the poverty headcount.

Chimhowu et al. (2005) have examined the nature and role of remittances in household income and impact of remittances may have on poverty reduction. They have used a framework for assessing in impact of remittances on poverty reduction. This study has found a number of conclusions about the influence of remittances on poverty reduction. First, remittances now form an important part of household livelihood strategies. Remittances contribute directly to raising household incomes, while broadening the opportunities to increase incomes. They also allow households to increase their consumption of local goods and services. However, available evidence suggests caution in drawing further conclusions on the extent to which remittances can be a broad strategy for poverty reduction. Remittances can be unreliable and hence can make specific contributions only at a particular moment in time. In the long term, they can cease altogether as migrants either return to the home country or are integrated into the host community. Second, at the community level, remittances generate multiplier effects in the local economy, creating jobs and spurring new economic and social infrastructure and services, particularly where effective structures and institutions have been established to pool and direct remittances. Where these have been set up and encouraged and where the state is supportive, remittances can make a difference, particularly in remote rural locations where state resources have not been effective (Alarcon, 2002). Third, at the national level, remittances provide foreign currency and contribute significantly to GDP. However for countries with low GDP, remittances receipts can distort formal capital markets and destabilize exchange-rate regimes through the creation of parallel currency markets. Fourth, remittances can redistribute resources from rich to poor countries. The increase in remittances, which now surpass official aid transfers to developing countries, reduces international inequality and promotes poverty reduction.

Adams (2004) has used a large nationally representative household survey to analyze the impact of internal remittances (from Guatemala) and international remittances (from the United States) on poverty reduction in Guatemala. With only one exception, the study finds that both internal and international remittances reduce the level, depth and severity of poverty in Guatemala. However, the paper finds that remittances have a greater impact on reducing the severity as opposed to the level of poverty in Guatemala. For example, the squared poverty gap which measures the severity of poverty falls by 21.1 percent when internal remittances are included in household income. This is true because households in the lowest deciles group receive a very large share of their total household income (expenditure) from remittances. Households in the bottom deciles group receive between 50 and 60 percent of their total income (expenditure) from remittances. Their income status changes dramatically and this in turn has a large effect. Any poverty measure like the squared poverty gap considers the number, distance and distribution of poor household beneath poverty line.

The themes of the Global Economic Prospect 2006 published by the World Bank are international remittances and migration, their economic consequences and how policies can increase their role in reducing poverty. In section "Remittances, Poverty and Inequality" includes that remittances directly affect poverty by increasing the income of the recipients. They also indirectly affect poverty in the recipient country through their effects on growth, inflation, exchange rates and access to capital. Measuring the impact of remittances is complex. But a growing body of evidence from poverty simulation model, cross-country regressions and analysis of household survey data shows that remittances, in facts do reduce poverty-although the evidence of their effect on inequality is mixed (World Bank, 2006c).

Adams and Page (2005b) have examined the impact of international migration and remittances on poverty in developing world. In this study, they have used the cross-country data to analyze how international migration and remittances affect poverty in the developing world and basic growth poverty model suggested by Ravallion (1997) and Ravallion and Chen (1997). This study based on a new data has set on international migration, remittances, inequality and poverty from 71 developing countries. The results have been shown that both international migration and remittances significantly reduce the level, depth and severity of poverty in developing world. After instrument for the possible endogenously of international migration and controlling for various factors, results suggest that, on average, a 10% increase in the share of international migrants in a country's population will lead to a 2.1% decline in the share of people living on less than \$1.00 per person per day. After instrument for the possible endogenously of international remittances, a similar 10% increase in per capita official remittances will lead to a 3.5% decline in the share of people living in poverty.

Although the available evidence is still relatively limited, growing evidence from household survey data complements the findings of the model that international remittances reduce the incidence and severity of poverty in several low income countries. According to that evidence, remittances reduce the poverty headcount ratio by 11 percentage points in Uganda, 6 percentage points in Bangladesh and 5 percentage points in Ghana (Adams, 2006).

Wodon et al. (2002) have concluded that in Guerrero and Oaxaca, to Southern Mexican states with significant international emigration and remittances inflows, the share of the population living in poverty is lower by 2 percentage points due to remittance income. They have argued that this poverty effect is similar in magnitude to that of many government programs in poverty reduction, education, health and nutrition.

Yang and Martinez (2005) have studied the impact of variations in the exchange rate on remittances sent by Filipino workers and the ultimate impact of remittances on poverty in the recipient regions. Using a large dataset from the Overseas Filipino Survey, they have found that and appreciation of the Philippine peso led to an increase in remittance flows, which contributed to the reduction in poverty. Interestingly, increased remittances not only reduced poverty in the migrant families, they also had spillover effects on non-migrant families.

Taylor et al. (2005), using data from a 2003 survey, have found that international remittances account for 15 percent of per capita household income in rural Mexico. They have concluded that an increase in international remittances would reduce both the poverty headcount and the poverty gap.

In his study Adams (1991), has used predicated income equations to evaluate the impact of international remittances on poverty and income distribution. Using this framework, the study shows that international remittances have a small but positive, effect on poverty. Poverty-line calculations indicated that the number of poor households declines by 9.8 percent when predicted per capita household income includes international remittances. Such remittances account for 14.7 percent of the total predicted per capita income of poor households.

Miamba et al. (2005) have analyzed the impact of international remittances on poverty using a growth-poverty model. This model, which has been used by a host of poverty researchers, assumes that economic growth-as measured by increasing in mean per capita income- will reduce poverty. The analysis of the results interestingly finds that, when the estimated values for unofficial remittances are added to official remittance figures, total remittances (official and unofficial) reduce the level of poverty in South Asia. On average, the point estimates for the poverty headcount measure suggest that a 10 percent increase in total remittances (official and unofficial) will lead to a 0.9 percent decline in level of poverty in South Asia. This means that for a "representatives country" where exactly one-half of the population lives below the poverty line, a 10 percent increase in total remittances (official and unofficial) will bring the proportion living in poverty down to about 0.48 percent.

Remittances may have reduced the share of poor people in the population by 11 percent in Uganda, 6 percent in Bangladesh and 5 percent in Ghana. Remittance income is also associated with higher school attendance in Philippines and Sri Lanka, has improved health outcomes in Guatemala and has increased investment in micro enterprises in Mexico (World Bank, 2006b).

It can be concluded that from these studies presented in this section that there are similarities between studies and the impact of international labor migration and remittances on poverty reduction is positive.

ii) STUDIES IN BANGLADESH

Afsar et al. (2000) have found that migration households have been experienced for enormous expansion of their income base during the post migration period. Currently a fifth of the migrant households have monthly income between 20,000 and 30,000 Taka compared to a solitary household prior to migration of the respondents. Expansion of income base leads to a dramatic improvement of the household's poverty situation. Using HCI (Head Count Index), the study estimates that 21 percent of the migrant households were moderately poor prior to overseas migration by the respondents. In the post-migration period, the proportion of such household slashed down dramatically to seven percent. In this study, they have also found that remittances promote development through increased material and human capital investment. The study shows that from zero level of savings, respondents now save a quarter of their overseas income

beside remittances. Apart from that their investment on health and education of family members, the two major indicators of human capital has been increased significantly compared to the pre-migration level.

Siddiqui (2005) has explored the extent and nature of international voluntary migration from Bangladesh. His study has identified the areas for policy intervention to increase the opportunities available for poor people to migrate beyond national borders with maximum protection. The study has emphasized that through timely and appropriate intervention, migration can be turned into a major development enhancing process. It can reduce poverty and be an important sustainable strategy of the poor.

Siddiqui's study (2001) has looked into both social and economic costs and benefits of female short-term international migration. It has found that 56% of families experienced positive economic results, 26.5% got negative economic results and for 15.5% families, the economic impact of migration was mixed. Economic impact was assessed on the basis of 10 indicators: (a) reasonable length of stay abroad or returning home before one year of stay; (b) reasonable flow of remittances or inability to generate remittances; (c) repaying loans for migration or inability to repay the loan; (d) buying land or inability to buy any land; (e) constructing a house or inability to construct a house of generating savings or inability to generate enough or any savings; (g) investing in business or inability to invest in business; (h) increase in income as percentage of family income or no increase in income as percentage of family income; (i) substantially bearing the subsistence costs of a family for a prolonged period or inability to bear the subsistence costs of family; (j) improve living standard or general deterioration in living standard.

Human development is considered to be the pre-requisite for poverty alleviation and growth and development of the country. Mahmood (1998) has observed that international migration and human development are interlinked. Enlarging people's choices is by far the most important contribution of international migration to human development. It widens individual's choices in terms of employment opportunities and for being more productive and creative. For the very poor, migration enables survival from hunger and starvation. It opens opportunities for employment and income for the unemployed; being more productive, for the underemployed. The study has also observed at the household level, overseas migration, therefore remittances contribute to better and higher education among migrant family members, enable better health and Medicare, and significantly underline improved housing and sanitation for the family. Various transfer payments made migrant families towards their relatives, friends and neighbors also contribute to respective welfare. Moreover, participation and contribution of migrant families in development of local infrastructures and various institutions contribute to local human development. These include, in particular, construction and development of schools, colleges, health centers, water supply and sanitation, rural electrification etc. Migration also helps development or strengthening of local level institutions such as family values and social norms and traditions, which have a positive bearing on human development.

Mahmood (1991) has found that the level and the pattern of use of remittances by migrant households would have diverse implications for the welfare of the respective households as also for the community and locality to which they belong to. Overseas remittances ensure a better living condition for a family at present, and enhance its resource base for the future. Transfer of remittances in the form of gifts and donations, and use of the same for alternative purposes create various linkages for the local economy. An increased demand is generated for various goods and services, which encourage local production and trading, therefore generate employment opportunities. The various sectors and activities, which are affected most, are construction, agriculture, services, manufacturing, transport and communication and social infrastructures.

The remittance earnings have direct poverty alleviation impact. A study shows that the higher the skill and education level of the overseas workers and employees, the lower their ties with the host country and incidence of sending remittances back home. About 94 percent of the Bangladeshi overseas workers are outside professional categories; they have strong ties with home and tend to send a significant portion of their remittance back to Bangladesh. The investigation on the pattern of expenditure of the workers shows that the expatriate workers spend 29.8 percent of their income on personal consumption abroad; they send 44.9 percent of their income back home and save 22.8 percent. The remittances sent by the overseas workers are used for various productive, investment and consumption purposes. A major share of remittances (36 percent) is used to meet recurrent consumption, which includes education, health care, and food. Such expenditures have a direct poverty alleviation impact. Another 20 percent is used for investment in land properties, while around 14 percent of remittances are spent to provide better housing arrangements. Moreover, remittances for the families play a role in restructuring the income structure and consumption (Raihan, 2006).

The impacts of migrant remittances touch not just the macro economic factors and the dependents of the migrants in home countries. They influence the social structure in terms of life standards, rural financial and trade activities, and income consumption levels of the people of particular community/villages both actively and passively. Many recipient families get rid of extreme poverty situation, at least marginally (Azad, 2006).

So from the analyses of the above mentioned studies of different researchers, the following findings can be summarized:

- Both international migration and remittances significantly reduce the level, depth and severity of poverty in developing world.
- Remittances promote development through increased material and human capital investment.
- Through timely and appropriate intervention, migration can be turned into a major development enhancing process.
- International migration widens individual choices in terms of employment opportunities and for being more productive and creative.
- Remittances for the families play a role in restructuring the income structure and consumption.

But these studies could not found the following issues. As a result, further research should be continued.

- Impact of international migration and remittances on depth and severity of poverty in locally.
- Comparative analysis of skilled and unskilled labor migration impact on poverty.
- Interlink of remittances and growth in locally.

AN OVERVIEW OF INTERNATIONAL MIGRATION, REMITTANCES AND POVERTY REDUCTION SCENARIO IN BANGLADESH

i) NATURE OF MIGRANT AND SCALE OF MIGRATION

Systematic recording of migration of Bangladeshi workers started from 1976. The Bureau of Manpower, Employment and Training (BMET), which is under the Labor and Employment Ministry of the Government of Bangladesh, is in charge of keeping the record of Bangladeshis who have left the country for overseas employment. BMET has classified temporary migrant population into four categories: professional, skilled, semi-skilled and unskilled. Doctors, engineers, teachers and nurses are considered professionals, manufacturing or garments workers, driver, computer operator and electrician are considered skilled, while tailors and masons etc. are considered semi-skilled. Housemaids, cleaners and menial laborers are considered unskilled workers. Table-1 shows that the skill composition of those who migrated over this period. From 1976 to 2005 half of the total migrants were unskilled (Bangladesh Economic Review, 2006). In 1995 professional's, skilled and semi-skilled workers were 52.42 percent of total migrants. But in 2005, it increased in 55.46 percent. The composition of worker going abroad for 2004 was: professional 0.77 percent, skilled worker 44.98 percent, semi-skilled 9.71 percent and low skilled 44.54 percent.

The formal "export of manpower" was launched in 1976 with the number at 6,087 workers only. In 2005 the export went up to 252,702. From 1976 to April 2006 altogether 42,73,000 people have migrated from Bangladesh on overseas employment (Bangladesh Economic Review, 2006). Table-2 shows the migration by country of employment. Bangladesh exports contract labor mostly to Middle Eastern and Southeast Asian Countries. Saudi Arabia, UAE, Kuwait, Oman, Malaysia and Singapore are some of the major countries of destination. Saudi Arabia is the largest employer of Bangladeshi migrant workers. Bahrain, Qatar, Jordan, South Korea, Brunei, Mauritius, Italy, UK, USA, Spain, Japan, France, Australia, Canada are also preferred countries for migration.

ii) FLOW OF REMITTANCE

The Bangladesh Bank documents remittance flows to Bangladesh from all over the world. Table-3 shows that the remittances sent by migrant workers have grown over time. It has increased from US \$1217.06 million (1995-96) to US \$3889.74 million (2005-06, April). In 2005-06 April remittances increased 21.91 percent compare to the figure for 2004-05. In 2004-05 remittances earnings were equivalent to 6.37 percent of GDP. This ratio has a secular increasing trend over the year. The ratio of remittances to export earning is also increasing steadily and in 2004-05 it was 44.46 percent (Table-4).

In 2004-05, 39.25% of the total remittances came from Saudi Arabia. In the total remittances, the share of remittances from USA, UAE and Kuwait are 14.48%, 11.49% and 10.57% respectively.

iii) POVERTY SCENARIO

Poverty has manifold expressions and, indeed many roots. It is about income deprivation. It is about shortfalls in consumption and inadequate supply of nutrition. It is about poor access to education and low physical asset bases. It is about risks, uncertainties and vulnerabilities. It is about personal insecurity as much as it is about lack of food security. It is about crisis coping capacities. It is about self-development initiatives. It is about dismal state of health and health care access (Sen and Rahman, 1998).

By most estimates, Bangladesh has witnessed a modest poverty reduction rate of around one percentage point a year since the early nineteen nineties. The percentage of population living in poverty fell from over 70 percent in 1970 to about 50 percent in 2000. A decline of nearly 10 percentage points occurred in just the first half of the nineties. The rate of decline slowed between 1996 and 2000, corresponding to a slowdown in economic expansion. Table-5 illustrates the declining trends in poverty and extreme poverty from 58.8 percent to 49.8 percent and from 42.7 percent to about 33.7 percent, during the nineties.

There has been a substantial improvement in the welfare of those identified as poor through earlier rounds of Household Income and Expenditure Survey (HIES). The impact of economic growth seems to have been widespread, with many people moving out of poverty. The poverty Gap (P1) measures the average distance the poor are from the poverty line and the Poverty Severity (P2), the square of the Poverty Gap, investigates the distributional characteristics of the poor. Changes in these measures suggest that the average distance from the poverty line had decreased for the poor between 1991-92 and 2000 from 17.2 percent to 12.9 percent, and the rate of decline in P₁ and P₂ measures were faster than that of the head count rates (World Bank, 2006d).

Human poverty trends have shown faster improvement than income-poverty trends. The Human poverty index (based on deprivations in health, education and nutrition) stood at 61 percent in the early eighties, (1981-83) but declined to 47 percent in the early nineties (1993-94) and dropped further to 35 percent in the late nineties (1998-2000). The index of human poverty was declined by 2.54 percent per year compared with 1.45 percent in the national head-count ratio for income-poverty over the last two decades.

Bangladesh has made significant inroads in poverty alleviation; the overall incidence of poverty remains unacceptably high with nearly 50 percent of the population below the poverty line. Although the head count rate has declined the actual number of poor has remained roughly the same during the nineties, around 63 million people. The number of people in extreme poverty declined modestly from 45 million to 42 million over the same period.

CONCLUSIONS AND POLICY IMPLICATIONS

The present study has indicated earlier that in some areas, international migration and remittances have a strong statistically significant impact on reducing poverty in developing countries. The remittances sent by the overseas workers are used for various productive, investment and consumption purposes. A major share of remittances is used to meet recent consumption, which includes education, health care and food. Such expenditures have a direct poverty alleviation impact. But skilled and unskilled labor migration impact on poverty, impact of labor migration on depth and severity of poverty, and international migration and growth interlink in Bangladesh context are important areas for international labor migration and poverty nexus. So, further research should be continued in this regard in near future. Bangladesh still receives lower amount of remittances compared to the number of her national working abroad. Number of Bangladeshi immigrants is smaller, mostly short term in employment, less skilled in working performance and low paid. Informal remittance transfer has long been seen as a strong barrier to receiving remittances in full swing (Azad, 2006).

With respect to migration, the positive impact of international migration on poverty makes the policy question of "managing migration" assume greater importance in the international development community. While the international community has paid considerable attention in past to international movements of goods, services and finance, much less attention has been paid to the international movements of people. There would be substantial potential benefits to world's poor if more international attention were focused on integrating "migration policy" to within the larger global dialogue economic development and poverty reduction.

With respect to remittance lowering transaction costs of remittances will help to increase the poverty-reducing impact of international remittances and will also encourage a larger share of remittances to flow through formal official channels.

Strong institutions and good policies will enhance the benefits of migration for developing countries. A stable business climate encourages the investment of income from remittances and a sound financial infrastructure is essential if remittances are to have a positive impact of financial deepening. Sound macro economic policies and openness to trade will also help to manage the macro economic risks associated with high inflows remittances in small economies.

There are some suggestions that bilateral agreements can enhance the benefit of migration by reducing the incentives for illegal migration and helping to ensure that migration is of equal benefit to both sending and receiving countries. But these suggestions have yet to be fully evaluated. Improved incentives are at the core of encouraging skilled people to stay or return home. The creation of better private sector jobs and the implementation of strategies for public sector, retention combining performance based systems with improved working conditions can increase incentives to stay. Portable social security benefits can increase incentives to return. Today only one migrant in five worldwide has full pension portability (World Bank 2006b).

REFERENCES

- Adams, R.H., Jr. (1991), "The Effects of International Remittances on Poverty, Inequality and Development in Rural Egypt," Research Report 86, International Food Policy Research Institute, Washington D.C.
- Adams, R.H., Jr. (2004), "Remittances and Poverty in Guatemala," Policy Research Working Paper 3418, World Bank, Washington D.C.
- Adams, R.H., Jr. (2006), "Remittances and poverty in Ghana," Policy Research Working Paper 3838, World Bank, Washington D.C.,
- Adams, R.H., Jr., and Page, J. (2005a), "The Impact of International Migration and Remittances on Poverty," in Samuel Munzele Maimbo and Dilip Rath (ed.s), *Remittances: Development Impact and Future Prospects*, World Bank, Washington D.C. pp.277-306.
- (2005b), "Do International Migration and Remittances Reduce Poverty in Developing Countries?" *World Development* Vol. 33, No. 10, pp. 1645-69.
- Afsar, R., Yunus, M., and Islam (2000), "Are Migrants Chasing After the Golden Deer? A Study on Cost-Benefit Analysis of Overseas Migration by the Bangladesh Labor," *Bangladesh Institute of Development Studies*.
- Alorcon, R. (2002), "The Development of Hometown Association in the United States and the Use of Social Remittances in Mexico," Department of Social Studies, Colegio de la Frontera Norte, Mexico.
- Azad, A.K. (2006), "Migration Remittance in Bangladesh Dynamics and Developments Impacts," *The Business Bangladesh*, April 2006, p. 26.
- Chimhowu, Piesse and Pinder (2005), "The Socio Economic Impact of Remittances on Poverty Reduction," in Samuel Munzele Maimbo and Dilip Rath (ed.s), *Remittances Development Impact and Future Prospects*, World Bank, Washington D.C., pp. 83-102.
- Bangladesh Economic Review (2006), Government of Bangladesh.
- Mahmood, R.A. (1991), "International Migration for Employment: Experiences of Bangladeshi Returned Migrants from Japan," *Bangladesh Institute of Development Studies*.
- (1998), "Globalization, International Migration and Human Development: Linkage and Implications," UNDP (mimeo), New York.
- Raihan, A. (2006), "Inward Remittances and Policy Measure," *The Business Bangladesh*, April, p. 33.
- Ravallion, M. (1997), "Can High-Inequality Developing Countries Escape Absolute Poverty?" *Economic Letters*, Vol. 56, pp. 51-57.
- Ravallion, M. and Chen, S. (1997), "What Can New Survey Data Tell Us About Recent Changes in Distribution and Poverty?" *World Bank Economic Review*, Vol. 11, No. 2, pp. 357-382.
- Sen, B. and Rahman, A. (1998), "Bangladesh Poverty Monitor: an Overview," *Bangladesh Institute of Development Studies*.

- Siddiqui, T. (2001), "Transcending Boundaries: Labor Migration of Women from Bangladesh," The University Press Limited, Dhaka.
- Siddiqui, T. (2005), "International Migration as a Livelihood Strategy of the Poor: The Bangladesh Case" in Tasneem Siddiqui (ed.) *Migration and Development: Pro-Poor Policy Choices*, The University Press Limited, Dhaka.
- Taylor, J.E., Mora, J. and Adams, R. (2005), "Remittances, Inequality and Poverty: Evidence from Rural Mexico," Research Program on International Migration and Development, DECRG, Mimeo, World Bank.
- Wodon, Q., -Urdinolan, D.A., Konig, G.G., Revah, D.O. and Siaens, C. (2002), "Migration and Poverty in Mexico's Southern States," *Regional Studies Program*, World Bank, Washington D.C.
- World Bank, (2006a), "World Development Report 2007: Development and the Next Generation", Washington D.C., pp. 188-189.
- World Bank, (2006b), "The International Migration Agenda & The World Bank: Overview," Washington D.C., p. 3.
- World Bank (2006c), "Global Economic Prospects 2006," Washington D.C., p.188.
- World Bank (2006d), "Social Safety Nets in Bangladesh: An Assessment," Washington D.C., pp. 6-7.
- Yang, Dean, and Claudia, Martinez (2005), "Remittances and Poverty in Migrants Home Areas: Evidence from the Philippine," in Caglar Ozden and Maurice Schiff (ed.s) *International Migration, Remittances and the Brain Drain*, World Bank, Washington D.C., pp. 81-121.

APPENDIX

TABLE 1: YEAR WISE OFFICIAL FLOW OF BANGLADESHI WORKERS BY THEIR SKILL COMPOSITION (1995-APRIL 2006)

Year	Professional	Skilled	Semi-Skilled	Unskilled	Total
1995	6352	59907	32055	89229	187543
1996	3188	64301	34689	109536	211714
1997	3797	65211	193558	118511	381077
1998	9574	74718	51590	131785	267667
1999	8045	98449	44947	116741	268182
2000	10669	99606	26461	85950	222686
2001	6940	42742	30702	109581	188965
2002	14450	56265	36025	118516	225256
2003	15862	74530	29236	136562	254190
2004	19107	81887	24566	147398	272958
2005	1945	113655	24546	112556	252702
2006 (up to April)	384	38224	9775	47652	96035

Source: Bureau of Manpower, Employment & Training.

TABLE 2: MIGRATION BY COUNTRY OF EMPLOYMENT

Year	Saudi Arabia	Kuwait	UAE	Bahrain	Oman	Malaysia	Singapore	Others	Total
1995	84009	17492	14686	3004	20949	35174	3762	8467	187543
1996	72734	21042	23812	3759	8691	66631	5304	9741	211714
1997	106534	21126	54719	5010	5985	152844	27401	7458	381077
1998	158715	25444	38796	7014	4779	551	21728	10640	267667
1999	185739	22400	32344	4639	4045	-	9596	9419	268182
2000	144618	594	34034	4637	5258	17237	11095	5213	222686
2001	137248	5341	16252	4371	4561	4921	9615	6656	188965
2002	163254	15767	25438	5370	3927	85	6870	4545	225256
2003	162131	26722	37346	7482	4029	28	5304	11148	254190
2004	139031	41108	47012	9194	4435	224	6948	25006	272958
2005	80425	47029	61978	10716	4827	2911	9651	35165	252702
2006 (up to April)	26697	10159	34293	5203	1856	3254	4466	10107	96035

Source: Bureau of Manpower, Employment & Training.

TABLE 3: COUNTRY WISE FLOW OF REMITTANCES (IN MILLION US \$)

Financial Year	Saudi Arabia	UAE	Qatar	Oman	Bahrain	Kuwait	USA	UK	Malaysia	Singapore	Others	Total
1995-96	498.20	83.70	53.28	81.71	30.08	174.27	11.536	41.28	74.43	3.99	60.76	1217.06
1996-97	587.15	89.64	53.16	94.45	31.52	211.49	157.39	56.20	94.51	6.66	93.32	1475.40
1997-98	589.29	106.86	57.81	87.61	32.42	213.15	203.13	65.80	78.09	7.69	83.57	1525.42
1998-99	685.49	125.34	63.94	91.90	38.94	230.22	239.43	54.04	67.52	13.07	95.82	1705.74
1999-00	916.01	129.86	63.73	93.01	41.80	245.01	241.30	71.79	54.04	11.63	81.14	1949.32
2000-01	919.61	144.28	63.44	83.66	44.05	247.39	225.62	55.70	30.60	7.84	59.91	1882.1
2001-02	1147.95	233.49	90.60	103.27	54.12	285.75	356.24	103.31	46.85	14.26	65.29	2501.13
2002-03	1254.31	327.40	113.55	114.06	63.72	338.59	458.05	220.22	41.40	31.06	99.61	3061.97
2003-04	1386.03	373.46	113.64	118.53	61.11	361.24	467.81	297.54	37.06	32.37	123.18	3371.97
2004-05	1510.45	442.24	136.41	131.32	67.18	406.80	557.31	375.77	25.51	47.69	147.60	3848.29
2005-06 (up to March)	1245.71	405.60	123.99	120.39	50.34	345.41	560.75	393.81	14.00	48.51	166.61	3475.12

Source: Bangladesh Bank.

TABLE 4: RATIO OF REMITTANCES TO GDP AND EXPORT EARNINGS

Financial Year	Percent of GDP	Percent Export Earning
1997-98	3.46	29.49
1998-99	3.74	32.04
1999-00	4.14	33.89
2000-01	4.01	29.10
2001-02	5.26	41.78
2002-03	5.90	46.76
2003-04	5.98	44.35
2004-05	6.37	44.46

Source: BBS, EPB, Bangladesh Bank.

TABLE 5: TRENDS IN CONSUMPTION POVERTY

	Upper Poverty Line			Lower Poverty Line		
	1991-92	1995-96	2000	1991-92	1995-96	2000
Head count Rate (P_0)						
National	58.8	51.0	49.8	42.7	34.4	33.7
Urban	44.9	29.4	36.6	23.3	13.7	19.1
Rural	61.2	55.2	53.0	46.0	38.5	37.4
Poverty Gap (P_1)						
National	17.2	13.3	12.9	10.7	7.6	7.3
Urban	12.0	7.2	9.5	4.9	2.6	3.8
Rural	18.1	14.5	13.8	11.7	8.6	8.2
Poverty Severity (P_2)						
National	6.8	4.8	4.6	3.9	2.5	2.3
Urban	4.4	2.5	3.4	1.5	0.7	1.2
Rural	7.2	5.3	4.9	4.3	2.8	2.6

Source: World Bank (2002), "Poverty in Bangladesh: Building on Progress". Based on analysis of the HIES.

APPLICATION OF SYSTEMATIC INNOVATION IN TECHNOLOGY DEVELOPMENT (RCA AND TOPSIS MODELS PRESENTATION TO DETERMINE PROBLEM SOLVING STRATEGIES)

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ABSTRACT

Technology development as one of the structural issues of technology management has been always seriously taken into consideration by organizations in order through the structures which promote technology to comprehend right changes in their various organizational structures. Progress and welfare of societies, economic booming, industries development, wealth creation and competitive advantage are all the result of technology application and its development. Given technology's structure dynamism, its transfer and development always require such factors as systematic innovation in order by logical and systematic approach of this science to provide suitable solutions for solving the existing fundamental conflicts in technological issues particularly technology development. For this purpose, in this research, through extensive study of technology development issues, conflicts tree of this problem is drawn and the existing conflicts are investigated and some strategies for solving the issue of technology development are offered. In the end, to prioritize the offered strategies, by considering the existing conflicts as the criterion and the recommended strategies as the option and using Shannon Entropy decision making technique, weight of each criterion is calculated and using TOPSIS technique problem solving strategies of technology development given the root conflict are prioritized.

KEYWORDS

Technology development, Systematic innovation, Theory of invention problem solving, Root Conflict Analysis (RCA), TOPSIS decision making technique.

INTRODUCTION

Technology development has been able to positively affect key factors of national and international economies and level of citizens' welfare. Hence, today, we are witness that by introduction of modern technologies, micro and macrostructures of societies become involved in fundamental changes and feel the need for fitting contexts in order to achieve improvement in living standards and welfare. Technology as actual application of science and experience for resolving human's need has had a strong role in countries' economic and industrial development and competitive advantage of enterprises (Dastjerdi *et al.*, 2010). At the present time, importance of technology as the main growth and development lever is very evident. In addition, the competitive environment has made enterprises seek capabilities apart from financial abilities and technology offers them the opportunity to realize this. Technology global impact on society, trade and industry is unquestionable. Today, technology as the greatest comprehensive force which affects humans' life has been admitted by various social strata (Piquito and Pretorius, 2000) and has been able to play a simple role in interaction between people, society and environment and to be defined as a key stimulus in evolutionary development of economy and society (Khalil, 2000). Basically, the issues related to technology, its development and transfer can be considered determinants of wealth creation and competitive advantage. This point in view of scientific circles is so important that Porter has acknowledged technology as one of the five competitive forces of industries. Therefore, it can be stated that this force as one of the key competition variables uses its capability to change competition through change of structure (Porter, 1988). Considering the aforesaid, we can find out about vital role of technology and its components in daily life but we should note that technology users accept technology when they are able to establish a proper relationship with presented values by technology. Therefore technology supplying firms increasing regard themselves bound to study fundamental issues in technology generation and more differing values relative to past technologies and technologies presented by their competitors. Further, organizations for development of the current technology consider themselves bound to careful study of issues, threats and changes in international markets. One of the important and key approaches of technology development and new products development can be the focus on innovation management. Systematic innovation as one of the effective solutions of technology development by its logical and systematic approaches is able to investigate various aspects of technology in order in its development process always the technologies to be provided which have more value and application relative to technology type. In fact, it can be said that systematic innovation in process of identification, profound and accurate etymology of technology development and resolving its problems and obstacles, has the capability to recommend solutions which in addition to speeding up and facilitating the development process, seriously take innovative aspect of the solution into account. This point may have significant effect on technology value in development process. In addition, capability of this science can be investigated to the extent that today growing tendency of researches with centrality of systematic innovation in different areas such as chemical sciences, mathematics, art quality management, design and manufacturing systems of products and services, value engineering, management and technology increasingly have been taken into

consideration by researchers. In line with what was said earlier, it can be referred to the special focus on TRIZ functional areas in the last decades for resolving technological issues. TRIZ application forms the main axis of prior studies in specification of technology roadmapping, study of enterprises' technological capabilities, technology forecasting, technology maturity, technology intelligence, offering new products in various industries using 40 inventive principles (www.Triz-journal.com). For example, Norrie (2007), has introduced TRIZ as a tool for study of current technologies and identifying potential offuture technologies at the time of composing technology road mapping. He used TRIZ approaches in 2 steps of the 7-step technology road mapping, i.e. specification of the systems requirements and discovery of various technologies. Souchkov (2007) based on modern TRIZ techniques, has evaluated technology. He introduced TRIZ procedures of technology valuation within a framework which shows the time and reason of using technology valuation methods. In addition, he believes technology valuation is not an accidental matter and requires special patterns. These special patterns will be used at micro and macro levels for technology valuation and finding out which phases of system evaluation have been performed.

Salimiet *al.* (2006) believe technology forecasting and future technologies determination are among the requirements of industrial firms. In the world of today, mere use of mathematics is not effective in technology forecasting, therefore the knowledge based on realities and experiences have been used next to mathematics. In their view, the numerous techniques used for technology forecasting are more like day dreaming, hence they tried to forecast technology based on TRIZ and through this to discover relationships between these categories. Moehrleand Lessing (2004) using TRIZ technique investigated enterprises' technological capabilities. Analysis of enterprises' capabilities using this technique will provide useful information with regard to competitors which at the time of strategic decisions makings will be considered amongst the most valuable sources. According to Mann (2003), use of innovative systematic methods allows more effective technology forecasting. From among a large number of invented methods, Mann considers TRIZ techniques a new step in forecasting of technology evolutionary course. Schuh (2003) regards technology the main factor in success of technology-oriented firms. To identify competitive technologies, technology managers need technology intelligence in order to forecast future path. To reach this goal, technology intelligence requires a variety of tools such as TRIZ methodology and the methods with TRIZ centrality mentioned by Schuh. Also, it can be referred to other done researches such as combination of TRIZ tools together with analysis of their potential states of failure and effects. Further, application of TRIZ tools in development of dynamic modeling, etc. Given the aforesaid, in this research, first, by extensive study in the areas related to technology the existing fundamental issues and conflicts are investigated in this environment. In the following, using Extended TRIZ approach and process of Root Conflict Analysis, positive and negative effects of each conflict are investigated and for resolving the existing conflicts new effective strategies are formulated. In the end, by application of multi-criterion decision making techniques, degree and priority of the offered strategies have been determined.

REVIEW OF THEORETICAL BASES TECHNOLOGY

Technology indisputably has been known the main basis of development which using its components including techno ware, human ware, info ware and organ ware transforms inputs into presentable output in the market (Nasirzadehand Gholamzadeh, 1995). Importance of technology has root in its competitive nature (Pilkington, 2006). Hence, paying attention to technology management and development is regarded amongst the prerequisites of each system for planning and policy making at macro level, technology management as an interdisciplinary specialization has been able to integrate exact sciences, engineering, managerial science and methods and to emphasize on technology as the factor of wealth generation (Khalil, 2000). According to Liao (2005), technology management is the process of planning, leading, controlling and coordinating technological capabilities in order to realize organization's strategic and operational goals which continually involves management and employees in technological innovation process to increase productivity level, improve quality of personal living and work condition (Edsomwan, 1987). Technology management by creation and diffusion of technology realizes human's ceaseless efforts (Christiansen, 1987) and shows its effect more strongly by technology integration, evaluation, marketing, and commercialization (Liao, 2005). To present technology management is a systematic way, assessment indices such as forecasting of new technologies potential, use of long term programs for development of technological possibilities, and continuous study of future technologies have been specified (Morita and Flynn, 1997). Technology management, in the process of products and services differentiation, reduction of operational costs, creation of new business opportunities, plays its role the best as facilitating and supporting element of strategic changes (Floyd, 1997). Technology management has national, organizational and individual dimensions. In national dimension (macro level), basically it focuses on role of general policies in progress of science and technology, in organizational dimension (micro level), it helps creation and preservation of organizations' competitive ability, and in individual dimension, it increases individual's financial power (Khalil, 2000). Therefore, paying attention to various aspects of technology management ought to be the top priority of managerial programs. Failing to combine effective and efficient technologies, lack of necessary education for technology utilization, and technology detrimental environmental impact always threat technology management and its various aspects and by accurate identification of the respective areas, one can transform them into opportunity and more and more benefit from them (Farahmand, 2004).

TECHNOLOGY DEVELOPMENT

Today, the process of societies development more than ever requires adoption of a concept of technology which in addition to comprehensiveness gives more importance and priority to its software aspects. Changes of technology concept from mechanical and hardware aspects to intellectual and software aspects is a sign of stepping in development path (Nasirzadehand Gholamzadeh, 1995). To institutionalize this, it is enough to make everyone sensitive to what has been so far assumed to be something unchangeable and to educate them and propagate the rational and logical way of doing these affairs.

From viewpoint of Platt and Wilson (1999), technology development is product of improvement and reinforcement of resources with the purpose of creating change and change management which constantly paves the way for various countries and industries in order to foster competitive capabilities and improve competitive advantages (Wang *et al.*, 2007). Technology development monitors all the efforts and activities which are made for promotion of technology level. These efforts may lead to creation of new technology or improve the existing technology. What seems necessary for technology development is a strategy which comprises a combination of technology transfer and its endogenous development because endogenous transfer and development of technology can be effectively complementary to each other (Abbaspur, 1897).

Technology development is the sign of human creativity (Khalil, 2000) the 4 main phases of which are as follows:

1. Determining technology strategies: technology strategy specifies the tasks should be done for improvement of new technologies.
2. Conceptualization: the thing which should be taken into account at this phase is not deviating from the improvement and progression path. Eventually, at evolution and selection stage, the best concepts are chosen for development.
3. Optimization: to achieve flexibility and maturity in new technologies, optimization is a necessary action.
4. Selection and transfer: by study of various aspects of successful technologies, 4 criteria, superiority, constancy, maturity, and flexibility, are introduced based on which the selected technologies are transferred to other development programs (Clausing, 2001).

Ultimate goal of technology development is optimal resources development and improvement of their utilization which eventually results in increased productivity of activities and greater profitability of enterprises (Christiansen, 2000). Hence, the need for a correct planning, dynamic organization, procurement and training of specialized human force and effective control of activities is still felt. Technology in development path always faces some obstacles the growing course of which widens their technology gap (Shafiee, 1987). Paying attention to technology's 4 components based on a systematic view while knowing reciprocal effect between the components and their synergic effect in the whole, ignites the first and basic sparks of overcoming these obstacles and paves the way for technology comprehensive development (Nasirzadehand Gholamzadeh, 1995).

On this path, the focus on the effective factors on technology development including creativity and innovation as promoting as well as cooperation and interaction of educational and research, industrial and judicial systems with technology macro policies for technology development is an imperative (Salami and Gudarzi, 2001).

RELATIONSHIP OF TECHNOLOGY DEVELOPMENT AND CREATIVITY ENGINEERING

Given the various existing methods for resolving technology issues and problems and its development and by changing methods and approaches of problem solving from the approach of reaction to problem to preventing occurrence of problem, creativity engineering as one of the most superior methods has been able to show its power in solving and affecting solution of various technological problems and other issues. Creativity engineering with its systematic approach has fundamentally changed the 4 main phases of technology development particularly technology strategy (Clausing, 2001). The urgent need for creativity for giving direction to problem solving process, seeking the problems in the unknowns and the ability of using creative methods and patterns has caused the attention to be more and more concentrated on such issues as creativity engineering, Theory of invention problem solving, and creative thinking given their abilities such as adoption of new attitude based on evolution forms, ability of quick and effective analysis (Salimiet *al.*, 2005). Technological changes result in improvement of technology level. Therefore, technology development process oversees all the efforts and activities which take place for promotion of technology level in a country, government or organization. These changes are based on new and innovative approaches which lead to generation of new technology, and improvement and development of the existing technology (Farahmand, 2004).

CREATIVITY ENGINEERING

Development process of science, technology and extensive information flow require systems and their components to comprehend the skills for facing problems and solving them for continuous survival and progress. Therefore, presence of an active spirit for this intellectually still body is a critical matter in order by continuation of time, innovativeness and adaptability to achieve its goals (Alvani, 2007). Researchers and psychologists such as Guilford in order to get out of mental stagnation recommend such skills as creative thinking, creativity principles, innovativeness and special techniques in order through which by understanding environment's changes and developments to face obstacles and problems and by creative approach to solve the problems. Therefore in a comprehensive definition, creativity is described as creation of something new and unique which in a suitable and useful way leads to a scientific, industrial or social problem solving (Pirkhaefi, 2008). In fact, principles of creativity and innovation involve a new and novel answer or concept but it should be noted that this novelty is in accordance with logical and objective principles. To solve this problem, Altshuller, after years study and investigation, introduced Creativity and Innovation Engineering Systematic Approach which in the following will be discussed.

CREATIVITY ENGINEERING AND THEORY OF INVENTION PROBLEM SOLVING

Cooperation of Genrich Altshuller with inventors in registration of inventions and analysis and examination of thousands patents led to presentation of a problem solving methodology based on systematic approach. This rational methodology later on was employed as an important and applied tool for solving technological issues, complex and simple problems (Mansurian, 2007). Step-by-step process, ideal solution, repeatability and having a structure for science of invention are among the first principles which Altshuller took notice of them in his studies and by further studies and by finding out about the role of technical conflicts in problem solving he invented the Matrix of Conflicts. TRIZ as a science emerging late in second half of the 19th century has gone through a variety of stages for evolution. Table (1) explains evolutionary process of this science.

TABLE 1: EVOLUTIONARY COURSE OF CREATIVITY AND INNOVATION ENGINEERING (1982-2008)

Year	Creativity and Innovation Engineering History
1982 to 1989	Development of TRIZ application in various aspects relative to art and mathematics (Murashkovsky, 1997; Tsourikov, 1991)
	Creating huge development by introducing ARIZ C85
	5-fold classification of Innovation Standard System based on article 76
	In addition to Physical Effects Data Base, other techniques developed as well (Salamatov, 1988)
	Design of TRIZ copy for children
1990 to 1998	TRIZ Russian Association start-up
	Altshuller published a book named Strategy of Creative Individual's Life (Pirkhaefi, 2008)
	Introduction of TRIZ software package in the US (www.ideation-triz.com)
	TRIZ Russian association was Known as TRIZ International Association in the world
1998 to 2008	Upon Altshuller's death in 1998, TRIZ faced recession
	Techniques before 1998 became famous as TRIZ
	Development of TRIZ application in various organizations (Zlotinet <i>al.</i> , 1999)
	The first software copy in traduced by Creax (www.creax.com)
	Attention to TRIZ managerial and business applications (Mann, 2004)
	Provision of new tools such as Root Conflict Analysis
	Combination of quality managerial and engineering models such as Quality Function Development

TRIZ lies within a range the beginning of which is a kind of creative world view or a comprehensive approach to sciences and technology and in the end of it the tools of creative problem solving and creativity and innovation techniques are placed. In fact, by a comprehensive definition the creativity engineering can be defined as a human-oriented science based on systematic methodology for creative problem solving. TRIZ is an algorithmic approach for creative solving of technical problems. TRIZ researches starts with this hypothesis: the universal principles of invention is a basis for creative innovation using advanced technologies, i.e. when these principles are defined, they can significantly help people's thinking in generation of processes based on innovation which act more forecasting (Zlotinet *al.*, 2001). In process of problem solving, the best and most successful solution is obtained from selection of the most suitable principles by concentrating on details. Use of TRIZ results in generation of concepts to reduce negative effects and improvement in design, particularly strategy design in technology management and development. TRIZ functional areas in scientific activities generally can be classified into 6 areas of technology improvement and development, inventions registration and new inventions development, new products development, development of existing products, forecasting of short and long term periods, and finally research and scientific engineering.

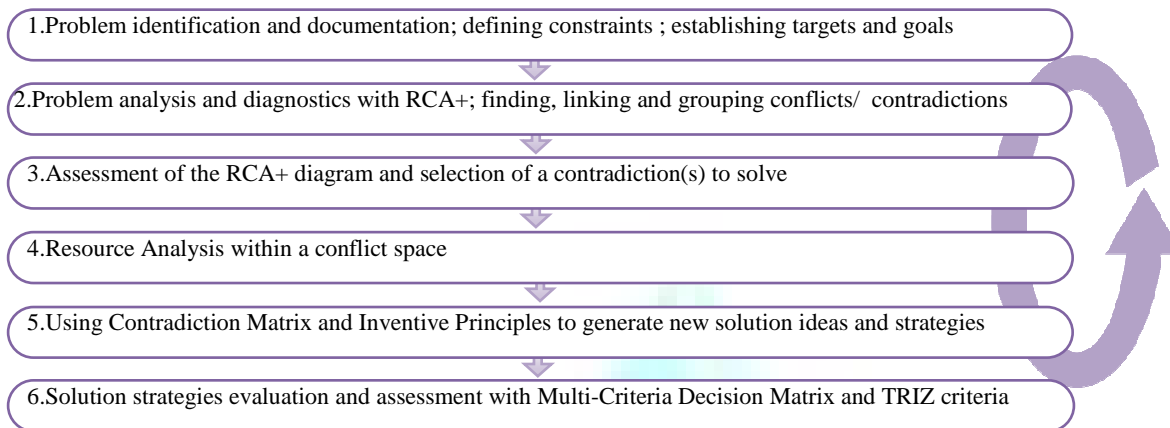
In actual performance, technology improvement and existing product development are among the tasks which are done more frequently and following the presented technology performance, organizations try to use the best new technology parameters with the least cost for technology development.

EXTENDED TRIZ PROCESS

The main philosophy of TRIZ methodology relates to its essential role in solving complex and difficult problems. TRIZ, independent from the applied fields, is able to analyze and solve a variety of problems and issues arising from artificial systems such as social, commercial, cultural and particularly technological (Mann and Domb, 1999). In recent years, with continuous successes of research models, a new style of Theory of invention problem solving, Extended TRIZ, has been introduced which is a process oriented method. Extended TRIZ with its 6 main steps is used for analysis of managerial problems and issues, identification of conflicts origin and their radical causes, selection of problems to solve, offering novel ideas and strategies of problem solving, and assessment of final result. This approach always updates tools of novel problem solving for application in organization technological systems. In addition to standard tools of inventive problem solving, this process uses techniques of Root Conflict Analysis, Comparative Ranking Scorecard and Multi-Criterion Decision Making Matrix and for further improvement of the suggested solution does not spare the modern principles and techniques. Extended TRIZ process is shown in figure (1). Each step in this process is gone through by techniques which systematically enter the process from the previous steps and the outputs are provided to enter the next stages. In

this cyclic process, the assumptions and decisions taken in previous phases, according to the feedback link presented in the figure, return to the intended stage and correction operation is done on them in order the next steps to be taken according to the standard (RuchtiandLivotov, 2001).

FIGURE 1: EXTENDED TRIZ PROCESS

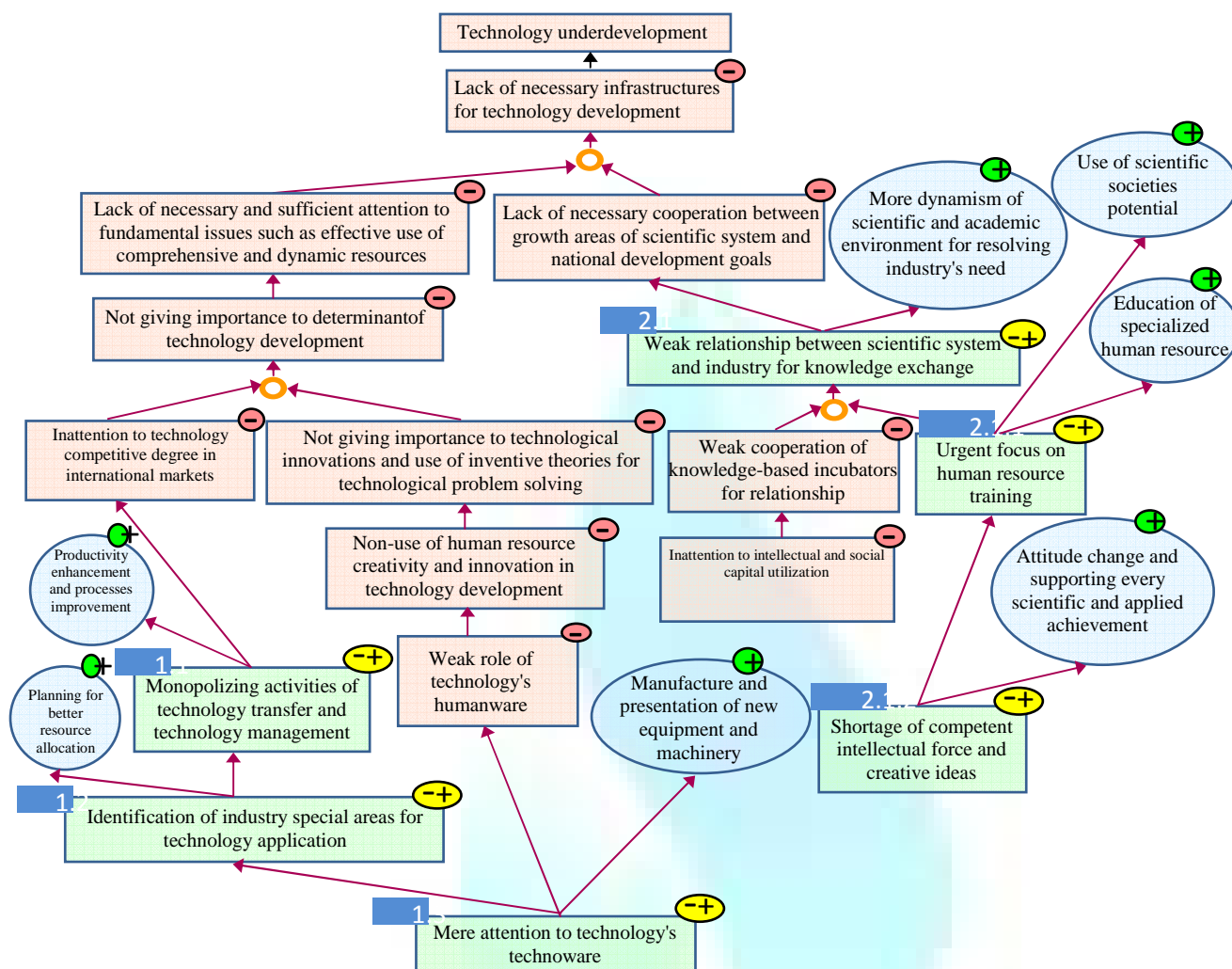


Source: Souchkovet *al.*, 2006

ROOT CONFLICT ANALYSIS

Root Conflict Analysis is an invented technique for analysis of issues and problems the main purpose of which is to extract conflicts from issues and presenting them as a tree structure. Diagram of Root Conflict Analysis designed top-down and its starting point is from a negative result. The diagram goes through its course by presenting different reasons and effects arising from negative result and understanding that whether the stated reason is conflict, otherwise it moves to lower levels. One of the main advantages of diagram of Root Conflict Analysis is stopping at a level of the tree structure where the stated reason without a need for discovering any further reason has the greatest contribution to causing the problem (Souchkov, 2005). In the diagram in question, all the negative effects are shown with negative sign and all the positive effects with positive sign, and conflicts with positive and negative signs. Between the effects, always two types of relationships govern. "or" relationship appears when two or more causes lead to a particular effect which are represented in the figure as arrows of two or more different reasons towards one effect, and "and" relationship in which causes and effects state their effect together and without elimination of the other. The small orange circles present in the diagram, represent "and" relationship. Given presence of a large number of conflicts, analyzing all of them is not possible. Hence, three strategies for selection of conflicts are taken into consideration. By selection of the first conflict which lies at the highest level and the conflict at the lowest level or a combination of these two strategies, the stages of conflicts analysis starts. In the end, it can be stated that by resolving the conflicts which lie at upper levels of the diagram, we reach short term solutions and long term and radical solutions are identified through solving the conflicts at lower levels (Souchkovet *al.*, 2006). Given the abilities of Root Conflict Analysis as one of the modern tools of Theory of invention problem solving, to solve the issue of technology underdevelopment, experts' view on the fundamental principles of technology underdevelopment is used and given the prior research, the research's model in figure (2) is presented as the main pillar of this tool for solution and study in order through various processes, the best possible strategies to be discussed for resolving this problem.

FIGURE 2: DIAGRAM OF ROOT CONFLICT ANALYSIS TO SOLVE THE ISSUE OF TECHNOLOGY UNDERDEVELOPMENT



PROBLEM SOLVING WITH ROOT CONFLICT ANALYSIS APPROACH

Table of sub-treeconflicts provided in table (2), by studying causes of conflict, examines the closest positive and negative effect of each cause in order to facilitate continuation of the process course for conflictselection. It should be noted that in the tree model of problem solution, the conflicts which have no negative effect move forward to the extent that the benefit from their origin and its negative effect, i.e. negative effect of the main cause in fact is considered as the sub-tree's negative effect.

TABLE 2: STUDY OF SUB-TREECONFLICTS EFFECT

Conflict	Causes	Positive effects	Negative effects
1.1	Monopolization of technology transfer and management activities	Increase of productivity and process improvement	Inattention to competitive degree of technology in international markets
1.2	Identification of industry's special areas for technology application	Planning for better resource allocation	Inattention to competitive degree of technology in international markets
1.3	Mere attention to technology's technoware	Manufacture and supply of new equipment and machinery	Weak role of technology's human ware
2.1	Weak relationship of national system of knowledge and industry for science exchange	More dynamism of scientific and academic environments for resolving industry's needs	Lack of necessary cooperation between growth areas of scientific system and national development goals
2.1.1	Urgent attention to issue of human resource education	Education of specialized human resource	Weak relationship of national system with industry for knowledge exchange
2.2.2	Shortage of competent intellectual force and creative ideas	Change of attitude and support of every scientific and applied achievement	Urgent attention to issue of human resource education

PRESENTING PROBLEM SOLVINGSTRATEGIES

In the following, based on the lowest conflict selection strategy, the conflict "mere attention to technology'stechno ware" has been selected as input. At this stage, to solve this conflict, it is necessary some strategies to be presented to which in table (3) is referred:

TABLE 3: PROBLEM SOLVING STRATEGIES

S1	Change of attitude to human resources from cost to asset
S2	Education of current human resources working in work places particularly education of creative thinking for offering innovative ideas
S3	Education and use of specialized forces for correct planning for identification of areas requiring technology transfer and development
S4	Talent management and improvement and retention of talent treasure
S5	Presentation of applied knowledge in universities and special attention to exact sciences and managerial issues as sub-branch sciences of technology management
S6	Improvement of human resource management programs
S7	Focus on fostering intellectual and social capitals
S8	Creating and safety valve to express opinions and welcoming scientific and feasible suggestions of work forces

MULTI-CRITERION DECISION MAKING TECHNIQUES APPLICATION FOR PRIORITIZATION OF PROBLEM SOLVING STRATEGIES

Given the solving process of the existing problem, in the final step, we only suffice with the problem solving strategies, but the essential point in identifying solution of each problem is making the respective strategies operational. Therefore, in this section, while specifying main strategies of the problem, for their ranking, first, Shannon Entropy for determining the indices' importance coefficient is used and with specification of weight vector by this technique, by applying TOPSIS Technique the strategies' final ranking takes place. It should be noted that in this problem, given structure of the two introduced techniques, the existing conflicts which have been examined in table (2) are presented as the problem's criteria and the presented strategies in table (3) are considered as decision making options.

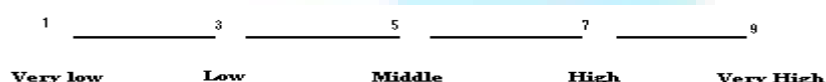
DETERMINING WEIGHT VECTOR AND TOPSIS APPLICATION TO FIND STRATEGIES PRIORITIES

By careful attention to the existing criteria in this issue, first, it is needed correct criteria to be used for resolving conflict between the criteria and for each criterion and strategy a symbol to be specified. Symbols of problem solving criteria and strategies are denoted by S in table (3) and by C in table (4), respectively.

TABLE 4: PROBLEM SOLVING CRITERIA

C1 ⁻	C2 ⁺	C3 ⁻	C4 ⁺	C5 ⁺	C6 ⁺
Monopolizing technology transfer and management activities	Identifying industry's special areas for technology application	Mere attention to technology's technoware	Weak relationship of national knowledge system and industry for exchange of science	Urgent attention to issue of human resource education	Shortage of competent intellectual force and creative ideas

Considering qualitative and quantitative nature of the introduced criteria, for solving the problem, the two following bi-polar scales are used to collect experts' opinions.



Entropy can be used as a suitable method for measuring weight of each introduced criterion. In this method, the wider the distribution in values of an index is, the more important that index will be. In theory of information, Entropy is an uncertainty criterion which is expressed by probability distribution. This distribution is defined by Shannon as follows:

$$E_i = S(P_1, P_2, \dots, P_n) = -k \sum_{i=1}^n [p_i * \ln p_i]$$

Entropy performing stages can be summarized as follows:

1. Calculation of P_{ij}
2. Calculation of the entropy value E_j
3. Calculation of the uncertainty value d_j
4. Calculation of the weights W_j
5. Calculation of the adjusted weights W'_j

By performing the calculations related to entropy stages, the obtained vector from this method can be used in TOPSIS technique. The weights regarding the six studied criteria can be seen in table (5).

TABLE 5: CRITERIA WEIGHTS OBTAINED FROM SHANNON ENTROPY TECHNIQUE

W1	W2	W3	W4	W5	W6
0.13	0.158	0.198	0.15	0.157	0.207

TOPSIS

TOPSIS model was recommended by Hwang and Yoon in 1981. This model can be regarded as one of the best multi-index decision making models. In this method, M options are measured by N indices. This method is based on the concept that the selected option should have the shortest distance from the positive ideal solution and the longest distance from negative ideal solution and it is supposed that desirability of each index is steadily increasing or decreasing. 6 steps of this method are:

1. Quantifying and de-scaling decision making matrix
2. Obtaining weighted de-scaled matrix
3. Finding positive and negative ideal solution
4. Obtaining distance of each option from positive and negative ideal solution
5. Specifying relative proximity of an option to ideal solution
6. Options ranking

Table (6) shows experts' views on each option, given the criteria. This table is first de-scaled (by norm method) and then by matrix multiplying of this table by the weight vector obtained from Shannon Entropy Method in table (5), the weighted de-scaled matrix is calculated.

TABLE 6: DECISION MATRIX

	C ₁ ⁻	C ₂ ⁺	C ₃ ⁻	C ₄ ⁺	C ₅ ⁺	C ₆ ⁺
S ₁	4	6	2	8	10	7
S ₂	6	9	5	4	7	8
S ₃	8	8	4	3	6	6
S ₄	5	7	4	6	4	6
S ₅	4	8	3	6	7	7
S ₆	3	7	2	8	9	7
S ₇	7	4	6	7	6	10
S ₈	7	6	3	10	5	5

TABLE 7: WEIGHTED DE-SCALED MATRIX V = N * W_n

	C ₁ ⁻	C ₂ ⁺	C ₃ ⁻	C ₄ ⁺	C ₅ ⁺	C ₆ ⁺
S ₁	0.032	0.047	0.036	0.061	0.079	0.071
S ₂	0.048	0.07	0.091	0.03	0.055	0.081
S ₃	0.064	0.063	0.072	0.023	0.047	0.061
S ₄	0.04	0.055	0.072	0.046	0.031	0.061
S ₅	0.032	0.063	0.054	0.046	0.055	0.071
S ₆	0.024	0.055	0.036	0.061	0.071	0.071
S ₇	0.055	0.031	0.109	0.054	0.047	0.102
S ₈	0.055	0.047	0.054	0.077	0.039	0.051

In the next step, positive and negative ideals should be specified for each index. Obviously, for the index which has negative aspect, the most ideal positive answer is the smallest existing answer and the most ideal negative answer is the greatest existing answer. Positive and negative ideals for the present problem are defined as follows:

$$i^+ = \{\min v_{i1}, \max v_{i2}, \min v_{i3}, \max v_{i4}, \max v_{i5}, \max v_{i6}\}$$

$$i^- = \{\max v_{i1}, \min v_{i2}, \max v_{i3}, \min v_{i4}, \min v_{i5}, \min v_{i6}\}$$

After specification of the ideals, the distance from positive and negative ideals for all indices ought to be calculated the general formula of which is follows:

$$d^+ = \sqrt{\sum_{j=1}^m (v_{ij} - v_{i^+j})^2}$$

$$d^- = \sqrt{\sum_{j=1}^m (v_{ij} - v_{i^-j})^2}$$

Tables (8) and (9) represent positive and negative ideal distance for the eight answers.

TABLE 8: POSITIVE IDEAL DISTANCE

d ⁺ 1	d ⁺ 2	d ⁺ 3	d ⁺ 4	d ⁺ 5	d ⁺ 6	d ⁺ 7	d ⁺ 8
0.071	0.082	0.092	0.013	0.042	0.038	0.096	0.077

TABLE 9: NEGATIVE IDEAL DISTANCE

d ⁻ 1	d ⁻ 2	d ⁻ 3	d ⁻ 4	d ⁻ 5	d ⁻ 6	d ⁻ 7	d ⁻ 8
0.071	0.082	0.092	0.013	0.042	0.038	0.096	0.077

After performing all the above stages, degree of relative proximity of each criterion to ideal solution is to be calculated. For this purpose, the following formula is used:

$$CL_i = \frac{d_i^-}{d_i^- + d_i^+}$$

Finally, given the performed stages, strategies ranking according to TOPSIS method are specified in table (10).

TABLE 10: PRIORITIZATION OF PROBLEM SOLVING STRATEGIES

S4	Talent management and improvement and retention of talent treasure
S6	Improvement of human resource management programs
S5	Presentation of applied knowledge in universities and special attention to exact sciences and managerial issues as sub-branch sciences of technology management
S2	Education of current human resources working in work places particularly education of creative thinking for offering innovative ideas
S8	Creating and safety valve to express opinions and welcoming scientific and feasible suggestions of work forces
S7	Focus on fostering intellectual and social capitals
S3	Education and use of specialized forces for correct planning for identification of areas requiring technology transfer and development
S1	Change of attitude to human resources from cost to asset

CONCLUSION

In present time, pivotal role of technology in growth and development of countries is very evident and beyond any doubt so that without its careful management, a dynamic presence on the market will be impossible. The need for utilizing technology has created a situation in which planning for technology development is considered a key requirement. In development path, technology is always faced with some obstacles which create major challenges for managers and industry policy makers, therefore adopting fitting measures and integrated strategies are regarded prerequisites on this path. In this direction, in present article, using different tools and forward-looking approaches through analysis of status quo and study of future scenarios, technology development is investigated. Main obstacles of technology development are identifies through extensive studies and interview with experts and specialists in this field and using Theory of invention problem solving with Extended TRIZ approach the existing relationships between them are analyzed. Studies on Root Conflict Analysis process, have revealed inattention to human aspect of technology concept and mere emphasis on its technical dimension as the most important and profound obstacles of technology development. This obstacle has a high leading power so that for managing, controlling and solving it as the rootconflict, the formulated strategies which after determining weight vector of conflicts (criteria) using Shannon Entropy Decision Making method and profiting from experts' view are ranked in the framework of 8 strategies by TOPSIS method. It is noteworthy that the mentioned strategies by change of researchers' selected domain may be ranked differently. In addition, it is suggested that for future researches more attention to be paid to the conflicts modeling based on cause and effect approach and for eventual decision making, DEMATEL and Network Analysis Models to use.

REFERENCES

- Abbaspur, M. (1897). *Technology and new world*. Tehran: Sadra.
- Alvani, M. (2007). *Public management*. Tehran: Nashre Ney.
- Christiansen, J. (2000). *Building the Innovative Organizations*. London: Mac Millan Press Ltd.
- Clausing, D. (2001). The Role of TRIZ in Technology Development. [www.triz-journal.com / archives / 2001/08/a/index.htm](http://www.triz-journal.com/archives/2001/08/a/index.htm).
- Dastjerdi, D., Mokhtarzadeh, N. & Yazdani, H. (2010). Investigating the effect of technology transfer on competitive performance of enterprise (case study: Iranian producer of pieces of Tondar 90). *Industrial management*, 111-124.
- Edsomwan, J. (1987). *Integrating productivity and Quality Management*. New York: Marcei Inc.
- Farahmand, N. (2004). *Technology management of organization*. Tehran: Fruzesh.
- HYPERLINK "http://www.amazon.com/C.-Floyd/e/B001KDQHLM/ref=sr_ntt_srch_lnk_1?qid=1314966546&sr=8-1" Floyd, C. (1997). *Managing Technology for Corporate Success (translated to Persian by nasirzadeh)*. Tehran: industriale management organization.
- Khalil, T. (2000). *Management of technology. The key to competitiveness and wealth creation*. NY: Mc Graw-Hill.
- Liao, S. (2005). Technology management methodologies and applications A literature review from 1995 to 2003. *Technovation*, 25, 381-393.
- Mann, D. (2003). Better technology forecasting using systematic innovation methods. *Technological Forecasting & Social Change* (70), 779-795.
- Mann, D. (2004). *Hands-on Systematic Innovation for Business and Management*. Lazarus Press.
- Mann, D. & Domb, E. (1999). 40 Inventive (Management) Principles with Examples. *The TRIZ Journal*, www.triz-journal.com/archives/1999/09/a/index.htm.
- Mansurian, A. (2007). Innovation engineering: TRIZ. Tehran: Rasa.
- Moehrle, M. & Lessing, H. (2004). Profiling Technological Competencies of Companies: A Case Study Based on the Theory of Inventive Problem Solving. *Profiling Technological Competencies*, 3 (4), 231- 239.
- Morita, M. & Flynn, E. (1997). The Linkage Among Management Systems, Practices and Behaviour in Successful Manufacturing Strategy. *International Journal of Operations & Productions Management*, 10, 67-93.
- Murashkovsky, Y. (1997). Biography of Arts Foundations of a Theory of Arts Systems Evolution, Skandinavia, Petrozavodsk.
- Nasirzadeh, G. & Ghasemzadeh, H. (1995). *Articles of technology and development in economical enterprise and national level*. Tehran: Industrial management organization.
- Norrie, R. (2007). TRIZ and Technology Roadmapping. *True North Innovation*, 1-3.
- Pilkington, A. T. (2006). Management of technology: themes, concepts and relationships. *Technovation*, 26, 288-299.
- Piquito, N. & Pretorius, L. (2000). Technology as a driver for economic development in South Africa. *South African Journal of industrial Engineering*, 11.
- Pirkhaefi, A. (2008). *Creativity*. Tehran: Hezare ghoghnu.
- Platt, L. & Wilson, G. (1999). Technology development and the poor / marginalized: context, intervention and participation. *Technovation*, 19, 393-401.
- Porter, M. (1988). *The technological dimension of competitive strategy, Strategic Management of Technology and Innovation* (First Edition ed.). Irwin.
- Ruchti, B. & Livotov, P. (2001). TRIZ-based Innovation Principles and a Process for Problem Solving in Business and Management. *The TRIZ Journal*, www.triz-journal.com/archives/2001/12/c/index.htm.
- Salamatov, Y. (1988). *Achievements at Molecular Level: Chemistry helps with solving complex inventive problems, in A Thread in a Labyrinth*, Karelia, Petrozavodsk.
- Salami, R. & Gudarzi, M. (2001). Strategies of leveraging Iran mental ownership system toward technology development of country. *Quarterly of Industrial management*, 3, 73-85.
- Salimi, M., Shahabi, H. & Iranmanesh, H. (2005). *the Innovation algorithm: TRIZ, systematic innovation, and technical creativity*. Tehran: Rasa.
- Salimi, S., Ghazanfari, M., Salimi M. (2006). Methodology representation of Triza-based technology forecasting, Published in international conference of strategies and technics problem solving.
- Schuh, G. (2003). Trized-base technology intelligence. *First presented at the European TRIZ Association meeting TRIZ Futures 2003*.
- Shafiee, M. (1987). *Tomorrow technology and tomorrow of technology*. Islamic ershad.
- Souchkov, V. (2005). Root Conflict Analysis (RCA+): Structuring and Visualization of Contradictions. Presented at ETRIA TRIZ Future 2005 Conference Graz.
- Souchkov, V., Hoeboer, R. & Zutphaen, M. (2006). Application of RCA+ to Solve Business Problems. Presented at ETRIA TFC 2006 Conference in Kortrijk.
- Souchkov, V. (2007). Accelerate Innovation with TRIZ, ICG T&C.
- Tsourikov, V. (1991). Mathematical Effects: a new Part of Information Collection in TRIZ. *Journal of TRIZ*, 2, 48-55.
- Wang, T., Chien, S. & Kao, C. (2007). The role of technology development in national competitiveness: Evidence from Southeast Asian countries. *Technological Forecasting & Social Change*, 74, 1357-1373.
- Website of Creax. Belgium www.creax.com.
- www.ideation-triz.com
- www.trize-journal.com
- Zlotin, B., Terninko, J. & Zusman, A. (2001). *Systematic innovation*. Tehran: Rasa.
- Zlotin, B., Zusman, A., Altshuller, G. & Philatov, V. (1999). *Tools of Classical TRIZ*. Ideation International Inc.

FINANCIAL FLEXIBILITY AND RISK MANAGEMENT

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ABSTRACT

The purpose of this study was to examine the financial flexibility and risk in various sizes of firms. The research for this study was based on secondary data collected from the annual Compustat files for the period of 1971 – 2005. The variables studied are total assets, total debt, retained earnings, debt issue, equity issue, cash and dividend. To study the variables, multivariate analysis has been applied. I have found that small firms have lower debt because of additional equity financing. This finding is based on Compustat data. Small firms maintain low leverage by issuing equity and building up cash holdings for financial flexibility. Small firms maintain cash holdings through increasing equity financing for the purpose of financial flexibility. When I account for financial flexibility, positive relationship among solvency, retained earning, debt, equity, cash and dividend are found. The higher the financial flexibility, then the lower the risk will be. A highly liquid or solvent firm is same as financially flexible. Firms may increase retained earnings, debt financing, and equity financing to create financial flexibility which results declining of risk. Reducing dividends and not holding excessive cash are the other two points among five – which would also maintain exchange between financial flexibility and risk.

KEYWORDS

Solvency, Financial Flexibility, Liquidity, Risk, Trade-off.

INTRODUCTION

The purpose of this study is to find out financial flexibility and risk between small firms and large firms in the US. This approach allows comparing financial flexibilities among the firms. As a result, this approach should better acknowledge the impact of a firm's financial flexibility on the investment and financing decisions. The rest of the paper is structured as follows.

In Section 2, I introduce cash flows to be balanced and financial flexibility to be broadened through profitability and liquidity which is a multidimensional concept and liquidity includes both the short term ability to meet immediate cash and raise cash in the mid and long run. The resources of financial flexibility may take forms of borrowing money from banks, selling bonds, commercial papers, delaying payments of trade creditors, liquidating assets, reducing cost, reducing dividend, and issuing capital stocks.

Section 3 introduces a rapidly changing concept risk including business risk, credit risk, market risk which is the movement of equity prices, foreign exchange rates, interest rates, and commodity prices, and operational risk including fraud, failure of management, and process errors.

The data, the set of variables, and the selection of periods are used to find the relationship among the variables is described in Section 4. In section 5, the results are presented and analysis is discussed. Recommendation is made based on results in section 6. Finally, section 7 concludes.

THE CONCEPT OF FINANCIAL FLEXIBILITY: A LITERATURE REVIEW

The FASB (1984) defines financial flexibility as the ability of an enterprise to take effective actions to alter the amounts and timing of future cash flows so that it can respond to unexpected needs and opportunities.

The basic form of financial flexibility may be described in terms of the amount or the number of financial resources available in the future. However, many of the actions taken today for the future can be very costly. Thus, it would be fundamentally inappropriate for a firm to maximize financial flexibility. Eventually, maximizing the firm value should be the ultimate goal of optimizing financial flexibility. Accordingly, we define financial flexibility as a firm's capacity to mobilize its financial resources in order to take preventive and exploitive actions in response to uncertain future contingencies in a timely manner to maximize the firm value.

Bernstein (1993) defines flexibility as the ability of an enterprise to take steps to counter expected interruptions in the flow of funds for reasons however unexpected. In this view, financial flexibility means the ability to borrow from a variety of sources, to raise equity capital, to sell and redeploy assets, and to adjust the level and the direction of operations in order to meet changing circumstances

Donaldson (1971) views financial flexibility from the perspective of balancing cash flows. One can expect cash flows to be out of balance (i.e. show an access or shortfall). Cash imbalances result in either cash surpluses which should be invested or cash deficit which should be financed by existing or potential lines of credits. Financial flexibility encompasses more than balancing of cash flows.

The scope of financial flexibility may be broadened through its relationships with profitability, cash flow, solvency and liquidity. According to FASB (1980b, p.46) corporate treasurers recognize the relationships between cash flows, liquidity, and financial flexibility where liquidity as a multidimensional concept that includes both the short term ability to meet immediate cash needs and ability to raise cash in the mid and long run.

According to Heath (1978, p.2, 23) liquidity and financial flexibility are narrower concept. He notes that profitability and solvency are also interdependent, with solvency depending on long term profitability. However this correlation between profitability and solvency does not exist in the short run.

Hendriksen and Van Breda (1992, p.72) hold a different view of relationship between solvency, liquidity, and financial flexibility. They agree that the three concepts are related but financial flexibility is a broader concept than solvency, and solvency in turn is a broader concept than liquidity. Unfortunately, Hendriksen and Van Breda do not address the relation existing between profitability and financial flexibility.

Financial Flexibility is gained from resources both in and outside the financial statements. Heath (1978, p.21) classifies the resources of financial flexibility into five categories:

- Borrowing Money from banks, selling bonds, commercial papers, delaying payments to trade creditors, extending due dates of loans and so forth.
- Liquidating assets by selling marketable securities, factoring receivable, selling plant and equipment and so forth;
- Reducing cost;
- Reducing dividends;
- Issuing Capital Stocks.

Graham and Harvey (2001) see financial flexibility as "preserving debt capacity to make future expansions and acquisitions" or "minimizing interest obligations, so that they do not need to shrink their business in case of an economic down turn."

RISK MANAGEMENT: A LITERATURE REVIEW

Risk management can be defined as a discipline for "Living with the possibility that future events may cause adverse effects" (Kloman 1999). Risk management is a rapidly developing discipline and there are many and varied views and descriptions of what risk management involves, how it should be conducted and what it is for. Risk management is not just something for corporations or public organizations, but for any activity whether short or long term. The benefits and opportunities should be viewed not just in the context of the activity itself but in relation to the many and varied stakeholders who can be affected.

A BRIEF TAXONOMY OF RISKS

Peter (2003, p.4,5) classifies risk into five categories: Market risk is defined as the risk to a financial portfolio from movements in market prices such as equity prices, foreign exchange rates, interest rates, and commodity prices.

Liquidity risk is defined as the particular risk from conducting transactions in markets with low liquidity as evidenced in low trading volume and large bid-ask spreads. Under such conditions, the attempt to sell assets may push prices lower, and assets may have to be sold at prices below their fundamental values or within a time frame longer than expected.

Operational risk is defined as the risk of loss due to physical catastrophe, technical failure, and human error in the operation of a firm, including fraud, failure of management, and process errors.

Credit risk is defined as the risk that a counterparty may become less likely to fulfill its obligation in part or in full on the agreed upon date. Thus, credit risk consists not only of the risk that a counterparty completely defaults on its obligation, but also that it only pays in part or after the agreed upon date.

Business risk is defined as the risk that changes in variables of a business plan will destroy that plan's viability, including quantifiable risks, such as business cycle and demand equation risk, and non-quantifiable risks, such as changes in competitive behavior or technology. Business risk is sometimes simply defined as the types of risks that are an integral part of the core business of the firm and that should therefore simply be taken on.

RESEARCH DESIGN

Sample: The initial sample consists of all available U.S. firms for the period of 1971–2005 from the annual Compustat files. Following previous studies i exclude financial firms from the sample and i need to have positive total assets, book value of equity, market value of equity, and net sales. After these requirements are applied, the sample consists of 173,515 firm-year observations.

DATA: The study is based on secondary data collected from the annual Compustat files for the period of 1971 – 2005. The variables studied are total assets, book total debt, and market total debt, firms with zero debt, cash, retained earnings, debt issue, equity issue, and dividend.

DATA ANALYSIS TOOLS: A 35 years period (1971-2005) has been selected for evaluating the performance. The logic of selection of this period is to find out financial flexibility of a firm in terms of cash, retained earnings, dividends, and external financing activities including new debt issue and new equity issue with considering risk management.

ANALYSIS AND FINDINGS

TABLE I

The data consists of firm-year observations for the period 1985-2005. Size is size deciles based on total assets. Book /Market Long-term/Total Debt is long term/total debt over book/market value of total assets. % of Firms with Zero Debt is the percentage of firms with no debt relative to the total number of firms in each size deciles.

TABLE II

The data consists of firm-year observations for the period 1971-2005. Size deciles are based on total assets. All the variables are reported as a proportion of total assets including Cash Holdings, Retained Earnings, total debt, total equity, and dividend.

TABLE III (MULTIPLE REGRESSION RESULTS)

I have estimated multiple regressions with variables to have significant impacts on solvency. The following firm and industry characteristic variables are included:

Ret = Retained earnings

Debt = Total Debt

Equity = Total equity

Cash = Cash and Equivalent

Div = Dividends

The multiple regression equation comprising all the variables is $Solvency = 73487.2 - 5013.89 Ret - 660593 Debt - 105152 Equity - 140576 Cash - 1092104 Div$.

The **F ratio** (in the Analysis of Variance Table) is 31.51161 and significant at $F = .002$. This provides evidence of existence of a linear relationship between the solvency and the all variables (Ret, Debt, Equity, Cash and Div). Coefficients (β_1, β_2 , and so on) are correlated with other independent variables. Here $R^2 = .975$ indicates that the variation in the independent variables accounted for 97.5 percent of the variance in the dependent variable. Table III also shows that there is a positive relation between solvency and other independent variables (retained earnings, total debt, total equity, cash, and dividends). It is observed from the variables that Ret, Debt, Equity, Cash, and Div have direct impacts on solvency whether they are positive or negative.

FINANCIAL FLEXIBILITY AND RISK: There is an inverse relationship between flexibility and risk (koornhop, 1988). To illustrate, Evaringham and Hopkins (1982) mention that an enterprise that has fully utilized its borrowing capacity in capital intensive projects may achieve extremely high rates of return but at the expense of its financial flexibility and increasing its risk profile. So, this relationship applies a financial flexibility. Excessive financial flexibility may result in waste, inefficiencies and declines in profitability which increase the risk profile of organization, and may, as was stated earlier, even result in a chaotic firm (volberda, 1998).

The evaluation of firm's financial flexibility and risk is important to stakeholders to ensure the security of investment, interest, dividends, and growth which may be affected by risk exposures. The higher the return, the lower the risk and vice versa. It is important that management of a firm evaluates the financial flexibility because actual and potential financial flexibility provides an indication of rate of return, level of risk as well as survival potentiality. Any decision affecting financial flexibility may be made with due consideration to impact positive on risk and return.

RECOMMENDATIONS

Financial flexibility and risk are inversely related. The higher the level of risk, the lower the rate of return. The key to increase financial flexibility is to reduce level of risk. I have the following suggestions for the firms.

They may increase retained earnings – Although plowback shows a potential growth of a firm but at the same time it gives liquidity, solvency, and financial flexibility. On the other hand, retained earning is potential for further investment that might bring more returns in future.

They may increase debt financing – High debt means high levered firm. Firm may have high debt which has to be fully utilized in the capital intensive projects and gain extremely high rates of return.

They may increase equity financing – A firm should have a well organized capital structure with equity financing. Proportion of equity may be larger than debt to maintain accountancy standard as well as protect the risk of bankrupt.

They may reduce dividends – Retaining portion of profit at a level which allows as accounting standard and provides solvency to the firm.

They may hold cash but not excessive – Cash holding is good for the firm for the liquidity purpose but excessive cash holdings may create waste, if they are idle.

CONCLUSIONS

The key to success in the competitive business environment is trade-off between financial flexibility and risk. The higher the financial flexibility, then the lower the risk will be. A highly liquid or solvent firm is same as financially flexible. I suggest five points – firms may increase retained earnings, debt financing, and equity financing to create financial flexibility which results declining of risk. Reducing dividends and not holding excessive cash are the other two points among five – which would also maintain exchange between financial flexibility and risk.

REFERENCES

- Bernstein, L. A., 1993, *Financial Statement Analysis: Theory, Application, and Interpretation*, 5th ed. Boston, Mass., Irwin.
- Christoffersen, P., F. (2003). *Elements of Financial Risk Management*, Academic press, London.
- DeAngelo H. and L. DeAngelo, 2006, *Capital Structure, Payout Policy, and Financial Flexibility*, University of Southern California working paper.
- Donaldson, Gordon, 1969, *Strategy for Financial Mobility*, Boston, Division of Research, Harvard Graduate School of Business Administration.
- Financial Accounting Standard Board, Recognition and Measurement in the Financial Statement of Business Enterprises, Statement of Financial Accounting Concepts (SFAC No. 5), 1984.
- Felix Kloman, H. (1999) "Milestones: 1900 to 1999." Risk Management Reports 26, no. 12.
- Graham, John R. and Campbell R. Harvey, 2001. The theory and practice of corporate finance: evidence from the field, *Journal of Financial Economics* 61, 187–243.
- Heath, L.C, 1980. Is working capital really working? *Journal of Accountancy* 150 (2), 55-62.
- Hendriksen, E.S. & Van Breda, M.F. 1992. *Accounting theory*. 5th Edition. Boston, Mass.: Richard D. Irwin.
- Heath, L.C. 1978. *Financial reporting and the evaluation of solvency*. New York: American Institute of Certified Public Accountants.
- William G. Zikmund, Eilliam G. Zikmaund. 2006. *Business Research Methods*, Harcourt College Pub, New York.
- Soku Byoun. (2007). "Financial Flexibility, Leverage, and Firm Size". Hankamer School of Business, Baylor University
- Volberda, H.W. (1998), *Building the Flexible Firm*, New York: Oxford University Press.

APPENDIX

TABLE I. FIRM SIZE DECILES AND LEVERAGE RATIOS FOR 1985 – 2005 PERIOD (119,813)

A. FOR 1985 – 2005 PERIOD (119,813)

Size Deciles	Total Assets	Book Long- Term Debt	Book Total Debt	Market Long- Term Debt	Market Total Debt	% of Firms With Zero Debt
1	3.36	0.0903	0.2087	0.0463	0.1003	0.2170
2	10.67	0.1134	0.2110	0.0763	0.1433	0.1822
3	23.72	0.1190	0.2023	0.0903	0.1548	0.1790
4	46.41	0.1241	0.1934	0.1006	0.1586	0.1877
5	84.14	0.1479	0.2078	0.1236	0.1751	0.1631
6	154.28	0.1792	0.2323	0.1461	0.1920	0.1282
7	293.57	0.2131	0.2628	0.1709	0.2133	0.0910
8	611.28	0.2486	0.2963	0.1985	0.2382	0.0538
9	1678.72	0.2479	0.2950	0.1962	0.2343	0.0379
10	2.778.29	0.2334	0.3005	0.1914	0.2458	0.0083

TABLE II. FIRM SIZE DECILES, CASH HOLDINGS, RETAINED EARNINGS AND EXTERNAL FINANCING ACTIVITIES

A. ALL FIRM-YEAR OBSERVATIONS (173,515)

Size Deciles	Cash and Equivalents	Retained Earnings	Net Long term Debt Issue	Net Total Debt Issue	Net New Equity Issue	Dividend
1	0.4141	-3.8807	0.0023	-0.0004	0.2527	0.0077
2	0.4012	-0.8725	0.0024	0.0027	0.1164	0.0068
3	0.3989	-0.4103	0.0007	0.0025	0.0852	0.0078
4	0.3958	-0.1390	0.0013	0.0024	0.0777	0.0083
5	0.3725	0.0244	0.0044	0.0059	0.0604	0.0093
6	0.3475	0.0961	0.0103	0.0113	0.0453	0.0097
7	0.3157	0.1656	0.0174	0.0183	0.0273	0.0117
8	0.2784	0.1940	0.0219	0.0229	0.0158	0.0136
9	0.2469	0.1995	0.0219	0.0227	0.0082	0.0170
10	0.2195	0.2102	0.0163	0.0172	0.0017	0.0193

TABLE III. PARAMETER ESTIMATES FROM MULTIPLE REGRESSIONS ON DETERMINANTS OF SOLVENCY

The sample consists of 146,553 firm-year observations with relevant Compustat data from 1971 to 2005. The dependent variable is the total assets (TA) divided by total debt (TD). The independent variables are as follows: retained earnings (Ret); debt (Debt); cash (Cash); dividends (D/V), equity (Equity):

Size Deciles	Y=(TA/TD)	X1= Ret	X2= Debt	X3= Equity	X4= Cash	X5= Div
1	16.1	-3.8807	-0.0004	0.2527	0.4141	0.0077
2	50.56	-0.8725	0.0027	0.1164	0.4012	0.0068
3	117.25	-0.4103	0.0025	0.0852	0.3989	0.0078
4	240.00	-0.1390	0.0024	0.0777	0.3958	0.0083
5	404.9	0.0244	0.0059	0.0604	0.3725	0.0093
6	664.14	0.0961	0.0113	0.0453	0.3475	0.0097
7	1117.08	0.1656	0.0183	0.0273	0.3157	0.0117
8	2063.04	0.1940	0.0229	0.0158	0.2784	0.0136
9	2690.57	0.1995	0.0227	0.0082	0.2469	0.0170
10	9245.55	0.2102	0.0172	0.0017	0.2195	0.0193

REGRESSION

Descriptive Statistics

	Mean	Std. Deviation	N
Y	1660.9190	2814.9607	10
X1	-.4413	1.2570	10
X2	1.055E-02	9.064E-03	10
X3	6.907E-02	7.436E-02	10
X4	.3391	7.031E-02	10
X5	1.112E-02	4.251E-03	10

Correlations

		Y	X1	X2	X3	X4	X5
Pearson Correlation	Y	1.000	.323	.538	-.506	-.820	.875
	X1	.323	1.000	.597	-.960	-.547	.459
	X2	.538	.597	1.000	-.780	-.915	.835
	X3	-.506	-.960	-.780	1.000	.756	-.677
	X4	-.820	-.547	-.915	.756	1.000	-.982
	X5	.875	.459	.835	-.677	-.982	1.000
Sig. (1-tailed)	Y	.	.181	.054	.068	.002	.000
	X1	.181	.	.034	.000	.051	.091
	X2	.054	.034	.	.004	.000	.001
	X3	.068	.000	.004	.	.006	.016
	X4	.002	.051	.000	.006	.	.000
	X5	.000	.091	.001	.016	.000	.
N	Y	10	10	10	10	10	10
	X1	10	10	10	10	10	10
	X2	10	10	10	10	10	10
	X3	10	10	10	10	10	10
	X4	10	10	10	10	10	10
	X5	10	10	10	10	10	10

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.988 ^a	.975	.944	664.3995

a. Predictors: (Constant), X5, X1, X2, X4, X3

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	69550327	5	13910065.32	31.512	.003 ^a
	Residual	1765707	4	441426.672		
	Total	71316033	9			

a. Predictors: (Constant), X5, X1, X2, X4, X3

b. Dependent Variable: Y

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	73487.197	22193.875		3.311	.030
	X1	-5013.894	4064.358	-.239	-1.234	.285
	X2	-660593	140958.0	-.2127	-4.686	.009
	X3	-105152	88515.939	-.2778	-1.188	.301
	X4	-140576	45855.640	-.3511	-3.066	.037
	X5	-1092104	562241.0	-.1649	-1.942	.124

a. Dependent Variable: Y

BOARD DEPENDENCE, INTERNAL AUDITORS AND EARNINGS MANAGEMENT: AN EMERICAL RESEARCH OF IRAN

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ABSTRACT

In this study we consider effect of performance of Iran corporate governance rule on earnings management by company. On the basis of Iran business law, the companies in Tehran stock exchange administration by board of directors and they must has internal auditing and protect minority stockholders against majority. In this study the corporate governance has been considered from board and audit committee attitudes. In order to do this research, the information of the companies in financial statements and the reports of the Tehran stock exchange have been used. For the measurements of the earnings management variables Joen's modified model has been used. The choice of the companies is randomly and the confidence interval has been considered %95. Time period was 2007 -2011 and 113 corporation randomly selected. Regression statistical method has been applied. The results of the research are the meaningful and positive relationship of executive directors with earnings management. The existence of internal auditor in companies causes the improvements quality of earnings and the relationship is meaningful and negative. In companies that concentration of ownership is high; earnings management is also high and has a meaningful relationship with them. Other results revealed nonexecutive directors ratio is high in almost of corporation in Iran.

KEYWORDS

Earnings management, Executive directors, Internal auditors.

INTRODUCTION

There are wide variety of governance mechanisms used throughout the world. In Anglo – American economies, for example, the primary governance mechanism is the equity market (Saberwal and Smith 2008). In Western European and some Asian economies, however, the primary governance mechanism is relatively concentrated ownership patterns via pyramidal ownership structure (Levy 2009). In transition economies, like China, the primary governance mechanism is the state and informal networks (Shen and Lin 2009). In India, business groups provide accountability, especially in the larger firm (Zattoni and Pederson and Kumar 2009). Notably, Islamic nations primarily rely on Sharia law to curb and guide business decisions (Safieddine 2009).

(Richard and Skinner and Allen 2008, 2009) and (thaghi 2009) and (Baharmoghadam 2010) and (Shiper 1984) and (Chodhari 2007) believe that the managers may embark with a set of real financial events to manipulate the in registering the public costs and advertisement and discounts and administrative costs also the coagulation of contracts which causes the deviance of clients from financial statements.

A numerous research have shown (Joong and others 2009, Viasani and others 2006) that in companies is which the ownership distribution is more than others and there is no stockholders or on the other hand the stockholders are distributed. The possibility of controlling over the managers performance is less than others.

Some researcher in different countries has emphasized this subject that the companies whose board members are nonexecutive director and more experienced and skillful in the company's subject field, can have a good control over the executive managers and managing director performance and reduce the agency costs, moreover if the managing director's duty is separated from the board in the company, Controlling over the managing director performance will be improved (Hasasyeganeh 2009-2008 and Abdoli 2010, Aghaie and Chalaki 2007).

According to the results of other researchers about the effect of improvement of super in tendency and control over the reduction of the managers agency costs and according to the publication of the corporate governance by Tehran Stock Exchange (TSE) present research has been done and is being tried to investigate the corporate governance according to Iran particular circumstances and also accounting standards.

In almost of research in Iran about earnings management indicate that 75 percent of corporations manipulate earnings and profits in various levels-gross profit, operational income and net income. (Abdoli 2010, Baharmoghadam 2009, Sagafi 2009, Hasasyeganeh 2008 and et al)

The present study contributes to extant published literature on corporate governance practices and earnings management. Although a large and growing literature documents that governance affects earnings management, never studies have concentrated on how corporate governance systems and law corporate governance of Iran affect on accrual accounting items. This study provides implications for this question in Iranian context.

BACKGROUND AND HYPOTHESIS DEVELOPMENT

EARNINGS MANAGEMENT

(Nabar and Thai 2007) examines the impact of investor protection and national culture on earnings management for a sample of 30 countries. The results indicate that earnings management is negatively associated with outside investor rights, consistent with Leuz et al. (2003). They also find that earnings management is relatively high in countries with high uncertainty avoidance scores and relatively low in countries where the primary language is English.

(Jiantao and Richard Harrison 2008) have tried to investigate the relationship between corporate government and the culture of country they operate in. This research is done on 399 multinational and manufacturing companies all around the world. In their research they analyzed the subject of culture according to Mr. Hofstede's mode. They have taken centralization of ownership, band controlling and governmental ownership in to consideration on corporate government. The result was the confirmation of the effect that culture and legal rights have on corporate government. Nen (2008) has concentrated on the relationship between earnings management and Hedging management or danger covering which is about money. His investigations are done according to (employer- agent) theory.

(Saghafi and Rezazade2009) have analyzed the cultural basis of accountant's professional behavior. During the research they tried to study Hofstede model and its analysis about the effect of accountant's behavior on different aspects such as conservativeness, and concealing and disclosing of information. The result was the confirmation of social value's effect on the professional behavior of accountants in measuring and disclosing of information but this affect's direction is not completely in conformity with their expectations and the statistical interesting of results was not meaningful.

(Baharmoghadam and Saghafi 2010) through a research analyze the important motives which will affect the earnings management in stock marketing companies. During the research they could find some evidences about the presence of a relationship the structure of ownership, the main presentation of shares amount of awards which is paid to manager's job quality of accounting agencies the quantity of company's improvement, financial structure and amount of earnings managements.

(Visvantan 2008) in his research in India corporations has primarily focused on real earnings management. This study examines the role of corporate governance in the context of "real" earnings management where firms attempt to achieve desired earnings numbers by departing from normal operating activities. Using a sample of 6,759 firm years, the study examines several overall board characteristics and audit committee characteristics in the context of real earnings management. The study finds limited support for some of the factors that have been found to be significant in constraining accruals type earnings management. Having a higher proportion of independent directors appears to be helpful in limiting this type of earnings management, however. These results should be of interest to investors and regulators who rely on governance mechanisms to oversee the integrity of corporate financial reporting.

(Abdoli .M ,and Royaiee .R, 2010) studies relation and affects cultures and earnings management in TSE .Results confirm relation individualism and power distance with earnings management but relation masculinity with earnings management don't confirm .Coefficient relation in privative versus government corporation was high.

(Hasani and Baharmogadam 2010) in their study investigate relation real earnings management in TSE. They focus on cash flow of operations, discretionary expense and change in inventory in corporations Results indicate meaningful relation operational cash flow and change in inventory and earnings management.

BOARD OF DIRECTORS

(Young Byun and Seok Hwang and Jong lee 2011) study value information of corporate decisions and corporate governance practices in Korea .they investigate a direct link between corporate governance practices and strategic corporate decisions such an investment, financing dividend policies and cash holdings .Their findings show that the value implications of financing, investment, dividend, and cash – holding decisions are strong for firms with sound corporate governance practices.

(Mohammad Al Abbas 2007) in his research in Saudi Arabia Market has recompensed to relationship of corporate governance with earnings management. The time period of his investigation was 2005 to 2007. For the measurement of discretionary accrual accounting items uses Jones model. The board combination, their independence, the existence of auditing committee in companies and the sovereignty of board duty form managing director of the companies. He has observed no meaningful relationship between corporate governance contractual and earnings management but realized that there is a negative relationship in companies between the auditing institute sizes and discretionary accrual accounting items.

(Aghai and Chalaki 2009) in their research have refund to the relationship of constitutive investors and board independence with earnings management in Iranian companies. They realized that there is a negative meaningful relationship between constitutive ownership and earnings management and also board independence with earnings management. They did not find any relationship between ownership concentration with earnings management.

(Yazdainan 2007) have refund in Tehran Stock Exchange to the relationship of board independence and the existence of internal auditor with earnings manipulation by managers. The result of their research was if the percentage of the constitutive is more than %45, the earnings management reduces and also there is a meaningful relationship between board independence and the existence of internal auditor.

(Mehrazin and Noravesh and Nikomaram 2008) in their research for the exploration of earnings management items have refund to compare the different models in Iranian companies and ultimately, concluded that Johns' modified model and the modified model with their inflation show a better behavior toward earnings management.

Hypothesis 1: There is meaningful and positive relationship between executive directors and accrual accounting items.

INTERNAL AUDITORS

(Meca and Ballesta 2009) studies and meta – analyze of 35 studies the effect on earnings management of firms board of directors and ownership structure .Their findings show that the results of previous studies on CEO duality and audit committee independence are caused by sampling error . In addition, the measure of discretionary accruals moderate the association between earnings management and some corporate governance.

(Charles Pynt and Remi Janin 2007) in their own research in French have considered the relationship and existence effect of internal auditor and auditing committee and earnings management.

They have assessed the effect of different dimension of auditing quality such as auditor reputation, the existence of auditing committee and their dependence over management and the earnings management. The results of their research were that the existence of auditors from five auditing famous companies has not caused the earnings management reduction. The existence of auditing committee has caused the earnings management. They express that these results in corporate governance is related to French companies which is different from the U.S.A.

(Renders and Gaeremynck and Sercu 2010) try to establish whether a positive relationship exist through modeling the relationship more carefully. After controlling for selection bias and endogeneity simultaneously. Find a significant positive relationship between corporate governance ratings and performance.

(Abdoli 2010) in his research has refund to the relationship of companies' ownership structure and the existence of major shareholder and the existence of internal auditor with earnings management. The result of his research is the confirmation of the existence of internal auditor with the reduction of earnings management and private corporations almost have internal auditors but some of government corporations have internal auditor .Any of corporation don't have auditing committee in Iran.

According to the above researches' results in Iran and according to the corporate governance performance by accepted companies' in Tehran Stock Exchange, hypothesis have been complied:

Hypothesis2: There is negative and meaningful relationship between internal auditor in company and accrual accounting items.

METHODOLOGY

In this section research, variables have been identified and their way of measurement has been explained and then the experimental research according to theoretical principle and also Iran environmental and legal circumstances arranged.

DATA AND SAMPLE

EXECUTIVE DIRECTORS

On the basis of Iran Trade Law, the companies are managed in the format of board and on the basis of articles; some of the board members can work in the company full-time and strive as a full-time manager. These managers are more informed than others about the happened events and more interested than others, therefore, there can be a kind of interest conflict between them and other stakeholders. They have little independence. On the basis of Iran corporate governance law, the board should registry the qualifications and executive directors of the board members in his yearly report and announce to all stakeholders and other people to company's web site. It is necessary to divide the number of them to all members of the board in order to measure members of the executive director's ratio.

INTERNAL AUDITOR

On the basis of Iran corporate governance law, companies have to have an internal auditor which strives under the control of manager's director or board. The internal auditor can audit and provide report in all of the financial and operational fields and made a report. In Iran, there is no auditing committee and this role plays more restricted by internal auditor. For the inquiry of research hypothesis the statistical community divided into two groups. Internal auditor and lack of internal auditor and the mean of the two communities compare and tested.

Discretionary accrual accounting

The discretionary accrual accounting of profits is measured with the help of Jones' modified model. The way of measuring has been mentioned below. In this model has been attempted to separate the discretionary accrual and undiscretionary accrual. The effect of economic condition a business unit on contractual items for a specific period of time which is known as "event period" with selling variables and properties and machinery and equipments is estimated as follow:

$$\frac{TA_{it}}{A_{it-1}} = \alpha_1 \left(\frac{1}{A_{it-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{it}}{A_{it-1}} \right) + \alpha_3 \left(\frac{PPE_{it}}{A_{it-1}} \right) + \varepsilon_{it} \quad (\text{Equation 1})$$

Thus, TA_{it} is the total accrual items, A is total assets, REV is changes of selling revenue and PPE is changes of properties, plant and equipments. After estimating of parameters of the above model by the help of information of the year 2005 to 2009, each company through implementation of models in discretionary accrual accounting items as mentioned below estimates for the "estimation period" it means the year 2010.

$$NDA_{it} = \alpha_1 \left(\frac{1}{A_{it-1}} \right) + \alpha_2 \left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}} \right) + \left(\frac{PPE_{it}}{A_{it-1}} \right) \quad (\text{Equation 2})$$

In the last step, the discretionary accrual accounting items or the factor of earnings management is calculated as below:

$$DA_{it} = \frac{TA_{it}}{A_{it-1}} - NDA_{it} \quad (\text{Equation 3})$$

On the basis of theoretical view, the total accrual items is calculated with the below method according to annually financial statements. In this research we calculate the difference between net income and net cash flow from the operation on the basis of Iran accounting standards as total accrual items.

$$TA_{it} = E_{it} - OCF_{it} \quad (\text{Equation 4})$$

In the above formula, E reagents the net income before tax and ocf , net cash flow from operations and TA reagents the total accrual items in time period of 2010.

SAMPLE

For the considering of research models and also tests research hypothesis, accepted companies have been in TSE. The end of their fiscal year should be the end month of Esfand (December) and should not involve the investment companies and time period 2007 to 2011 their data should be available.

The number of the companies according to the above condition was 345 which 113 companies from different industries have been chosen randomly.

DESCRIPTIVE STATISTICS

Before investigation and checking up each of the research hypothesis, the results of descriptive statistic related to each of the variables studied.

TABLE 1: TABLE DESCRIPTIVE STATISTIC OF THE VARIABLES

St. Deviation	Variance	Statistical Mean	Type of corporation	Variable
4.217	3.933	-5.507	dependence	Earnings management
1.4528	2.8594	0.353	Independence	Executive directors ratio
3.8141	2.9541	0.6315	Independence	Internal Auditor

As it is shown in the above table, the st.deviation results for earnings management is high. This shows in average in all corporations earnings management is done .63 percent of corporation has internal auditors.

RESEARCH RESULTS

According to theoretical principles and research literature and also other carried out researches in Iran, the relationship between variables will be identified as below:

$$DA_{it} = \alpha_0 + \alpha_1 * CG_{it} + \alpha_2 \text{ Variable Control} + \varepsilon \quad (\text{Equation 5})$$

By dividing the variable of corporate governance to each of favorable components of research which has been pointed in hypothesis the research model will be compiled as below:

$$DA_{it} = \alpha_0 - \alpha_1 * \% \text{exe director} + \alpha_2 * \text{inter audit} + \alpha_3 * \text{Variable control} + \varepsilon \quad (\text{Equation 6})$$

DA_{it} as the discretionary accrual accounting items (dependent variable) – independent variable include: **% exe director** as the busy director and full time on company and - **inter auditors** as the internal auditor of company that employee of corporation and report to board of directors - **variable control** involved the controls variables of research include ownership corporation as the basis of "herfindal-hireshman" model and size corporation as the basis of logarithm total assets.

1-In the first hypothesis has been mentioned, there is a positive and meaningful relationship between discretionary accrual accounting items with executive director. In this hypothesis, it is supposed that companies whose number of employed executive director is high, the rate of discretionary accrual accounting items is, more too. And the reason is, they are going to show a improved performance. Therefore, they have the motivation of manipulating the financial figures.

Thus, the continuation of their pressure in the board of the companies increased and this issue is interpretable along the pictorial of manipulate earnings in theoretical framework. The results of the regression experiment have been mentioned as follow:

TABLE 2: RESULTS OF FIRST HYPOTHESIS

Model	R Square	Adjusted R Square	Std. Error of the Estimate	Sig. F
1	0.37	0.42	2.802E11	0.021

As results are shown in the table above, sig f scale is less than the scale of acceptable error level (It means %5). Therefore the hypothesis is confirmed and the meaningful relationship between executive director and the discretionary accrual accounting items scale is confirmed, as well.

The coefficient signal is positive and high which reveals the positive and direct relationship between them.

In the second hypothesis, considering the situation of Iran environmental economic we expect that, in spite of the lack of prediction and the presence of auditing committee in Iran, but the presence and the role of the internal auditor in the company, causes the financial behavior of executive managers to be in the direction of stockholders.

We expect that there is a meaningful relationship between the average discretionary accrual accounting items in the companies which has internal auditor to the average of this in companies which don't have internal auditor. The results of the experiment have been shown in the follow table:

TABLE 3: RESULTS OF SECOND HYPOTHESIS

Model	95% Confidence Interval		correlation	t	Sig. 2tailed
	Lower	Upper			
Internal auditor – non internal auditor	- 2.3489	1.8365	.58	2.08	0.017

As the above table shows, sign T scale is less than alpha %5, thus, the hypothesis research based on meaningful relationship between internal auditors in the companies with the discretionary accrual accounting item has been confirmed. The relation between them is positive. The intensity of relationship between them is high which expresses the high correlation between them (58%) .

OTHER STATISTICAL RESULTS

For investigate effect of dependence variables as a whole (ownership concentration and and size corporation) on discretionary accrual accounting item uses multivariate regression. Results of these regression is shown bellow in ANOVA analysis:

TABLE 4: RESULTS OF ANOVA

Model	Sum of Squares	Mean Square	F	Sig.
Regression	.513	.171	2.117	.0407
Residual	17.911	.218		
Total	18.424			

On the results of table revealed that Sign is lower of 5%, and then relation of dependence variables on discretionary accrual accounting items is confirmed.

The variable size of the companies as an effective factor on motivation possibilities for earnings management in different researches, the size of the natural logarithm of sale entered as control variable in research model. The results haven't changed for none of the hypothesis but the relationships reinforced a lot as though it increased for own concentration 83 percent and for executive director 24 percent which express the meaningful effect of the variable.

For indicate effect of dependence variables on discretionary accrual accounting items uses FORWARD methods. Results of these are shown on following table:

TABLE 5: RESULTS OF FORWARD ANALYSIS

Model	Beta Ln	t	Sig.	Partial Correlation	Co linearity Statistics
					Tolerance
Executive Board	.395	2.787	.0271	.390	.645
Internal Auditors	.293	1.712	.0347	.329	.989
Size Corporation	.269	1.282	.0581	.263	.998
Ownership concentration	.187	1.069	.04792	.202	.969

On the table above, executive directors has most effect on discretionary accrual accounting items. Beta multiple indicate this results. The results above indicate all of variables affect on earnings management.

More above results indicate that Iranian corporation's board of directors almost has specialize in engineering and only 34 corporations has executive director in accounting or finance and economics .In many of corporations, number of non executive director more than executive directors and this directors selected out of corporation – by major stockholders or holding companies - and they don't have information about performance of managers corporation and they have multiple profession .

DISCUSSION AND CONCLUSION

On the basis of theoretical principals of the research and also the other carried out researches in Iran, it was supposed that by accomplishing the corporate governance in Iran, the supervision over managers' performance of trade companies has been improved audits crystallization is in decreasing or omission of discretionary accrual accounting in order to manipulate of the earning by managers. This subject in the hypothesis research has been examined by decreasing the statistical profit by manager's agency's costs for stakeholders and other interested groups decreased and financial reporting improves and also fair-minded of financial statistics of reporting which is important in the view of auditors of standards auditing is provided.

In the first hypothesis the effect of executive director over decreasing of earnings management scale has been confirmed and it was our imagine by presence of employed managers in company and their membership executive director that dependence to financial position of corporations directing the profit along their beneficiary should be tampered and occurring such subject has been confirmed.

Companies which have internal auditor the possibility of earnings management has been decreased and internal audits could play their role precisely in spite of the lack of the presence of auditing committee. By investigating the researched companies it was distinguished that most of the executive director in Iranian companies have no financial and economic expertise. Therefore to make sure toward the performance of financial domain we necessarily have to support the internal audit and sort them in our sub-directory in order to report them directly.

In final, base on results of research suggestions include:

1. Independence of board and number of nonexecutive directors was concentrated
2. In corporate governance law of Iran do not predict auditing committee and other committees
3. TSE corporation do ranking as corporate governance same other countries

REFERENCE

- Abdoli, M.R, (2011), "Relation of Non Executive Directors and Ownership Concentration with Discretionary Accrual Accounting," Australian Journal of Business and Management Research, Vol .1, No. 4, pp93-101
- Agaiie, M. and Chalaki, P, (2010), "Relation of Corporate Governance and Earning Management in TSE," Iranian Accounting Review, Vol 2, No.35.Pg35.
- Atmaja, L.Y.S, (2009), "Governance Mechanisms and Firm Value: The Impact of Ownership Concentration and Dividends," Corporate Governance: An International Review , Vol 17(6) , pp 694-709.
- Azar, A. and Momeni, M. (2009), "Statistics and Application on Management," Samt Publication, Tehran.
- Al –Abbas ,M , (2009), "Corporate Governance and Earnings Management : An Empirical Study of the Saudi Market," Journal of American Academy of Business , Cambrige ,Sep,Vol 15,Iss1,Pg 301.10 Pgs.
- Board Accounting Standard of Iran, (2009), "Accounting Standards," Official Auditing of Iran, Tehran.
- Chen ,K.y , Elder,R.J, Hung .S, (2010), "The Investment Opportunity Set and Earnings Management : Evidence From the Role of Controlling Shareholders," Corporate Governance, An International Review , Vol 18(3) , pp 193-211.
- Dechow, P., Sloan, R. and Sweeny, A. (1996), "Causes and Consequences of Earning Manipulation: An Analysis of Firms Subject to Enforcement Actions by the SEC," Contemporary Accounting Research, Vol 13, PP1-36.
- Hassanifard. H, and Baharmogadam. M, (2010), "Relation Actual Transaction and Earnings Management," Iranian Journal of Accounting, Vol 1, Iss 2, pp 3- 28.
- Hasasyegane .Y, 2009, " Effect of Board of Directors on Corporate Governance," Journal of Hesabdar, Vol 21 No .174, pp12-32.
- Hasas, Y. (2008), " Effect of Corporate Governance on Earnings Management," Quarterly Study of Accounting, Vol 4, No.17, pp123-134.
- Jiatao .li, and Harrison.R, (2008), "Corporate Governance and National Culture: A multi Country Study," Corporate Governance, Bradford, Vol2, Iss 5, P607.
- Judge William (2010), "Corporate Governance Mechanisms Throughout the World," Corporate Governance: An International Review, Vol 18(3). pp 159-160.
- Iqbal, Z. and Lewis , M.K , "An Islamic Perspective on Governance," Edward Elgar Publishing Limited : Gloucestershire , 2009 , 384pg.
- Meca, E.G. and Ballesta, J.S, (2009), "Corporate Governance and Earnings Management: A meta- analysis, " Corporate governance: An International review, Vol 17 (5), pp 594- 610.
- Mehrazin, A. and Noravesh, I. and Nikomaram , H. (2008) , " Assessment of Model of Accrual Accounting and Detection of Earnings Managements, Thesis of Doctorial Accounting," Science and Research Branch of Islamic Azad University, Tehran.
- Midary, A. (2006), "Relation Type of Corporate Governance and Economics Iran," Thesis of doctorial economic, Tehran.
- Nabar.S, and Thai .K.K.B,(2007), "Earnings Management ,Investor Protection and National Culture," Journal o International Accounting Research ,Vol 6 ,Iss2 ,pg 35.
- Lin. N, (2008), "The Agency Problems of Hedging and Earning Management," Contemporary Accounting Research, Vol 25, Iss 3, p7.
- Park, K., R. Park, and L. Hwang, 2005, "Corporate Governance and the Distribution of Shareholder Wealth," Asia-Pacific Journal of Financial Studies 34, pp. 149–188.
- Piot, c. and Janin, R. (2007), " External Auditors, Audit Committees, and Earnings Management in France," European Accounting Review, Vol 16, Iss2, pg429.
- Renders , A. and Gaeremynck ,A. and Sercu ,p,(2010) , " Corporate Governance Ratings and Company Performance : A Cross- European Study, "Corporate Governance : An International Review , Vol 18(2) .
- Rezazade.G and Saghaphy. A, and Baharmogadam.M,(2003) , "Cultural of Accountants Professional Behavior," Accounting Studies Magazine , Accounting and Management Faculty ,Iranian Accounting Studies , Allame Tabatabayi University, Accounting College, Vol 1, PP3-39.
- Roychowdhury, S., (2004), "Management of Earning Through The Manipulation of Real Activities," Working Paper. University of Rochester, New York.
- Roychowdhury, S., (2006). " Earnings Management Through 87 – 106", Real Activities Manipulation," Journal of Accounting and Economics, Vol 42, Pg 335-370.
- Sylvia,V.S. and Utama,s.(2008) , " Type of Earnings Management and Effect of Ownership Structure ,Firm Size and Corporate Governance Practices : Evidence From Indonesia," The International Journal of Accounting ,Vol 43,pp1-27.
- Teresa, M.Pergola et al, (2009), "Effects of Corporate Governance and Board Equity Ownership on Earnings Quality, An Empirical Study," Available at www.Google.com.
- Visvanathan.G,(2008) , "Corporate Governance and Real Earnings Management," Academy of Accounting and Financial Studies Journal ,Vol 12 ,Iss 1.pg 9
- www.rdis.ir (include all of Iranian Financial Statements Corporations in TSE)
- Yazdani, N. (2007) , "Corporate Governance and Earnings Managements," Iranian Accounting Review ,Vol 12, No3, pp29-42.
- Young Byun,H. and Seok Hwang ,L. and Lee Jong , W.(2011), "Value Information of Corporate Decisions and Corporate Governance Practices , " Asia –pacific journal of financial studies , Vol 40, pp 69 -108.

CHILD LABOUR CONDITION IN RESTAURANT SECTOR OF BANGLADESH**JASMINE JAIM****LECTURER****INSTITUTE OF BUSINESS ADMINISTRATION****JAHANGIRNAGAR UNIVERSITY****SAVAR, DHAKA****BANGLADESH****ABSTRACT**

Child labour is a sheer reality in Bangladesh. Though there are government rules regarding child labour, significant number of children is working in different sectors. This paper is to basically explore the overall scenario of the children at the age below 12 years working in restaurant sector. The study has unveiled that the total daily as well as weekly working hours are high. In addition, the study also concentrated on the starting and ending time, interval of work, holidays, vacations to reveal the acute scenario. Further, it has also been revealed that the other facilities to the children provided by the employers are not quite satisfactory. Moreover, sometimes the way to manage the problems of the children at working place is simply cruel. Government should take proper care regarding this issue.

KEYWORDS

Child Labour, Holidays, Labour Law, Time.

INTRODUCTION

Throughout the world the child labour issue is one of great concern. It is quite common for children of all types of societies to be engaged in some forms of occupation depending on the economic structure and level of development. The ILO's Statistical Information and Monitoring Program on Child Labor (SIMPOC) estimated that 211 million children, or 18 percent of children 5–14, are economically active worldwide (ILO, 2002). In fact, of the country concerned, child labour has been generally perceived more as a problem of poor developing countries, which are consistently facing challenges against poverty, high population growth, rising unemployment, natural disasters and so on (BBS 2003). Popular opinion in high-income countries often seems to hold that child labor in developing countries is nearly always a form of child abuse, in which children work in hazardous conditions in run-down factories (Edmonds, 2005). In Bangladesh, with respect to land area the current population size is relatively large and a significant number of children are engaged in labour market. Out of 3,50,63,000 children of the age group of 5-14 years the number of working children was about 5 million (BBS, 2003). Due to legislation enforced by government rules there is very little scope for children to be employed in formal sectors. But in reality, many children are found working in formal sector as well as quasi-corporations. According to UNICEF's Asian Child Labour Report (1999), there are some 40 industries in Bangladesh which use child labour, often under hazardous conditions and with little regard for health and safety. Even children have been injured while engaged in underground mining, in maritime work and while operating or cleaning machinery in motion. In addition, child workers are regularly exposed to dangerous levels of dust, gases, fumes, heat and noise. Moreover, ailments like muscular-skeletal and respiratory-related are common among child labourers. (Priyangika 1999) A few years ago, the garment industry was the biggest source of employment for child workers in the formal sector. A 1991 study entitled "The Conditions of Garment Workers in Bangladesh" found 13 percent of the workers to be working children.

The minimum age for employment varies according to sector. The Mines Act prohibits children under 15 years old from working in mines. The Factories Act and Rules establishes 14 years as the minimum age for employment in factories. According to US Department of Labour there are no specific laws covering the informal sectors, such as agriculture and domestic work, although the majority of child workers fall under these categories. According to The Bangladesh Labour Code, 2006 (section 34) no child shall be required or allowed to work in any profession or establishment. However, the section 44 states exception to employment of child worker in some circumstances. Therefore, any child attaining the age of twelve may be employed in light work which is not dangerous to his or her health and development or which will not prevent him or her from education. However, in many sectors children of the age below 12 years are found working. Some sectors such as restaurants where a large number of children are actively working is not getting much attention. Therefore, this paper is to explore the condition of the children of the age below 12 years working in this sector.

OBJECTIVES

The broad objective of the paper is basically to explore the condition of the children of the age below 12 years working in restaurant sector. The specific objectives are mentioned below:

1. To find out the total working time, the starting and the ending time of work of the children.
2. To investigate the nature of the holidays and vacations of the working children.
3. To explore the facilities provided to the children by the employers.
4. To analyze the problems of managing the children in the working place.

RESEARCH METHODOLOGY

The study area of the research is Dhaka as there significant numbers of restaurants engage children for work. Total 40 restaurants are selected as the sample. The nature of this research required both primary and secondary data for consideration. Primary data were collected from the face to face interview of the restaurant owners. The data was collected in July, 2009. Secondary information further was collected from different books, web-sites and relevant academic journals.

AGE OF CHILDREN

Almost half of the restaurant owners (53%) engage one child in his work. Some (25%) engage two children and the rest of them (22%) engage three children in his restaurant. Therefore, in 40 restaurants there are 71 children. About half of them (51%) are of the age between 11 to less than 12 years and many (27%) of them are of the age between 10 to less than 11 years. The rest of them (23%) are even from 7 years to less than 10 years old.

TABLE - 1: AGE OF THE CHILDREN

Age (in year)	No. of Children	Percentage of Children	Cumulative Percentage of Children
7-8	1	1.41	1
8-9	5	7.04	8
9-10	10	14.08	23
10-11	19	26.76	49
11-12	36	50.70	100
Total	71	100	100

Source: Field Survey.

All the children are males in here. In restaurants children are well known as "Glass Boys". Generally, these children are engaged in calling customers, cleaning, serving, washing dishes and so on.

WORKING TIME OF THE CHILDREN

The starting time of work of children varies from 5 a.m. to 4 p.m. specially because some work in shifts. For engaging children for preparation of breakfast, generally (at 42.50% cases) the work starts before 7 a.m. At large number of restaurants (30%), children start work around 6 a.m.; even the work can be start at 5 a.m. It should be mentioned that no young person (may also child workers attaining the age of twelve) shall be required or allowed to work in between 7 p.m. and 7 a.m. according to section number 41 of the Bangladesh Labour Code, 2006. Again, considering the ending time it has been revealed that in most of the restaurants (62.50%) children work after 7 p.m. For the purpose of dinner in many restaurants children work upto 10 p.m. (22.50% cases) and 11 p.m. (15% cases) or even upto 12 p.m. (10% cases). Situation is quite different in a few restaurants (5%) where children are engaged in preparing sweet food and beverage (faluda, lassi etc.) start their work at 4 p.m. and end at 4 a.m. excluding 2 hours for sleeping.

TABLE - 2: STARTING TIME OF WORK

Starting Time	No. of Restaurants	Percentage of Restaurants
5.00 a.m.	1	2.50
5.30 a.m.	2	5.00
6.00 a.m.	12	30.00
6.30 a.m.	2	5.00
Before 7.00 a.m.	17	42.50
After 7.00 a.m.	23	57.50
Total	40	100.00

Source: Field Survey.

TABLE - 3: ENDING TIME OF WORK

Ending Time	No. of Restaurants	Percentage of Restaurants
Before 7.00 p.m.	15	37.50
After 7.00 p.m.	25	62.50
8 p.m.	2	5.00
9 p.m.	2	5.00
10 p.m.	9	22.50
11 p.m.	6	15.00
12 p.m.	4	10.00
4 a.m.	2	5.00
Total	40	100.00

Source: Field Survey.

On an average the children work for about 11 hours 30 minutes per day. However, the highest time is 17 hours for 15% restaurants. Besides, most of the employers (75%) provide interval for one time and some employers (7.50%) provide interval for two times basically for taking meal. However, the average interval time is 45 minutes. And per week the average working hour is 75 hours 15 minutes. In this regard it should be mentioned that this practice is far more inconsistent with the existing law. According to the Bangladesh Labour Code, 2006 (sub-section of 2 of section number 41) no young person (may also child workers attaining the age of twelve) shall be required or allowed to work in any establishment for more than 7 hours in any day and 42 hours a week. The law further declares (in subsection 4) that if any young person works excess hours, his total working hours shall not exceed 48 hours a week in case of establishment.

TABLE - 4: TOTAL TIME OF WORK

Criteria	Time
Average Total Time of Work per Day	About 11 Hours 30 Minutes
Average Interval Time per Day	About 45 minutes
Average Total Time of Work per Week	75 Hours 15 Minutes

Source: Field Survey.

HOLIDAYS AND VACATIONS OF THE CHILDREN

Many of the employers (45%) do not provide any holiday to the children. Some (17.50%) provide half holiday and the rest of them (37.50%) provide one day as holiday. However, the young persons or the children have the provisions for weekly holiday according to the law (sub-section of 7 of section number 41, Bangladesh Labour Code, 2006).

TABLE - 5: NUMBER OF HOLIDAYS

Type of Holiday	Number of Employers	Percentage of Employers
No Holiday	18	45.00
Half Holiday	7	17.50
Holiday (for 1 Day)	15	37.50
Total	40	100.00

Source: Field Survey.

Almost all employers (95%) provide vacations on two Eids. On an average, the children have 5 days vacation on Eid-ul-Fitre and 6 days vacation on Eid-ul-Azha. Few employers (7.50%) also provide vacations on religious occasions such as Shab-e-barat, Shab-e-kadar, other government holidays and so on.

FACILITIES PROVIDED TO CHILDREN

Some employers (80%) provide salary but in lump sum amount. According to the restaurant owners for similar type work they provide or would provide almost 2 or 3 times more salary to the adult employees than that of the children. A 2002 child labor survey found, where much attention has been paid to child labor in the garment industry, only 1.2 percent of children 5–14 working as paid employees. (Edmonds, 2005)

Considering other facilities, generally, in restaurants (95%) children are provided with food. Half of the restaurants owners provide all meals, many (40%) provide one meal and some (5%) provide only snacks. Many employers (42.50%) provide clothing basically one in Eid. Most of the cases (70%), children stay at the shop or at home of the owners. However, only a few (7.50%) go to school though primary education is compulsory.

TABLE - 6: PROVIDING SOME FACILITIES TO THE CHILDREN

Type of Facilities	Number of Employers	Percentage of Employers
Food	38	95.00
Clothing	17	42.50
Shelter	18	70.00
Total	40	100

Source: Field Survey.

MANAGEMENT OF THE PROBLEMS OF THE CHILDREN

Due to young age, there are some problems of the children at work. According to the restaurant owners the major problem is making mistakes at work. Then gradually come quarrel with other children, slow working, slow understanding, emotion for family and other problems such as stealing food or money etc.

TABLE - 7: PROBLEMS OF THE CHILDREN

Problems	Rank
Making Mistake	1
Quarrel with Other Children	2
Slow Working	3
Slow Understanding	4
Emotion for Family	5
Other Problems	5

Source: Field Survey.

Half of the employers stated that they resolve problems through counseling. However, some have admitted that they (17.50%) resolve through rebuking or even some (20%) through beating. Salary cutting is also used as punishment (at 5% cases). In this regard, it can be cited that a study conducted into the conditions and composition of one of the largest group of child labourers—household domestics in the January-March 1997 Child Workers in Asia bulletin described the findings: "Violence ranges from verbal abuse to physical abuse and torture. The most common types of violence include calling names, shouting, complaining and finding faults, the use of insulting and filthy language, obscene words, beating, slapping, whipping, and being burnt with hot spoons or rods." (Priyangika 1999)

TABLE - 8: MANAGING PROBLEMS OF THE CHILDREN

Management Technique	Number of Employers	Percentage of Employers
Through counseling	20	50.00
Rebuking	7	17.50
Beating	8	20.00
Cutting from Salary	2	5.00
Others	3	7.50
Total	40	100.00

Source: Field Survey.

AWARENESS OF THE LABOUR LAW

Half of the restaurant owners admitted that they are aware about the labour law. Still they prefer the children to employ in their work. The main reason is cheap labour. Another important issue is that the children are easy to manage comparing with the adult persons. The Ministry of Labor and Employment is designated to enforce labor legislation; however, there are no penalties for breaking child labor laws. Due to a lack of manpower, child labor laws are seldom enforced outside of the garment export industry.

CONCLUSION

The condition of the children in the restaurant sector is not acceptable. Yet the prevailing socio-economic conditions do not permit outright elimination of child labour overnight. Experiences indicate that the elimination of child labour from one particular industry may culminate in an increase in child labour in another. In this context, the government should immediately come forward to formulate a comprehensive National Plan of Action, aimed at gradual elimination of child labour from the country.

REFERENCES

- Edmonds V. E., Pavcnik N., "Child Labour in the Global Economy", Journals of Economic Perspectives, Volume 19, No. 1, Winter 2005, PP. 199-220
 International Labour Organization (ILO). 2002. "Every Child Counts: New Global Estimates on Child Labour". Geneva: ILO.
 Bangladesh Bureau of Statistics, National Child Labour Survey 2002-2003
 Nishanthi Priyangika, "Child Labour on the Increase in Bangladesh" [http://www.wsws.org/articles/1999/nov1999/bang-n03.shtml, accessed 20 April, 2009]

FISCAL DEFICITS AND OUTPUT GROWTH IN NIGERIA

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ABSTRACT

Both static and dynamic simultaneous equation models were used in determining the impact of fiscal deficits and inflation on output growth, and their impulse responses in Nigerian economy. Using annual data for the period of 1971 to 2009 shows that inflation rate, output growth, and money supply have contraction impact on the fiscal deficits. The real money supply was found to be relatively more important in explaining fiscal deficits. Equation 2 shows that real money supply, output growth and fiscal deficits have insignificant expansionary effect on inflation. Equation 3 of the static structural model reports that Fiscal deficit and inflation have a significant expansionary effect on Real money supply while output growth has a contraction impact on inflation rate in Nigeria. The empirical evidence from the VEC model reports that fiscal deficits are negatively related to output growth. On the other hand, fiscal deficits have a positive relationship with inflation rate.

KEYWORDS

Nigerian economy, Fiscal Deficits, Finance.

INTRODUCTION

Fiscal deficits contribute to greater liquidity and inflation which has led to situations where expenditure could not be curtailed, resources could not be raised for fear of adverse effects. In most of the developing countries, inadequate attention was given to policies that have inflation-induced thereby creating distortions in the management of available resources. There is no doubt that Nigerian economy is still suffering under mild output growth, high inflation rate and weak fiscal condition in spite of the demand management policies being adopted in Nigeria. In 1971, Nigeria had fiscal surplus of 2.6 percent, inflation rate 15.6 percent and output growth 21.4 percent. In 1972, fiscal deficit was 0.8 percent, while inflation and output growth decreased to 3.2 percent and 5.5 percent respectively. The average rate of deficit between 1975 and 1978 was 4.05 percent while that of inflation was 21.8 percent and output growth was 2.2 percent. Fiscal deficit became continuous from 1981 to 1994 with an average of 8.2 percent. In the same period, inflation and output growth averaged 26.3 percent and 0.8 percent respectively.

Fiscal deficit was reduced from 15.6 percent in 1993 to 7.7 percent in 1994 while inflation rate increased from 54.2 percent in 1993 to 57 percent in 1994. A similar case was obtained between 1982 and 1983, 1986 and 1987. The collapse of oil price, frequent high rate of inflation and relatively insignificant output growth in 1980s led to efforts at restructuring the economy and addressing the increasing level of poverty. (Soludo 1998, Trade policy of Nigeria 2000).

There is a confusing linkage between fiscal deficit and output growth among many researchers. Some of them believe that fiscal deficit has a positive relationship with output growth (Eisner and Pieper 1984) while others state that deficits are negatively associated with capital accumulation and hence negatively with output growth. The previous studies have advanced in characterizing the implications of alternative sources and composition of deficits spending without tracing the transmission of structural shocks from one variable to another. In light of the above discussion, this work intends to address the following questions.

1. What are the impacts of fiscal deficits on output growth and inflation in Nigeria?
2. What is the nature of the relationship among fiscal deficit, output growth and inflation?

OBJECTIVES OF THE STUDY

The objectives of the study are:

1. To determine the impact of fiscal deficits on output growth and inflation.
2. To determine the impulse responses among fiscal deficits, output growth and inflation in Nigeria in order to trace the transmission of structural shocks from one variable to another.

HYPOTHESIS OF THE STUDY

The hypotheses of the study are:

1. Fiscal deficits have no impact on output growth and inflation in Nigeria
2. Fiscal deficits, output growth and inflation have no significant impulse response in Nigeria.

SIGNIFICANCE OF THE STUDY

Fiscal deficits and output growth appear to be the macroeconomic problems facing Nigeria. It is possible that either a wrong diagnosis has been made of the problem or that certain factors within the economy are preventing the variables from staying within target level. The impulse response used in this research will indicate the magnitude of the shocks transmitted from one variable to another. This will help policy analysts in their recommendation and governments in pursuing consistent fiscal policies.

SCOPE AND LIMITATION

This study carries out econometric analysis of fiscal deficits and output growth in Nigeria. It determines the impact of fiscal deficits and inflation on output growth; and identifies the relationship among these macroeconomic indicators. This research covers a period of thirty (39) years (1971-2009).

LITERATURE REVIEW

De Gregorio (1992:417-425, Fischer (1993: 485-512) and Agenor (1999:28) observe that the correlation between inflation and growth is nonlinear and negative. Agenor (1999) believes that at low levels of inflation, changes in inflation have only a negligible impact on growth rate.

Money supply and real output influence the price level directly and inversely respectively. Adejube (1982:65) they show the relationship between real output and inflation, he did not show the relationship between fiscal deficit and inflation or fiscal deficit and output growth. He also did not find out whether dependent variable and each independent variable are random walk stochastic processes.

Anand and Wijnbergen (1989:31) state that government can expect 2.7 percent of GNP from the inflation tax if inflation remains at 25 percent a year. They conclude that "to maintain consistency between fiscal policy and even a moderate inflation target at 25 percent, a substantial further reduction in fiscal deficits of one percentage point of GNP is required.

The empirical work done by Chibber and Shafik (1990), Sowa and Kwakye (1991) and Sowa (1994) show that output and money supply are significant explanatory variables of the inflation spiral in Ghana. Sowa (1994) indicates that the inflation elasticity with respect to output is almost unity (0.967). He shows that inflation in Ghana, either in the long run or short run, is influenced more by output volatility than monetary factors. These studies did not determine the level of fiscal deficit that is sustainable with a given level of output growth and inflation rate.

Romer (1993:872) points out that unexpected monetary shock affect both prices and real output from its natural or equilibrium value is positively related to departure of actual inflation from expected inflation. Agenor (1991:28) states that high inflation and large fiscal deficits are often seen as key symptoms of macroeconomic instability. He observes that such instability is, in general, more pronounced in developing countries relative to industrial countries because the former tends to be more diversified and less able to absorb external shocks.

Oyijide (1972) observed that budget deficits in Nigeria (between 1957 to 1972) were used for capital formation, economic growth and development. He points out that deficit financing goes with increases in the domestic price level during the period of study. He did not specify the relationship between fiscal deficit and increase in aggregate demand. Ochimeze (1991) notes that changes in deficit financing do not have significant influence on changes in gross national income, gross capital formation and consumer price index.

THE MODEL

The model for the study is the Structural Vector Autoregressive (SVAR) transformed into a Vector error correction (VEC). Cooley and Leroy (1985) and Sarte (1997) state that if reduced VAR models are interpreted as structural VARs, the restrictions on error distribution adopted in atheoretical macroeconometrics are not arbitrary renormalizations but prior identifying restrictions. The structural equations of the model are written as:

$$INF_t = \alpha_0 + \sum_{i=1}^n \beta_i INF_{t-1} + \sum_{i=1}^n \gamma_i (FD/GDP)_{t-1} + \sum_{i=1}^n b_i YG_{t-1} + \sum_{i=1}^n d_i RMS_{t-1} + e_{1t} \quad (1)$$

$$(FD/GDP)_t = \alpha_1 + \sum_{i=1}^n \phi_i INF_{t-1} + \sum_{i=1}^n a_i (FD/GDP)_{t-1} + \sum_{i=1}^n \lambda_i YG_{t-1} + \sum_{i=1}^n p_i RMS_{t-1} + e_{2t} \quad (2)$$

$$YG_t = \alpha_2 + \sum_{i=1}^n w_i INF_{t-1} + \sum_{i=1}^n k_i (FD/GDP)_{t-1} + \sum_{i=1}^n h_i YG_{t-1} + \sum_{i=1}^n g_i RMS_{t-1} + e_{3t} \quad (3)$$

where: INF = Inflation rate

FD = Fiscal deficit = overall balance

GDP = Gross Domestic Product

YG = Output growth

RMS = Real money supply

α_0 , α_1 and α_2 are the intercepts of inflation function, Fiscal deficit function and output growth function respectively.

β , γ , b , d , ϕ , a , λ , p , w , k , h , and g are the coefficients of the macroeconomic variables in the model.

U 's are the impulse or innovations (stochastic terms).

The Vector error correction (VEC) model is specified as:

$$\Delta INF_t = \alpha_0 + \beta \sum_{i=1}^n \Delta INF_{t-1} + \gamma \sum_{i=1}^n \Delta (FD/GDP)_{t-1} + b \sum_{i=1}^n \Delta YG_{t-1} + d \sum_{i=1}^n \Delta RMS_{t-1} + \gamma_1 (EC)_{t-1} + E_{1t} \quad (4)$$

$$\Delta (FD/GDP)_t = \alpha_1 + \phi \sum_{i=1}^n \Delta INF_{t-1} + a \sum_{i=1}^n \Delta (FD/GDP)_{t-1} + \lambda \sum_{i=1}^n \Delta YG_{t-1} + p \sum_{i=1}^n \Delta RMS_{t-1} + \gamma_2 (EC)_{t-1} + E_{2t} \quad (5)$$

$$\Delta YG_t = \alpha_2 + w \sum_{i=1}^n \Delta INF_{t-1} + k \sum_{i=1}^n \Delta (FD/GDP)_{t-1} + h \sum_{i=1}^n \Delta YG_{t-1} + g \sum_{i=1}^n \Delta RMS_{t-1} + \gamma_3 (EC)_{t-1} + E_{3t} \quad (6)$$

where: E's are the error terms

EC = The error correction term which is obtained from the co-integration relation.

Δ = change in

PRESENTATION OF RESULTS AND ANALYSIS

The results of the unit root tests show that all the variables are integrated of order one I(1). These results are presented in table 4.1.

TABLE 1: UNIT ROOT TEST

Variables	ADF		Longest lag	Standard error	t-value (level)	t-value (1 st dif)	HCSE
	Levels	1 st dif					
FD/GDP	0.66370	-0.3363	1	0.24541	2.704	-1.370	0.59969
INF	0.54761	-0.4524	1	0.16007	3.421	-2.826	0.21122
YG	0.04646	-0.9535	1	0.17343	0.268	-5.498	0.09204
RMS	0.83065	-0.1694	1	0.08898	9.335	-1.903	0.06564

The Engle-Granger (EG) and Co integrating Regression Durbin-Watson (CRDW) tests are now supplemented by the more powerful tests developed by Johansen. The results of the Johansen cointegration tests are summarized in Table 4.2.

TABLE 2: JOHANSEN COINTEGRATION TEST RESULTS

Eigenvalue	Likelihood ratio	5% critical value
0.904976	-155.601	27.1
0.488318	-149.906	21.0
0.347634	-146.275	14.1
0.223756	-144.122	3.8

The Eigenvalues with corresponding likelihood shows rejection of the null hypothesis at 5 percent significance level.

RESULTS OF THE SHORT-RUN STRUCTURAL MODEL

The results for the short-run static unrestricted model are reported in table 4.4.

TABLE 4: RESULT OF THE SHORT-RUN STATIC REDUCED FORM EQUATIONS

Independent variables	Dependent Variables			
	FD/GDP Equation 1	INF Equation 2	RMS Equation 3	YG Equation 4
FD/GDP _{t-1}	0.82620 (-3.077)**	0.45309 (0.683)	1.3265 (0.740)	-0.61898 (-1.657)
INF _{t-1}	-0.078067 (-0.574)	-0.95747 (-2.852)**	0.12859 (-0.142)	0.20452 (1.082)
YG _{t-1}	-0.11106 (-0.668)	0.00776 (0.165)	-0.8923 (-0.809)	-1.1748 (-5.078)**
RMS _{t-1}	-0.046604 (-2.332)**	0.063131 (1.279)	0.21715 (-1628)	-0.10723 (-3.857)**

$R^2 = 0.975378$

Note: The figures in the parenthesis indicate the t-statistics.

** indicates that the statistic is significant at 5% level of significance.

The above result shows that inflation, output growth, Real exchange rate, and Real money supply affect Fiscal deficits by 0.078, 0.111, and 0.047 percents respectively. In equation 2, Fiscal Deficit (FD/GDP) affects Inflation rate by 0.45309 which is significantly different from zero. The most prominent effect on the inflation rate is that of the Real money supply as is evident from the total effect of 0.063131 and t-value of 1.279 which are significantly different from zero. This is in accordance with Chibber and Shafik (1990) and contrary to Sowa (1994:1114). In equation 4, RMS has a significant contraction impact on output growth with total effect of -0.10723 and t-value -3.857. Inflation has an expansionary effect on output but not significant. This is in order with the work of Fischer (1993) and Easterly and Rebelo (1993). In equation 3, Fiscal Deficits affects Real money supply rate by 1.3265. Inflation affects Real money supply by 0.12859 while output growth affects Real Money Supply (RMS) by -0.89823. The R^2 value of 0.98 indicates that about 98 per cent of the variations in the dependent variables can be explained by the exogenous variables. The F-tests on retained regressors indicate that money supply, fiscal deficits and output growth are significant.

THE RESULTS OF VECTOR ERROR CORRECTION MODEL

The results of the estimated preferred parsimonious VEC model are presented in table 5.

TABLE 4.5: THE RESULTS OF VEC MODEL

Independent Variables	Dependent Variables			
	FD/GDP Equation 1	YG Equation 2	INF Equation 4	RMS Equation 3
FD/GDP ₋₁	-0.22414 (-1.005)	-0.092984 (-0.374)	0.35736 (0.646)	0.04132 (0.028)
YG ₋₁	-0.118801 (0.655)	-0.15550 (0.768)	0.55797 (1.239)	0.9876 (0.606)
INF ₋₁	0.038190 (0.571)	0.063533 (0.852)	0.53669** (3.235)	-0.79112 (-2.174)
RMS ₋₁	0.024100 (1.163)	-0.074069** (-3.203)	0.11704** (2.275)	0.72581 (6.431)

Note: The figures in parenthesis indicate the t-tests

*indicates that the statistics is significant at 5 per cent level of significance

In equation 1, fiscal deficits are influenced by one year lagged value of itself. Other variables such as inflation, real exchange rate output growth and real money supply affect fiscal deficits and their parameters are significantly different from zero.

In equation 2, output depends on fiscal deficits, inflation and the lag of itself, but the most prominent effect on it is that of real money supply. Fiscal deficits and output growth influence inflation rate by 0.35736 and 0.55979 respectively. The coefficients of the variables in equation 2 are correctly signed.

Equation 3 in table 4.5 shows that inflation rate is significantly affected by the lag of itself and money supply. Fiscal deficits and output growth also affect inflation rate but not significant.

The above results indicate that if Nigeria wants to achieve a sustained high rate of growth of output in the long run, it must concentrate on the development of appropriate policies. The $R^2 = 0.933$ implies that the repressors explain 93 percent of the variations in the system. The F-tests on the retained regressors also indicate that inflation, real money supply, output growth, rate and fiscal deficits are significant in the model.

THE IMPULSE RESPONSE

The result of the impulse response functions are shown in table 6.

TABLE 6: IMPULSE RESPONSE

Independent Variables	Dependent Variance			
	FD/GDP	YG	RMS	INF
FD/GDP	-0.8262	-0.1111	-0.04660	-0.07807
YP	-0.6.90	-1.175	-0.1092	0.2045
RMS	1.326	-0.8982	-0.2172	-0.1286
INF	0.4531	0.06777	0.06313	-0.9575

+ = Expansionary impact

- = Contraction impact

The impulse response functions indicate that any unanticipated increase in fiscal deficits will have a contraction impact on itself and output growth. The impact of this is expansionary on inflation rate and real money supply.

The effect of any unanticipated increase in output growth on its lag, fiscal deficits, and real money supply is contraction and expansionary on inflation. Any unanticipated increase in inflation rate will have contraction impact on its lag, as well as real money supply. On the other hand, an unanticipated increase in inflation rate will have expansionary impact on fiscal deficit and output growth.

The results of the impulse responses further indicates that any unanticipated increase in money supply will have contraction impact on itself, as well as output growth and fiscal deficits. It has an expansionary impact on inflation.

EVALUATION OF HYPOTHESES

In this section, we shall test the two hypotheses of the study base on our analysis of the model.

Test of hypothesis one

H_0 : Fiscal deficits have no impact on output growth and inflation rate in Nigeria.

H_1 : Fiscal deficits have impact on output growth and inflation rate in Nigeria.

The results of the parsimonious Vector Error Correction (VEC) model show that fiscal deficits have impact on output growth and inflation in Nigeria as show in table 4.5. The implication of negative coefficients of fiscal deficits is to emphasize a contractionary impact of fiscal deficit on output growth. On the other hand, fiscal deficits have positive impact on inflation rate. The $R^2 = 0.93$ shows the goodness of fit of the model.

TEST OF HYPOTHESIS TWO

H_0 : Fiscal deficits, output growth and inflation have no significant impulse response in Nigeria. H_1 : Fiscal deficits, output growth and inflation have significant impulse response in Nigeria.

The results of the impulse response functions show that there is a significant transmission of structural shocks from one variable to another. The summary of these results are shown in table 4.6.

SUMMARY

The study employed static and dynamic simultaneous equation models to determine the impact of fiscal deficits on output growth and inflation, and to specify their impulses responses in Nigeria using annual data for the period of 1971 to 2009.

The empirical evidence from static structural model indicates that inflation rate, output growth, and money supply have contraction impact on the fiscal deficits. The real money supply was found to be relatively more important in explaining fiscal deficits. Equation 2 shows that real money supply, output growth and fiscal deficits have insignificant expansionary effect on inflation. Equation 3 of the static structural model reports that Fiscal deficit and inflation have a significant expansionary effect on Real money supply while output growth has a contraction impact on inflation rate in Nigeria.

The empirical evidence from the VEC model reports that fiscal deficits are negatively related to output growth. On the other hand, fiscal deficits have a positive relationship with inflation rate. It affects inflation rate by a total effect of 0.35736. There is evidence that inflation in Nigeria is engineered more by real money supply and shortage in output.

RECOMMENDATION

The following recommendations are made based on our findings.

1. There is need to check the growth of money supply because of its likely contraction impact on output growth.
2. Government should check the level of deficits for effective control of inflation rate in Nigeria. The need arises because increase in fiscal deficit increases money supply which negatively affects output growth.

AREA FOR IMPROVEMENT

The researcher suggests the following for further studies.

A study of the optimal deficit that is consistent with output growth and inflation rate in Nigeria.

CONCLUSION

In conclusion, the impact of fiscal deficits on output growth is negative. A unit increase in fiscal deficits brings a total effect of -0.092984 on output growth. This shows that the impact of fiscal deficits on output growth is not in accordance with the way some economists such as Eisner and Pieper (1994) regard it.

Our study also reports that the impact of fiscal deficits on inflation is expansionary. A unit change in fiscal deficits cause about 0.35736 increase in inflation rate.

The impulse response among fiscal deficits, output growth and inflation show that there are transmissions of structural shocks from one variable to another. We found out that fiscal deficits have contraction impact on output growth but an expansionary effect on inflation rate. Our study also reports that unanticipated

increase in inflation rate will have expansionary impact on fiscal deficits and output growth. An unanticipated increase in inflation rate will have expansionary impact on fiscal deficits and output growth.

REFERENCES

- Adam, S. Christopher (1992), Recent Developments in Econometric Methods: An Application to the demand for money in Kenya. Nairobi, African Economic Research consortium.
- Adejogbe, M. (1982). The Mechanism and Dynamics of inflation in Nigeria: 1961- 1972" In Awosika K and Onitiri, A.M. (eds). *Inflation in Nigeria* (proceedings of National Conference). Ibadan, NISER pp. 47-74.
- Adeyeye, E.O. and Fakiyesi, T.O., (1998), "Productivity, price and income Board and Anti-inflation policy in Nigeria" *The Nigeria Economic Under the Military* (proceedings of the 1980 Annual conference of the Nigerian Economic society). Pp. 309-320.
- Agenor, P.R. (1999). *The Economics of Adjustment and Growth*. Forthcoming Academic Press.
- Aghevli, B and Khan, M. (1987) "Government Deficits and the Inflationary process in developing countries" *IMF Staff Papers*. Vol. 25 No3.
- Anand and Wijnbergen (1989) Inflation and the financing of government expenditure: An introductory analysis with application to Turkey. The World Bank Economic Review Vol. 3 No. 1
- Blanchard, Oliver J. and Fischer Stanley, (1989) *Lectures on Macroeconomics*. Cambridge: MIT Press.
- Branson, W.H. (1989). *Macroeconomic Theory and Policy* 3rd Edition, New York. Harper and Row Publishers.
- Bhasin, Vija K, (1999), Export and Economic Growth: Empirical Evidence from Ghana. *African Journal of Economic policy* Vol. 6. No.1.
- Chhibber, Ajayi and Shafik Nemat, (1990), exchange reform, parallel markets, and inflation in Africa. The case of Ghana. *World Bank Working Papers*. No 427 (May 1990).
- Cooley, Thomas F. and Leary, Stephen. F. (1985). A theoretical macroeconomics: A critique. *Journal of Monetary Economics*, Vol. 16 (June 1985) pp. – 308.
- De Gregorio, J. (1992). "The effect of inflation on Economic growth: Lessons from Latin American" *European Economic Review* P. 417-425.
- Diamond, S.B. and Ogundare, S.O. (1982). "Causes of inflation including the Relative Importance of Tutorial and External cases" *Inflation in Nigeria* In Awosika, K and Onitiri, H.M. Ibadan: NISER pp. 73.
- Easterly, W. and Rebelo. S. (1993) Fiscal Policy and economic growth: an empirical investigation, NDER Working Paper, No. 4499.
- Eisner, R. and Pieper, P.J. (1984) A new view if the federal debt and budget deficit, *American Economic Review*, 74. 11-29.
- Fellner, W. (1971): "Philips-Type Approach or Acceleration?" *Brookings papers on Economic Activity*, Vol. 2 pp.469- 483, 1991.
- Fischer, S. (1993). The role of macroeconomic factors in growth. *Journal of Monetary Economic*. Vol 32, No 3 pp. 485-512.
- Friedman, M. (1968): "The Role of Monetary Policy *American Economic Review*, pp 1-17 March 1968.
- Gujarati, N. Demodar (1995). *Basic Econometrics* 3rd Edition. New York. McGraw Hill, Inc.
- Kulkarni, R.G. (1966) Deficit Financing and External Sources". *Deficit Financing and Economic Development*. Bombay, Asia Publishing House.
- Lipsey, R.G. (1960) "The Relation between unemployment and the Rate of change of money in the United Kingdom, 1862 – 1957" *Economica*, vol. 28 pp 1-31, 1960.
- Lucas, R.E. and Rapping, L.A. (1969): "Price expectations and the Philips curve" *American Economic Review*, Vol. 56, 342- 350 June 1969a.
- Meinster, D.R., (1977), Inflationary Finance and Per capital consumption in a Neoclassical Monetary Growth Model. *Quarterly Review of Economics and Business*. Vol. 17. No.
- Michesell, R, (1969), Inflation in Latin America" In Nibest C (ed). *Latin American Problems in Economic Development*. New York: Free Press.
- Morrison, T.K. (1982), "The structural determinant of government deficits in Developing Countries" *World Development* Vol. 10 No 6.
- Ochizee, V.N. (1991), "The Relationship Between Deficit Financing, Capital Formation, inflation and Economic Growth", Unpublished MSc. Thesis, Department of Economics, University of Nigeria.
- Olaloku, F.A. (1979). Structure of the Nigerian Economy, Lagos. The Macmillan Press Limited.
- Ott, D.J., Ott, F.A. and Yoo J.H. (1975): "Macroeconomic Theory" International Student Edition, McGraw-Hill Kogakusha, Ltd. London.
- Oyijide, T.A. (1972) "Deficit Financing Inflation and Capital formation: An analysis of the Nigerian Experience, 1957 – 1970". N.J.E.S.S. Vol 14, No. 1.
- Premchand, A. (1944) Government Budgeting and Expenditure controls; Theory and practice. Washington D.C. International Monetary Fund.
- Romer, David, (1993), Openness and Inflation Theory and Evidence. *The Quarterly Journal of Economics* Vol. CVIII Issue 4.
- Romer, David (1996). *Advanced Macroeconomics* New York: The McGraw Hill Companies.
- Rock, M. James (1991) Debt and the twin Deficits Debate. London. Mayfield Publishing Company.
- Rowlatt, P.A. (1996). A Micro model of price inflation. *Economica*.
- Sarte, Pierre Daniel G. (1997), "On the identification of structural vector Auto-regressions", Federal Reserve Bank of Richmond, *Economic Quarterly Journal*, Vol. 83. No3.
- Sowa, N.K. (1994). Fiscal Deficits, Output growth and inflation targets in Ghana. *World Development* Vol 22 No 8.
- Sowa, N.K. and Kwakye, J.K. (1991) Inflationary trends and control in Ghana. AERC. Research Report (Nairobi, AERC, 1991).
- Soludo, C.C. (1998a) Fiscal Deficits, Exchange rates and External Balance: Evidence from Nigeria. Paper accepted for publication in *African Economic and Social Review*, Vol. 3, Nos 1-2.
- Soludo, C.C. (1998b) *Macroeconomic policy modelling of African Economics*. Enugu Acena Publishers.
- Uzuaga, W.A. (1985). *Money and Banking in Nigeria*. Enugu Fourth Dimension Publishers.

MEASURING THE QUALITY OF TEHRAN'S MUNICIPALITY SERVICES FROM THE VIEW POINT OF THE CLIENT

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ABSTRACT

Applied research ahead in order to review and measure indicators of quality of Tehran municipality clients is done. In this study, a researcher looking for satisfaction or dissatisfaction client organization is the quality of its services. The main goal of the research hypotheses customer satisfaction research based on the quality of services has been proposed. In this study for measuring the level of services quality of Tehran municipality we used SERVQUAL model. In this model service quality measured in performance and expected model. Using standard questionnaires and calculated the model reliability (Cronbach alpha coefficient 94%) of the simple random method, the required information with regard to control estimation error of 196 samples was collected. For data analysis in addition to descriptive methods, for testing the hypotheses normality test, Wilcoxon test and Friedman test was used. Results of main hypothesis show that there is a significant distance between customer expectations and performance of Tehran municipality. Secondary hypotheses results indicate significant differences in all five dimensions of services quality including tangible factors, responsibility, reliability, assurance and empathy between expectations and performance. Friedman test results also indicate the priority of having the tangible factors to improvement is needed. Finally, the results of research indicate proposals to increase the services quality in organization.

KEYWORDS

SERVQUAL model (service quality), performance level expectations, Kolmogorov – Smirnov test, Tehran Municipality.

INTRODUCTION

During recent decades, the main organizational activity (commercial and serving activities) is being in the service of client. Although organizations should meet the clients' desires suitably, most of them don't know "how" recognize and supply their desires. Therefore, organizations should change, stabilize and attract the clients systematically. Supplying the clients' expectations, organizations could satisfy them. Also, they could delight the clients, create a desired image and cause the customer loyalty to increase by presenting some thing more than their expectations. Therefore, a set of designed politics and measures relative to the increase of organization's responsibility toward the clients and the decrease of dissatisfaction are called comprehensive management of the quality (Mirsepasi & Golezadeh, 2009).

Improvement of the quality is of a great importance among the services, because the governmental organizations present them. Today, because the governments pay more attention to the presentation of better services to the clients, they attend to present the services by which the clients' satisfaction is increased. In the modern governmental management, the following question the government is faced:

How could they present the high-quality and economical services (Alwani & Riahi, 2003) Because the organizations are already facing with some limitations affecting on their decision-making and performance, they can list the clients' needs by listening and analyzing their words. They should emphasis firstly on the rare resources (Shen et al, 2009).

STATEMENT OF THE PROBLEM

With regard to the continual change of the environment and the increase of uncontrollable and environmental threats of the market, it is impossible to improve it by slow movement. Therefore, all organizations and firms should move toward the innovation and creativity in order to survive in market (chen, 2009).

In this regard, the municipality of Tehran as the biggest services organization was examined in order to achieve the survey's goals and to satisfy the citizens and the employees of the organization (this was not true about the previous researches). Therefore, organization should use the tools by which the client's needs

could be recognized and listed. This survey is aimed to recognize the clients' needs, to estimate their satisfaction and to present suitable procedures by use of SERVQUAL model.

Due to the SERVQUAL model, the clients' expectations and perception from received services are recognized and grouped (Kay & Theresia, 2001).

As mentioned before, this survey is aimed to answer the question how the clients' needs and desires are classified by use of SERVQUAL model. On the other hand, today the organizations are competing with each other and they are trying to apply various innovations in order to attract the clients. It is clear that organizations are going toward the electrification and the successful organizations are those who have perfect attitudes toward the clients. In the survey, the quality of services from the viewpoint of the client is measured. Therefore, this survey is aimed to examine the aspects of a comprehensive management in order to present some procedures by determination of the importance of services, quality from the view point of the clients.

This survey is also aimed to answer the following questions:

- What are the differences between the quality of current services and the quality of desired services in Tehran's municipality?
- How is the quality of services in Tehran's municipality from the perspective of services' quality aspects?
- Now a day, municipality has established some firms in order to present the electronic services. So, what is the influence of electrification on the degree of client's satisfaction?

IMPORTANCE AND NECESSITY RESEARCH

In fact, with the beginning of revolution in the quality of governmental services, citizenship charters became propounded in order to improve the quality of governmental services. The main idea was from behalf of the clients. The citizenship charters comprise the basics which should be followed (Schiavo, 2000). Regarding the importance of needed works in order to present the high-quality services to the people, the suitable attitude toward the clients and the act of 1382 approved by the high council of the country, governmental organizations should increase the knowledge of their staffs in order to satisfy their clients by presenting the high-quality services. Because the municipality plays a main role in the presentation of public services, this survey is aimed to improve the quality of services by recognizing the weak and strength points of the organization.

RESEARCH BACKGROUND

There are many researches related to the quality of the services from which the modern ones are mentioned.

The research titled "the qualitative and quantitative research related to the evaluation of services' quality" (Lu Liu et al 2008), is one the modern researches in the field of the quality of the services. In this survey, researchers evaluate and measure the degree of clients' satisfaction toward the modern computer networks by use of qualitative and quantitative methods. From the quantitative perspective, the statistical and phase-hierarchical method is used in order to analyze the data. From the qualitative perspective, the hierarchical and Arden's plan methods are used in order to conclude about the different services. Researchers also use some affecting parameters related to the clients' satisfaction. All results are the same (Lulu et al, 2008).

The second research is related to the measurement of the quality of services in the public library of a university in Bangladesh. The survey is aimed to measure the quality services in Daka University. Because the University doesn't receive any money in lieu of its services, the survey is similar to our survey. The SERVQUAL model is used in order to analyze the data. The students of the University were interviewed and the difference between their expectations and perceptions was analyzed. The T-student test was used in order to analyze the data. The results show that there is a meaningful difference between the two measured levels (expectations and perceptions of the students from the services of the University) (Zabed et al, 2009).

The third research titled "The users' satisfaction from the mobile services of Utopia in 2009" is aimed to examine the relationship between the aspects of services quality and the difference between the users' expectations from the services. This is a measuring survey and a questionnaire is used in order to gather the needed data. The samples were randomly selected and 220 questionnaires were accomplished. The results show the users' dissatisfaction from the quality of the services (Rakshit, 2009).

An other research named "modeling the client's value, the services' quality and racism of Vietnam in 2009", is a cause and effect model in which each category is measure by use of a questionnaire. Researchers use the structural equations model and cooperative method in order to analyze the data. The results show that there is a meaningful relationship between the racism and factors such as the value of clients and the quality of services in Vietnam (Rosenbaum & IpKin, 2009).

The last research, on which the current survey is based, was conducted by Roses et al in 2008. The survey titled "examining the management of satisfaction from the quality of information technology services", was about the clients of the Brazil's banks. This survey was aimed to evaluate and measure the difference between the expectations and the level of presented services in the field of information technology of the banks. The survey was a measuring one in which the questionnaire was used in order to gather the data. The results show that there is a meaningful difference between the expectations and perceptions of the clients relative to the information technology (Roses et al, 2008).

RESEARCH OBJECTIVES

Main objective: Measuring the quality of services in the municipality of Tehran from the view point of the client.

SECONDARY OBJECTIVES

1. Recognizing the power and weak points of the organization during the presentation of services to the clients and the improvement of their quality.
2. Measuring the difference between the desired services and the available services of Tehran's municipality.
3. Recognizing the factors affecting on the services of municipality of Tehran, respectively.

RESEARCH THEORETICAL FRAMEWORK

The use of SERVQUAL model in 80 decade by Parasuraman et al has been regarded as an instrument in order to recognize and measure the factors affecting on the clients satisfaction.

The mode is used as a method to recognize the power and weak points of the services quality in an organization (Parasuraman, 1988).

The model is composed of five aspects as the followings:

TANGIBLE FACTORS

1. modern equipments
2. remarkable physical possibilities
3. well-dressed employees
4. arranged documents

RELIABILITY

5. performance of the job until the certain time
6. being concerned about the solution of client's problem
7. improvement of the services at the first time
8. presentation of the services at the certain time
9. correct reporting

RESPONSIVENESS

10. employees tell the clients what they will do
11. employees present immediate services to the clients

12. employees have a tendency to help the clients
13. employees are always ready for services to the clients

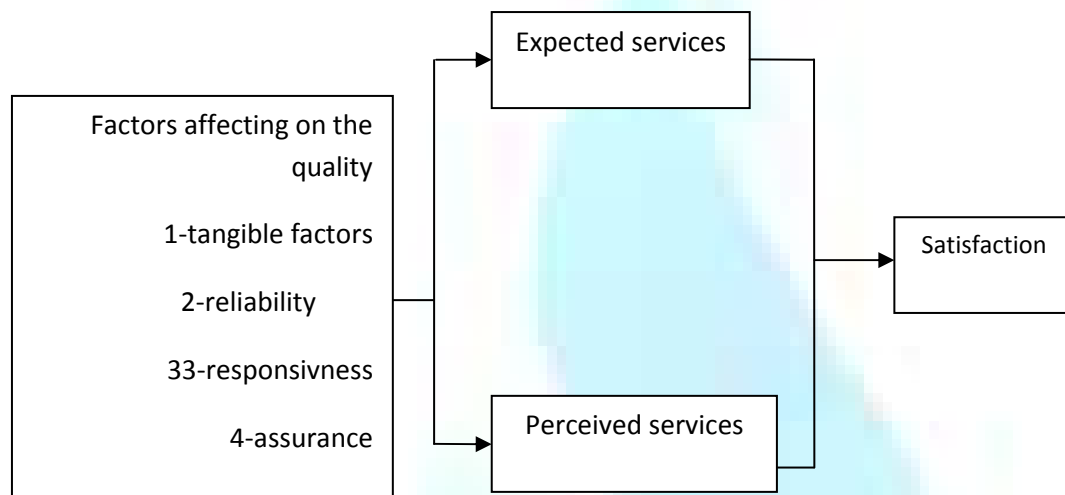
ASSURANCE

14. behavior of the employees makes confidence of the client
15. clients feel security during their interactions
16. employees behave politely with the clients
17. employees have suitable knowledge in order to respond the clients' questions

Empathy

18. personal attention to the clients
19. suitable time for the clients
20. paying special attention to the clients
21. considering the best profits for the clients
22. perception of the clients' needs

Finally, the research model should be presented as the follow:

FIGURE1: ANALYTICAL MODEL OF THE RESEARCH**RESEARCH HYPOTHESES****MAIN HYPOTHESIS**

The client of Tehran's municipality is pleased with the presented services.

SECONDARY HYPOTHESES

- The client of Tehran's municipality is pleased with its tangible factors
- The client of Tehran's municipality is pleased with its reliability
- The client of Tehran's municipality is pleased with its responsiveness
- The client of Tehran's municipality is pleased with its assurance
- The client of Tehran's municipality is pleased with its empathy

METHODOLOGY

This is a theoretical and descriptive-measuring survey in which the sample includes the clients of Tehran's municipality. The population was randomly selected. The used instrument is a questionnaire composed of two parts. First part includes the questions related to the measurement of research variables and the second part includes the questions related to the clients. First part includes five questions and second part includes four questions.

Reliability and permanency of the research has been confirmed. In this regard, the coronbach's α is 94 percent which shows the accepted reliability of the questionnaire. About 96 questionnaires were completed and analyzed. After gathering data by Excel software, the gathered data was analyzed by use of SPSS and Minitab soft wares.

The descriptive and analytical methods were used in order to analyze the data. In descriptive part, there are some charts, boxes and tables. In analytical part, the klomograph-smirnoph, Vilakson and Fridman methods were used.

CLIENTS' QUALIFICATIONS

The following table includes the qualifications of the clients:

TABLE1: QUALIFICATIONS OF THE CLIENTS

%	variety	choices	factors
7.65	15	female	gender
92.35	181	male	
31.63	62	Diploma and associate of arts	education
51.53	101	Bachelor of arts	
16.84	33	M.A	
10.20	20	Below 30 years	age
33.67	66	From30 to 40 years	
35.20	69	From40 to 50 years	
20.92	41	Over 50 years	marriage
29.08	57	unmarried	
70.92	139	married	

MEASUREMENT OF THE FACTORS

After the measurement of the variables, descriptive criterions of the model's factors were calculated.

TABLE2: DESCRIPTIVE CRITERIONS OF THE MODEL'S FACTORS

middle	average	condition	Statistical criterion
6.67	6.45	desired	Tangible factors
3.17	3.21	current	
7.00	6.49	desired	reliability
3.60	3.45	current	
7.00	6.56	desired	responsiveness
3.17	3.23	current	
5.80	5.82	desired	empathy
3.40	3.37	current	
7.00	6.68	desired	assurance
3.40	3.39	current	
6.76	6.40	desired	Quality of services
3.45	3.33	current	

Based on the table above, it could be said that during the current situation, the highest criterion is related to the reliability and the lowest criterion is related to the tangible factors. Also, the highest degree of expectation is related to the reliability and the lowest is related to the empathy.

NORMALITY TEST

This part includes the normality test related to the main variables in order to choose a suitable method for analyzing data by use of kolmogrof-smirnof method.

TABLE 3: NORMALITY INFORMATION RELATED TO THE MODEL'S FACTORS

possibility	Klomogrof-smirnof	condition	Normality test
0.000	3.604	desired	Tangible factors
0.001	1.976	current	
0.000	4.024	desired	reliability
0.000	2.660	current	
0.000	4.084	desired	responsiveness
0.001	1.945	current	
0.000	4.391	desired	empathy
0.000	3.487	current	
0.000	4.033	desired	assurance
0.000	2.190	current	
0.000	3.782	desired	Total quality o f the services
0.000	2.500	current	

As seen in the table above, being normality of the variables has been rejected in all cases and the non-parametric methods should be used in order to test hypotheses.

EXAMINATION OF RESEARCH HYPOTHESES AND CONCLUSION

Regarding the quantitative entity of the questionnaire and the available variables, vilkason's non-parametric test was used in order to test the research hypotheses. In this survey, the calculated criterions of the factors are compared to each other. Then, the hypotheses based on the satisfaction of the client are placed on the H_0 and it shows the client's dissatisfaction from the services.

TABLE 4: THE RESULTS OF VILKAKSON'S TEST RELATED TO THE COMPARISON BETWEEN THE PERFORMANCE LEVEL AND THE EXPECTATION

results	possibility	Normal z	Model's factors
Rejection o f main hypothesis	0.000	-12.160	Tangible factors
Rejection o f main hypothesis	0.000	-12.163	reliability
Rejection o f main hypothesis	0.000	-12.175	responsiveness
Rejection o f main hypothesis	0.000	-12.236	assurance
Rejection o f main hypothesis	0.000	-12.151	empathy
Rejection o f main hypothesis	0.000	-12.142	Quality of services

According to the results, the performance of Tehran's municipality doesn't supply the clients' expectations.

Descriptive results show that there is a distance between the average number and the performance of services quality (3, 0, 7).

RESULTS OF SECONDARY HYPOTHESIS 1: Based on the data analysis, the normality of information related to the secondary hypothesis1 was rejected. Then, the results of vilkason's test rejected the null hypothesis, i.e., there was a meaningful relationship between the expectations of the clients and the performance of the municipality form the tangible factors perspective.

With regard to the mean criterion, the current services level related to the tangible factors is 2/ 3 and the expectations level of the clients from the services quality is 4,6.

RESULTS OF SECONDARY HYPOTHESIS 2: Based on the analyses, the hypotheses 2 and 0 were rejected by the kolmogrof-smirnof test and vilkason's comparative test, respectively. It means that there is a meaningful difference between the clients' expectations and the performance of Tehran's municipality.

With regard to the mean criterion, the current level of the services is placed in the reliability aspect (3, 4) and the clients' expectations level from the quality of the services is also in the same level (4, 6).

RESULTS OF SECONDARY HYPOTHESIS 3: Based on the data analyses, the secondary hypothesis 3 and null hypothesis were respectively rejected by Kolomogroph-Smironoph test and Vilkokson test. It means that there is a meaningful difference between the clients' expectations and the performance of Tehran's municipality.

Based on the mean criterion, the services level and the clients' expectations level are 2, 3 and 6, 6, respectively.

RESULTS OF SECONDARY HYPOTHESIS 4: Based on the data analyses, the secondary hypothesis 4 was firstly rejected and then, regarding the results of secondary hypothesis 4 by use of vilkakson's test, the null hypothesis was also rejected. It means that there is a difference between the client's expectations and the performance of Tehran's municipality from the empathy perspective.

With regard to the mean criterion, the current level of services and the expectation level of the quality are respectively 3,4 and 6,7.

RESULTS OF SECONDARY HYPOTHESIS 5: Based on the data analyses, the normality of information related to the secondary hypothesis 5 was rejected by Kolomogroph-Smironoph test. Then, the null hypothesis was rejected based on the achieved results from the secondary hypothesis 5 test and by Vilkalson test. It means that there is a meaningful relationship between the client's expectations and the performance of Tehran's municipality from the reliability perspective.

Based on the mean criterion, the level of current services and the level of client's expectations are 3,4 and 6,7, respectively.

RESULTS OF MAIN HYPOTHESIS: Firstly, the normality of information related to the main hypothesis was rejected by Kolomogroph-Smironoph test. Then, based on the achieved results of main hypothesis test, the nul hypothesis was rejected by use of Vilkalson's test. It means that there is a meaningful difference between the client's expectations and the performance of Tehran's municipality.

With regard to the mean criterion, the level of services and the level of client's expectations are 3,3 and 6,4, respectively. In order to increase the quality of services, the aspects of quality should be improved.

The results of Five-fold factors classification Friedman Test was used in order to test the equality and the classification of five-fold factors of services quality model. The results show that the qualities of factors are not the same and they are classified as follows:

1. Tangible factors
2. Responsiveness
3. Assurance
4. Reliability
5. Empathy

PROCEDURES AND SUGGESTIONS

A. Theoretical suggestions related to the tangible factors

Regarding the difference between the clients' expectation and the performance of the municipality, the followings are suggested in order to decrease the distance:

- To use the arranged systems in order to keep the documents on file.
- To use the remarkable physical possibilities including refrigerators, suitable informing systems and the required space.
- To use automatic informing systems and electronic systems in order to be informed from more affairs.

B. Theoretical suggestions related to the reliability

- To invest more capital on the informing systems and to use the advantages of the employment of the obliged employees.
- To examine the client's expectations in order to respond update. By this, the reliability of the municipality could be in creased.
- To improve the performance of electronic systems.

C. Theoretical suggestions related to the responsiveness

- To minimize the responsiveness time by creating a concrete informing system and collecting the information related to the work experience
- To increase the employees' tendency to ward the assistance of the clients by creating the client-based culture.
- To promote the 24-hour electronic systems of services.

D. Theoretical suggestions related to the assurance

- To employ the experienced persons in order to respond the clients suitably.
- To present reports correctly by use of computer systems and online services

FUTURE SUGGESTIONS

With regard to this issue that the current survey has been conducted about the municipality of Tehran and has presented suitable results, it is suggested to use it as a theoretical model in other places.

It is suggested to consider the all factors affecting on the client's satisfaction and to recognize the relationship between the variables and affecting factors by use of structural equation models.

It is better to examine the clients satisfaction based on the other models relative to the quality of services and to compare the achieved results to the results of current survey.

REFERENCES

- Alwani, S. M. Riahi, B (2003), a new theory of total quality management in the public sector, issues of administrative reform, 41, 42
- Kay C. Tan, Theresia A. Pawitra (2001) "Integrating SERVQUAL and Kano's model into QFD for service excellence development", Managing Service Quality, Vol. 11 Iss: 6, pp.418 – 430
- Lu LIU, W, ZHOU, Jun-de S, (2009) Quantitative and qualitative research on service quality evaluation system in NGN, The Journal of China Universities of Posts and Telecommunications, Volume 16, Issue 5, Pages 71-77
- Mirsepasy, N, Gholam zadeh, D., (2009) Volume II, Tehran, termeh, pp 198-213.
- Parasuraman A, Zeithaml Valarie A, Berry Leonard L. SERVQUAL: a multiple-item scale for measuring consumer perceptions of service quality. J Retail 1988; 64(1):12–37
- Rakshit, N, (2009) "User's perceived service quality of mobile communications: experience from Ethiopia", International Journal of Quality & Reliability Management, Vol. 26 Iss: 7, pp.699 – 711
- Rosenbaum M, IpKin A. W, (2009) "Modeling customer equity, SERVQUAL, and ethnocentrism: a Vietnamese case study", Journal of Service Management, Vol. 20 Iss: 5, pp.544 – 560
- Roses, Luís Kalb, Hoppen, Norberto, Henrique Jorge Luiz, Management of perceptions of information technology, Journal of Business Research, 2008, 876–882
- Schiavo, L, (2000), "Quality Standard in the Public Sector: Differences Between Italy and UK The Citizens Charter Initiative", Public Administration, Vol.78 Issue 3, P 79, 20P
- Shen chiou.j & et al. (2009) «buyer satisfaction and loyalty intention in online auctions online auction web site versus online auction seller». journal of service management, vol. 20 no. 5, pp. 521-543
- Walton, John, (1999), Developing strategic human resources, translators:
- Zabed S.M. Ahmed, Md. Zahid Hossain Shoeb, (2009) "Measuring service quality of a public university library in Bangladesh using SERVQUAL", Performance Measurement and Metrics, Vol. 10 Iss: 1, pp.17 – 32

ATTITUDES OF INDIANS TOWARDS SERVICE QUALITY FOR LIFE INSURANCE IN INDIA**ANAND PRAKASH****RESEARCH SCHOLAR, ITM-BIT COLLABORATIVE RESEARCH PROGRAMME, NAVI MUMBAI****ASST. PROFESSOR****BALAJI INSTITUTE OF TELECOM & MANAGEMENT****PUNE****SANJAY KUMAR JHA****ASSOCIATE PROFESSOR****DEPARTMENT OF PRODUCTION ENGINEERING****BIRLA INSTITUTE OF TECHNOLOGY****MESRA****S. P. KALLURKAR****PRINCIPAL****A.G. PATIL INSTITUTE OF TECHNOLOGY****SOLAPUR****ABSTRACT**

Most researchers agree that service quality is extremely important for the achievement of the business goals. It is a phenomenon experienced by customers and referred to by expressions in respect of life insurance business as 'content', 'personal', 'welcome', 'alignment', 'procedural', 'authenticity', and 'dedication'. Yet many life insurers are struggling to improve service, wasting money on ill-conceived service programs and undermining credibility with management rhetoric not backed up with action. This paper describes Indians attitudes towards service quality for life insurance business presented through different demographical factors. It is expected that findings from such survey would constitute vital input for life insurers in designing marketing strategies, which are essential to the service-improvement journey. In the Indian context, type of customer personalty, age, gender, level of education, and monthly income influence the service quality. The paper also provides the research implications useful for business transformations and further development of research on service quality.

KEYWORDS

Attitude, demography, life insurance, service quality.

INTRODUCTION

In India, insurance has a deep-rooted history. The writings talk in terms of pooling of resources that could be re-distributed in times of calamities such as fire, floods, epidemics and famine. The Insurance Regulatory and Development Act of 1999 set out "to provide for the establishment of an Authority to protect the interests of holders of insurance policies, to regulate, promote and ensure orderly growth of the insurance industry and for matters connected therewith or incidental thereto and further to amend the Insurance Act, 1938, the Life Insurance Corporation Act, 1956, and the General Insurance Business (Nationalization) Act, 1972." The Act effectively reinstituted the Insurance Act of 1938 with (marginal) modifications with whatever was not explicitly mentioned in the 1999 Act was to be referred back to the Insurance Act, 1938.

The regulatory regime introduced by the IRDA provided regulations for insurance agents who are governed by the Licensing of Insurance Agents Regulations, 2000 and the Licensing of Insurance Regulations (amendment), 2002. Importantly, to ensure professional standards, the IRDA has mandated minimum educational qualifications for all agents, together with training and examination requirements. Through a Government of India Notification dated 11th November 1998, the Insurance Ombudsman was created to address grievances of the insured customers and protect the interest of policyholders. They have jurisdiction in respect of personal lines of insurance where the contract value does not exceed INR 20 lakhs. The IRDA deals with other disputes that fall outside the Ombudsman's jurisdiction.

Policyholder protection was enhanced through the enactment of the Protection of Policyholders' Interests Regulations, 2002. It stipulates the responsibility of insurance companies to spell out clearly the terms and conditions of insurance policies as well as other details. It is understood that the insurance business is a complex dealing because it is characterized by both financial and legal dimensions. The financial definition of insurance focuses on an arrangement that redistributes the cost of unexpected loss. That is, the collection of a small premium payment from all exposed and distributed to those suffering from the loss. The legal definition, however, focuses on a contractual arrangement, whereby one party agrees to compensate another party's loss. The financial definition provides for the funding of the losses, whereas the legal definition provides for the legally enforceable contract that spells out the legal rights, duties and obligations of all the parties to the contract.

Life insurance, however, is a distinctive type of insurance where there is certainty of the payment of a specified amount either on the death of the insured or on the maturity of the policy, whichever is earlier subject to uberrimae fidei (utmost good faith), spes successions (hope of succession and not hope of insurable interest), cause proxima (the proximate and immediate cause of loss is important), pari delicto (parties to be equally blamed, in case of illegal policies, the premium cannot be recovered/returned), salus populi supereminet (by the regard for public interest and welfare is the highest in law) and res ipsa loquitur (the thing speaks for itself; e.g. in case of accidents, the circumstances of the case and not more about occurrence of the events has to be seen) maxims as applicable to insurance contracts (Prakash, Mohanty and Kallurkar, 2011).

RESEARCH BACKGROUND

Most Indians who have a life insurance policy are customers of the Life Insurance Corporation of India (LIC). The same is true for general insurance where the bulk of the policies are with public sector companies. Therefore, IRDA's consumer protection regulations today are really about public sector service providers and their policyholders, especially that of the LIC. One of the major weaknesses in the regulation is that there is no in-built mechanism to ensure compliance by insurers. It is illustrated by means of Regulation 10 (1) which calls upon the insurer to respond to the insured within a time norm of 10 days of the receipt of any communication from the latter in all policy servicing matters but there is no enabling system to ensure that each customer will actually have his / her request complied with within the time norm laid down by the management. No customer knows what would happen if these norms are not kept! That is, these norms

are only for monitoring the employee performance and actions, and not for the information of customers or other stakeholders excluding insurers and their employees.

A life insurance policy is a key component of a financial plan of an Indian. If chosen well, it safeguards the financial future of a family if the breadwinner passes away. If, however, it is bought for the wrong reasons, the same life policy can become a drain on resources and prevents the policyholder from meeting crucial financial goals. Almost every Indian investor has a life insurance policy that he does not want (Kapoor, 2011). That is, getting stuck with an unsuitable life insurance policy is very common, and escaping from a life policy entails a very high cost to the extent of losing up to 50% of the premium paid.

Unsuitable selling of life policy can also effect the valuation of life insurers negatively considering the fact that almost all of the private sector life insurance companies have incurred substantial losses. Business World (2006) reports that just five years after the life insurance sector was opened up to the private sector, two major distress sales have already rocked the industry. Only losses itself should not be the major concern. But profits are still many years away. In fact, a typical life insurer hopes to break even between 3-5 years of commencing operations, start making net profits around 7-8 years and achieve payback in 10-15 years of first commencing business (Business World, 2006).

India's life insurance business transits to a new era from beginning September 2010, when the stage was cleared for the debut of new-look unit-linked insurance plans (ULIPs) that hold the promise of being more transparent and investor-friendly. The IRDA capped various ULIP charges, increased their lock-in period and mandated a minimum guarantee for such plans. The IRDA chairman Mr. J. Hari Narayan considers this a positive approach towards building trust between purchasers of insurance products and the industry but through service quality. The agents are now required to submit a detailed report on lifestyle of buyers of life insurance policies, which include their travel plans, expenses on food, and so on. They will be now required to disclose their commissions.

These changes have affirmed one critical fact: "(Life) insurance was being sold as a tax planning device some times ago, it is being sold as an investment option now, and some day, we hope (life) insurance will be sold as insurance," a concluding line in the IRDA Journal of May 2009 said. Life insurance companies now see service quality as a way to retain customers and allow cross-selling other related services to transform the customer into a long-term client (Sathya Swaroop, 2009). But, even it may not ensure the customer loyalty or patronage intensions due to growing product commoditization and diminishing brand differentiation on account of 23 life insurers with multiple product holding (Mint Money, 2011). Besides, customer interactions for life insurance by insurers are relatively infrequent when compared to other industries like banking, investments, retail or travel. In order to provide best services to customers, it is important that employees and agents should know the company, its processes and products extensively.

With changing times, markets change, technologies change and so do customer needs. When employees and agents take responsibility and exceed customer expectations by serving as a single window for need fulfillment, stated or unstated, at no extra cost or delay, a customer is delighted. Such customers are not just loyal customers; they also become the most dedicated and effective salespersons and advertisers. Another important aspect leading to a loyal customer is being transparent and fair. However, the life insurance agents are usually blamed for not remaining fair in their dealing with customers about hidden charges and make commitments beyond what is actually possible. Usually complicated communication by using jargons and also difficult documentation and processes with too much information overload are frequently found in life insurance mis-selling. Theoretically, people are naturally touched by great service, which highlights that customer satisfaction should result from good service quality, and should lead to patronage intensions. This needs to be examined in the context of life insurance business in India considering it to be a type of service factory (page 31, Schmenner 1986, 2004).

In a life insurance business, multiple stakeholders, viz. consumers, insurance companies, distribution networks, government and regulators, and others like consumer groups and media, interact with the system in different ways and have diverse expectations. Therefore, the service quality items are likely to differ amongst stakeholders. The administrators of the life insurance business find it very difficult to fix the norms that would suit all the stakeholders (Prakash, Mohanty, and Kallurkar, 2011).

The paper is the part of the research which had central motivation to design and develop a service quality model for life insurance business characterized by multiple stakeholders with different backgrounds such that there remains in-built mechanism to ensure compliance for the set norms which can be studied externally for all life insurers through a validated framework of questionnaire survey (Prakash et al. 2011). Recently, only one study was found on service quality for the life insurance business (Siddiqui and Sharma 2010). Though numerous researchers have made theoretical and empirical contribution to the study of service quality in various industries, the area of life insurance is not adequately researched. Siddiqui and Sharma (2010) only ensured face validity of the survey instrument using Exploratory Factor Analysis for performing subsequent gap analysis. The face validity is just one form of construct validity, which is ensured with the scale conforming to its conceptual definition unidimensionally on meeting necessary levels of reliability. Siddiqui and Sharma (2010) had not tested the other forms of construct validity, namely, convergent validity, discriminant validity, and nomological validity.

Moreover, service quality has proved to be a difficult concept to grasp. It has been referred to as 'elusive' (Parasuraman et al., 1985; Smith, 1999), and research relative to the construct is still considered 'unresolved' (Caruana et al., 2000) and 'far from conclusive' (Athanasopoulos, 2000). Hence, there is paucity of systematic academic research to date in respect of service quality modeling for life insurance business.

Over the last four years, we have been studying service quality for life insurance business in India, focusing primarily on these questions:

- What is service quality? (Prakash, Kallurkar and Mohanty 2008, 2009, 2011)
- What role does technology play in service encounter? (Prakash, 2011)
- What are the linkages of service quality? (Prakash et al. 2011)
- How have researchers in the literature review, identified the context of service quality practices and characteristics, and how have they proposed to measure it? (Prakash, Kallurkar and Mohanty 2011; Prakash et al. 2011)
- What are issues for evaluating array of service quality models? (Prakash, Kallurkar and Mohanty 2011; Prakash et al. 2011)
- How can a uniform construct (minimum number of items) of service quality be developed that it meets the requirement of important stakeholders which would be easier for the administrators of the life insurance business to fix? (Prakash, Kallurkar and Mohanty 2011)
- What are the relationships between service quality, customer satisfaction, and patronage intensions? (Prakash et al. 2011)

However, in this paper, we focus on the following questions for presenting lessons learned in respect of attitudes of Indians towards service quality for life insurance that we believe are essential for improving service quality.

- Do demographic variables, like type of customer-personality, age, gender, educational status, and monthly income have any effect on service quality attitude to life insurance business?
- What are the reasons for investing / saving in the life insurance?
- What are major complaints in respect of a life policy ever? So on.

Some of the research questions are contingent on the answers to some prior questions.

RESEARCH METHODOLOGY

Research design process is the blueprint for fulfilling research objectives and answering questions through collection, measurement, and analysis of data. It aids the researcher in allocation of limited resources by posing crucial choices in methodology.

Research Design: type and purpose

Type: The study involves descriptive research for especially drawing inferences from testing of hypotheses, which is the part of inferential statistics. In addition, the study also uses descriptive statistics. It has involved communication study, ex post facto design, cross-sectional research, statistical study, field study, and actual routine for the participants' perceptions of the research activity.

Purpose: For the purpose of discussing social-cultural factors that account for service quality attitudes following objective can be stated:

- To collect descriptive evidences on life insurance practices on service quality attitude.

Selection of questionnaire: rationale, relevance, pre-testing

The argument for choosing survey questionnaire was based on two major reasons. Firstly, survey questionnaire provides a quick, efficient and accurate means of assessing information about the population. Secondly, survey questionnaire is more appropriate where there is a lack of secondary data.

- Rational: The anonymity of the respondent gives greater freedom of expression.
- Relevance: Logically sequenced questions have been earlier tested to quality for reliability and its adequacy is be done through pattern discovery using Neural Networks, and therefore, the developed tool is good for making continuous improvement and assessment on service quality in life insurance.
- Pre-testing: Generally, when measures are developed, some type of pretest should be performed. It ensures that items not behaving statistically as expected may need to be refined or deleted. We use the validated multiple-item scale for measuring service quality in life insurance business developed using structural equation modelling approach (Prakash et al. 2011); hence, pretest is not required to be carried out for this study.

Sampling design

- Target population: The 'target population' in this research is the customers of various life insurance companies, i.e., they are head of households who have a life insurance policy in Pune for time period of the survey. The 'relevant population' comprises of such life insurance customers who are residing in Pune, who are natural markets of their life insurance advisors with the capacity to pay the premium of such life insurance policies. The 'target area' (entire region or set of locations from which information is collected) in Pune is Pimpri Chinchwad Municipal Corporation limits.
- Sampling frame: A sampling frame is the list of elements from which the sample is actually drawn. As we have tried to restrict only to the natural markets of the life insurance advisors, our sampling frame had the list of names offered by such advisors who were their actual customers in their natural markets with working telephone numbers.
- Sampling method: We have used purposive non-probability sampling for all stages of survey considered in this study, as we believed that some specific people can have only the information required in the survey.
- Sample Size: For descriptive research, the level of precision has been considered as ± 3 percent, the level of confidence or risk as 95% and the degree of maximum variability with proportion of 0.5. The resulting sample size will then be 1067. Similar studies have considered 1024 useful responses.

Data collection

Data were collected using questionnaires with 21 validated items of service quality for life insurance business (Prakash et al. 2011). Questionnaires were administered from February 2011 to April 2011.

Data analysis

It would help to conclude from the analysis that demographical factors play considerable role of varying degrees on service quality attitudes of Indians to life insurance services using age, gender, education, marital status, primary and secondary occupations in the family, expectation to have a house to live after retirement from work without paying rent and without any outstanding mortgage payment, total monthly income, decision-maker in the household about savings and investments, children to take care of the respondents' financial needs in old age, the purpose of saving, any outside consultation before taking life insurance decisions, life insurance provider, risk appetite, reasons for investing / saving in life insurance, first response for coping with a financial emergency, the information stressed at the point of sale of a life policy (in particular, the illustrations), type of resolution is expected by respondents' personality in respect of a life policy (Mint Money, 2011), and major complaints in respect of a life policy ever as classification variables.

RESULTS AND DISCUSSION

Apart from age, gender, level of education, and monthly income, other classification variables are mostly multiple response considered in the study are only for profiling the respondents.

Single response classification variables

Table 1 gives a summary of descriptive statistics for the survey, where most of the respondents are males. As most of them are in the age group of 20 – 35 years, they are majorly Single Person with no dependents, Single Person with dependents, Currently Married, and Couple with children. Very few respondents are of category Couple with no children, older couple, Widow / Widower, and Divorced. Most of the respondents in the study expect to have a self home, where most of them have monthly income up to Rs.40000 per month. Also, very few respondents are of view that they would not be cared by children in old age. Major Complaints in respect of a life policy ever were Bonus followed by Policy is not issued at standard rates, Refund Cheque Not Received, and Provider not traceable. In respect of the information stressed at the point of sale of a life policy, the statement types as choices were Statement 1 reflecting "Past practice is a reasonable guide to future practice in most circumstances", Statement 2 reflecting "Past practice in respect of this type of policy", Statement 3 reflecting "Recent statements from the life office", and Statement 4 reflecting "The normal practice within the industry in India". Most of the respondents have low to medium appetite of risk of return on their investments but they were stressed with information as 'Past practice in respect of this type of policy' at point of sale which portrayed high returns associated with high risk of return.

The four personality types considered are as Feeler (empathy-oriented as Personality 1 reflecting "Understand how I feel and take a sympathetic approach to resolving my issue", Entertainer (social-oriented as Personality 2 reflecting "Treat me like a person; I don't want generic answers", Thinker (process-oriented as Personality 3 reflecting "Take the time to fully explain resolution steps and allow me to talk", and Controller (result-oriented as Personality 4 reflecting "Don't spend time on unnecessary details, just resolve my issue!" Most of the respondents were found to be associated with Personality 2. That is, they suffered from mis-selling of life products with no more interest in *generic answers* and look forward to *fully explain resolution steps and allow talking*. It is worth noting that most respondents had first response to financial emergency as family support followed by taking loan and spending from buffer saving.

TABLE 1: SUMMARY OF DESCRIPTIVE STATISTICS FOR SINGLE RESPONSE CLASSIFICATION VARIABLES

Age		Gender		Marital Status		Level of Education	
20 – 35	702	Male	687	Currently Married	230	Illiterate	16
36 – 45	281	Female	384	Single Person with no dependents	301	Literate but without formal schooling	9
Above 46	89	Total	1071	Single Person with dependents	192	Less than primary	12
Total	1071			Couple with children	265	Primary Schools	16
				Couple with no children	51	Middle schools	6
				Older couple	16	High school / Matriculate	29
				Widow / Widower	4	Higher Secondary / Intermediate	39
				Divorced	12	Technical Educations / Diploma	55
				Total		Graduate	351
						Professional Degrees	256
						Post Graduate and above	282
						Total	1071
Expectation of Self Home		Risk Appetite		Monthly Income		Care confidence by children for old age	
Yes	859	Low	508	Up to Rs.20000	182	They will	283
No	124	Medium	365	Up to Rs.30000	335	They might	251
Not Sure	88	High	125	Up to Rs.40000	222	They won't	55
		Can't say	73	Up to Rs.50000	167	I do not need their assistance	170
		Total	1071	Up to Rs.60000	79	Don't have child	312
				Up to Rs.75000	37	Total	1071
				Up to Rs.100000	17		
				More than Rs.100000	32		
				Total	1071		
Personalty		Information stressed at point of sale		Major Complaint		First response to financial emergency	
Personalty 1	163	Statement 1	196	Provider not tracable	185	Spend from buffer saving	230
Personalty 2	459	Statement 2	499	Refund Cheque Not Received	186	Take loan	263
Personalty 3	299	Statement 3	267	Policy Not Issued	215	Dispose / distress selling	87
Personalty 4	150	Statement 4	109	Correction in Contract Details	85	Compromise on other expenses	38
Total	1071	Total	1071	PIN Mailer Not Received	63	Family support	356
				Bonus	248	Seek extra work	51
				Contest / Reward Points Related	81	Surrender a life policy	41
				Any other (specify)	8	Any other (specify)	5
				Total	1071	Total	1071

Through one-way ANOVA test, this study intends to first test for significant mean differences in respect of the information stressed at the point of sale of a life policy (in particular, the illustrations), and thereafter of different customer-personalty types.

- ANOVA for the information stressed at the point of sale of a life policy: The findings from the one-way ANOVA for service quality indicates that significant mean differences exist among the different statement types for the dimensions of service quality, however, there exists no significant mean differences among the different statement types for the overall service quality (Table 2). Analysis of the differences in dimensions of service quality among four statement types shows that respondents for Statement 1 and Statement 2 view performance of service quality dimensions significantly better than the respondents for Statement 3 and Statement 4 as the scale is reverse coded (Table 3). That is, companies should stress more on past practice for realizing the sale of a life policy, whereas recent statements from the life office and statement to reflect the normal practice within the industry in India may create negative remarks for various dimensions of service quality.

TABLE 2: ANOVA FOR THE INFORMATION STRESSED AT THE POINT OF SALE OF A LIFE POLICY

		Sum of Squares	df	Mean Square	F	Sig.
SQ	Between Groups	8.152	3	2.717	1.069	.361
	Within Groups	2713.021	1067	2.543		
	Total	2721.173	1070			
CON	Between Groups	102.234	3	34.078	23.717	.000
	Within Groups	1533.163	1067	1.437		
	Total	1635.397	1070			
PER	Between Groups	80.642	3	26.881	17.333	.000
	Within Groups	1654.688	1067	1.551		
	Total	1735.330	1070			
WEL	Between Groups	124.208	3	41.403	24.034	.000
	Within Groups	1838.112	1067	1.723		
	Total	1962.319	1070			
ALI	Between Groups	105.128	3	35.043	19.077	.000
	Within Groups	1959.967	1067	1.837		
	Total	2065.094	1070			
PRO	Between Groups	180.777	3	60.259	33.848	.000
	Within Groups	1899.555	1067	1.780		
	Total	2080.332	1070			
ATH	Between Groups	59.902	3	19.967	11.753	.000
	Within Groups	1812.705	1067	1.699		
	Total	1872.607	1070			
DED	Between Groups	48.725	3	16.242	8.447	.000
	Within Groups	2051.685	1067	1.923		
	Total	2100.411	1070			

TABLE 3: MEANS OF THE STATEMENT-TYPES ON DIMENSIONS OF SERVICE QUALITY

Dimensions of Service Quality	Statement 1	Statement 2	Statement 3	Statement 4
Sample Size	196	499	267	109
Content	2.556	2.385	2.985	3.220
Personal	2.531	2.766	3.176	3.376
Welcome	2.520	2.347	3.116	3.046
Alignment	2.480	2.794	3.322	3.303
Procedural	2.398	2.383	3.352	2.761
Authenticity	2.383	2.547	2.869	3.156
Dedication	2.413	2.824	3.026	2.560
Service Quality Total	17.281	18.046	21.846	21.422

- ANOVA for the personality types: The findings from the one-way ANOVA for service quality indicates that significant mean differences exist between the different personality types (Table 4). Analysis of the differences in service quality among four personality-types shows that Personality 1 and Personality 2 view performance of service quality significantly better than that of Personality 3 and Personality 4 as the scale is reverse coded (Table 5). That is, companies should create scalable and actionable framework aimed at personalized customer experiences such as personality-based service, which teach employees and agents to use clues and cues to identify different customer personality types and flex their resolution style accordingly to avoid emotional disconnects such that service quality remains imbibed in their sales of life policies.

TABLE 4: ANOVA OF ALL DIMENSIONS OF SERVICE QUALITY

		Sum of Squares	df	Mean Square	F	Sig.
SQ	Between Groups	27.625	3	9.208	3.648	.012
	Within Groups	2693.548	1067	2.524		
	Total	2721.173	1070			
CON	Between Groups	54.433	3	18.144	12.246	.000
	Within Groups	1580.964	1067	1.482		
	Total	1635.397	1070			
PER	Between Groups	17.757	3	5.919	3.677	.012
	Within Groups	1717.572	1067	1.610		
	Total	1735.330	1070			
WEL	Between Groups	34.006	3	11.335	6.272	.000
	Within Groups	1928.314	1067	1.807		
	Total	1962.319	1070			
ALI	Between Groups	46.689	3	15.563	8.227	.000
	Within Groups	2018.406	1067	1.892		
	Total	2065.094	1070			
PRO	Between Groups	77.595	3	25.865	13.780	.000
	Within Groups	2002.738	1067	1.877		
	Total	2080.332	1070			
ATH	Between Groups	38.089	3	12.696	7.384	.000
	Within Groups	1834.518	1067	1.719		
	Total	1872.607	1070			
DED	Between Groups	24.709	3	8.236	4.234	.006
	Within Groups	2075.702	1067	1.945		
	Total	2100.411	1070			

TABLE 5: MEANS OF THE PERSONALITY-TYPES ON DIMENSIONS OF SERVICE QUALITY

Dimensions of Service Quality	Personality 1	Personality 2	Personality 3	Personality 4
Sample Size	163	459	299	150
Content	2.466	2.460	2.876	2.987
Personal	2.706	2.828	3.077	2.887
Welcome	2.429	2.516	2.819	2.900
Alignment	2.779	2.806	2.920	3.420
Procedural	2.411	2.462	2.876	3.147
Authenticity	2.356	2.571	2.819	2.940
Dedication	2.595	2.662	2.957	2.933
Service Quality Total	17.742	18.305	20.344	21.214

TABLE 6: IMPORTANCE OF SERVICE QUALITY DIMENSIONS FOR LIFE INSURANCE

	Content	Personal	Welcome	Alignment	Procedural	Authenticity	Dedication
Most Important	168	102	245	152	244	219	197
Very Considerable Important	384	394	298	324	309	336	341
Considerable Important	295	283	289	272	266	248	235
Neutrally Important	151	151	116	169	110	166	170
Less Important	35	103	83	104	103	71	73
Very Less Important	27	32	38	35	33	23	45
Least Important	11	6	2	15	6	8	10
Total	1071	1071	1071	1071	1071	1071	1071

Considerable importance for service quality dimensions of life insurance business has been attached by almost 60 percentile of the sample data (Table 6), which is supported with following additional evidences of hypotheses testing under inferential statistics:

- Age:

The age seems to influence content, welcome, alignment, procedural, and authenticity factors of service quality for life insurance business at .05 based on Chi-square test. However, based on remarks of Directional Measures, the age of the respondent does not influence personal and dedication factor of service quality for life insurance business at .05 based on Chi-square test.

Further, both Directional Measures and Symmetric Measures were significant at .05 with negative correlation for reverse coded scale for content; hence, higher content scores are to be associated with increased age.

Both Directional Measures and Symmetric Measures were significant at .05 with positive correlation for reverse coded scale for welcome; alignment; procedural; and authenticity; hence, higher welcome, alignment, and procedural scores are to be associated with decreased age.

- Gender:

Gender seems to influence content, procedural, authenticity, and dedication factors of service quality for life insurance business at .05 based on Chi-square test.

Both Directional Measures and Symmetric Measures were significant at .05 with positive correlation for reverse coded scale for content; procedural; authenticity; and dedication; hence, higher content, procedural, authenticity, and dedication scores are to be associated with male respondents.

- Level of Education:

The level of education seems to influence the content, personal, welcome, alignment, procedural, authenticity, and dedication factors of service quality for life insurance business at .05 based on Chi-square test.

Both Directional Measures and Symmetric Measures were significant at .05 with positive correlation for reverse coded scale for content; personal; welcome; alignment; procedural; authenticity; and dedication; hence, higher content, personal, welcome, alignment, procedural, authenticity, and dedication scores are to be associated with lower level of education as being graduate.

- Monthly Income:

The level of income does influence the content, personal, welcome, alignment, procedural, authenticity, and dedication factors of service quality for life insurance business at .05 based on Chi-square test.

Both Directional Measures and Symmetric Measures were significant at .05 with positive correlation for reverse coded scale for content; personal; welcome; alignment; procedural; authenticity; and dedication; hence, higher content, personal, welcome, alignment, procedural, authenticity, and dedication scores are to be associated with lower level of income as up to Rs.40000 per month in the classification of monthly income for the study.

From the above, it can reasonably be concluded from the analysis that demographical factors play considerable role of varying degrees on attitudes of Indians to life insurance business services. Specifically, age, gender, level of education, and monthly income – all have significant impact of varying degrees on attitudes towards life insurance. The findings serve as inputs to marketers of life insurance business services on how they formulate and implement relevant marketing strategies towards addressing the attitude of Indians to life insurance.

Multi response classification variables

Some situations required data to be collected which involved several responses or measurements for a single question. They are presented in Table 7 for the better understanding of respondents who participated in the survey. For multiple response variables, respondents were presented with a list and they were asked to check those that apply. This method of presentation is used to insure that the respondent considers each of the feasible possibilities.

TABLE 7: SUMMARY OF DESCRIPTIVE STATISTICS FOR MULTI RESPONSE CLASSIFICATION VARIABLES

Occupation		Household Decision-maker		The Purpose of Savings	
Farmer	58	Self	540	Education requirements of children	262
Salaried employee (Private Sector)	337	Spouse	217	For marriage of children	158
Salaried employee (Central Govt)	178	Parent	377	Old age security	406
Salaried employee (State Govt)	184	Siblings	55	Buying real estate or renovations	112
Retail business from fixed premises	56	Others (specify)	12	Meeting social obligations	68
Retail business without fixed premises	2			For starting / expanding a business	96
Owner of small-scale manufacturing	54			Safeguard against income uncertainty	108
Self employed Professionals	127			For security of my family	333
Home based workers	59			For sudden medical emergencies	131
Retired and earning pension	35			No specific purpose in mind as of now	84
Housewife	53			Any other (specify)	8
Student	33				
The External Consultation for Life Insurance		The Life Insurance Provider		Reasons for Investing / Saving in Life Insurance	
No	277	Agents	805	Financial security	630
Camps organized by companies / govt	63	Bancaassurance	85	Better return	247
Friends / Peer group	361	Brokers	96	Liquidity	102
Union leader / Community leader	34	Corporate Agents	111	No fear of theft or fraud	155
Agents	175			No other choice	39
Religious institutions	10			Easy access / availability	35
Banks	49			Easy withdrawal	39
Self Help Groups / NGOs	6			Simple procedure	26
Relatives	270			Option of flexible contribution (topup)	7
School teacher	27			Trust worthy	184
Colleague at work	142			Agent convinced me	46
Employer	57			Others have taken it	24
Tax Lawyer / Investment Advisor	28			Was advised by peer / relatives	26
Others (specify)	0			Tax benefits	181
				Usual habit	12

Following are the characteristics of the profile of Indians in respect of investments and in particular life insurance:

- Most of the respondents involved in the study were salaried employee of Private Sector followed by that of Central Government and State Government.
- The household decision-making about savings and investments is mostly self-driven followed by parent and spouse.
- The main purpose of making savings are old age security followed by for security of my family, Education requirements of children, and for marriage of children.
- The external influencer for life insurance decisions is mostly seen with friends / peer group followed by relatives, thereafter by no influencer, agents, and colleague at work.
- Most of the respondents consider agents as their life insurance provider.
- The major reasons for investing / saving in the life insurance as perceived by respondents were financial security followed by better return, trust worthiness, and tax benefits.

RESEARCH IMPLICATIONS

From the above, it can reasonably be concluded from the analysis that demographical factors play considerable role of varying degrees on attitudes of Indians to life insurance business. Specifically, age, gender, level of education, and monthly income – all have significant impact of varying degrees on attitudes towards life insurance. The findings of this study suggest some major implications for marketing of life insurance business in Indian businesses environment.

Within the life insurance business, customers from their point of view have normally purchased a complex product as a comprehensive life insurance policy. These products have often been purchased to meet a future life insurance need to protect the customer from a life risk that could occur. However, in some cases, they may have been 'sold' and the customers' understanding may not be complete. It is to be noted that such life insurance service customers want the basics – they expect fundamentals, not fanciness; act, and not empty promises. Hence, the validated dimensions of service quality for life insurance business are ensured to be imbibed through training and development of employees and agents by life insurance companies in sales of their life policies; otherwise customers would not find themselves struck with an unsuitable life insurance policy, which is currently very common.

Life insurance products are normally sold through direct agents, banks, brokers, or corporate agents. It is commonly said that life insurance products are "sold and not bought". For this reason, agents, banks, brokers, or corporate agents are paid commission consistent with the level of their sales. Most of the policyholders in India have purchased the life policy through agents. As the income of agents depends on their sales, there may be an inconsistency between the needs of the client and the desires of the agent.

CONCLUSION

Regardless of its high ambitions, the research is constrained by resource limitations, both financial and non-financial resources. Limitations of time, funding and scope of the study required the research study to focus on a limited number of objectives. Moreover the research problem and questions often directly or indirectly involve multiple areas of management while limits of time and funds would not make all areas can be investigated. In terms of scope of the study, this study suffers from the limitation that it limits to a single service industry (life insurance business). This study also suffers from methodological limitations associated with convenience sampling and anonymous survey-based research.

The research was carried out at a particular time and in a particular context. Although the results of this research used the first validated service quality model in the life insurance environment that was developed in the Indian context, it remains to be seen whether or not target populations in other countries perceive service quality in the same fashion. Hence, further research is required to establish the practical international relevance.

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REFERENCES

1. Athanassopoulos, A.D. (2000) 'Customer satisfaction cues to support market segmentation and explain switching behavior', *Journal of Business Research*, Vol. 47, No. 3, pp.191–207.
2. Business World (2006), 'Gasping for Capital', 13th February, pp. 34-38.
3. Caruana, A., Ewing, M.T. and Ramaseshan, B. (2000) 'Assessment of the three-column format SERVQUAL: an experimental approach', *Journal of Business Research*, Vol. 49, No. 1, pp.57–65.
4. Kapoor, P. (2011) 'Break free from BAD Insurance', *The Times of India*, 14th March, pp. 18.
5. Mint Money (2011), 'Six Myths: Rethinking Customer Loyalty', 2nd February, pp. 13.
6. Parasuraman, A., Zeithaml, V.A. and Berry, L.L. (1985) 'A conceptual model of service quality and its implications for future research', *Journal of Marketing*, Vol. 49 (Fall), No. 4, pp.41–50.
7. Prakash, A. (2011) 'Role of Technology in Service Encounter', *International conference on 'MTIE-2011'*, scheduled on November 17-19, 2011.
8. Prakash, A., Kallurkar S.P. and Mohanty, R.P. (2008) 'Fostering Service Quality in Life Insurance business: A Study' in All India Seminar organized by The Institution of Engineers (India) *Mapping Excellence towards Global Competitiveness* (MAP EXCEL' 2008) on 16-17th October 2008.
9. Prakash, A., Kallurkar S.P. and Mohanty, R.P. (2009) 'Issues in the Practice of Life Insurer Service Quality: The Road to Maturity' in *International conference on Service Quality Excellence – Challenges & Strategies* on 16-17th February 2009.
10. Prakash, A., Mohanty, R.P. and Kallurkar S.P. (2011) 'Service quality modelling for life insurance business using neural networks', *Int. J. Productivity and Quality Management*, Vol. 7, No. 3, pp. 263 – 286.
11. Prakash, A., Mohanty, R.P., Kumar S., and Kallurkar S.P. (2011) 'Validation of Multiple-Item Scale for measuring Service Quality in Life Insurance Business: Structural Equation Modelling Approach', *Int. J. Productivity and Quality Management*, Vol. 8, No. 4, pp. 433-458
12. Sathya Swaroop, D. (2009) 'Investigating customer preferences for life insurance in India using factor analysis', *Interdisciplinary Journal of Contemporary Research In Business*, Vol. 1, No. 8, pp.185–195.
13. Schmenner, R.W. (1986), "How can service businesses survive and prosper", *Sloan Management Review*, Vol. 27 No. 3, pp. 21-32.
14. Schmenner, R.W. (2004), "Service Businesses and Productivity", *Decision Sciences*, Vol. 35 No.3, pp. 333-347.
15. Siddiqui, M.H., and Sharma, T.G. (2010), "Measuring the Customer Perceived Service Quality for Life Insurance Services: An Empirical Investigation", *International Business Research*, Vol. 3, No. 3, Published by Canadian Center of Science and Education, pp. 171-186.
16. Smith, A.M. (1999) 'Some problems when adopting Churchill's paradigm for the development of service quality measures', *Journal of Business Research*, Vol. 46, No. 2, pp.109–120.

PROFITABILITY PERFORMANCE: A CASE STUDY OF PANYAM CEMENTS AND MINERAL INDUSTRIES (AP), INDIA

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ABSTRACT

Profitability analysis measures how well a firm is performing in terms of its ability to generate profits. Profitability of the firm is highly influenced by internal and external variables, i.e., size of organizations, liquidity management, growth of organizations, component of costs and inflation rate. The paper made an attempt to know the profitability and to assess the impact of selected profitability ratios on ROE of the company, for fulfillment of the objectives the data collected from the annual report from 2001-2010. The collected data is analyzed and computed to fit for drawing inferences. In this investigation correlation and multiple regression analysis was used to find out impact of selected profitability ratios (Gross Profit, Operating Profit, Net Profit, Earning Per Share, Return on Total Assets) on ROE. The result reveals that selected profitability ratios do not have significant impact on ROE.

KEYWORDS

Earning per Share, Gross Profit, Net Profit, Operating Profit, Return on Total Assets, ROE.

INTRODUCTION

Profitability analysis measures how well a firm is performing in terms of its ability to generate profits. It is a financial metric that is used to assess business ability to generate earnings as compared to expenses and other relevant costs incurred during a specific period of time. For most of these profitability ratios, having a higher value relating to a competitor's ratios or the same ratios from a previous period is indicative that the company is doing well. Profitability analysis helps the firm to take various strategic and operational oriented decisions such as net sales generated from the operation, gross profit figures in specific years compare to previous periods and also take the decisions relating to need for modernizations, expansion and diversification of business in the different markets.

Profitability ratios are used to give an idea of likely company turn a profit as well as how that profit relates to other important information about the company, in general the higher a company's profit margin the company is in better terms of sale, net profit and assets utilization so, there is special focus is made on profitability analysis. Profitability analysis is carried out with the help of different profitability ratios.

LITERATURE REVIEW

The determinants of the profitability of Australian manufacturing firms analyzing to estimate the dynamic profitability models over the business cycle, to test both the persistence and cyclicality of firm profitability. Econometric results suggest that lagged profitability is a significant determinant of current profit margins, and that industry concentration is positively related to firm profit margins. Also, profit margins are found to be procyclical in concentrated industries but counter-cyclical in less concentrated industries (McDonald, 1999).

The trade reforms are often expected to decrease profit margins as firms struggle to compete in international markets, there is the possibility that increased competition may improve firm efficiency and provide a positive impetus to firm profitability. The authors developed an efficiency index to directly analyze the impact of changing efficiency levels on firm profit margins (Kambhampati, 2003).

The determinant of profitability of Public Sector Banks in India by an empirical estimation of profit function model which showed that interest cost, interest income, other income, deposits per bank, credit to total assets, proportion of priority sector advances and interest income loss were the significant determinants of profits and profitability of Indian Public Sector Banks. Also, the average establishment cost positively contributed to the profitability but adversely affected the net profit of the Indian Public Sector Banks (Ganesan, 2001).

Assessed the financial performance (profitability) of commercial banks in Saudi Arabia. The authors employed a regression model to test the effect of business risk, concentration and market size on the profitability of the bank measured in terms of return on assets (ROA) and return on equity (ROE), and earnings per share (EPS). The empirical results generated from the three models showed that business risk and the bank size were the main variables which determined banks' profitability (Ahmed, 1999).

(Thomas, 1987) indicated that financial ratios express relationships among items taken from financial statements. The traditional use of financial ratios has been as a measure of the liquidity, performance and profitability of a firm and thereby as a monitor of the efficiency and effectiveness of the management.

The profitability determinants into two main categories, namely the internal determinants and the external determinants. The internal determinants included management controllable factors such as liquidity, investment in securities, investments in subsidiaries, loans, non-performing loans, and overhead expenditure. Other determinants such as savings, current account deposits, fixed deposits, total capital and capital reserves, and money supply also play a major role in influencing the profitability of commercial banks. The external determinants include those factors which are beyond the control of management of these institutions such as interest rates, inflation rates, market growth and market share (Rasiah, 2010).

The superior firm hypothesis stating that firms differ with respect to their level of productivity and that these inter firm differences are the major factor behind profit heterogeneity. The logic behind it is that firms operating at relatively higher productivity levels have competitive advantages over less productive competitors which are reflected in their profitability Demsetz (1973).

On other hand few studied have identified and tested a number of factors affecting the profitability of business enterprises. Notable among them are Baker (1973), Phillips (1976), Rumelt (1982), Paul (1985), Brahmaiah (1991), Schwalback (1991), Kaur (1997), Sahu (2000), Vijayakumar and Kadirvrlu (2003), Raman and Dangwal (2003), Bhayani (2004 and 2006) and Mishra and Mishra (2006).

OBJECTIVES OF THE STUDY

- To know the profitability performance of Panyam Cements and Mineral Industries (AP), India, through profitability ratios.
- To assess the impact of profitability ratios on ROE with the help of multiple regression

HYPOTHESIS OF THE STUDY

- H1: Gross Profit Ratio positively affects profitability
- H2: Net Profit Ratio positively affects profitability
- H3: Operating Profit positively affects profitability
- H4: Return on Total Assets (ROA) positively affects profitability
- H5: Earning Per Share (EPS) positively affects profitability

SCOPE OF THE STUDY

This study investigate the affect of selected profitability ratios on ROE, for this analysis data is gather from the annual financial statement of Panyam Cements and Mineral Industries (AP), India, from 2001-2010.

TOOLS OF ANALYSIS

In this study principal tool is used are selected profitability ratio such as Gross Profit, Operating Profit, Net Profit, Earning Per Share, Return on Total Assets and Return on Equity Ratios. The model is build based on selected profitability ratios (Gross Profit, Operating Profit, Net Profit, Earning Per Share, Return on Total Assets) are used independent variables and Return on Equity is used as dependent variable apart from ratios analysis statistical treatment of data are also performed among them Mean, Standard Deviation, Correalation, Multiple Regression analysis is carried out to draw out inferences for testing the hypothesis of the study.

OPERATIONAL DEFINITIONS

GROSS PROFIT MARGIN

Gross profit margin = sales-cost of sales/sales OR Gross profits/Sales. It measures the relative profitability of a firm's sales after the cost of sales has been deducted. The higher the gross profit margin, the better (that is, the lower the relative cost of the merchandise sold).

OPERATING PROFIT MARGIN

Operating profit margin = Operating Profits/sales. It measures the percentage of each sales amount remaining after all costs and expenses other than interest, taxes, and preferred stock dividends are deducted. It represents the pure profits earned on each sales amount. A high operating profit margin is preferred.

NET PROFIT MARGIN

Net profit margin = Earnings after Taxes (EAT)/Sales. It measures how profitable a company's sales are after all expenses, including taxes on interest and preferred stock dividends, have been deducted. The higher the firm's net profit margin, the better.

EARNINGS PER SHARE (EPS)

Earnings per share = Earnings after Taxes (EAT)/Number of shares of common stock outstanding. Earnings per share represent the number of amounts earned during the period on behalf of each outstanding share of common stock. The firm's earnings per share (EPS) are generally of interest to present or prospective stockholders and the management. EPS is closely watched by the investing public and is considered an important indicator of corporate success.

RETURN ON TOTAL ASSETS (ROA)

Return on Total Assets = Earnings after Taxes (EAT)/Total Assets. The return on total assets (ROA), often called the return on investment (ROI), measures the overall effectiveness of the management in generating profits with its available assets. The higher the firm's return on total assets, the better.

RETURN ON COMMON EQUITY (ROE)

Return on common equity = Earnings after Taxes (EAT)/ Common Stock Equity. The return on common equity (ROE) measures the return earned on the common stockholder's investment in a firm. Generally, the higher this return, the better off the owners.

FINDINGS AND IMPLICATIONS

Table no 1 shows correlation between ROE and Gross Profit it reveals that there is negative correlation between ROE and gross profit and which is insignificant at 5% level of significance hence, we reject hypothesis there is no influence of Gross Profit on ROE.

TABLE NO 1: CORRELATION BETWEEN GROSS PROFIT AND ROE

		ROE	GP
ROE	Pearson Correlation	1	-.199
	Sig. (2-tailed)		.582
	N	10	10
GP	Pearson Correlation	-.199	1
	Sig. (2-tailed)	.582	
	N	10	10

Table no 2 reveals correlation between operating profit and ROE and the Pearson correlation was used to test the H2: operating Profit Ratio positively affects profitability. The results reveal that operating profit is negatively correlated with return on equity (ROE) which is statistically insignificant at 5% level of significance.

TABLE NO 2: CORRELATION BETWEEN OPERATING PROFIT AND ROE

		ROE	OP
ROE	Pearson Correlation	1	-.216
	Sig. (2-tailed)		.550
	N	10	10
OP	Pearson Correlation	-.216	1
	Sig. (2-tailed)	.550	
	N	10	10

Table no 3 refers that correlation between Net Profit and ROE is negative correlation i.e -.215 which is insignificant correlation at 5% level of significance .The Pearson correlation was used to test the H3: Net Profit Ratio positively affects profitability, but in this test Net Profit not affect s positively on ROE

TABLE NO 3: CORRELATION BETWEEN NET PROFIT AND ROE

		ROE	NP
ROE	Pearson Correlation	1	-.215
	Sig. (2-tailed)		.551
	N	10	10
NP	Pearson Correlation	-.215	1
	Sig. (2-tailed)	.551	
	N	10	10

Table no 4 reveals that correlation between ROE and EPS is negative correlation i.e. -.073 which is insignificant correlation between ROE and EPS at 5% level of significance. This is used to test the H4: EPS positively affects profitability .As per Pearson correlation EPS is not positively affects on ROE

TABLE NO 4: CORRELATION BETWEEN EPS AND ROE

		ROE	EPS
ROE	Pearson Correlation	1	-.073
	Sig. (2-tailed)		.840
	N	10	10
EPS	Pearson Correlation	-.073	1
	Sig. (2-tailed)	.840	
	N	10	10

Table no 5 refers that correlation between ROE and ROA is -.084.To test the H5: ROA positively affects profitability. It is negative correlation between ROE and ROA which is insignificant correlation at 5% level of significance. So H5 rejected

TABLE NO 5: CORRELATION BETWEEN ROA AND ROE

		ROE	ROA
ROE	Pearson Correlation	1	-.084
	Sig. (2-tailed)		.817
	N	10	10
ROA	Pearson Correlation	-.084	1
	Sig. (2-tailed)	.817	
	N	10	10

Table no 6 reveals the result of multiple regressions the regression model used in this analysis is hereunder. $ROE = \beta_0 + \beta_1 GP + \beta_2 OP + \beta_3 NP + \beta_4 EPS + \beta_5 ROA$, where $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4$ and β_5 , are the parameters of the ROE line to be estimated. The pooled regression results of the model used to find out the impact of selected profitability ratios on ROE. In the pooled regression ROE is used as dependent variable and selected profitability ratios (Gross Profit, Operating Profit, Net Profit, Earning per Share, Return on Total Assets) are all the independent variables taken together and the impact of these independent variables on the ROE of the company. the multiple correlation and coefficient for all independent variable are Gross Profit (45.149), Operating Profit (-47.622), Net Profit (-3.894), Earning Per Share (39.048) and Return on Total Assets (.593) from these figures it is found that Gross Profit, EPS and Return on Total Assets are positively impact on the ROE of the company and remaining profitability ratios such as Operating Profit and Net Profit are negatively influence on ROE of the company. The multiple correlation co-efficient of ROE on Gross Profit, Operating Profit ,Net Profit ,Earning Per Share and Return on Total Assets is 0.350.it reveals that ROE is not highly influenced by selected profitability ratios in the study. It is also evident from the R^2 value that the independent variables gross profit, operating profit ,net profit ,earning per share and return on total assets contribute -97.5 percent of the variation on the ROE hence, it is inferred that selected profitability ratios are not shows the significant influence on ROE.

TABLE NO 6: MULTIPLE REGRESSION ANALYSIS

Variable	Regression Coefficient	Standard Error of Regression Coefficient	"t" Value	Sig.t
GP	45.149	79.625	.567	.601
OP	-47.622	105.440	-.452	.675
NP	-3.894	42.544	-.092	.931
EPS	39.048	255.114	.153	.886
ROA	.593	2.333	.254	.812
CONSTANT	-410.431	811.407	-.506	.640
multiple R=.350	R ² =.122	adj.R ² = -.975	S.E.of R=827.981	

CONCLUSION

Efficiency of any organization can be judge through its profitability. Profitability of the firm is highly influenced by internal and external variables, i.e., size of organizations, liquidity management, growth of organizations, component of costs and inflation rate. The results found that The multiple correlation co-efficient of ROE on Gross Profit, Operating Profit ,Net Profit ,Earning Per Share and Return on Total Assets is 0.350.it reveals that ROE is not highly influenced by selected profitability ratios in the study. It is also evident from the R² value that the independent variables Gross Profit, Operating Profit ,Net Profit ,Earning Per Share and Return on Total Assets contribute -97.5 percent of the variation on the ROE hence, it is inferred that selected profitability ratios are not shows the significant influence on ROE

REFERENCES

- Ahmed, A. a. (1999). "Performance of the Banking Sector in Saudi Arabia." *Journal of Financial Management and Analysis*, 12 (2), 30-36.
- Altman, E. (n.d.). Financial Ratios Discriminated Analysis and the Prediction of Corporate Bankruptcy." *Journal of Finance*,.
- Altman, E. T. (1974). "Evaluation of a company as a going Concern." *Journal of Accountancy*, (12), 50-57.
- Beaver, w. (1966). "Financial Ratios as Predictors of Failure:Empirical research inAccounting-Selected Studies1966." *Supplement toJournal of Accounting Research*, , 71-111.
- Belkaoui, A. (1978). "Financial Ratios as Predictors of CanadianTakeover." *Journal of Business, Finance andAccounting*, (Spring), 93-107.
- Fieldsend, S. &. (1987). "Industry Effects and the Proportionality Assumption in Ratio Analysis:A Variance Component Analysis." *Journal of Business Finance and Accounting* (14:4), 497-517.
- Frecka, T. C. (1983). Generalised Financial Ratio Adjustment Process and their Implications." *Journal of Accounting Research* (Spring), 308-316.
- Ganesan, P. (2001). "Determinants of Profits and Profitability of Public Sector Banks in India: A Profit Function Approach." *Journal of Financial Management and Analysis*, 14 (1), 27-37.
- Gentry, J. a. (1987). Funds Flow Components, Financial Ratios, and Bankruptcy," *Journal of Business Finance and Accounting*, (14(4)), 595-606.
- Gibson, C. (1982). "How Industry PerceivesFinancial Ratios." *Management Accounting*, (4), 13-19.
- Hopwood, W. &. (1988). "Incremental Information Content of Earnings and Non-earnings Based Financial Ratios." *Contemporary Accounting Research*, 318-342.
- Huyghebaert, N. G. (2000). "New Firm Survival: The Effect of Start-Up Characteristics," *Journal of Business Finance& Accounting* (27(5&6)), 627-651.
- Kambhampati, U. a. (2003). "Disciplining Firms: The Impact of Trade Reforms on Profit Margins in Indian Industry." *Applied Economics*, 35, 461-470.
- L.J., G. (2006). Principles of Managerial Finance. (11), 44-75.
- Lee, C. &. (1988). "Expectation Formation and Financial Ratio Adjustment Processes." *The Accounting Review*, (4), 292-306.
- McDonald, J. (1999). "The Determinants of Firm Profitability in Australian Manufacturing." *the Economic Record*, 75 (229), 115-126.
- Ohlson, J. (1980). "Financial Ratios and the Probabilistic Prediction of Bankruptcy." *Journal of Account Research*, , 18, No.2, 109-131.
- Pinches, G. K. (1973). "A Multivariate Analysis of Industrial Bond Ratings." *Journal of Finance*, , 1-18.
- Rasiah, D. (2010). "Review of Literature and Theories on Determinants of Commercial Bank Profitability." Retrieved 2010, from <http://www.allbusiness.com/economy-economic-indicators/economic-news/15078706-1.html>.
- Rege, U. (1984). "Accounting Ratios to Locate Takeover Targets." *Journal of Business, Finance and Accounting*, (Autumn), 291-311.
- Reilly, F. (1986). Investments: New York. 71-116.
- Thomas, J. a. (1987). "an empirical investigation of association between financial ratios use and small business sucess", *Journal of business finance and accounting*, , 14 (4), 555-571.
- Tippett, M. (1990). An Induced Theory of Financial Ratios." *Accounting and Business Research*, (21(81)), 77-85.
- Whittington, G. (1980). "Some Basic Properties of Accounting Ratios." *Journal of Business Finance and Accounting*, (7:2), 219-232.

THE AUDIT EXPECTATION GAP: AN EMPIRICAL STUDY IN JORDAN

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ABSTRACT

This study aims at measuring The Independent Accountant's Responsibility in the Response to the Expectations of Financial Statements Users. This is performed by showing the effect of independence; it aims at discovering the extent of existence of material differences that have significant statistical relation among certified public accountants, financial statements' users regarding the importance of factors which lead to the Expectations gap, the factors that lead to bridging the gap. Study found the following: The main reason behind the existence of the expectation gap in Jordan was the issue of independence and lack of it. Differences are statistically significant among groups of the study sample regarding factors leading to the existence of the expectations gap, and factors leading bridging that gap. Adopting and applying international auditing standards (240,570) helps achieving a positive responsive to the expectations of the users. There was an increasing tendency by financial statements users and accountants for expanding the responsibility of public accountants towards third parties.

KEYWORDS

Auditing; International auditing standards; Independence in auditing, Audit expectation gap.

INTRODUCTION

Increased in recent years, financial crises and banking at the global and Arabic, which led to increased concern of users of financial statements of investors, shareholders and public opinion and thus the lack of confidence in the ability of accounting and auditing firms to protect their rights in the event of such crises.

Financial community is expected to auditor to include in his technical competence, impartiality, neutrality and independence, as expected from the discovery of fundamental errors affecting the accounts, and to prevent the issuance of misleading financial statements (Jarbou Y, 2004, p369).

The contrast between the duties and responsibilities expected by the public (users of financial statements) of the auditor, and what can the performance reasonably led to the existence of what is expressed by the term expectations gap (the gap between what the community expects of auditors and what is understood by the community of their performance) (Ghali, G,2001,p9). Which has been recognized by the profession in most countries of the developed world, one of the most important issues facing the auditing profession at the moment, and significantly affect the users' confidence in the performance of the financial statements and reports of Chartered Accountants.

The authors explain the existence of this gap to widen and volatility of the main reasons are (Porter, Brenda.,1993, p48):

1. That the public's expectations of auditors is a reasonable amount of the checker, which makes the performance even if it was reasonable and within the limits of his duties determined in accordance with auditing standards generally accepted, for a minor access to the ambitions and aspirations of the public. In this case, the auditor cannot load the responsibility for this gap, but it requires a reduction of the ceiling of the public expectations.
2. That the public's expectations of auditors are reasonable and in the limits of what is required of the auditor in accordance with standards generally accepted, but the actual performance of the auditor low what is required of it, for various reasons such as lack of familiarity with duties imposed on it under those standards or because of an imbalance in the efficiency of the professional or both.

Have varied views on the factors affecting the increase or decrease the gap but the majority agrees that the great responsibility borne by the auditing profession with all its components (organizations, standards, auditors, etc.). So drew widespread criticism for audit firms from many interested concentrated mainly in the inability to respond effectively to the needs and expectations of users of financial statements of the information expected to be obtained as a result of checking the lists, which is reflected in the practice of the profession and in different forms, including:

- Increase the number of lawsuits filed against the auditor and paying all of the burdens to the Audit Institutions (Al-Shuraim. O & Barakat. L, 2005, p26).
- Download the auditor greater responsibilities on many of the most important issues need to provide early warning of the entity's ability to continue the activity, and detect fraud and illegal acts and reporting, and provide an absolute guarantee for the validity and accuracy of financial statements that are reportable (Arens, 2003, p354).

Based on the above and from the importance of the topic in the field of audit this study is targeted to stand on the auditor's responsibility in responding to the expectations of users of financial statements from the perspective of auditors and users of financial statements and producers have been selected these categories to the importance of their views in achieving the objectives of the study.

PROBLEM OF STUDY

1. What are the reasons and factors that led to the existence of the audit expectations gap, and what factors help narrow?
2. Will the independence and impartiality of the auditor to achieve a reasonable expectation of users of financial statements?
3. Does the discovery of the fraud and the auditor reported to achieve a reasonable expectation of users of financial statements?
4. Does the auditor's assessment of the extent of the entity's ability to continue to replace the audit and report to achieve a reasonable expectation of users of financial statements?
5. Does the clarity of the legal responsibility of the auditor to achieve a reasonable expectation of users of financial statements?

IMPORTANCE OF STUDY

Resulted in the expectations gap growing criticism of the auditing profession from different segments of society, as well as the increasing lawsuits filed against the auditor for the failure of the audit, which resulted in the undermining of confidence in the profession, which is the most important thing to

maintain it. Therefore, it is necessary to direct efforts to study ways to narrow the expectations gap, so that the audit profession to continue to function in society, and have to respect them. More precisely, the importance of the study is reflected in the following matters:

1. The study represents an attempt to identify the auditor's responsibility in responding to the expectations of users of financial statements and the solutions proposed to contribute to and help reduce the exposure of the auditor of the legal accountability to the users of financial statements, and to find ways of bridging and narrowing the expectations gap in the audit between the auditors and users of financial statements.
2. This study is important because it is looking at a subject of great importance in the field of auditing, namely, the expectations gap in the audit as an important determinant of the role of the audit function and its relationship to society, especially after the emergence of the issue of research in many research and studies in developed countries such as Britain, Australia and the United States of America and Spain and a number of Arab countries.
3. This study contributes to efforts seeking to enhance the confidence of the community audit and the emphasis on the importance and essential role in providing credibility and fairness of information and to meet the needs of users of financial statements in the various decision-making with the greatest reliability.

OBJECTIVES OF STUDY

1. Identify the causes and the factors that led to the existence of the expectations gap in the audit, and make recommendations contribute to bridging this gap narrowed.
2. Identify the impact of the independence and impartiality of the auditor in achieving a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.
3. The extent of the impact of the discovery of the fraud and the auditor reported to the achievement of a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.
4. To determine the effect of the auditor's report for the continuity established in the achievement of a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.
5. Highlight the impact and clarity of the legal responsibility of the auditor in achieving a reasonable expectation of users of financial statements from the perspective of auditors, preparers and users of financial statements.

HYPOTHESES OF STUDY

1. No significant differences were statistically significant between the views of auditors and users and preparers of financial statements regarding the importance of the factors that lead to a gap of expectations.
2. No significant differences were statistically significant between the views of auditors and users and preparers of financial statements regarding the importance of the factors that lead to narrowing the expectations gap.
3. Does not lead auditor independence and impartiality to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.
4. Checker does not detect the fraud and report it to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.
5. Does not result in the auditor's report on the extent of the entity's ability to continue in the activity to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.
6. Does not clear the legal responsibility of the auditor to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.

LITERATURE REVIEW

Ashit Saha., (2008) "Audit Expectations Gap in India: An Empirical Survey" The study aimed to referendum survey of brokers and financial analysts, bankers and auditors and to differentiate levels of difference between their views on the expectations gap between the respondent groups.

The study found that users of financial statements of financial analysts, bankers and financial intermediaries expect a greater role for the performance of the auditor, the study showed that there is a tendency of these categories to download the auditor responsibilities and duties of a wider than those seen by accountants legal study also showed that there is a tendency to sue the auditors in the case of non-disclosure in their reports of the ability of established continuity.

Lee, et al., (2007) "audit expectation gap: an empirical study in Malaysia" The study aimed to detect the presence of expectation gap in Malaysia and analyze the nature of this gap, using the framework of the study (Porter, 1993) through examination of the views of auditors and users of the report of the auditor.

The study found a gap expected in auditing in Malaysia, where the beneficiaries of the auditor's report expected the auditor's duties and responsibilities of higher than by the study pointed out that there are unreasonable expectations for the part of users of financial statements and the researchers attribute to the failure and the inability of the criteria to meet their needs and aspirations There is also less of the performance by the auditors in Malaysia.

Jun & Feng, (2004) "An Empirical Study of Audit Expectation Gap' in The People's Republic of China" The study aimed to survey the work and a referendum in the Republic of China (PRC) for the widening expectation gap in auditing and auditing issues related to the work in the environment under the Chinese.

The study to provide evidence for the existence of a gap expectation and there is a widening of the gap in China there is also an expansion in increasing the responsibility of the auditor showed that the auditor is responsible for achieving the objectives of the audit process as he is responsible for the discovery of fraud and preserve the independence and it is also responsible for third party and recommended the need to modernize and develop the auditing profession.

Peter et al., (2001) "Evidence of the audit expectation gap in Singapore" The study aimed to measure the level and nature of the expectations gap in the nineties as compared to the results of the study results Chelucc The study was conducted to measure the expectation gap in Singapore. The study found that there is a gap expected range in Singapore and expanded to increase the auditor's responsibility for fraud prevention and fraud for the maintenance of accounting records, and supports the adoption of the auditor's report prolonged strongly in Singapore, and proved that the auditors are worthy of narrowing the gap of expectation to serve the decisions of users of financial statements.

Monroe et al., (1994) "An Empirical Investigation of the Audit Expectation Gap: Australian Evidence". This study aimed primarily to test the existence and nature of expectation gap in Australia, and whether the changes made in the form of audit report affect the gap.

Concluded that, regarding the factor of responsibility, the changes in the form of audit report had the effect of changing the auditor's responsibility for the views to download less than it was in the old format of the report.

With respect to the reliability factor of the new wording of the report does not fully reflect the idea of the Auditor of the reliability of the financial statements, and that the differences remained constant as long as no changes were made to the formulation of a paragraph in the opinion of the new reports, compared with old reports.

The factor of predictions, the gap still exists, although modifications in the wording had improved in part this gap.

Overall, the recent changes in the formulation of the audit report has narrowed the gap in some locations, but had the opposite effect in other locations.

Humphrey et al., (1993) "The Audit Expectations Gap in Britain: An Empirical Investigation" The study aimed to present the results of the questionnaire mailing to verify the opinions of the individuals on the issues of expectations of the audit in Britain, include: the role of the auditor and should be, and taboos and arrangements that must be placed on auditing firms, and the resolutions and provisions of the Chartered Accountants are expected to take in certain cases. The study found many results, including:

- There are large differences between the views of Chartered Accountants and other groups are statistically significant and actually enhance it clear that the audit expectations gap exists, it exists in diverse aspects of nature and audit functions and understand the performance of Chartered Accountants.
- There is little evidence to suggest that the gap is the outcome of the general decline towards the professions, and it appears that groups of users to have unrealistic views of the scope of audit work.
- The survey results reinforce that the most dangerous components of the expectations gap on the outskirts of the nineties include:
 - The role of auditors for detection of fraud.
 - The scope of responsibilities of auditors to the third party.
 - Assess the nature of the balance sheet.
 - The severity and continuity of the threats to the independence of the auditor.
 - Aspects of the management audit work (for example; the auditor's responsibility to overcome the risk and uncertainty).

Porter, (1993) "An Empirical Study of the Audit Expectation-Performance Gap" Aimed to provide a new idea of the structure and the gap of expectation and components in the audit, as well as access to a comprehensive understanding and correct to the goal of narrowing the gap by trying to bring the community's expectations of Chartered Accountants and the performance of their auditors, thereby reducing the criticism faced by the profession today.

Researcher provided a definition of the expectation gap and divided into two main components: a gap of reasonableness and the performance gap and the latter is divided into two parts: a lack of standards and a lack of performance. At the side of the field results showed that all of the tasks listed in the questionnaire, thirty-five of them except contributing to the audit expectations gap is broken down as follows:

- Seven tasks related to deficiencies in performance and contribute to the expectation gap by 16%.
- Eight tasks related to deficiencies in standards and contribute to the expectation gap by 50%.
- Ten functions reflect the reasonable expectations and contribute to the expectation gap by 34%.

THE CONTRIBUTION OF THIS STUDY

Can be limited to the most important characteristic of this study for previous studies in the following:

1. Given the previous studies, we find that most have focused on the study of the extent of the expectations gap in the scrutiny of the environment in which the government, while this study is under discussion, analysis and testing of the auditor's responsibility and its impact in responding to the expectations of users of financial statements through the study of causes and factors that led to the existence of the expectations gap and the relative importance of these factors, and proposals to limit the scope of this gap as found in the environment of Jordan.
2. This paper discusses the auditor's responsibility and its impact in responding to the expectations of users of financial statements, as different aspects of the test views of the various parties associated with the auditing profession (auditors, investors, preparers of financial statements in public shareholding companies listed on the Amman Stock Exchange).
3. This study attempts to identify the places of the widening gap and the most important factors in narrowing the gap between the auditor and the parties benefiting from the financial reports and that from the perspective of the various parties associated with the auditing profession, gathered around the following issues (factors in the presence of the gap, and narrowed, the legal responsibility, independence, fraud, continuity).
4. The study comes as a step in moving toward completion of those studies are started and try to address issues that did not address her also taken into account the developments and developments in the international auditing standards, and the audit profession, and privacy of the Jordanian environment.

RESEARCH METHODOLOGY AND ANALYSIS OF RESULTS

METHODOLOGY OF THE STUDY

To achieve objectives of this study, the researcher did a theoretical study through books, periodicals, electronic bulletins and sites, legal enactments and the relevant international auditing Standards As to applied part, it was covered a questionnaire distributed to three groups: public accountants, investors, and those accountants responsible for preparing the financial statements. A total of 360 questionnaires forms were distributed at an average of 120 for each group; 281 questionnaires were received, i.e. 78% and 270 questionnaires analyzed, i.e. 75%.

POPULATION AND SAMPLE OF THE STUDY

The study population consists of the auditor's (487), preparers of financial statements in public shareholding companies of Jordan's (264) company, and investors in the Amman Financial Market, where he was to distribute the questionnaires as follows:

1 - Auditors: The distribution of model resolution on a sample of Chartered Accountants practicing and working in the offices of the audit and that audit the accounts of public shareholding companies listed on the Amman Financial Market was the study sample was chartered accountants licensed and who meet the following conditions:

- A. Be a chartered accountant in the audit process in March one of audit firms.
- B. That the Audit Office where he worked from within the office checked the accounts of public companies.
- C. Audit Office to be among the offices which audit the accounts of public companies the study sample.

Based on the foundations of the former have been identified the study sample in the (120) Chartered Accountant working in (40) Audit Bureau, analyzed 98% identification rate of 82% of questionnaires distributed and this is a sample survey because it was taking all the chartered accountants who meet the conditions above.

2 - investors: the field was down to the Amman Stock Exchange-resolution models for the distribution to investors who are in the trading floor on the stock exchange (whether individuals or businesses) during field visits. Questionnaires were distributed and received by hand have been identified in the study sample (120) investor in the Amman Stock Exchange in order to match the sample auditors analyzed 89 to identify 74% of questionnaires distributed.

3- Preparers of financial statements: the random sample was selected from the authors of the financial statements in the Jordanian public shareholding companies that are trading shares on the Amman Stock Exchange, the distribution of questionnaires and received by hand have been identified the study sample in the (120) AI target through which financial managers and heads of accounts in the companies as involved in the preparation of financial statements, in order to match the samples auditors and investors, analyzed 83 to identify and represent a gain of 69% of questionnaires distributed.

STATISTICAL METHODS USED IN THE STUDY

The researcher generally uses the descriptive statistical methods to obtain the features of the study sample structure and to distribute it; and to analyze the responses of the study sample. These descriptive statistical methods include the utilization of: Percentages, means, standard deviations, T-test for hypothesis test, The One Way ANOVA analysis and testing Schaffe.

RELIABILITY OF THE STUDY

To verify the reliability of the survey (questionnaire), reliability coefficient was made for the field study through using (Cronbach's Alpha). The value of stability coefficient was (0.911), which indicates that the instrument of study has a high reliability which justifies its use because it is in statistical standard a good percentage as it is higher than the accepted 60%. All this has been analyzed through the statistical package (SPSS).

ANALYSIS OF RESULTS AND HYPOTHESES TEST

TABLE (1.1): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF THE VIEWS OF RESPONDENTS ON THE FACTORS THAT LEAD TO THE EXISTENCE OF THE AUDIT EXPECTATIONS GAP

S.No	Statement	Auditors		Investors		Preparers of financial statements	
		Mean	St. Deviation	Mean	St. Deviation	Mean	St. Deviation
1	Execute the clarity of the role and responsibilities of the auditor to the financial community.	4.36	0.664	3.87	0.944	4.17	0.762
2	The auditor does not possess full independence.	4.56	0.593	3.88	0.939	4.48	0.705
3	Twice the capacity of scientific and practical completion of the auditor when auditing tasks.	4.03	0.843	3.91	0.973	4.42	0.767
4	Low quality of performance in audit.	4.11	0.716	3.94	0.969	4.32	0.646
5	Lack of professionalism of the auditor.	4.08	0.904	3.86	1.024	4.28	0.724
6	Inadequate system of self-censorship in the auditing profession.	4.95	0.772	3.98	0.989	4.18	0.798
7	The auditor not detecting fraud.	3.81	0.877	4.15	0.948	4.26	0.797
8	The existence of contracts and informal links.	3.44	0.886	3.74	0.9111	3.84	0.930
9	Lack of accounting reports to keep pace with changes in society	3.68	0.903	3.57	1.054	3.97	0.811
10	Lack of awareness of the financial community and the nature of the audit function and limitations	4.22	0.879	3.65	1.129	3.81	0.952
11	Shortcomings in the standards and laws governing the audit profession and the specific responsibilities and duties of the auditor.	4.14	0.963	3.88	1.038	4.10	0.738
12	Auditor's Report to the lack of precision and clarity in terminology.	3.32	1.021	3.80	1.021	4.03	0.968
13	Not determine the scope of liability of the auditor carefully, especially about the third party.	3.56	1.131	3.80	1.096	3.94	0.811
General Mean		4.02	0.858	3.85	1.00	4.14	0.80

TABLE (1.2): RESULT OF ANOVA TEST OF THE FIRST HYPOTHESIS

S. No Hypothesis	Mean	St. Deviation	The Calculated Value of (F)	Indexed Value of (F)	SIG	Result
Hypothesis 1	3.979	0.5224	7.997	3.00	0.000	Rejection

Test was used ANOVA to test the first hypothesis, and given to the table No. (1.2) it is clear that the value of F calculated was 7.997, the highest of Tabulated value, and since the decision rule is: accept the premise of nihilism if the calculated value is less than the tabular and rejected if the calculated value is greater than value is indexed, it was rejected the hypothesis of nihilism (H_0) and accept the alternative hypothesis (H_a) this means that: "There are significant differences statistically significant between the views of auditors and users of financial statements and producers regarding the importance of the factors that lead to the existence of the expectations gap between auditors and users of financial statements".

To strengthen the previous result and to find out the differences between the three groups (auditors, investors and preparers of financial statements) has been used Researcher Test (Scheffe) for a posteriori comparisons, the following table shows the results of this test.

TABLE (1.3): TEST RESULT "SCHEFFE" TO LOCATE THE DIFFERENCES IN THE FIRST HYPOTHESIS

Hypothesis 1	Auditors	Investors	Preparers of financial statements	Mean
Auditors			*	3.945
Investors			*	3.853
Preparers of financial statements				4.156

(*) When significant statistical level of significance (0.05)

The results indicate that there are significant differences statistically significant and has received a class preparers of financial statements at the highest arithmetic mean (4.156) and by the support and approval of (83.12%), the highest level of support among the clauses that the hypothesis implies that the category of the authors of the financial statements most agree on the factors contained in the table (1.1), which indicates that the differences in favor of the category of the authors of the financial statements. This means that there are significant differences statistically significant between the views of auditors and users and preparers of financial statements regarding the importance of the factors that lead to the existence of the expectations gap between auditors and users of financial statements.

TABLE (1.4): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF THE VIEWS OF RESPONDENTS ON THE FACTORS THAT LEAD TO NARROWING THE EXPECTATIONS GAP IN AUDITING

S.No	Statement	Auditors		Investors		Preparers of financial statements	
		Mean	St. Deviation	Mean	St. Deviation	Mean	St. Deviation
1	Strengthening the independence of the auditor.	4.57	0.658	4.19	0.810	4.61	0.580
2	Strengthen the role of professional organizations and its dominance on the profession of accounting and auditing.	4.40	0.665	3.89	0.977	4.01	0.818
3	Outlook Study for users of financial statements are reasonable and meet those expectations.	4.04	0.895	3.92	0.991	3.80	0.787
4	Expand the responsibilities of the auditor regarding the discovery of fraud.	3.77	1.040	4.09	0.949	4.20	0.808
5	Increase the effectiveness of communication and information about the role of the auditor.	4.26	0.805	4.04	0.975	3.82	0.938
6	External evaluation of the financial statements and the views of auditors by a third party neutral.	3.41	1.064	4.08	0.984	3.86	1.145
7	The auditor to improve communications with users of financial statements.	3.89	0.979	3.97	0.999	3.98	0.756
8	Activation of social responsibility and ethical scrutiny	4.19	0.807	3.95	1.010	4.16	0.867
9	The organizations and professional bodies and the development of legal standards and laws to keep pace with the changes surrounding the auditing profession.	4.39	0.699	4.07	1.036	4.30	0.693
General Mean		4.102	0.846	4.022	0.970	4.082	0.821

TABLE (1.5): RESULT OF ANOVA TEST OF THE SECOND HYPOTHESIS

S. No Hypothesis	Mean	St. Deviation	The Calculated Value of (F)	Indexed Value of (F)	SIG	Result
Hypothesis 2	4.074	0.5562	0.512	3.00	0.600	Acceptance

View table No. (1.5) it is clear that the value of F calculated was 0.512 which is less than Tabulated value, and since the decision rule is: accept the premise of nihilism if the calculated value is less than the tabular and rejected if the value is calculated larger than the value indexed, and therefore we accept hypothesis nihilism (Ho) and reject the alternative hypothesis (Ha) This means that: "There are no significant differences statistically significant between the views of auditors and users of financial statements and producers regarding the importance of the factors that lead to narrowing the expectations gap between auditors and users of financial statements."

TABLE (1.6): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF THE VIEWS OF RESPONDENTS ABOUT THE IMPACT OF INDEPENDENCE AND NEUTRALITY ON THE EXPECTATIONS OF USERS OF FINANCIAL STATEMENTS

S.No	Statement	Auditors		Investors		Preparers of financial statements	
		Mean	St. Deviation	Mean	St. Deviation	Mean	St. Deviation
1	Enjoy the full independence of the auditor in the preparation of the audit program.	4.51	0.692	4.37	0.728	4.59	0.585
2	Non-interference in the management identify areas and items and documents that are subject to examination, or attempt to accept the auditor for some vocabulary and documents without the scrutiny and examination.	4.36	0.679	3.96	1.060	4.45	0.785
3	The auditor's assessment of relations between him and the circumstances (including the branches and members of the audit team) and between the client and the facility that may result from the threat of independence.	4.12	0.721	4.13	0.919	3.98	0.788
4	Veering away from the auditor any relationships and circumstances that may result from the threat of independence are essential.	3.96	0.913	4.01	0.923	4.34	0.771
5	The appointment of the auditor of the auditors by the Association of Jordanian and non-interference in the appointment of the auditor management and sequestration.	3.75	1.227	3.99	1.005	3.83	1.257
6	The failure of the auditor to provide consulting services other than audit to the facility.	3.38	1.061	3.82	1.239	3.55	1.050
7	Determine the minimum and higher fees to the auditor of the auditors by the Association for Jordanians.	3.59	1.023	4.03	1.070	3.63	1.215
8	Reduce competition among audit firms.	3.68	0.926	3.85	1.143	3.27	1.118
9	Enjoy the full independence of the auditor in preparing audit report.	4.14	0.941	4.29	0.882	4.56	0.684
10	Auditor's commitment to the rules of professional conduct and professional standards and laws.	4.41	0.731	4.24	0.920	4.57	0.607
11	Lack of financial interest of the auditor with the client or in its activities.	4.48	0.789	4.30	0.871	4.60	0.714
General Mean		4.035	0.882	4.090	0.978	4.125	0.870

TABLE (1.7): RESULT OF T- TEST OF THE THIRD HYPOTHESIS

S. No Hypothesis	Mean	St. Deviation	The Calculated Value of (T)	Indexed Value of (T)	SIG	Result
Hypothesis 3	4.085	0.4524	39.414	1.96	0.600	Rejection

View table No. (1.7) it is clear that the value of T calculated amounted to 39.414 which is greater than the value of indexed, and since the decision rule is: accept the premise of nihilism if the calculated value is less than the tabular and rejected if the value is calculated larger than the value indexed, and therefore we reject nihilistic hypothesis (Ho) and accept the alternative hypothesis (Ha) This means that: lead auditor's independence and impartiality to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.

TABLE (1.8): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF THE VIEWS OF RESPONDENTS ABOUT THE IMPACT OF THE DISCOVERY OF THE AUDITOR TO DEFRAUD THE EXPECTATIONS OF USERS OF FINANCIAL STATEMENTS

S.No	Statement	Auditors		Investors		Preparers of financial statements	
		Mean	St. Deviation	Mean	St. Deviation	Mean	St. Deviation
1	Exercise professional skepticism when planning the audit process and implementation.	3.90	0.974	3.98	0.971	3.74	1.155
2	Organize meetings between the team members to discuss the process and understand the possibility of material misstatements of the financial statements resulting from fraud or error.	4.45	0.594	3.87	0.927	4.14	0.646
3	Assign auditors with sufficient experience and knowledge of the audited accounts of high risk.	4.36	0.646	4.05	0.928	4.20	1.079
4	Auditing accounting estimates that may result in material misstatements.	4.32	0.667	4.10	0.917	4.27	0.649
5	Assess the potential risks for the existence of fraud or error leads to substantial distortions.	4.32	0.670	4.14	0.911	4.32	0.682
6	Surprise visit to sites belonging to the unit subject to the scrutiny of the inventory of some assets, such as midwife to the embezzlement of cash and stock.	4.27	0.714	4.06	1.095	4.36	0.805
7	Communication and discussion with the auditors who audit the accounts of subsidiaries or related company to identify risks of material misstatements due to mutual transactions among themselves.	3.97	0.812	4.11	1.122	4.32	0.700
8	Meeting the management of Internal Audit and the Audit Commission in the case of their existence.	4.18	0.803	4.16	1.130	4.39	0.642
9	To inspect the records and meetings of the board of directors and audit.	4.29	0.677	4.19	1.009	4.31	0.582
10	Can check the detailed (comprehensive) accounts for the high-risk.	4.24	0.733	4.20	0.967	4.49	0.650
11	Inquire about the company's lawyer filed lawsuits against the company and the estimates on them.	4.34	0.659	4.00	1.087	4.28	0.725
12	Query management for any fraud or significant error was discovered.	4.35	0.735	4.24	0.815	4.44	0.546
13	Extensive testing of internal control in terms of design and application.	4.37	0.617	4.12	0.823	4.36	0.635
14	Obtain the approvals of the parties that deal with the company such as suppliers, customers and banks.	4.32	0.729	4.04	0.910	4.35	0.818
15	Obtained from the client representation letter acknowledging responsibility for the fair presentation of financial statements.	4.46	0.692	4.22	0.808	4.04	0.663
General Mean		4.276	0.715	4.099	0.961	4.267	0.732

TABLE (1.9): RESULT OF T- TEST OF THE FOURTH HYPOTHESIS

S. No Hypothesis	Mean	St. Deviation	The Calculated Value of (T)	Indexed Value of (T)	SIG	Result
Hypothesis 4	4.227	0.4546	44.363	1.96	0.000	Rejection

View table No. (1.9) it is clear that the value of T calculated amounted to 44.363 which is greater than the value of indexed, and since the decision rule is: accept the premise of nihilism if the calculated value is less than the tabular and rejected if the value is calculated larger than the value indexed, and therefore we reject nihilistic hypothesis (Ho) and accept the alternative hypothesis (Ha) This means that: lead auditor for the discovery of fraud and report it to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.

To strengthen the previous result and to find out the differences between the three groups (auditors, investors and preparers of financial statements) has been used Researcher Test (Shave) for a posteriori comparisons, the following table shows the results of this test.

TABLE (1.10): TEST RESULT "SCHEFFE" TO LOCATE THE DIFFERENCES IN THE FOURTH HYPOTHESIS

Hypothesis 1	Auditors	Investors	Preparers of financial statements	Mean
Auditors		*		4.280
Investors	*		*	4.102
Preparers of financial statements		*		4.296

(*) When significant statistical level of significance (0.05)

The results indicate that there are significant differences were statistically significant in favor of the authors of the financial statements as the arithmetic mean of the authors of the existing financial category is the highest 4.296 Therefore, the differences tend to favor this category, which is more than three categories on the approval of the paragraphs of the hypothesis. In the sense that the discovery of the auditor of fraud and disclosure of his lead to achieving a reasonable expectation of users of financial statements from the perspective of this group, no different situation for the auditor there is consent, but there are some reservations as it is believed the auditors that the responsibility for detecting fraud rests with management, and their mission to provide reasonable assurance, not absolute assurance on the financial statements are free of fraud, according to the requirements of international standards. The researcher attributed the differences to the existence of a gap to the expectations in an environment audit.ent audit.

TABLE (1.11): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF THE VIEWS OF RESPONDENTS ON THE IMPACT ASSESSMENT OF THE AUDITOR OF THE ENTITY'S ABILITY TO CONTINUE THE ACTIVITY ON THE EXPECTATIONS OF USERS OF FINANCIAL STATEMENTS

S.No	Statement	Auditors		Investors		Preparers of financial statements	
		Mean	St. Deviation	Mean	St. Deviation	Mean	St. Deviation
1	Taking into account the auditor if there are events or circumstances that may give rise to substantial doubt on the entity's ability to continue.	4.29	0.954	4.75	0.497	4.42	0.586
2	Evaluation of management's estimates of the entity's ability to continue.	4.13	1.099	4.67	0.417	4.20	0.676
3	Analysis and discussion of cash flow, profitability and future prospects with management at the earliest before the release of the report.	4.59	0.655	3.41	0.580	4.39	0.748
4	Analysis of the latest financial data available periodically and discussed.	4.46	1.076	3.77	0.419	4.31	0.779
5	Checking the task of subsequent events after the balance sheet date in search of things that affect the continuity of the company.	4.59	0.743	4.26	0.471	4.32	0.717
6	To obtain representations from management in the written representation regarding the future plans that can be done to improve the situation.	4.64	0.501	4.78	0.412	4.12	0.832
7	Discuss the weaknesses of the financial position with management.	4.54	0.521	3.17	0.762	4.32	0.682
8	Disclosure in the report for any doubts about the continuity established in the activity.	4.46	0.762	5.00	0.000	4.38	0.695
General Mean		4.463	0.789	4.226	0.445	4.308	0.714

TABLE (1.12): RESULT OF T- TEST OF THE FIFTH HYPOTHESIS

S. No Hypothesis	Mean	St. Deviation	The Calculated Value of (T)	Indexed Value of (T)	SIG	Result
Hypothesis 5	4.325	0.5054	43.104	1.96	0.000	Rejection

View table No. (1.12) it is clear that the value of T calculated amounted to 43.104 which is greater than the value of indexed, and since the decision rule is: accept the premise of nihilism if the calculated value is less than the tabular and rejected if the value is calculated larger than the value indexed, and therefore we reject nihilistic hypothesis (Ho) and accept the alternative hypothesis (Ha) This means that: lead the auditor's report on the extent of continuity of established to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.

To strengthen the previous result and to find out the differences between the three groups (auditors, investors, and preparers of financial statements) has been used Researcher Test (Scheffe) for a posteriori comparisons, the following table shows the results of this test.

TABLE (1.13): TEST RESULT "SCHEFFE" TO LOCATE THE DIFFERENCES IN THE FIFTH HYPOTHESIS

Hypothesis 1	Auditors	Investors	Preparers of financial statements	Mean
Auditors		*		4.443
Investors	*			4.209
Preparers of financial statements				4.311

(*) When significant statistical level of significance (0.05)

Noted that the higher the center of my account is in the category of auditors, and therefore the differences tend to favor this category. This indicates that the auditors considered the most agree that the auditor's assessment of the extent of the entity's ability to continue and report on the investigation leads to the reasonable expectations of the users of financial statements. This indicates that there is a willingness by the auditors to assume the responsibilities set forth in the current audit standards, particularly ISA No. 570. The auditors believe that the implementation of actions contained in the table (1.11) achieves a better response to the expectations of users of financial statements and their point of view that these procedures can be done.

TABLE (1.14): ARITHMETIC MEANS AND STANDARD DEVIATIONS OF THE VIEWS OF RESPONDENTS ON THE IMPACT AND CLARITY OF LIABILITY ON THE EXPECTATIONS OF USERS OF FINANCIAL STATEMENTS

S.No	Statement	Auditors		Investors		Preparers of financial statements	
		Mean	St. Deviation	Mean	St. Deviation	Mean	St. Deviation
1	The auditor is responsible by law for the client - who suffered the damage - in the case of ordinary negligence in the performance of the audit process.	4.51	0.646	4.68	0.466	3.80	1.190
2	The auditor is responsible by law to users of financial statements (third party) who can predict adopting the financial statements, and those who have suffered damage as a result of ordinary negligence.	4.13	0.768	4.78	0.412	3.98	0.981
3	The auditor is responsible by law to a third party who suffered damage resulting from ordinary negligence in the audit of financial statements, if this third party is any person who is targeted mainly the work of the auditor, and known to him before starting the process.	4.31	0.794	4.64	0.548	3.87	0.817
4	The auditor is responsible by law to a third party who suffered damage resulting from ordinary negligence in the audit of financial statements, if this third party is any person who is targeted mainly the work of the auditor, but the auditor is expected to advance with a reasonable degree that the third party will depend on the financial statements.	3.29	0.852	4.83	0.548	3.68	1.069
5	The auditor is responsible to the law of each party were damaged due to gross negligence by the auditor in auditing the financial statements.	2.31	0.868	4.89	0.303	3.77	1.051
6	Any third party use the auditor's report to sue the auditor for negligence.	4.11	0.716	5.00	0.00	3.87	0.929
7	The plaintiff (the client or third party) the right to compensation equal to the amount of actual losses suffered as a result of the failure of the audit, the auditor of the court ruled him guilty of neglect.	4.07	0.899	4.95	0.208	3.83	0.852
8	Legal rules governing the civil liability of the accountant in Jordan and the legal clear.	4.10	0.935	4.69	0.628	3.79	0.933
General Mean		3.770	0.817	4.652	0.459	3.824	0.977

TABLE (1.15): RESULT OF T- TEST OF THE SIXTH HYPOTHESIS

S. No Hypothesis	Mean	St. Deviation	The Calculated Value of (T)	Indexed Value of (T)	SIG	Result
Hypothesis 5	4.081	0.7230	24.588	1.96	0.000	Rejection

View table No. (1.15) it is clear that the value of T calculated amounted to 24.588 which is greater than the value of indexed, and since the decision rule is: accept the premise of nihilism if the calculated value is less than the tabular and rejected if the value is calculated larger than the value indexed, and therefore we reject nihilistic hypothesis (Ho) and accept the alternative hypothesis (Ha) This means that: lead the clarity of the legal responsibility of the auditor to achieve a reasonable expectation of users of financial statements from the perspective of auditors and users of financial statements and producers.

To strengthen the previous result and to find out the differences between the three groups (auditors, investors and preparers of financial statements) has been used Researcher Test (Scheffe) for a posteriori comparisons, the following table shows the results of this test.

TABLE (1.16): TEST RESULT "SCHEFFE" TO LOCATE THE DIFFERENCES IN THE FIFTH HYPOTHESIS

Hypothesis 1	Auditors	Investors	Preparers of financial statements	Mean
Auditors		*	*	4.443
Investors	*		*	4.209
Preparers of financial statements	*	*		4.311

(*) When significant statistical level of significance (0.05)

Notes from the table (1.16) that the highest center of my account is in the category of investors, and therefore the differences tend to favor this category. The sense that investors are preparing most agree that the clarity of the legal responsibility of legal accountant achieve reasonable response to users of financial statements as the most important category, using the financial statements. This indicates that investors expect that the paragraphs in the table (1.14) and clear and that the auditor and the binding of these things lead to a reasonable expectation from the point of view. The researcher attributes the existence of these differences to the existence of the expectations gap in the audit.

RESULTS AND RECOMMENDATIONS

RESULTS

- The results showed that there are significant differences between the views of auditors, investors and preparers of financial statements regarding the importance of the factors that lead to the existence of the expectations gap.
- No significant differences were statistically significant between the three categories of opinions regarding the importance of the factors that lead to narrowing the expectations gap, where the results showed that the most important factors that lead to narrowing the expectations gap strengthen the independence of the auditor, where this factor had a consensus on the categories the percentage of 89.2% approval, The study followed users of financial statements of expectations reasonable and to meet those expectations, where he earned the approval rate 85.2% The third activation of social responsibility and ethics of the legal accountant, and agreed categories by 81% with respect to increasing the effectiveness of communication and information about the role of the auditor.
- The study proved the field of an agreement and the approval rate 81.6% between the groups, with respect to actions that can be performed by the auditor to maintain independence and neutrality and that the response to the expectations of users of financial statements was reasonably achievable through the commitment and application of the conceptual framework on independence issued by IFAC, which requires audit institution to implement a set of procedures before taking a decision to accept or continue the audit process.
- The response to the expectations of users of financial statements in the discovery of fraud and reporting, can be achieved reasonably well through the implementation of procedures audit contained in the international standard ISA 240 and File auditing standards the U.S. SAS no.99, and according as evidenced by the field study a degree of not less than (agree), this procedures can be summarized in the undertaking:
 - The practice of systematic uncertainty in the planning of the audit process and implementation.
 - Organization of meetings between members of the team process to discuss the possibility of fraud.
 - Mandate of chartered accountants with experience enough to do auditing high-risk.

• Gather information to identify and assess the risks of material misstatements due to fraud and respond to the risk estimated by collecting and examining and evaluating evidence.

5. The fact that the auditor's procedures contained in the ISA No. 570 and for the assessment of the entity's ability to continue to achieve a reasonable response to the expectations of users of financial statements by 86.4% from the perspective of auditors, preparers and users of financial statements.

6. The study showed the consensus of groups and by not less than 85% on the following matters:

- The auditor is responsible by law for the client - who suffered the damage - in the case of ordinary negligence in the performance of the audit process.
- The auditor is responsible by law to the users of financial statements (third party) who can predict the financial statements of adopting legal accountant, who have suffered damage as a result of ordinary negligence.
- The auditor is responsible to the law of each party were damaged due to gross negligence by the auditor in auditing the financial statements.

The results showed that the legal rules governing the civil liability of legal accountant in Jordan is not clear properly, especially the law regulating the legal profession Accounting No. 73 of 2003 and the Companies Act No. 22 of 1997.

RECOMMENDATIONS

1. Professional organizations must strengthen the independence of the auditor, and by clearly defining the role of audit committees in this respect and strengthen the role of these committees in the appointment and removal of the auditor. And review by the auditor to provide other services to the client other than audit.
2. That the professional organizations (such as the Jordanian Association of auditors and audit facilities, and the Audit Office) has developed educational programs to educate users of financial statements the nature of the work of the auditor and the limits of his responsibility to reduce their expectations.
3. Be keen on the auditor's knowledge of the different views to users of financial statements, and attention to improving communication with users, and to respond to reasonable expectations. And attention by professional organizations hold conferences and seminars for practitioners and meetings with the parties concerned in order to clarify the latest developments in the audit function and objectives.
4. Required to respond to the expectations of users of financial statements that there should be sufficient coordination between the organizations legislative, professional, educational, and practitioners to find ways to achieve that response, whether through research or the development of legislation and existing standards, as well as creating channels of communication effectively with international organizations to pour all efforts to achieve the best possible response to the expectations of users of financial statements.
5. The need to continue in the formulation of standards and revised to match the changing requirements of the audit, particularly with regard to the responsibility of the auditor to the third party, and the revision of the Charter of Professional Conduct and other publications in line with the changing needs of society and new technologies that are identified through practice and research.
6. Need to formulate rules and laws that work to determine the auditor's responsibility towards the users of financial statements, and that through the study of laws and cases relevant in other countries and benefit commensurate with the nature of the economic situation and the political and legislative in Jordan and in line with the development of the auditing profession and narrowing the gap of expectations at the same time maintain the rights of the parties concerned.
7. The continuation of research studies with respect to expectations gap, and by addressing other parts of the users of financial statements, such as credit management staff in banks, and the staff of income tax, and auditors in the Audit Bureau, and academics in the universities of Jordan. And the need to conduct studies discuss the impact of the development of the auditor's report on the expectations gap, especially after the recent amendment to the ISA number (700), which added new paragraphs to the auditor's report and the response of this amendment to the expectations of users of financial statements.

REFERENCES

1. Al-Shuraim. O & Barakat. L , "Auditing of accounts", the first edition, the center of the Secretary for publication distribution, Sana'a, Yemen, 2005, p. 26.
2. Arens, A.A., Elder, R. J. and Beasley, M.S., "Auditing and Assurance, Service: An Integrated Approach". (9th ed.), New Jersey, prentice Hall, 2003.
3. Ashit Saha., "Audit Expectations Gap in India: An Empirical Survey", The Icfai Journal of Audit Practice, Vol. V, No. 2, pp. 67-83, April 2008.
4. Ghali, G., "The development of the audit profession to address contemporary problems and challenges of the Third Millennium", University House of Printing, Publishing and Distribution, Alexandria, 2001. P. 8.
5. Humphrey, Christopher., Moizer, Peter., & Turley, Stuart "The Audit Expectations Gap in Britain: An Empirical Investigation", Accounting and Business Research, Vol. 23, No. 91A, pp. 395-411, 1993.
6. IFAC, 2010 www.ifac.org
7. Jarbou Y., "Expectations gap between the financial community and the auditors and legal ways to address narrowing the gap", Journal of the Islamic University, a series of human studies, Volume 12, Number 2, July 2004. P.369.
8. Lee, and JD Gloeck., AK Palaniappan, "The audit expectation gap: an empirical study in Malaysia" Southern African Journal of Accountability and Auditing Research Vol 7: 2007.
9. Monroe, Gary S. , Woodliff, David R., "An Empirical Investigation of The Audit Expectation Gap: Australian Evidence", Accounting and Finance, Vol.34, No.1, May, 2004.
10. Peter J. Best, Sherrena Buckby, Clarice Tan, "Evidence of the audit expectation gap in Singapore" Managerial Auditing Journal, vol 16 Issue: 3 pp:134-144.
11. Porter, Brenda., "An Empirical Study of the Audit Expectation-Performance Gap", Accounting and Business Research, Vol.24, No.93, pp.49-68.1993.
12. Porter, Brenda., "An Empirical Study of the Audit Expectation-Performance Gap", Accounting and Business Research, Vol.24, No.93, pp.49-68.1993
13. Uma, Sekaran, "Research Methods for Business: A Skill Building Approach", 7th Edition, John Wiley and Sons Inc., New York, 2003,
14. Yusuf Munir Sidani, "The audit expectation gap: evidence from Lebanon", Managerial Auditing Journal, Vol:22 ,Issue: 3, pp:288 – 302., 2007
15. Z. Jun Lin & Feng Chen, "An Empirical Study of Audit 'Expectation Gap' in The People's Republic of China", International Journal of Auditing, Vol. 8, No. 2, pp. 93-115, July 2004

DIFFUSION OF MOTOR VEHICLE SALES IN DELHI

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ABSTRACT

The aim of this paper is to project the long-term trends in the growth of four-wheelers, two-wheelers, auto rickshaws, taxis, buses and goods vehicles in Delhi up to the year 2020-21. Based on data from 1965-66 to 2005-06, the logistic model fits well in projecting the growth of four-wheelers and auto rickshaws, while in case of the growth in the number of two-wheelers, taxis, buses and goods vehicles, the Gompertz model is better. It is found that the total number of vehicles will be 11.71 millions in 2020-21 which will be nearly fifty per cent of the projected population of Delhi and out of these, 96 per cent will be private vehicles. This shows that there will be a rapid proliferation in the number of private four-wheelers during the next fifteen years with a decline in the relative share of two-wheelers. Similarly, the total number of commercial vehicles will increase from 0.28 million in 2005-06 to 0.5 million in 2020-21 with an increasing share of passenger vehicles and a decreasing share of goods vehicles. Now, motor vehicles being the worst air polluters apart from most energy intensive mode of transport, this growth of motor vehicles will pose a challenge to the policy makers, at the front of environment, energy consumption and parking.

KEYWORDS

Auto rickshaws, buses, four-wheelers, goods vehicles, Gompertz model, Logistic model, taxis, two-wheelers.

INTRODUCTION

Transportation is considered as a service because it provides the mobility required for society. This service is provided by a number of different types of motor vehicles, which serve as integral part of an overall transportation system. When such system does not satisfy the numerous requirements of mobility, it leads to an increase in demand for motor vehicles. The vehicle demand is an integral part of transportation demand modeling. Unlike the demand for other commodities such as food, cloth, house, etc., vehicle demand is a derived demand (Abu-Eisheh et al. 2002). That is, a person demands to be transported not because he or she just wants to move but because he or she wants to achieve some other purpose such as reaching school, or office, or movie, or theater. Therefore, the importance of analyzing the growth in motor vehicle demands in order to be able to predict the expected number of motor vehicles in a given place should be accurate. The demand for motor vehicles form the primary input to any decision related to creation and management of transportation facilities such as road construction, energy requirement, utilization of transit system, and parking lot, etc. It also provides solution to the problems arising due to the growth of motor vehicle such as air pollution, road congestion and accident. Hence, the government, decision makers, legislatures, transport and urban planners and traffic engineers are among the many groups that have a particular interest in forecasting the motor vehicle growth.

In this paper, we highlight the various types of transportation demand in Delhi. The transport system in Delhi is predominantly road based with railways catering to only about 1 per cent of the local traffic. The buses are almost the only means of public transport system. In addition to the bus transit system, the travel demand of Delhi is also satisfied by auto rickshaws, taxis, private cars and motorcycles. Now, Delhi has also added 65.05 kilometers route of mass rapid transit system (Economic Survey Delhi 2005-06). In comparison to other cities of India, the growth of total number of vehicles in Delhi is highest with private vehicles being higher, especially the four wheelers. Thus, an attempt has been made to develop some differential model that will forecast the level of motor vehicle growth for the years 2010-11, 2015-16 and 2020-21 using annual data of registered motor vehicles from 1965-66 to 2005-06. Based on the concept of Logistic and Gompertz function, the differential model is developed under limited growth scenario, where upper limit of the growth is called saturation level. Out of these models, the best fit will be selected and utilized for forecasting the level of motor vehicle growth on the basis of R^2 value, mean square error (MSE) and the nature of the curves.

TRENDS IN THE GROWTH OF MOTOR VEHICLES

The growth of motor vehicles in Delhi has increased tremendously over the years as can be observed from Table I. Till March 2006, bus transit was the primary mode of transportation in Delhi, which constituted only about 1 per cent of the total vehicles whereas, private vehicles (four-wheeler and two-wheeler) account for 94 per cent and the rest 5 per cent include goods vehicles, auto rickshaws and taxis. From 1965-66 to 2005-06, the number of registered vehicles increased from 80 thousand to 48 lakhs i.e. more than 60 folds increases, while population rose about 5 fold i.e. from 3.1 millions to 16 millions. Out of the total vehicles, the share of commercial vehicles is far less than the private vehicles.

TABLE I. POPULATION AND REGISTERED NUMBER OF MOTOR VEHICLE IN DELHI

Year	Population	Private Vehicles		Commercial Vehicles			Total Vehicle	
		Four Wheeler	Two Wheeler	Passenger Vehicle				
				Auto	Taxis	Buses		
1965-66	3140214 (4.08)	31348 (15.13)	31351 (31.99)	6243 (12.82)	2838 (7.27)	1417 (21.01)	7223 (16.55)	80420 (21.94)
1970-71	4065698 (4.25)	61521 (8.97)	109112 (17.03)	10812 (10.06)	4105 (4.98)	3266 (12.98)	15262 (11.83)	204078 (13.72)
1975-76	5006283 (4.25)	93196 (5.90)	232459 (9.53)	16295 (5.19)	4996 (5.80)	5891 (7.67)	26081 (8.21)	378918 (8.32)
1980-81	6220406 (4.41)	123655 (9.10)	364010 (15.04)	20920 (10.70)	6583 (7.25)	8528 (13.08)	38072 (11.60)	561768 (13.28)
1985-86	7622810 (4.15)	202905 (17.27)	746619 (12.41)	40713 (11.11)	8772 (3.41)	14617 (6.28)	61860 (12.51)	1075486 (13.19)
1990-91	9420644 (4.15)	427743 (9.62)	1294066 (7.18)	65829 (4.30)	10426 (6.46)	19671 (8.77)	106052 (5.62)	1923787 (7.57)
1995-96	11379236 (3.85)	685850 (6.14)	1844471 (4.34)	80208 (2.11)	14593 (5.09)	29183 (6.68)	139300 (2.90)	2793605 (4.68)
2000-01	13782976 (3.09)	920723 (11.93)	2230534 (6.32)	86985 (-8.71)	18362 (-2.06)	41483 (-4.58)	158492 (-2.31)	3456579 (6.91)
2005-06	16021000	1466641	3062536	73644	20693	43500	141996	4809010
AGR	4	10	13	7	6	11	8	11

Source: Delhi Statistical Handbook (various years)

Note: Figures in the parenthesis are average five years annual growth rate

However, in case of commercial vehicles, the average growth rate of goods vehicle is higher than that of passenger vehicles. The passenger vehicles increased from 10.5 thousand to 0.14 million, while goods vehicles increased from 7 thousand to 0.14 millions during the period 1965-66 to 2005-06. Among passenger vehicles, the share of auto rickshaws is higher than that of taxis and buses, but, after 1975-76, the number of buses has increased more than the taxis. On the other hand, the annual average growth rate of buses is highest i.e. 11 per cent, followed by 8 per cent in case of auto rickshaws and 6 per cent for taxis. The low demand of taxi may be due to higher cost of traveling in comparison to that of auto rickshaws. Though the share of buses to total vehicles has been gradually reducing from 1.76 per cent in 1965-66 to about 1 per cent in 2005-06, still it catered to 60 per cent of the total traffic load. On the other hand, private vehicles account for 94 per cent of the total vehicles but cater to only 30 per cent of the total traffic load (Economic Survey Delhi 2005-06). Interestingly, the period between 2000-01 and 2005-06 shows an average negative growth rate for all categories of commercial vehicles. The negative growth rate is significantly higher in case of passenger vehicles (-) 8.77 per cent as compared to goods vehicles (-) 2.31 per cent. Similarly, under passenger vehicles, auto rickshaws have registered highest negative average growth rate (-) 8.71 per cent, followed by buses (-) 4.58 per cent and taxis (-) 2.06 per cent. This is due to the implementation of several directives issued by the Supreme Court of India for the control of vehicular pollution in the years 1998, 2000 and 2001. These directives are such as the phasing out or ban on plying of old commercial passenger vehicles and conversion of commercial passenger vehicles into single fuel mode i.e. on compressed natural gas (Transport Department Govt. of Delhi). In spite of negative growth rate in recent past, commercial vehicles have increased significantly over the years in Delhi. Although large proportion of mobility need is still catered by commercial vehicles, there is a rapid increase in reliance on private vehicles in the recent years. As seen from Table 1, there has been an exponential growth in the category of private vehicles, which increased from 62.7 thousand in 1965-66 to 4.53 millions in 2005-06 at an average annual growth rate of 12 per cent. Till 1985-86, the annual growth rate of two-wheelers (motorcycle, scooter and moped) was higher than that of four-wheelers (car and jeep) and after that the growth rate of four-wheelers has been more than that of two-wheelers. Thus, the rapid increase in private vehicles during last two decades may be primarily due to increase in household income, increase in commercial and industrial activities, availability of motor vehicle product and improvement in road infrastructure. Beside these, there have been significant changes in motor vehicle sector during the last two decades. After liberalization of Indian economy during late 1980s and early 1990s, many new firms entered motor vehicle market to produce variety of cars and two-wheelers. Availability of motor vehicle and its financing at low interest rate increased the sale of private vehicles substantially after 1990. Though all these have contributed in the increase of the share of private vehicles, equally important reasons are to be found in public transport system itself. Speed, service quality, convenience, flexibility and availability favour adoption of private vehicles as the main mode of transport at present in Delhi. Finally, using the trend of motor vehicles growth per 100 persons, we develop the forecasting model for different types of vehicles in the next section.

MODEL FOR MOTOR VEHICLE GROWTH FORECASTING

The growth of motor vehicles over time typically follows a sigmoid or S-shaped curve (Prescott, 1922). There are a number of differential functions that can describe S-shaped curves, for example, logistic, Gompertz, Von Bertalanffy, etc. (Draper, et al. 1998). These curves are to forecast how and when a given growth system will reach its saturation limit. Although the path of these growth functions can be represented in the general S-shape fashion, different types of entities can grow different patterns. Hence, the exact form of the curves, including the slope and the asymptote, may be different for each particular growth pattern. For example, the slope may be very steep during early phases, including rapid growth, or it may be gradual suggesting a slow and hesitant start, but all of them will level into saturation limit. Main advantage of these models is to obtain saturation level in long term forecast as most of the systems whether natural or artificial attain saturation level after a certain period. The properties of the S-curve growth model is such that if the growth is quite rapid at an early phase and relatively slow when approaching the saturation level, then the Gompertz function is the best method because it attains its maximum rate of growth at an earlier phase than that of logistic model. If, on the other hand, the diffusion process is such that growth is initially slow and relatively rapid during the maturing phases, then the logistic model is a superior forecasting method because it grows more rapidly towards the maximum level than the Gompertz model. The two frequently used functional forms of S-curve representing different growth patterns are the logistic and the Gompertz functions (Ogut, 2004 and Singh, 2006). The major problem that has to be solved first in these models is the saturation level. A few studies have estimated the saturation level from the S curve growth function (Singh, 2000, and Law, et al., 2005), but most of the studies provide the saturation level externally by applying rule of thumb, e.g. one car per family (Palelink, 1960), one driving member per family (Tanner, 1978), per capita vehicle ownership (Button, et al., 1993 and Kobos, et al., 2003). Therefore, using average number of seat capacity per vehicle, we assume the saturation level $(100/3) = 33$ for four-wheelers and $(100/2) = 50$ for two-wheelers. As auto rickshaw and taxi are considered as contact carriage, and their seating capacity being 2 and 3 respectively, these are assumed to be saturation level per 100 persons. However, the bus is considered as public transport system and the seating capacity ranges from 11 (TRV) to 60 (High Capacity Bus). Therefore, it is assumed that the saturation level for bus is 1 for 100 persons. In case of goods vehicle, the saturation level is assumed to be 4 per 100 persons. The assumption is based on four types of goods vehicles observed to be plying in Delhi such as: three wheeler, mini truck, tractor, and truck. Finally, using saturation level (S) and time (t), we develop logistic and Gompertz models to forecast the growth of commercial vehicle per 100 persons (V) in Delhi.

$$\frac{dV_t}{dt}$$

The logistic model can be developed as follows: The changes in vehicle growth with respect to time i.e. $\left(\frac{dV_t}{dt}\right)$ is proportional to the product of the level of

vehicle growth at time t i.e. (V_t) and the percentage of market untapped i.e. $\left(\frac{S - V_t}{S}\right)$, where S is saturation limit of the growth. The corresponding

$$\frac{dV_t}{dt} = \frac{bV_t(S - V_t)}{S} \quad (1)$$

differential equation is where $b > 0$ is the proportionality constant i.e. growth rate.

$$V_t = \frac{S}{1 + ae^{-bt}} \quad (2)$$

Integrating the above differential equation, we get that the logistic function is

The parameters a and b model the location and shape of the curve, respectively. For $t = 0$, $V_0 = \frac{S}{1 + a}$ is the starting level of the automobile growth and for $t = \text{very large}$, $V_\infty = S$ is the saturation limit. The logistic curve reaches its maximum growth rate at half of the saturation level i.e. $V_t = S/2$,

called the point of inflection of the curve and occurs at $t = \frac{\ln a}{b}$. The logistic curve is symmetric about the point of inflection.

Similarly, the Gompertz model can be developed as follows: The change in vehicle growth with respect to time i.e. $\left(\frac{dV_t}{dt}\right)$ is proportional to the product of present level of vehicle growth at time t i.e. $\left(V_t\right)$ and the logarithmic density of vehicle growth level i.e. $\ln\left(\frac{S}{V_t}\right)$, where S is the saturation limit of the

$$\frac{dV_t}{dt} = bV_t \ln\left(\frac{S}{V_t}\right) \quad (3)$$

growth. The corresponding differential equation is

where $b > 0$ the proportionality constant i.e. growth rate.

Integrating the above differential equation, we get that the Gompertz function is $V_t = Se^{-ae^{-bt}}$ (4)

The parameters a and b model the location and shape of the curve, respectively. The Gompertz curve reaches its maximum growth rate at $V_t = S/e$,

which is the point of inflection of the curve that occurs at $t = \frac{\ln a}{b}$. For $t = 0$, $V_0 = Se^{-a}$ is the starting level of vehicle growth and for $t = \text{very large}$, $V_\infty = S$, is the saturation limit. Unlike logistic curve, it is not symmetrical about its point of inflection.

Finally, using saturation level S and time variable t , the parameters a and b are estimated by ordinary least square procedure after transforming the logistic [equation (2)] and Gompertz [equation (4)] functions into logarithmic form, where time variable t is taken as 1 for 1965-66, 2 for 1966-67, and 41 for 2005-06. Based on R^2 value and MSE, the better forecasted values are selected, where MSE is the average of square of the difference between actual and predicted values.

ESTIMATION OF MODELS

The estimated results of four-wheelers, two-wheelers, auto rickshaws, taxis, buses and goods vehicles in both these models are reported in **Table II**.

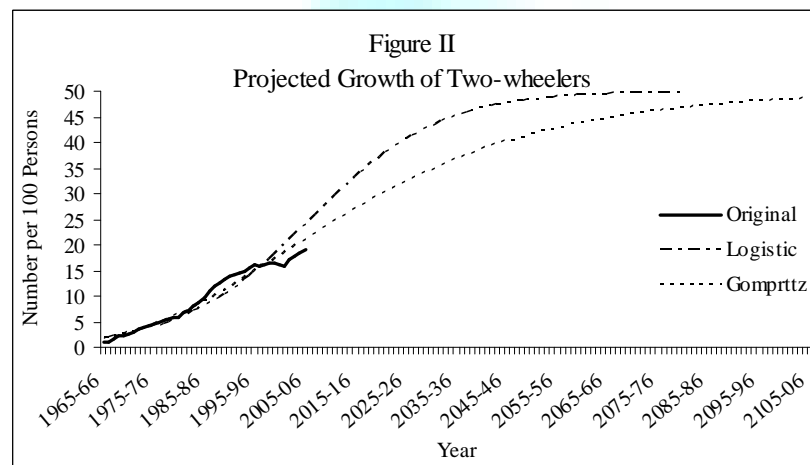
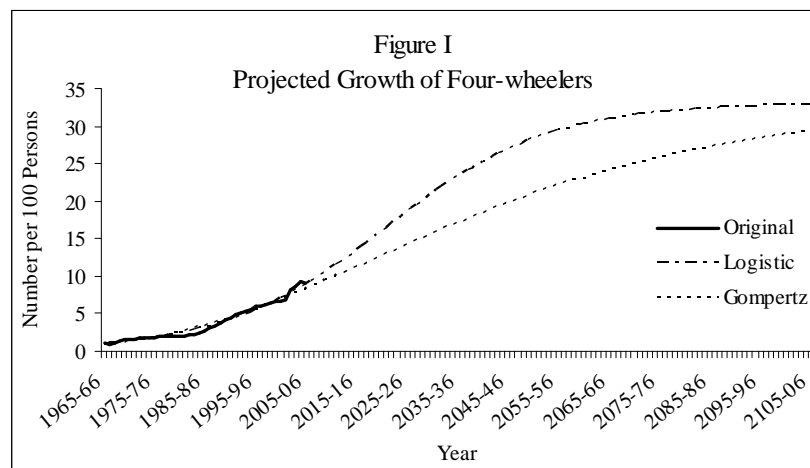
TABLE II. ESTIMATED RESULTS OF LOGISTIC AND GOMPERTZ MODEL

Model	Parameters	Private Vehicles		Commercial vehicles			
		Four Wheeler	Two Wheeler	Auto Rickshaw	Taxi	Bus	Goods Vehicle
Logistic	b	0.0620 (36.82)	0.0779 (22.08)	0.0210 (6.85)	0.0062 (3.83)	0.0413 (10.02)	0.0445 (12.53)
	ln a	3.5379 (87.18)	3.2904 (38.68)	2.0778 (12.11)	2.4193 (62.01)	2.5284 (25.47)	2.4396 (28.51)
	R²	0.97	0.93	0.55	0.27	0.72	0.80
	MSE	0.1264	4.1303	0.0374	0.0271	0.0022	0.1356
	b	0.0247 (29.06)	0.0344 (33.20)	0.0161 (6.37)	0.0019 (3.99)	0.0184 (9.95)	0.0205 (12.54)
Gompertz	ln a	1.3361 (65.22)	1.2684 (50.75)	0.7353 (12.06)	1.2304 (104.79)	0.9721 (21.79)	0.9401 (23.90)
	R²	0.96	0.97	0.51	0.29	0.72	0.80
	MSE	0.2215	1.4901	0.0503	0.0002	0.0019	0.1348

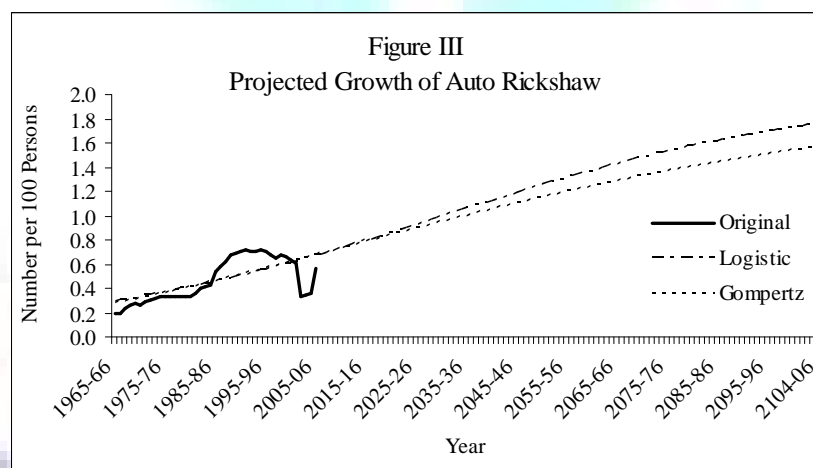
Note: Figures in the parenthesis are the values of t-statistics

Note: Bold italic figures are selected parameters

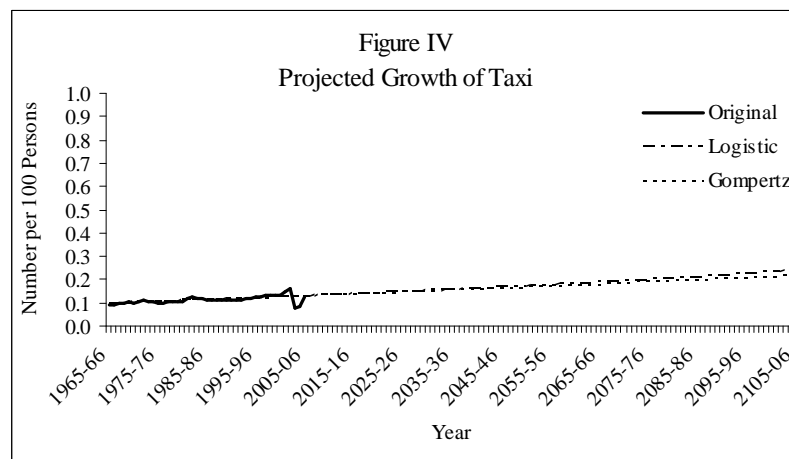
Though the models have different functional forms, they have several features in common. All of them are monotonically increasing and having horizontal asymptotes with one of them representing saturation level. According to R^2 values, the models fit the data very well. However, the R^2 value of taxis in both these models is low. All the parameters have the expected sign and most are highly significant as observed from t statistics. The highest R^2 and lowest MSE values of two-wheelers, taxis, buses and goods vehicles are found in Gompertz model. However, four-wheelers and auto rickshaws growth provides higher R^2 and lower MSE values in logistic model. Therefore, according to R^2 and MSE, logistic model fits the data better in the case the growth of four-wheelers and auto rickshaws whereas the Gompertz model is better in case of two-wheelers, taxis, buses and goods vehicles (**Table II**). The properties of these models are also reflected in **Figures I to VI**.



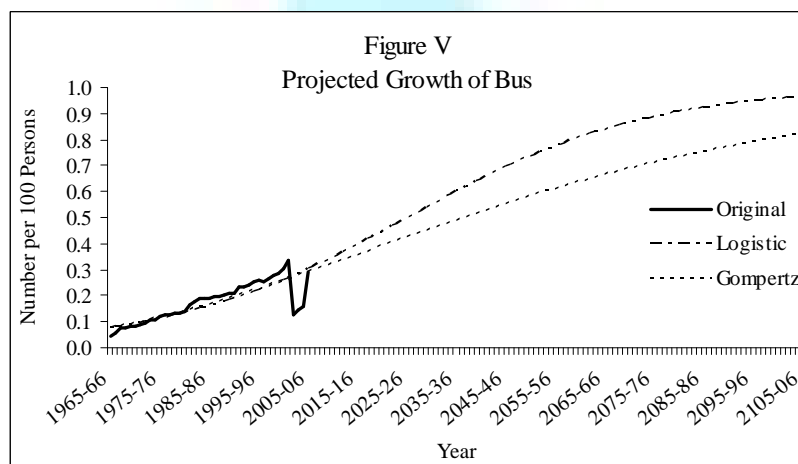
In **Figure 1**, the original growth of four-wheelers is initially slow then it takes a relatively rapid stage of growth rate, and hence it follows the logistic curve. From the figure, it is clear that in near future the growth rate will be higher. Alternatively, the growth of two-wheelers is quite rapid at an early phase as shown in **Figure II**, and hence follows Gompertz curve. In future the growth rate will be slowly proceeding towards saturation level. In case of auto rickshaw, the original growth curve is initially slow, then increases and decreases rapidly (**Figure III**). Finally it takes upward direction. This down fall in growth is due to the intervention of government's auto fuel policy.



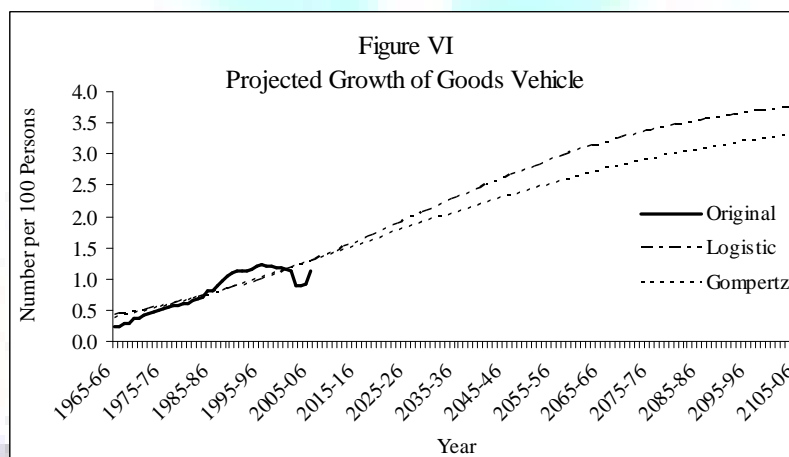
However the trend of original curve follows the path of logistic curve rather than Gompertz (**Figure IV**). The slow growth of taxi made the logistic and Gompertz curves linear, by appearance, but it is really not so. The up and down in the original curve at the end is due to the same reason as in case of auto rickshaw model.



The original growth of bus is quite rapid at an early phase, then decreases rapidly in 2002-03, and comes to the original level after three years (**Figure V**). The negative growth is basically due to the introduction of government's auto fuel policy. Thus, if we put a trend line to the original curve it takes the path of Gompertz curve.



Similarly, original growth of goods vehicles is also quite rapid at an early phase, except a small down fall in 2002-03. Finally, it starts rising and bends towards the path of Gompertz curve (**Figure VI**).



The saturation level and selected parameters a and b in **Table II**, help to develop forecasting models for the growth of different types of motor vehicles per 100 persons as given below:

$$\text{Four wheeler}_t = \frac{33}{1 + 34.3930e^{-0.0620t}} \quad (7)$$

$$\text{Two wheeler}_t = 50e^{-3.5551e^{-0.0344t}} \quad (8)$$

$$\text{Auto rickshaw}_t = \frac{2}{1 + 7.9868e^{-0.0210t}} \quad (9)$$

$$\text{Taxi}_t = 3e^{-3.4227e^{-0.0019t}} \quad (10)$$

$$\text{Bus}_t = 1e^{-2.6435e^{-0.0184t}} \quad (11)$$

$$\text{Goods vehicle}_t = 4e^{-3.0055e^{-0.0154t}} \quad (12)$$

PROJECTION OF MOTOR VEHICLE GROWTH UP TO 2020-21

Equations (7), (8), (9), (10), (11) and (12) project the growth of four-wheeler, two-wheeler, auto rickshaw, taxi, bus and goods vehicle per 100 persons for the years 2010-11, 2015-16 and 2020-21, by substituting $t = 46, 51$ and 56 respectively. The projected value of above motor vehicles per 100 persons is converted into absolute value by multiplying the projected population and dividing it by 100 reported in **Table III**.

Note that the year 2005-06 contains the actual number of vehicles. The total number of motor vehicles in Delhi will rise from 4.8 millions in 2005-06 to 11.7 millions in 2020-21, which is nearly half of the projected population of Delhi, and out of which 96 percent will be private vehicles (two-wheeler and four-wheeler) i.e. 11.2 millions. In the category of private vehicles, the number of four-wheelers will be three time to the present (2005-06) number, while two-wheelers is less than two and a half time at the end of 2020-21. It is also observed that, the share of four-wheelers will increase with a decreasing share of two-wheelers. On the other hand, the analysis of the personal vehicles growth per 100 persons provides that 16 and 30 persons will have four-wheelers and two-wheelers in 2020-21 (**Figure I** and **Figure II**). The two-wheelers have already attained its maximum growth rate in 2001-02, when 18 persons had two-wheelers out of 100 persons. The four-wheelers will reach its maximum growth rate just beyond our forecasting period i.e. in 2021-22 and at that time 17 persons will have four-wheelers out of 100 persons. The total number of commercial vehicles in Delhi will rise from 0.28 million in 2005-06 to 0.5 million in 2020-21, with nearly equal share of passenger and goods vehicles at the initial stage (2005-06). However, the share of passenger vehicles will increase gradually and at the end of 2020-21, it will be 53.66 per cent of the total commercial vehicles. Similarly, in the category of passenger vehicles, auto rickshaws will increase two fold from 73 thousand in 2005-06 to 141 thousand in 2020-21 by keeping the same share to the passenger vehicles. The growth of taxis will be slow and its share to passenger vehicles will be in decreasing trend i.e. 15.01 per cent in 2005-06 to 12.59 per cent in 2020-21. Interestingly, the number of buses will increase more than double during the same period i.e. 43 thousand in 2005-06 to 95 thousand in 2020-21. At the same time the percentage share of the buses will increase from 31.56 per cent to 35.23 per cent. The major finding as per **Table III**, is the rapid proliferation in the number of private four-wheelers i.e. cars or jeeps during the next fifteen years with a decline in the relative share of two-wheelers. Another interesting finding is that the bus fleet will be increasing. This may slow down the growth of private vehicles. The expansion of metro rail may also reduce the growth of private vehicles as observed from the study conducted by us.

TABLE III. PROJECTED GROWTH OF MOTOR VEHICLES IN DELHI

Year	Population	Private Vehicles			Commercial Vehicles			Passenger Vehicle	Goods Vehicle	Total Vehicle
		Four Wheeler	Two Wheeler	Private Vehicle	Auto	Taxis	Buses			
		A	B	C=A+B	D	E	F	G=D+E+F	H	C+G+H
2005-06*	16021000	1466641 (32.38)	3062536 (67.62)	4529177 [94.18]	73644 {53.43}	20693 {15.01}	43500 {31.56}	137837 [2.87]	141996 [2.95]	4809010
2010-11	18451000	2038726 (31.43)	4448060 (68.57)	6486787 [94.97]	91329 {52.19}	24233 {13.85}	59438 {33.96}	175000 [2.56]	168546 [2.47]	6830334
2015-16	21285000	2858624 (33.17)	5758748 (66.83)	8617371 [95.33]	113898 {52.14}	28801 {13.18}	75755 {34.68}	218454 [2.42]	203369 [2.25]	9039194
2020-21	24485000	3905663 (34.85)	7300195 (65.15)	11205858 [95.69]	141338 {52.17}	34118 {12.59}	95438 {35.23}	270893 [2.31]	233944 [2.00]	11710696
		2.7	2.4	2.5	1.9	1.6	2.2	2.0	1.6	2.4

Note: * Actual growth

The figure in the parenthesis () are percentage to the private vehicle

The figure in the parenthesis { } are percentage to the passenger vehicle

The figure in the parenthesis [] are percentage to the total vehicle

The last row is the number times the vehicle grow from 2005-06 to 2020-21

CONCLUSION

A simple examination of trends over the past forty-one years clearly shows a rapid increase in motor vehicle growth in Delhi. These trends support logistic and Gompertz model to forecast the growth of all types of motor vehicle per 100 persons up to the years 2020-21. The logistic function fits well for forecasting the growth of four-wheelers and auto rickshaws, whereas Gompertz function is better for taxis, buses and goods vehicles. In absolute term, these models provide that the total number of vehicles will be 11.7 millions in 2020-21 which will be nearly fifty percent of the projected population of Delhi at that time. Out of these, 96 per cent will be the private vehicles. This shows that there will be an exponential growth in the number of private four-wheelers during the next fifteen years with a decline in the relative share of two-wheelers. Since motor vehicles are the worst air polluters (Kush S. 2001) apart from most energy intensive mode of transport (Reddy A. K. N. et al. 2000), the expected growth of motor vehicles will pose a challenge to the policy makers. At the same time, it is also linked with growing number of road accidents and fatalities. The demand for vehicle parking in commercial places is also an area of concern.

BIBLIOGRAPHY

- Abu-Eisheh, S. A. and Mannering, F. L. (2002), "Forecasting automobile demand for economies in transition: a dynamic simultaneous equation system approach", *Transportation Planning and Technology*, Vol.25, pp.311-331.
- Button, K., N. Ngoe and Hine, J. L. (1993), "Modeling vehicle ownership and use in low income countries", *Journal of Transport Economics and Policy*, Vol. 27, No.1, pp.51-67.
- Dayal, A. (2003), "A dream revisited: an archival journey into the making of the Delhi metro rail", Delhi Metro Rail Corporation Ltd.
- Directorate of Economic and Statistics, Government of NCT of Delhi, "Delhi Statistical Hand Book", various issues, New Delhi.
- Draper, N. R. and Smith, H. (1998), "Applied Regression Analysis", John Wiley & Sons.

- Graham, D. J. and Glaister, S. (2004), "Road traffic demand elasticity estimates: a review", *Transport Reviews*, Vol. 24, No. 3, pp.261-274.
- Kush, S. (2001). "Automobile Pollution" IVY Publishing House.
- Ogut, K. S. (2004), "S-curve models to determine the car ownership in Turkey", *ARI*, Vol. 54, No. 2, pp.65-69.
- Palelink, J. (1960), "Projection du parc Automobile en Belgique", *Cahiers Economiques de Bruxelles*, Vol.3, pp.407-418.
- Peter, H. K., Jon, D.E. and Thomas, E.D. (2003), "Scenario analysis of Chinese passenger vehicle growth", *Contemporary Economic Policy*, Vol.21, No.2, pp.200-217.
- Planning Department Government of NCT of Delhi, "Economic Survey of Delhi 2006", New Delhi.
- Prescott, R. B. (1922), "Law of growth in forecasting demand", *Journal of American Statistical Association*, pp.471-479.
- Reddy, A. K. N., Anand, Y. P. and D'Sa, A. (2000), "Energy for a sustainable road/rail transport system in India", *Energy for Sustainable Development*, Vol.4, No.1, pp.29-44.
- Singh, S. K. (2000), "Estimating the level of rail and road based passenger mobility in India", *Indian Journal of Transport Management*, Vol.24, No.12, pp.771-781.
- Singh, S. K. (2006), "The demand for road-based passenger mobility in India: 1950-2030 and relevance for developing and developed countries", *European Journal of Transport and Infrastructure Research*, 6(3): 247-274.
- Storchmann, K. (2005), "Long-run gasoline demand for passenger cars: the role of income distribution", *Energy Economics*, 27: 25-58.
- Tanner, J. C. (1978), "Long term forecasting of vehicle ownership and road traffic", *Journal of the Royal Statistical Society*, Vol. 141, No.A, pp.14-63

AN EXPLORATORY INVESTIGATION ON EFFECTIVE RISK HANDLING ATTITUDES OF TOP BUSINESS LEADERS IN RELATION TO THEIR APPROACHES TOWARDS INNOVATION

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ABSTRACT

Top business leaders are arguably different: in their innovation capabilities, strategy formulation and deployment as well as risk attitudes. The paper makes an attempt to research both quantitatively and qualitatively about the effective risk taking and handling attitudes as well as their innovation approaches. While analyzing such attributes, it was quantitatively confirmed that there is indeed a correlation existing between the two. This is also consistent with logic. There is always a risk which is taken and handled by the top business leaders in implementing something innovative, strategy implementation or product deployment in the form which has never existed before. Qualitative research establishes some deeper connections as well as some of the salient points. The key results of our exploratory research are important, especially for the HR, or R&D organizations, which are trying to recruit leaders and managers at the top management level in their organizations.

KEYWORDS

Risk handling, Innovation, Leaders.

INTRODUCTION

Effective leaders are a great asset to an organization's future. Leadership is a complex process involving multifarious factors and cross-functional issues. Leadership has been defined as a process whereby an individual (leader) influences strongly a group of individuals or an individual (follower) to achieve a common goal [1]. Leadership is a purposeful relationship, which occurs episodically among participants, who use their individual skills in influence, to advocate transforming change." [2]. In the other words leadership is the ability to step outside the culture to start evolutionary change processes that are more adaptive.

For an organization to continuously progress, it must innovate its processes, products and services. Hence, top leaders are constantly faced with the ever present challenges of stimulating innovation. Innovation has been typically proved in earlier studies to be triggered by a decline in corporate growth or competitiveness. It can occur especially at the peak times of crisis for an organization and that organization creates the new wave or rides the curve of a new innovative product or service.

Risk and innovation are inherently involved in [3]:

- Launching a new product
- Implementing a new business model
- Entering a new market
- Improvements in product/service/process
- Handling crisis
- Combinations of above

The purpose of the present study was to further explicate the nature of the risk taking abilities and innovation. The objectives were:

- To profile leaders involved in complex and uncertain cross-functional process like Innovation and calibrate them with the variable of uncertainty: Risk Taking
- To aid in understanding of parameters for selection of the right leader at the top/executive level who will have the leadership skills, charisma and determination to lead a major innovation initiative.

METHODOLOGY

A correlational approach was used to investigate the leadership traits [1, 3, 4, and 5] of risk-taking and innovation of top business leaders in the world. Wikipedia [4] was used as a secondary data source as an unbiased source.

Qualitative analysis was also carried out to ensure depth in the research and probe deeper.

Around twenty four top business leaders [5] were categorized into three categories (low, medium and high, as perceived by leadership experts and their reputation) based on their innovation capabilities. Two leaders from each category were chosen through stratified random sampling indicating a sample size of 25%.

The leaders undertaken for the exploratory research are:

- Bill Gates
- Steve Jobs
- Jack Welch
- Michael Dell
- Jeff Bezos
- Lakshmi Mittal

INSTRUMENTATION

Top 6 business leaders were rated on various parameters [1,3,4,5] that were developed for Innovation and Risk. The variables in each category of innovation and risk were defined as below:-

- INNOVATION
 - Experimentation with New Technologies (Typically breakthrough technologies, radical innovation)
 - Academic/Technical Capabilities
 - Development of Products, their Business Models and Their Features (Typically incremental innovation, and more related with business aspects)
 - Overseeing Business Details and Restructuring
 - Accurate Prediction of Future Trends
- RISK
 - Start Working Early (minimal/nil experience)
 - Start Own Business (at early age of 20-30)
 - Demonstration and Implementation of their new technology/process
 - Being Unpopular (Persistent on their ideas, making it through the resistance to their implementation)
 - Engaging in Argumentation (Publicly being expressive and strong in marketing, and being able to defend their companies against lawsuits)

DATA COLLECTION

Only secondary unbiased data source, Wikipedia, was considered for ratings of leaders on the above parameters. For each occurrence, or similar occurrence of keywords/phrases of a particular variable on the leader's webpage, they were awarded 1 point. The system of awarding points was cross-checked to ensure that duplicate recurrences of points referring to the same point/context were avoided.

The highest point in each parameter across all leaders was taken to be the dividing factor. Then, the scores of all leaders were divided by the score on that particular dividing factor. Through this method, the scores were normalized across all variables for the parameters of both innovation and risk for each leader.

RESEARCH HYPOTHESIS

H1

H1: Effective Leaders high on innovation will rate high on risk taking attitudes and effective risk handling.

Risk taking involves decision making at the top management level to venture into previous unexplored areas and opportunities. This requires acute observation of what will be the future trends or what technologies or business processes will ride the next shock wave [2, 5].

Innovation requires having future visions for services and products and developing them creatively with originality [1, 4, 5]. It is also inherently involved with development of Business strategy or policy, which is formulated creatively, the likes of which don't exist [5].

If innovation and risk taking abilities were both plotted on a Venn diagram using the above concept, they can be expected to have an overlap. This overlap would possibly be for thinking differently than mainstream approaches, as well as different style of implementation and application.

H2

H2.a: Technical/Academic capability of innovation or having high level of technical knowledge is highly correlated for risk taking in effective leadership.

High technical/academic capabilities correspond to high knowledge and greater understanding of newer technologies as well as upgraded skillset [6] which can be possibly empowering to work on or develop new technologies leading to creation, expansion or development of businesses. This may also reflect as a part of leadership quality.

H2.b: Intellectual capabilities of forming innovative strategies and developing business processes are highly correlated for effective risk taking amongst top business leaders.

High capabilities for strategy formulation and implementation, as well as capability to innovate new business processes correspond to better management of the business establishment [1,4,5] which can be possibly correlated to effect change and new systems which can be correlated with taking the risks involved in initiative-taking and implementation.

ANALYSIS AND RESULTS

H1

Study of Correlation Coefficients [6, 7] was undertaken to understand the relationship between the Innovation and Risk Taking abilities. The table I shows the results after analysis was carried out.

TABLE I: INNOVATION-RISK TAKING CORRELATIONS OF TOP BUSINESS LEADERS

CORRELATION TABLE		VARIABLES FOR RISK TAKING				
		var1 (Work early)	var2 (Own business)	var3 (New Tech.)	var4 (Risk of Unpopularity)	var5 (Argument)
	Var1 (Experimentation with new tech.)	Pearson Correlation 0.618*	0.673*	-0.05276	0.392	0.588
		Sig. (1-tailed) 0.045305	0.031431	0.460465	0.221014	0.109781
		N 6	6	6	6	6
VARIABLES FOR INNOVATION	Var2 (Acad/Tech Capabilities)	Pearson Correlation -0.089	-0.3117	-0.05196	0.32*	-0.16893
		Sig. (1-tailed) 0.433427	0.273797	0.461062	0.04811	0.374506
		N 6	6	6	6	6
	Var3 (Product Devp.)	Pearson Correlation 0.552*	0.913**	0.581**	0.500309	0.5688
		Sig. (1-tailed) 0.127932	0.005493	0.113831	0.156076	0.119406
		N 6	6	6	6	6
	Var4 (Oversee Business & Restructuring)	Pearson Correlation 0.069843	0.449908	-0.08156	0.938**	0.644*
		Sig. (1-tailed) 0.447703	0.185337	0.438966	0.002838	0.043807
		N 6	6	6	6	6
	Var5 (Future Trend Prediction)	Pearson Correlation 0.161515	0.653*	0.817*	0.618*	0.437968
		Sig. (1-tailed) 0.379917	0.049769	0.023509	0.045293	0.192526
		N 6	6	6	6	6
	*	Correlation is significant at the 0.05 level (1-tailed).				
	**	Correlation is significant at the 0.01 level (1-tailed).				

The following points emerged from the above correlation analysis:

- Top business leaders which took the risk of starting their own business and started it early were correlated with experimentation with newer technologies, which is also proved by numerous other examples in qualitative research outside the scope of this analytical study.
- Effective business leaders who were famous for bringing innovative products in the market as well as development of products were again highly correlated with starting their own business and implementation of new technologies or processes within their own businesses, as well as with starting early in their lives.
- Top leaders who are famous for overseeing every detail of their company's business strategy and restructuring were the ones who ran the risk of being unpopular (like Bill Gates, Jack Welch) as well as indulging in arguments successfully and defending their company's/strategy's position.
- Moreover, those leaders who had voiced their future trends analyses had high correlations with running their own businesses, implementation of new processes or technologies and running the risk of being unpopular.

The above table confirms H1 with adequate significance level for each variable of innovation that is correlated with some of the variables of risk taking. Hence, effective leaders possessing some of the attitudes of innovation are statistically proved to have a risk taking attitude in some aspect or another.

H2

Principal Component Analyses (Factor Analysis) [6,7] was carried out to lump the parameters into factors of Risk Taking and Innovation, to simplify our understanding.

TABLE IIA: FACTOR ANALYSIS ON INNOVATION

Component Score Coefficient Matrix		
	Component	
	1	2
var001	0.010400119	0.657586019*
var002	-0.129946273	0.535740902*
var003	0.531805543*	0.009302664
var004	-0.239112269*	0.17325947
var005	0.536252312*	-0.161667821
Extraction Method: Principal Component Analysis.		
Rotation Method: Varimax with Kaiser Normalization.		
INNOVATION	FACTOR ANALYSIS	

TABLE IIB: FACTOR ANALYSIS ON RISK TAKING

Component Score Coefficient Matrix		
	Component	
	1	2
var001	-0.190221062	0.781308672*
var002	0.158742915	0.402600312*
var003	-0.13432778	0.036996965
var004	0.48611584*	-0.193807707
var005	0.485062283*	-0.141609543
Extraction Method: Principal Component Analysis. .		
Rotation Method: Varimax with Kaiser Normalization		
FACTOR ANALYSIS RISK TAKING		

*Significant dependency of that particular parameter on the particular factor

^ Parameters are in the same order as in Table I

From the above Principal Component Analyses (Factor Analyses), the various factors were found for the two variables and these were recognized as under:-

- Innovation
 - Innovation in Strategy (Factor 1)
 - Innovation in Technology/Product (Factor 2)
- Effective Risk Taking
 - In crisis handling (Factor 1)
 - In launching a new technology/business mode (Factor 2)

After understanding these factors exist according to the research analysis carried above, two hypotheses come into picture: H1a and H1b. For each factor in Innovation, it was hypothesized that it would have correlation with the Risk Taking factors.

To statistically verify the H2a and H2b hypotheses, Correlation analysis and Linear Regression Analysis [7] were carried out.

The Correlation analysis is as shown in Table III.

TABLE III: CORRELATION ANALYSIS AFTER PRINCIPAL COMPONENT ANALYSIS

		VAlnnov1	VAlnnov2
VARisk1	Pearson Correlation	0.8375731985*	0.081067878
	Sig. (1-tailed)	0.018715544	0.439332286
	Sum of Squares and Cross-products	3.2219	0.1752
	Covariance	0.64438	0.03504
	N	6	6
VARisk2	Pearson Correlation	0.7488827227*	0.185397137
	Sig. (1-tailed)	0.04335729	0.36254527
	Sum of Squares and Cross-products	1.049975	0.14605
	Covariance	0.209995	0.02921
	N	6	6
* Correlation is significant at the 0.05 level (1-tailed).			

Both the variables/factors of Effective Risk were directly correlated on the first variable/factor of innovation, i.e., Innovation in Strategy.

To further validate with more rigorous statistical testing, Linear Regression was carried out separately for both the variables of Effective Risk Handling to see their relationship with each factor of Innovation. The aim was to determine a functional relationship of Effective Risk Handling with each innovation type. The results have been tabulated in Table IV.

TABLE IV: LINEAR REGRESSION ANALYSIS

Coefficients(a)					
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	Sig.
1	(Constant)	0.01804554	0.66923511		0.026964428
	VAR0In01	0.97057919	0.36561235	0.84397838*	2.654667399
	VAR0In02	-0.0888848	0.65076599	-0.04342339	-0.136584859
a	Dependent Variable: VAR00003 (Risk1)				
Coefficients(a)					
Model		Unstandardized Coefficients		Standardized Coefficients	t
		B	Std. Error	Beta	Sig.
1	(Constant)	0.53286335	0.29491473		1.806838741
	VAR0In01	0.30916158	0.16111597	0.73751799*	1.918876006
	VAR0In02	0.05716084	0.28677586	0.07660934	0.199322344
a	Dependent Variable: VAR00004 (Risk2)				

Both the variables of Risk had insignificant weak correlation on product based innovation type.

Thus, accumulating the above two analyses,

- H2a was not confirmed.
- H2b was confirmed.

QUALITATIVE RESEARCH

Findings

- Bill Gates rates very high on both of product based and strategy based types of innovation. This, in turn, helps him to effectively handle risks or crisis in handling a new product or formulating a new business strategy. Perhaps, this is why he's most successful. (Nowadays, he has retired from CEO. This as well as statistical analysis accounts only for the period when they were CEO.)
- Successful business leaders who have started their own company were initially involved completely in product based innovation; as their firms grew bigger, they molded themselves into innovators in strategies. [8] They have higher involvement in overseeing their business details as well as in developing new products.

DISCUSSION

- High correlation was also found between the risk of running unpopular with the greater degree of overseeing business strategy and corporate restructuring. This implies that leaders who take bold creative initiatives handle risk related to resistance to their initiatives.
- Evidence was found that top business leaders who have been successful at handling risk effectively are more innovative and original in their approaches.

IMPLICATIONS

- The importance of this research lies in creating a parameter list for the HR process recruiting for top management or executive level for an R&D organization; they need to see a candidate's ability in terms of their innovation in their corporate governance and strategy formulation and implementation based on their envisioning future trends. Such CEOs will bring great success to the company.
- A candidate's suitability at the top level has meager relevance to his innovation skills in high-end technology. However, business oriented product development has strong dependency on the factor of strategy-based innovation. This implies that at top management, a person must be able to capitalize on the new technology which has been invented and develop it further for the market and end-user in mind. This strategic process is crucial for success of the company which continuously innovates.

LIMITATIONS

There is a possibility of systematic error due to reliance on self-reporting methods. However, such errors don't affect the quantitative analyses, especially the correlation analyses as such, which makes statistical testing valid.

This study focuses only on top business leaders or CEOs. This indicates a narrow universal set and the results apply only to business leaders or CEOs. However, stratified random sampling was done to adequately represent innovators in product and strategy.

REFERENCES

1. *Effective Leadership: Theory and Practice*, Peter G. Northouse, Sage Publications, 2009, 5e, pp 3, 15-37, 39-52, 89-94, 125-140, 276-287
2. Michael S. Kearns, *Leadership Definition* in the Leadership and Management Journal 2005 <http://www.blogger.com/email-post.g?blogID=13192245&postId=112937445207349899> accessed on 11 May 2011
3. *Different leadership skills for different innovation strategies*, Jean-Philippe Deschamps, IMD, Strategy and Leadership Journal, Emerald, VOL. 33 NO. 5 2005, pp. 31-38
4. www.wikipedia.org accessed on 2 March 2010
5. *The Leader Within: Learning enough about yourself to lead others*, Drea Zigarami, Michael O'Connor, et al., Prentice Hall, 2004, 1e, 76, 175-182, 189-197, 211, 212
6. *Lasting Leadership: What You Can Learn*, Mukul Pandya, Robbie Shell, Susan Warner, Jeffrey Brown, et al., Wharton School Publishing, 2004, 1e, xv, xvii-xx
7. *Marketing Research: An Applied Orientation*, Naresh K. Malhotra, Prentice Hall, 2009, 5e, 34-63, 364-388, 409-415, 426-500, 534-575, 610-634
8. *The leadership-culture connection: An exploratory investigation*, Lory Block, British Columbia, Leadership and Organizational Development Journal, Emerald, VOL. 24/5 [2003], pp 318-334

AUTOMATIC INFORMATION COLLECTION & TEXT CLASSIFICATION FOR TELUGU CORPUS USING K-NN ALGORITHM

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ABSTRACT

Many algorithms have been implemented to the problem of Automatic Information Collection and Text Categorization. Most of the work in this area was carried out for the English corpus; on the other hand very few researches have been carried out for the Telugu corpus. In this project we have implemented the k- Nearest Neighbor (k-NN) algorithm, which is known to be one of top performing classifiers applied for the English text. The results show that k-NN is applicable to Telugu text.

KEYWORDS

Text Collection, Text classification, Term Weighting, Similarity Measuring, Telugu Script, Unicode, k-NN Classifier.

INTRODUCTION

Information gathering process produces a collection of data (corpus). A corpus is a large and representative collection of language material stored in a computer process able form. Corpus provides the basic language data from which a variety of lexical resources can be generated. We have collected Telugu script corpus from www.uni.medhas.org which provides Unicode Telugu data.

Huge amount of electronic textual information is increasingly available through the internet and organizations, making the process of retrieving data and information turns into a real problem without good indexing and summarization of documents contents. Text or document categorization is one solution for the problem. Many statistical learning methods have been applied in the field of text categorization in the recent years [1] [4], this includes regression models, nearest neighbor classifiers, Bayes belief networks, decision trees rule learning algorithms, neural networks, and inductive learning techniques. In this project we chose the nearest neighbor machine learning approach for its simplicity, effectiveness, and also because of its applicability with small number of training patterns.

RETRIEVAL - NEED OF CLASSIFICATION

Information retrieval (IR) corresponds to representation, storage, organization, and access to information items. IR has no restriction on the format. But typically, retrieval systems include letters, documents of all sorts, newspaper articles, books, research articles etc. Usually the IR system when ever finds a query with less number of relevant documents it retrieves the other members of class having relevant documents which increase precision and recall.

In a classification task, the precision for a class is the number of **true positives** (i.e. the number of items correctly labeled as belonging to the positive class) divided by the total number of elements labeled as belonging to the positive class (i.e. the sum of true positives and **false positives**, which are items incorrectly labeled as belonging to the class). Recall in this context is defined as the number of true positives divided by the total number of elements that actually belong to the positive class (i.e. the sum of true positives and **false negatives**, which are items which were not labeled as belonging to the positive class but should have been).

Often, there is an inverse relationship between precision and recall, where it is possible to increase one at the cost of reducing the other. For example, an information retrieval system (such as a search engine) can often increase its recall by retrieving more documents, at the cost of increasing number of irrelevant documents retrieved (decreasing precision).

In the context of classification tasks, the terms **true positives**, **true negatives**, **false positives** and **false negatives** are used to compare the given classification of an item (the class label assigned to the item by a classifier) with the desired correct classification (the class the item actually belongs to). This is illustrated by the table below:

Precision and recall are then defined as:

TABLE 1: THE RESULT OF CLASSIFICATION

Expected Result		Positive	Negative
obtained result	Positive	tp (true positive)	fp (false positive)
	Negative	fn (false negative)	tn (true negative)

Precision=tp/(tp+fp)

Recall=tp/(tp+fn)

AUTOMATIC INFORMATION COLLECTION

There are great amounts of textual information on the internet and in computerized systems of different associations and companies; it is very difficult to collect manually this huge amount of information for that it is very time consuming. Automatic Information Collection helps in reducing the time needed to collect hundreds or thousands of daily arrived documents.

There are no tools existed for the collection of data from the WWW automatically. This is necessary for a classification tool for dynamic acceptance Telugu test document. The system can automatically collect Telugu data from the Internet by the specified link to use it as document to be classified.

Downloading a web file sends a "request" to a web server using the standard HTTP 1.1 protocol. The server processes your request and sends you a "response". The response's "header" tells you the file's size, last modified date, MIME type, and other useful information. Finally, the response's payload is the file itself.

TEXT CATEGORIZATION: OVERVIEW

The goal of this clustering method is to simply separate the data based on the assumed similarities between various classes. Thus, the classes can be differentiated from one another by searching for similarities between the data provided.

The k-Nearest Neighbor is suitable for data streams. kNN does not build a classifier in advance. When a new sample arrives, k-NN finds the k neighbors nearest to the new samples from the training space based on some suitable similarity or distance metric.

k-NN is a good choice when simplicity and accuracy are the predominant issues. k-NN can be superior when resident, trained and tested classifiers has a short useful lifespan, such as in the case with the data streams where new data is added rapidly and the training set is ever changing. k-NN does not rely on prior probabilities, and it is computationally efficient. The main computation is the sorting of the training documents in order to find out the k nearest neighbors for the test document.

k-Nearest Neighbor is useful when there are less than 20 attributes per instance, there is lots of training data, training is very fast, learning complex target functions and don't want to lose information.

The disadvantages of using such a function are that it is slow in sorting out queries and irrelevant attributes can fool the neighbor.

DATA PREPROCESSING AND INDEXING

Data pre-processing comprises six sub-components including document conversion function word removal, word stemming, feature selection, dictionary construction, and feature weighting. The functionality of each component is described as follows:

a. Document converting –converts different types of documents such as XML, PDF, HTML, DOC format to plain text format.

b. Function word removal –removes topic-neutral words such as articles, Prepositions, conjunctions etc. from the documents

c. Word stemming –standardizes word's suffixes (e.g., labeling -- label, introduction -introduce).

d. Indexing tables – kNN algorithm for classification is based on Statistics like weights for that the creation of tables for each document and calculation of TFIDF values.

e. Term weighting – For most existing document clustering algorithms, documents are represented by using the vector space model. In this model, each document d is considered as a vector in the term-space and represented by the term frequency (TF) vector:

$$d_{tf} = [tf_1, tf_2, \dots, tf_D]$$

where tf_i is the frequency of term i in the document, and D is the total number of unique terms in the text database. Normally there are several preprocessing steps, including the removal of stop words and the stemming on the documents. A widely used refinement to this model is to weight each term based on its inverse document frequency (IDF) in the document collection. The idea is that the terms appearing frequently in many documents have limited discrimination

power, so they need to be deemphasized. This is commonly done by multiplying the frequency of each term i by $\log(n/df_i)$, where n is the total number of documents in the collection, and df_i is the number of documents that contain term i (i.e., document frequency).

Thus, the tf-idf representation of the document d is:

$$d_{tf-idf} = [tf_1 \log(n/df_1), tf_2 \log(n/df_2), \dots, tf_D \log(n/df_D)]$$

when the document vectors are normalized, only the vector product has to be calculated, which can be done faster than the computation of the Euclidian Distance, especially for sparse vectors. The cosine similarities measure the cosine of the angle between two vectors. The bigger the value, the smaller is the actual angle and the more similar are the two vectors. This makes the distance metrics also independent of the length of the documents, as document vectors of different length, but with the same angle to each other, will have zero distance.

For example, given term frequency (TF) weights for science document:

TABLE 2: TERM WEIGHTS FOR A DOCUMENT

sports2				
ID	Word	Count	Tf	tfidf
35	మైలేజీ	1	0.007	25
44	జులైలో	2	0.015	10
59	బియ్యం	1	0.007	25
61	అధికమై	1	0.007	50
107	లాభా	1	0.007	16.666
116	వ్యవహ	1	0.007	50
179	ప్రస్తుత	14	0.105	350
198	పట్ట	1	0.007	50
226	పుంతలు	1	0.007	0.7
227	పుంజకోంట్	2	0.015	0.375
236	తోక్కిస్తాం	1	0.007	4.545
275	కాలంలో	1	0.007	0.7

IMPLEMENTATION

We used Python and Java programming languages for implementation of this work. Python is an interpreter, interactive, object-oriented, extensible programming language. There are two types of strings in Python: byte strings and Unicode strings. Python handles Unicode strings same as that of byte strings. Unicode strings are encoded in UTF-8 format. Python has codecs module which convert UTF-8 encoded byte strings to Unicode strings. We used Java (JDBC) to make database operations using MS Access.

The system can be divided into following modules:

- Automatic Information Collection from web
- Preprocessing and extraction of words from corpus
- Applying stop word removal
- Developing a new N-gram based technique for stemming of the data set.
- Developing the Index tables
- Dimensionality reduction
- Implementing the k-NN Classifier
- Performance measures

AUTOMATIC INFORMATION COLLECTION FROM WEB

- Here we get the data from the news-papers which are available online in the internet. There are some websites providing us the daily news papers in the Telugu script like www.uni.medhas.org.
- This data is called as corpus which will be useful to study the canonical structure of the script. These files are saved in UTF_8 format so that the content in the files can be visible.

Getting a web file using these classes always includes these steps:

- Create a URL object from a URL string.
- Open a URLConnection object from the URL object.
- Set up the web server request by calling set* methods on the URLConnection object.
- Send the request to the web server by calling connect () on the URLConnection object.
- Get the web server response by calling get* methods on the URLConnection object.
- Decode the file content based upon the content type.

PREPROCESSING AND EXTRACTION OF WORDS FROM THE CORPUS

- In this step, the files in the corpus are preprocessed where preprocessing is the process by which we will remove or ignore the characters which are other than in the Telugu language.
- All the numbers, Roman characters and any unwanted letters except "space" will be removed.
- This can in process described below.
 - First, we read all the files of the category.
 - Then, read each file into a string variable.
 - Next step is identifying each individual character.
 - Remove each character which is unwanted.
 - Final step is to write the string to a file.
- From the preprocessed file we will extract the words using a space identifier which separates each word.

APPLYING STOP WORD REMOVAL

Many times, it makes sense to not index "stop words" during the indexing process. Stop words are words which have very little informational content. These are words such as: గురించి, ఎంత, ఎందుకు, ఒక, అవి, వాళ్లు, వారు etc.

Studies have shown that by removing stop words from the index, you may benefit with reduced index size without significantly affecting the accuracy of a user's query. Care must be taken however to take into account the user's needs.

- Here we will remove the words such as articles, Prepositions, conjunctions etc. from the documents.

STEMMING OF WORDS USING N-GRAM DATA STRUCTURES

Stemming is common form of language processing in most, "A failure to process morphological variants results in retrieving only 2% - 10% of the documents retrieved with such processing".

It is the step we develop three dictionaries having key as stem (bigram/trigram/quadgram) and value as words for those corresponding N-grams.

- Here we will give priority order as higher priority to quadgram, priority levels towards trigram and bigram having less priority.
- Starting with quadgram if a key is quadgram having two or more words as value then we will consider the key as stem and push into a stemmed dictionary.
- The above step is repeated for trigram and bigram.
- Now stemmed dictionary containing some key value pairs by giving higher priority to quadgram we will remove if any other values in the dictionary contains same words which under come in the values of quadgram.
- If a word is exactly of length 2 or 3 or 4 and doesn't have any morphological variants then that word itself is considered as root.

DEVELOPING THE INDEX TABLES

k-NN algorithm for classification is based on Statistics like weights for that the creation of tables for each document and calculation of TFIDF values are necessary.

- For the table corresponding to a file to have values first we should have another file called count with frequency each stem word for that file.
- These values are then inserted into the file by systematically processing count file.
- Once all the training documents have its associated initial tables we can calculate Inverse Document Frequency (IDF) and Term Frequency Inverse Document Frequency (TFIDF).

DIMENSIONALITY REDUCTION

- Feature selection is performed here using Document Frequency Thresholding
- Words doesn't occur in just one document are removed based on the assumption that rare words do not affect category prediction.

FINDING TERM WEIGHTS & IMPLEMENTING THE CLASSIFIER

Classification is the process which assigns one or more labels or no label at all to a new (unseen) document. There are many machine learning algorithms which have been applied to the problem of text categorization, ranging from statistical methods. There is already one classifier implemented in Text Categorization using k-NN, the k-nearest neighbor classifier.

K-NEAREST NEIGHBOR

The cosine similarity measure is commonly used in Information Retrieval [Sal89] and hence is adopted as the basic similarity measure in k-NN. The weighted cosine measure between document X and Y with weight vector W and set of terms (or words) T as

$$sim (d_i, d_j) = \frac{\sum_{k=1}^t w_{di} \cdot w_{dj}}{\sqrt{\sum_{k=1}^t (w_{di})^2 \cdot \sum_{k=1}^t (w_{dj})^2}}$$

Where w_{di} and w_{dj} are normalized TF of word t for d_i and d_j , respectively. Select k nearest training documents, where the similarity is measured by the cosine between a given testing document and a training document.

- Using cosine values of k nearest neighbors and frequency of documents of each class i in k nearest neighbors, sort the classes based on their cosine values.
- Assign (i.e., classify) the testing document a class label which has maximum k value.

PERFORMANCE MEASURES

Precision and recall alone do not say much about the effectiveness of the classifier. Hence, it is necessary to compute different standard values which combine precision and recall, to derive a robust measure of the effectiveness of the classifier.

ALGORITHMS USED IN IMPLEMENTATION

1. Algorithm for Automatic Information Collection.
2. Algorithm for Text Classification using k-NN algorithm.

ALGORITHM FOR AUTOMATIC INFORMATION GATHERING

Input website URL

Read the data from url and write it into web_url file

Preprocess the web_url file

Copy all the web links from web_url

Save the links into url_links file

Read the each link from url_links

For each link

If `ascii > 255 && ascii==10 && ascii==32`

Read the data from site

write it into sites folder as Telugu file

read all the web links from current web page

write it into sites folder as Telugu_url file

repeat this process until EOF

ALGORITHM FOR TEXT CLASSIFICATION USING K-NN ALGORITHM

Read the file from web

Preprocess the file

Apply stop word removal

Apply stemming process

Index the stemmed words

Calculate DF value

If `DF==0`

Eliminate the word from index table

Find the IDF value of test document

Find the associated `TF*IDF` value of test document

Calculate cosine similarity measure with each trained set

Assume the k value

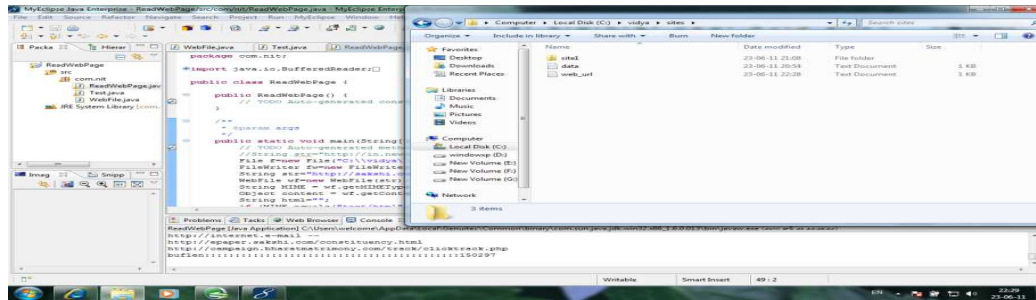
Take the k highest similarity values

Consider the class which has maximum number of k- nearest neighbors in it

Classify the test document into that class

SCREENS

FIG 1: AUTOMATIC INFORMATION COLLECTION



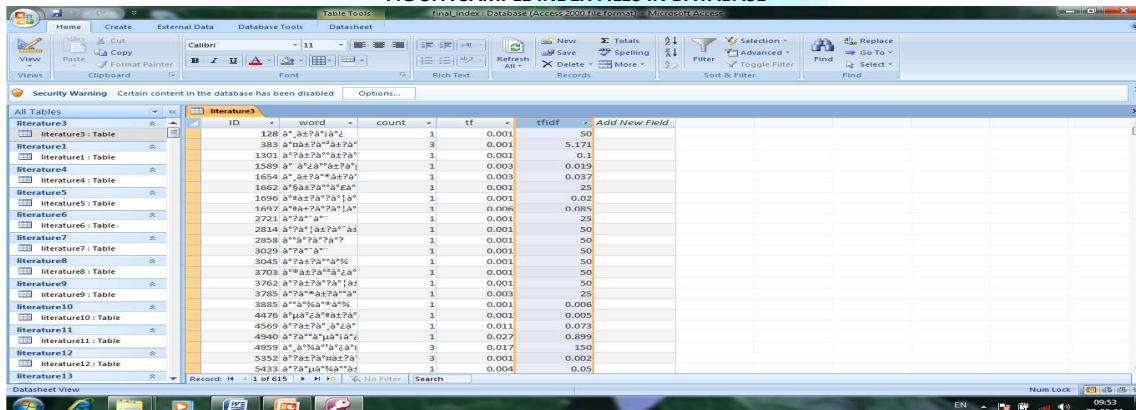
This screen shot shows the source code for information collection tool and the folder containing collected data.

FIG 2: GUI OF N-GRAM BASED STEMMING



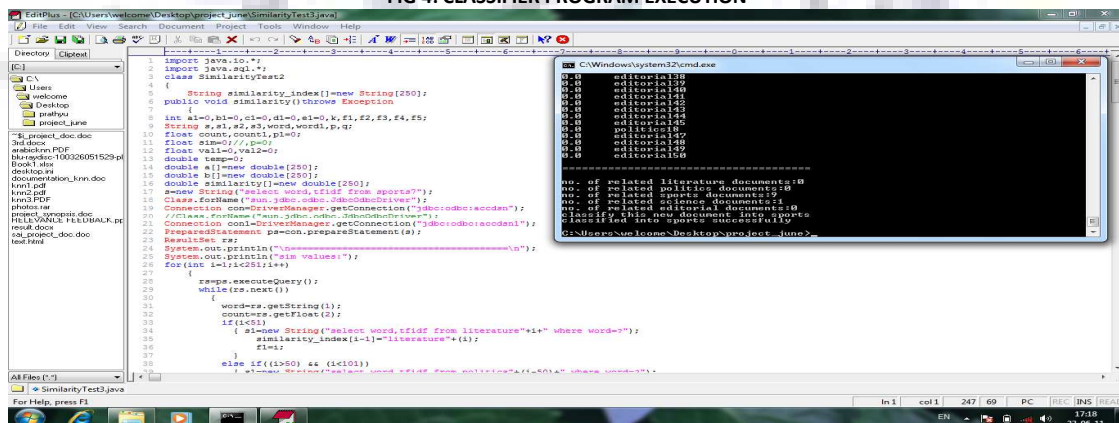
The above screen shot shows the three columns each column showing sorted words, stem word and their associated morphological words, and stem words respectively. The screen shot is obtained when the program for stemming is executing. For the Stemming the input is all the words collected from all file in corpus.

FIG 3: A SAMPLE INDEX FILES IN DATABASE



The above screen shot shows the index file generated in MS – Access in which for each word TF-IDF values are calculated and are inserted into the file.

FIG 4: CLASSIFIER PROGRAM EXECUTION



The above screen shot shows source code and execution of the classifier program in which cosine similarity is calculated in between test document and each training document for finding k-nearest neighbors.

RESULTS

In the training phase of the system we trained 250 documents belonging to 5 different classes business, science, sports, politics and rivers. Then during testing we took a Telugu document containing information related to sports. Then we executed classifier program at different values of K and the results are analyzed. Results are drawn for different values of k for k-Nearest Neighbor Classification for Telugu documents. The results are tabulated as the following table.

Table 3: Effect of value of K on Classification result

Value of k	Number of Similar Documents from Each class					Classified To
	Business	Science	Sports	Politics	Rivers	
1	0	0	1	0	0	Sports
5	0	1	4	0	0	Sports
10	0	1	9	0	0	Sports
20	2	4	11	2	1	Sports
50	10	14	12	5	9	Science

We can clearly conclude that as the value of k increases up to a certain limit maximum correct similar documents are from SPORTS. If the k value increases above this limit the proportionality of correct similar documents decrease. For our classifier the limit is 10.

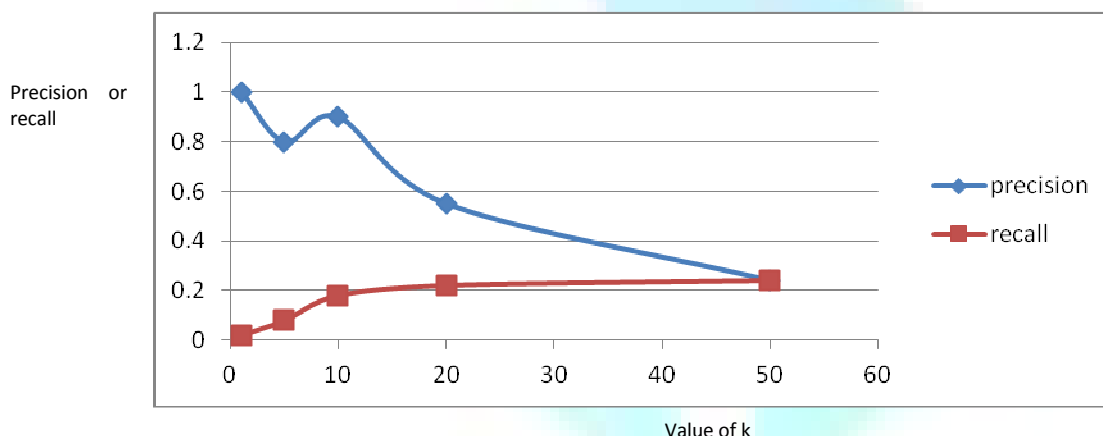
For the above table we calculated precision and recall to determine best value of k which optimizes them. The calculated precision, recall are tabulated as below for easy evaluation of the result.

TABLE 4: PRECISION AND RECALL AT DIFFERENT VALUES OF K

K	Precision	Recall
1	1	0.02
5	0.8	0.08
10	0.9	0.18
20	0.55	0.22
50	0.24	0.24

A graph is drawn for precision and recall at different values of k and is shown below.

FIG 5: GRAPH OF PRECISION AND RECALL AT DIFFERENT VALUES OF K



The precision, recall graph must conclude the best value of k for k-NN classification. The precision value is high at k=1 but recall is low. The optimum precision and recall are obtained at k=10. At k=20 recall has its highest value but the precision has fallen sharply. So the conclusion is 10 is the best value for k in k-NN classification for Telugu document.

CONCLUSION

Our Automatic Information Collection can only eliminate English characters from the links but not other. We can extend the filtering for other languages also. The system can be extended for any other language collection. Fortunately, there is still a lot of work to do. New corpora and weighting functions can be implemented. It is also possible to export the document vectors after the dimensionality reduction to other data formats, which can then be applied to several other classifiers.

REFERENCES

1. Li Baoli1, Yu Shiwen1, and Lu Qin2 An Improved k-Nearest Neighbor Algorithm for Text Categorization
2. Gongde Guo1 , Hui Wang1 , David Bell 2, Yaxin Bi2, and Kieran Greer An k-NN Model-based Approach and Its Application in Text Categorization
3. Eui-Hong (Sam) Han George Karypis, Vipin Kumar Text Categorization Using Weight Adjusted k-Nearest Neighbor Classification
4. Fabrizio Sebastiani Text Categorization
5. Renato Fernandes Corrêa, Teresa Bernarda Luderemir Automatic Text Categorization
6. Gerard Salton and Christopher Buckley Term-weighting approaches in automatic text retrieval
7. Aigars Mahinovs and Ashutosh Tiwari Text Classification method review
8. Gerald J.Kowalski, Mark T. Maybury Information Storage and Retrieval Systems Theory and Implementation
9. Williams B. Frakes and Ricardo Baeza-Yates Information Retrieval: Data Structures & Algorithms

RE-ATTEMPT CONNECTIVITY TO INTERNET ANALYSIS OF USER BY MARKOV CHAIN MODEL

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ABSTRACT

The need of internet is widely spread throughout the world. A large number of people are joining the user group everyday. Places where broadband facilities are not available, people are using dial-up based connectivity, specially in rural areas. This suffers from troubles of frequent non-connectivity and call-disconnectivity. A user leaves the computer terminal after multiple failure attempts of non-connectivity. Some hard-core and dedicated users of dial-up based connection re-joins the attempt process after being away for time being. If re-joining has some probability then this needs to study intensively. Naldi [2002] assumed that there are only two operators and developed a probability model. Unfortunately, the consequence of failing to achieve the properties are harsh, mostly lost data, angry users, misuse data and safe, secure data. This paper is an attempt to analyse the rejoining probability by using a Markov chain model over consumer behavior and internet traffic sharing.

KEYWORDS

Markov Chain Model, Blocking Probability, Internet Service providers, Transition probability matrix.

INTRODUCTION

In India many users in rural areas are using internet through dial-up setup where the telephone lines are used as to provide connecting and data expressions. Definitely the broadband service is faster in speed but require higher cost. In contrary, dial-up services are cheaper, although slower in connectivity.

Suppose that there are two operators in the market to provide internet service to users. The market is competitive and both service providers are looking for to grave more to more customers in order to improve upon their customer base.

We establish the following hypotheses to model the behaviour of the user and the sharing of his traffic between the two competitors.

- The user initially chooses one of the two operators (indicated as O_1 and O_2) with probability p and $1-p$ (initial shares respectively).
- The probability p can take into account all the factors that may lead the user to choose one of the two operators as his first choice, including the range of service it offers and past experience.
- After each failed attempt the user has two choice: he can either abandon (with probability P_A) or switch to the other operators for a new attempt.
- Switching between the two operators is performed on a call-by-call basis and depends just on the latest attempts.
- During the repeated call attempt process the blocking probability L_1 and L_2 (i.e. the probability that the call attempt through the operator O_1 and O_2 fails) and the probability of abandonment P_A stay constant.
- When user abandons the attempts process (with probability P_A) he can again join the connecting process either from O_1 or from O_2 .

A REVIEW

Naldi [1998 a, b, c & d] examined the impact of traffic measurement and traffic analysis in telecommunication sector with special reference to telephone network. Shukla and Gadewar [2007] examined stochastic model for cell movement in a knockout switch in computer network. In similar contribution, Shukla *et al.* [2007] discussed a stochastic model for space division switches in computer network and its extension is in Shukla *et al.* [2007 b]. Szabo *et al.* [2007] discussed accurate traffic classification in world of wireless mobile and multimedia network. Dainotti *et al.* [2008] presented a detailed discussion on classification network traffic via packet level hidden Markov model. Shukla and Jain [2007 a & b] developed Markov chain model analysis methodology and indexing technique for multilevel queue scheduling in operating system. Shukla and Thakur [2007] presented crime based user analysis in internet traffic sharing under cyber crime. Shukla and Thakur [2008 a, b & c] discussed Markov chain modeling application for Banyan switch network and traffic sharing problem. John *et al.* [2008] presented an analysis for trends and differences in connection behavior within classes of internet backbone traffic. Shukla, Tiwari and Tiwari [2008] focused on the rest state analysis in internet traffic distribution in multioperator environment. Shukla, Jain and Ojha [2010 a, b & c] discussed markov chain model based analysis of deadlock index and multilevel queue scheduling. Shukla and Thakur [2010 a & b] applied the imputation methods over knowledge discovery and web mining in data warehouse search problems. Shukla, Thakur and Tiwari [2010] discussed stochastic modeling of internet traffic management and in one more similar analysis Tiwari, Thakur and Shukla [2010] presented a view point on cyber crime analysis for multi dimensional effect in computer network. Marnerides *et al.* [2008] discussed the problem related to detection and mitigation of abnormal traffic behavior in autonomic networked environments. Shukla and Singhai [2010] discussed traffic analysis of message flow in three cross bar architecture in space division switches. Shukla, Jain and Choudhary presented a technique for estimation of ready queue processing time under usual group lottery scheduling (GLS) in multiprocessor environment. Some other useful similar contributions are due to Thakur and Shukla [2010]. Shukla, Gangele, Verma and Singh presented [2011] elasticity of internet traffic distribution computer network in two market environment. Shukla, Gangele, Verma and Singh [2011] developed a detailed discussion on elasticities and index analysis of usual internet traffic share problem.

MARKOV CHAIN MODEL

Let O_1 and O_2 are two operators in a competitive market and a user enters into a cyber cafe where computer terminals for operators are available to access the Internet.

Let $\{X^{(n)}, n \geq 0\}$ be a Markov chain having transitions over the state space $\{O_1, O_2, Z, A\}$ where

State O_1 : User attempting call through first operator O_1

State O_2 : User attempting call through second operator O_2

State Z : Corresponds to a success call (in connectivity)

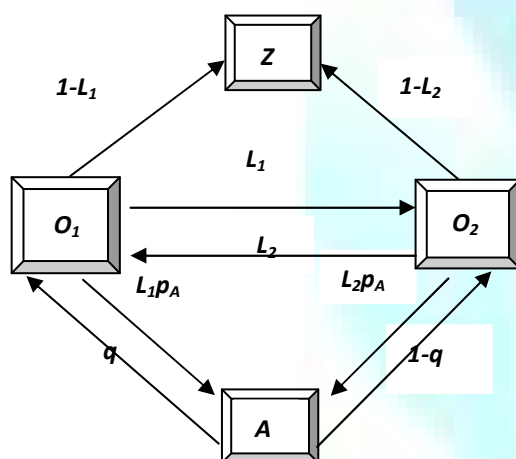
State A : User leaving (abandon) the attempt process

The $X^{(n)}$ stands for state of random variable X at n^{th} attempt ($n \geq 0$) made by the user. Some underlying assumptions for model are:

- The user initially chooses one of the two operators, operator O_1 with probability p and operator O_2 with probability $(1-p)$. This we say is the initial preference to an operator.
- When first attempt of connectivity is failed, the users attempts one more to the same operator, and thereafter, switches over to the next one where two more consecutive attempts are likely. This we say "two-call" basis attempts for the effort of connectivity.
- User has two choices after each failed attempt
 - He can either abandon with probability p_A or
 - Switches to the other operator for a new attempt.
- The blocking probability that the call attempt through the operator O_1 fails is L_1 and through the operator O_2 is L_2 .
- The connectivity attempts of user between operators are on call-by-call basis, which means if the call for O_1 is blocked in k^{th} attempt ($k > 0$) then in $(k+1)^{\text{th}}$ user shift over to O_2 . If this also fails, user switches to O_1 .
- Whenever call connects through either of O_1 or O_2 we say system reaches to the state of success in n attempts.
- The user can terminate the attempt process marked as the system to the abandon state A at n^{th} attempts with probability p_A (either O_1 or from O_2).
- When a connected call is suddenly disconnected either from O_1 or O_2 and connected again with operator O_1 with probability S_1 and with O_2 with probability S_2 we say disconnection occurs.
- On the occurrence of disconnection, the return back from success state to operator O_i ($i = 1, 2$) is based on initial transition from O_i . Due to this disconnection the system returns back to same operator from where it reached to the success state (Z).
- From state Z user can not move to the abandon state A .
- State Z and A are absorbing states.

MODEL OF USER BEHAVIOUR

THE FIGURE 1.0 SHOWS THE TRANSITION DIAGRAM



Let L_1 and L_2 be the blocking probability of network of O_1 and O_2 respectively. The q is probability of transition from abandon state to operator O_1 . The user behavior can be modeled by four state discrete time markov chain in which state O_1 corresponds to the user attempting to place a call through the operator O_1 state O_2 corresponds to the user attempting to place a call through the operator O_1 state Z corresponds to a successful call and state A to the user leaving the process.

The state Z is absorbing state define a markov chain $\{X^{(n)}, n \geq 1\}$ with state space $\{O_1, O_2, Z, A\}$ where $n=0, 1, 2, 3, 4, \dots$ Denote discrete time.

The starting conditions (state distribution before the first call attempt) are [Naldi [2002]]

$$\begin{bmatrix} p[X^{(0)} = O_1] = p \\ p[X^{(0)} = O_2] = 1 - p \\ p[X^{(0)} = Z] = 0 \\ p[X^{(0)} = A] = 0 \end{bmatrix} \dots (1.0)$$

Since the user switch from O_1 and O_2 only if his call fails and if he does not abandon, the transition probability from O_1 to O_2 is $L_1(1-p_A)$. Consequently, the probability of a call places through O_1 being completed is a single attempt is $1-L_1$.

The one-step transition probabilities matrix as stands by Naldi [2002] is:

$$\begin{matrix} & O_1 & O_2 & Z & A \\ \begin{matrix} O_1 \\ O_2 \\ Z \\ A \end{matrix} & \begin{bmatrix} 0 & L_1(1-p_A) & 1-L_1 & L_1p_A \\ L_2(1-p_A) & 0 & 1-L_2 & L_2p_A \\ 0 & 0 & 1 & 0 \\ q & 1-q & 0 & 0 \end{bmatrix} & \dots (1.1) \end{matrix}$$

Following results are derived by Naldi [2002]:

$$P[X^{(n)} = O_1] = P[X^{(n-1)} = O_2]L_2(1 - p_A) \quad \dots(1.2)$$

$$P[X^{(n)} = O_2] = P[X^{(n-1)} = O_1]L_1(1 - p_A) \quad \dots(1.3)$$

After unwrapping the recursions we get the general relationships for O_1

$$\left\{ \begin{array}{ll} P[X^{(n)} = O_1] = p\sqrt{(L_1L_2)^n} \cdot (1 - p_A)^n, & n \text{ even} \\ P[X^{(n)} = O_1] = (1 - p)L_2\sqrt{(L_1L_2)^{n-1}} \cdot (1 - p_A)^n, & n \text{ odd} \end{array} \right\} \quad \dots(1.4)$$

for O_2

$$\left\{ \begin{array}{ll} P[X^{(n)} = O_2] = (1 - p)\sqrt{(L_1L_2)^n} \cdot (1 - p_A)^n, & n \text{ even} \\ P[X^{(n)} = O_2] = pL_1\sqrt{(L_1L_2)^{n-1}} \cdot (1 - p_A)^n, & n \text{ odd} \end{array} \right\} \quad \dots(1.5)$$

The state probabilities after the first attempt can be obtained by simple relationship:

Here $n=1, 2, 3, 4, 5, 6, 7, \dots$

$n = 1$

$$\left[\begin{array}{l} p[x^{(1)} = O_1] = p[x^{(0)} = O_2]p[x^{(1)} = O_1 / x^{(0)} = O_2] \\ p[x^{(1)} = O_2] = p[x^{(0)} = O_1]p[x^{(1)} = O_2 / x^{(0)} = O_1] \dots \\ p[x^{(1)} = A] = p[x^{(0)} = O_1]p[x^{(1)} = A / x^{(0)} = O_1] \end{array} \right] \quad \dots(1.6)$$

$n = 2$

$$\left[\begin{array}{l} p[x^{(2)} = O_1] = p[x^{(1)} = O_2] \cdot p[x^{(2)} = O_1 / x^{(1)} = O_2] + p[x^{(1)} = A] \cdot p[x^{(2)} = O_1 / x^{(1)} = A] \\ p[x^{(2)} = O_2] = p[x^{(1)} = O_1] \cdot p[x^{(2)} = O_2 / x^{(1)} = O_1] + p[x^{(1)} = A] \cdot p[x^{(2)} = O_2 / x^{(1)} = A] \\ p[x^{(2)} = A] = p[x^{(1)} = O_1] \cdot p[x^{(2)} = A / x^{(1)} = O_1] + p[x^{(1)} = O_2] \cdot p[x^{(2)} = A / x^{(1)} = O_2] \end{array} \right] \quad \dots(1.7)$$

Where $M = L_1 L_2 (1 - p_A)$, $N = p q$

$$\left[\begin{array}{l} p[x^{(0)} = O_1] = p, p[x^{(0)} = O_2] = 1 - p, p[x^{(0)} = Z] = 0, p[x^{(0)} = A] = 0 \end{array} \right] \quad \dots(1.8)$$

$$\left[\begin{array}{l} p[x^{(1)} = O_1] = (1 - p)L_2(1 - p_A), p[x^{(1)} = O_2] = pL_1(1 - p_A), p[x^{(1)} = A] = pL_1p_A \end{array} \right] \quad \dots(1.9)$$

$$\left[\begin{array}{l} p[x^{(2)} = O_1] = p \cdot p_A(M + qL_1), p[x^{(2)} = O_2] = M(1 - p)(1 - p_A) + p(1 - q)L_1p_A, \\ p[x^{(2)} = A] = M p_A \end{array} \right] \quad \dots(1.10)$$

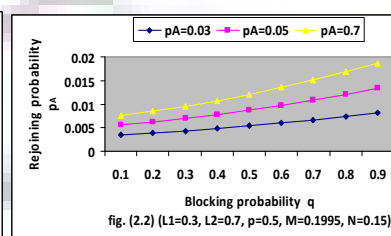
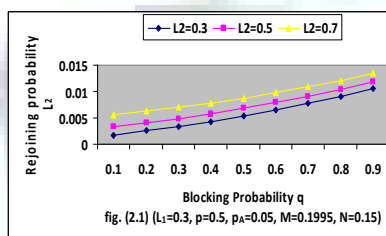
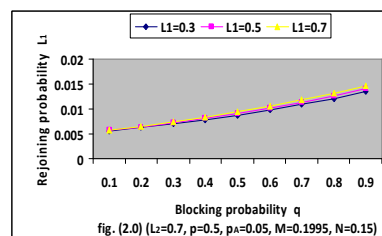
$$\left[\begin{array}{l} p[x^{(3)} = O_1] = M[(1 - p)L_2(1 - p_A)^2 + p_A(p - pq + q)] \\ p[x^{(3)} = O_2] = p_A[pL_1(1 - p_A)(M + qL_1) + M(1 - q)] \\ p[x^{(3)} = A] = p_A[pL_1p_A(M + qL_1) + L_2\{M(1 - p)(1 - p_A) + p(1 - q)L_1p_A\}] \end{array} \right] \quad \dots(1.11)$$

$$\left[\begin{array}{l} p[x^{(4)} = O_1] = p_A[M(1 - p_A)\{p(M + qL_1) + L_2(1 - q)\} + NL_1p_A\{M + qL_1 + qL_2(1 - q)\} + qL_2M \\ (1 - p)(1 - p_A)] \\ p[x^{(4)} = O_2] = M[(1 - p)M(1 - p_A)^2 + L_1(1 - p_A)p_A(p - pq + q)] + p_A(1 - q)[pL_1p_A(M + qL_1) \\ + L_2\{M(1 - p)(1 - p_A) + p(1 - q)L_1p_A\}] \\ p[x^{(4)} = A] = Mp_A[\{(1 - p)M(1 - p_A) + p - pq + q\} + p_A\{p(M + qL_1) + L_2(1 - q)\}] \end{array} \right] \quad \dots(1.12)$$

SIMULATION STUDY

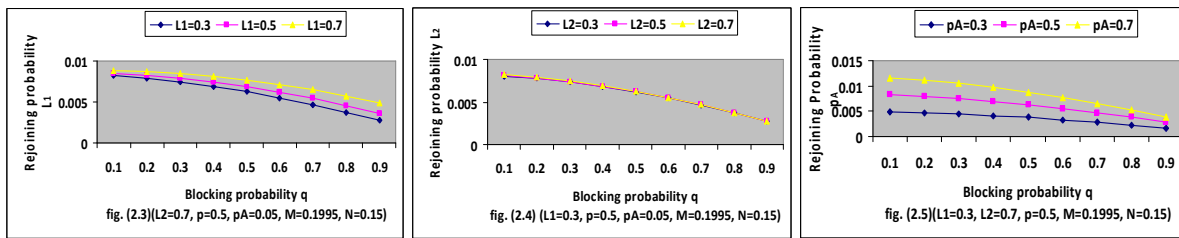
This section contains re-attempting connectivity of analysis model characteristics with respect blocking probability of operation O_1 and operator O_2 .

$$\left[\begin{array}{l} p[x^{(5)} = O_1] = p_A[M L_2(1 - p_A)^2\{p(M + qL_1) + L_2(1 - q)\} + M N q(p_A)\{M L_1 + L_2(1 - q)\} \\ + qL_2^2 M(1 - p)(1 - p_A)^2] + M q p_A[\{(1 - p)M(1 - p_A) + p - pq + q\} + p_A\{p(M + qL_1) + L_2(1 - q)\}] \end{array} \right] \quad \dots(2.0)$$



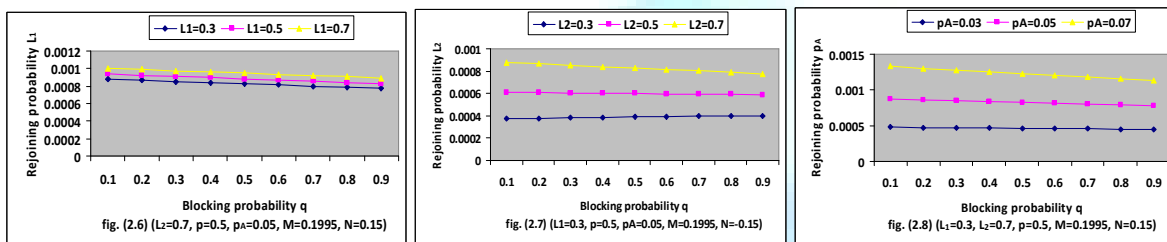
In reference of fig. (2.0, 2.1, and 2.2) L_1 , L_2 , and p_A values is separately high. While rejoining probability variation with respect to re-attempting probability q it is found that they are in increasing trends. For lower value of L_1 , L_2 and p_A the rejoining connectivity level upper than when L_1 , L_2 and p_A is high.

$$\left[\begin{array}{l} p[x^{(5)} = O_2] = p_A[M(1 - p_A)\{pL_1(1 - p_A)(M + qL_1) + M(1 - q)\} + NL_1^2(1 - p_A)p_A\{M + qL_1 \\ + qL_2(1 - q)\} + qM_2(1 - p)(1 - p_A)] + M(1 - q)p_A[\{(1 - p)M(1 - p_A) + p - pq + q\} + p_A\{p(M + qL_1) \\ + L_2(1 - q)\}] \end{array} \right] \quad \dots(2.1)$$



In view of fig. (2.3, 2.4 and 2.5) the rejoining probability has downward trends and when L_1 , L_2 and p_A separately low, the shifting pattern found words lower side. The rejoining probability of the connectivity process of the first operator and both operators' alternates is going down with the increasing level of blocking probability. However, if opponent operator also bears the same in increasing pattern then the rejoining probability curve is further lower down.

$$p[x^{(5)} = A] = L_1(p_A)^2[M(1-p_A)\{p(M+qL_1)+L_2(1-q)\}+N\{M+qL_1+qL_2(1-q)\}+qM_2(1-p)] \\ p_A]+M^2p_A[(1-p)L_2(1-p_A)^2+p_A(p-pq+q)]+L_2(p_A)^2(1-q)[pL_1p_A(M+qL_1)+L_2\{M(1-p) \\ (1-p_A)+p(1-q)L_1p_A\}] \quad \dots(2.2)$$



When to examine rejoining probability with respect to q as obtains in L_1 , L_2 and p_A . The output fig.(2.6, 2.7 and 2.8) are showing reverse pattern on the q rejoining probability if high contains a stability factors in re-attempting connectivity variations. These constant pattern of rejoining probability for operator O_1 and operator O_2 or alternates change rate of parameters it shows linear trends of re-attempting operations.

$$p[x^{(6)} = O_1] = p_A[M(1-p_A)\{pM(1-p_A)(M+qL_1)+ML_2(1-p_A)(1-q)\}+NML_1(1-p_A)p_A \\ \{M+qL_1+qL_2(1-q)\}+qM^2L_2(1-p_A)^2(1-p)]+M(1-q)p_AL_2(1-p_A)[\{(1-p)M(1-p_A) \\ +p-pq+q\}+p_A\{Mp(L_2(1-p_A)+q)+L_2^2(1-p_A)(1-q)\}]+L_1(p_A)^2q[\{M(1-p_A)\{p(M+qL_1) \\ +L_2(1-q)\}+N\{M+qL_1+qL_2(1-q)\}+qM^2(1-p)p_A\}]+qM^2p_A[(1-p)L_2(1-p_A)^2 \\ +p_A(p-pq+q)]+L_2(p_A)^2(1-q)q[pL_1p_A(M+qL_1)+L_2\{M(1-p)(1-p_A)+q(1-q)L_1p_A\}] \quad \dots(2.3)$$

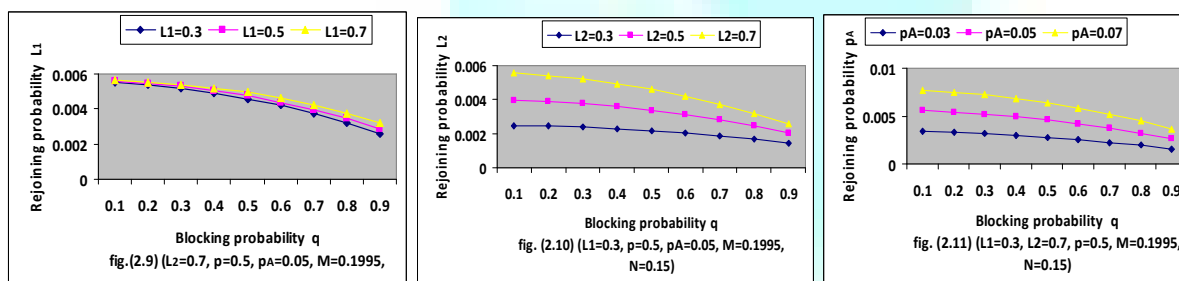


Fig. (2.3, 2.4 and 2.5) are similar to fig. (2.9, 2.10 and 2.11) and showing downward trend of rejoining probability. The re-attempting process of the connectivity for both operators with respect to alternate's operators where values is little high for both operators the rate of change parameter is downward. This pattern of rejoining probability of connectivity is downward showing a sharp decrement in the re-attempting connectivity.

$$p[x^{(6)} = O_2] = p_A[M^2(1-p_A)^2\{p(M+qL_1)+L_2(1-q)\}+MNP_A\{MqL_1^2(1+p_A)+qM(1-q)\} \\ +qM^2L_2(1-p)(1-p_A)^2]+MqL_1(1-p_A)p_A[\{(1-p)M(1-p_A)+p-pq+q\}+p_A\{pL_1(1-p_A) \\ (M+qL_1)+M(1-q)\}]+L_1(p_A)^2(1-q)[\{M(1-p_A)\{p(M+qL_1)+L_2(1-q)\}+N\{M+qL_1 \\ +qL_2(1-q)\}+qM^2(1-p)p_A\}]+M_2(1-q)p_A[(1-p)L_2(1-p_A)^2+p_A(p-pq+q)] \\ +L_2(p_A)^2(1-q)^2[pL_1p_A(M+qL_1)+L_2\{M(1-p)(1-p_A)+p(1-q)L_1p_A\}] \quad \dots(2.4)$$

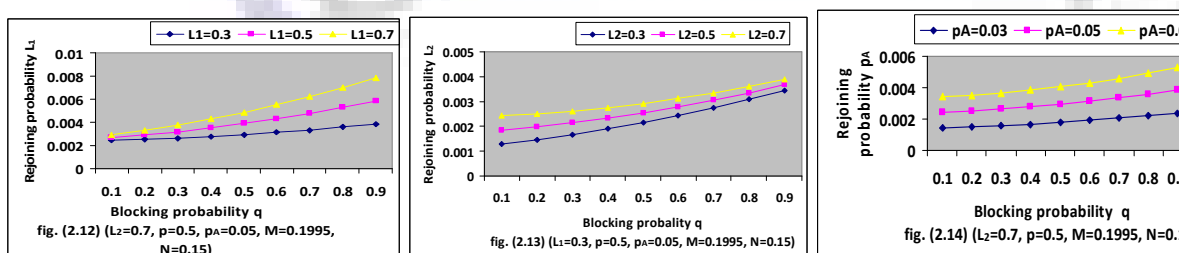


Fig. (2.0, 2.1 and 2.2) are similar to fig. (2.12, 2.13 and 2.14) and showing upward trend of rejoining probability. According to fig. (2.12, 2.13 and 2.14) L_1 , L_2 , p_A values probability is little shifted high the curves are shifted toward higher values with similar trends. When to consider the opponent blocking probability the

trend is linear and by increasing rejoining probability q the rejoins bears positive signals. If L_1 , L_2 and p_A is also high with respect to q the rate of positive increment of rejoining probability.

$$p[x^{(6)} = A] = p_A [M^2(1-p_A)p_A \{p(M+qL_1) + L_2(1-q)\} + MNqL_1(p_A)^2 \{ML_1 + L_2(1-q)\} + qM^2L_2(1-p_A)p_A(1-p)] + MqL_1(p_A)^2 \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} + p_A [M^2p_A(1-p_A) \{p(M+qL_1) + L_2(1-q)\} + MNL_1(p_A)^2 \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)L_2(1-p_A)p_A + MNL_1(p_A)^2 \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)L_2(1-p_A)p_A] + ML_2(p_A)^2(1-q) \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} \quad \dots(2.5)$$

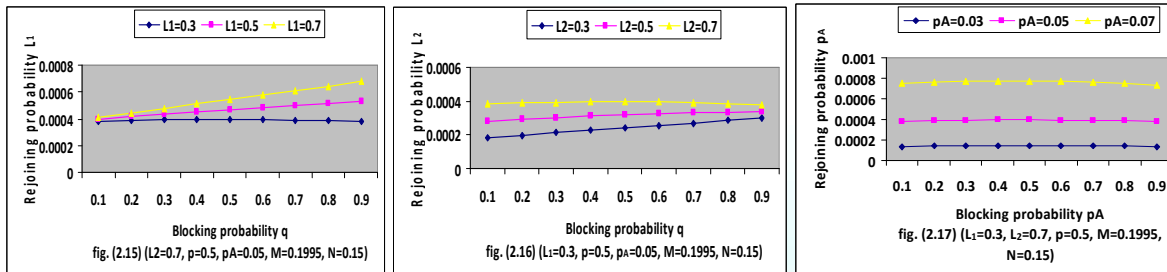


Fig. (2.6, 2.7 and 2.8) are similar to fig. (2.15, 2.16 and 2.17) and showing linear and constant trend of rejoining probability. L_1 values probability is little shifted high the curves are shifted toward higher values with similar trends. The output are showing reverse pattern on the q rejoining probability if high contains a stability factors in re-attempting connectivity variations. The fig. (2.16 and 2.17) shows that if opponent blocking level is low then rejoining probability level is almost constant. But when opponent blocking is high this parameter has reducing re-attempting patterns.

This paper presents some more extending process equations that represent a better reliable and re-attempting connectivity for simulation study.

$$p[x^{(7)} = O_1] = p_A [M^2(1-p_A)^2 \{pM(L_2(1-p_A)+q) + L_2^2(1-p_A)(1-q)\} + qM^2Np_A \{ML_1 + (1-q)L_2(1-p_A)\} + qM^2L_2^2(1-p_A)^3(1-p)] + M^2q(1-p_A)p_A \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} + M(p_A)^2(1-q) \{M(1-p_A) \{p(M+qL_1) + L_2(1-q)\} + N \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)p_A\} + M^2(1-q)L_2(1-p_A)p_A \{[(1-p)L_2(1-p_A)^2 + p_A(p-pq+q)] + ML_2(p_A)^2(1-q)^2 \{pP_A(M+qL_1) + L_2 \{[(1-p)(1-p_A)^2L_2 + p(1-q)p_A\}]\} + qp_A[M^2(1-p_A)p_A \{p(M+qL_1) + L_2(1-q)\} + MNqL_1(p_A)^2 \{ML_1 + L_2(1-q)\} + qM^2L_2(1-p_A)p_A(1-p)] + Mq^2L_1(p_A)^2 \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} + qp_A[M^2p_A(1-p_A) \{p(M+qL_1) + L_2(1-q)\} + MNL_1(p_A)^2 \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)L_2(1-p_A)p_A] + ML_2(p_A)^2q(1-q) \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} \quad \dots(3.1)$$

$$p[x^{(7)} = O_2] = p_A [M^2(1-p_A)^2 \{pL_1(1-p_A)(M+qL_1+M(1-q))\} + MNL_1^2(1-p_A)^2p_A \{M+qL_1+qL_2(1-q)\} + qM^3(1-p)(1-p_A)^2] + M^2(1-q)(1-p_A)p_A \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{M(1-p_A)p(M+qL_1) + ML_2(1-p_A)(1-q)\} + qL_1^2(1-p_A)(p_A)^2 \{M(1-p_A) \{M+qL_1+L_2(1-q)\} + N \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)p_A\} + qM^2(1-p_A)p_A \{M(1-p)(1-p_A) + L_1p_A(p-pq+q)\} + M(p_A)^2q(1-q) \{pL_1p_A(M+qL_1) + L_2 \{M(1-p)(1-p_A) + p(1-q)L_1p_A\} + (1-q)p_A[M^2(1-p_A)p_A \{p(M+qL_1) + L_2(1-q)\} + MNqL_1(p_A)^2 \{ML_1 + L_2(1-q)\} + qM^2L_2(1-p_A)p_A(1-p)] + Mq(1-q)L_1(p_A)^2 \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} + (1-q)p_A[M^2p_A(1-p_A) \{p(M+qL_1) + L_2(1-q)\} + MNL_1(p_A)^2 \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)L_2(1-p_A)p_A] + ML_2(p_A)^2(1-q)^2 \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{p(M+qL_1) + L_2(1-q)\}\} \quad \dots(3.2)$$

$$p[x^{(7)} = A] = p_A [M^2(1-p_A)p_A \{pL_1^2(1-p_A)(M+qL_1) + M(1-q)\} + MNL_1^2(1-p_A)(p_A)^2 \{M+qL_1+qL_2(1-q)\} + M^3(1-p)(1-p_A)p_A] + M^2(1-q)(p_A)^2 \{[(1-p)M(1-p_A) + p-pq+q] + Mp_A \{p(M+qL_1+qL_2(1-q)) + (1-q)p_A\} + L_1^2(p_A)^3 \{M(1-p_A) \{p(M+qL_1) + L_2(1-q)\} + N \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)p_A\} + qM^2(p_A)^2 \{M(1-p)(1-p_A)p_A + L_1p_A(p-pq+q)\} + L_1L_2(p_A)^2q(1-q) \{pL_1p_A(M+qL_1) + L_2 \{M(1-p)(1-p_A) + p(1-q)L_1p_A\} + p_A[M^2(1-p_A)^2L_2p_A \{p(M+qL_1+L_2(1-q))\} + M^2Np_Aq \{L_1p_A + L_2p_A(1-q)\} + qM^2L_2^2(1-p)(1-p_A)^2p_A] + M^2q(p_A)^2 \{[(1-p)M(1-p_A) + p-pq+q] + p_A \{pL_1(1-p_A)(M+qL_1) + M(1-q)\} + L_1L_2(p_A)^3(1-q) \{M(1-p_A) \{p(M+qL_1) + L_2(1-q)\} + N \{M+qL_1+qL_2(1-q)\} + qM^2(1-p)p_A\} + M^2(1-q)L_2(p_A)^2 \{[(1-p)L_2(1-p_A)^2 + p_A(p-pq+q)] + L_2^2(p_A)^3(1-q)^2 \{pL_1p_A(M+qL_1) + L_2 \{M(1-p)(1-p_A) + p(1-q)L_1p_A\} \} \quad \dots(3.3)$$

CONCLUSION

The attempt process by the user is affected by the re-attempt connectivity probability. If re-attempt probability is high then success of connectivity is also high. This paper presents a new persistent internet connectivity services designed to simplify cluster based internet service management. This rejoining probability called a re-attempting internet structure. Internet services are successfully bringing re-attempting connectivity to masses. Millions of people depend on internet services for applications like searching, messaging, education, news, current events, maps and some other important purpose. All are the very useful for the people but some causes there had problems. In this paper presents if internet service providers and connections are failed then we can connect rejoin probability that reconnect the internet and service connectivity with the re-attempting data structure.

REFERENCES

1. **Naldi M. (1998 a):** A classification of B-ISDN traffic measurements based on measurement purpose, Temporary Document TD 3/2-11, ITU-Telecommunication Standardization Sector, Study Group 2 meeting.
2. **Naldi M. (1998 b):** A simulation analysis of the impact of dimensioning objectives on the yearly quality of service, Temporary Document TD 3/2-2, ITU-Telecommunication Standardization Sector, Study Group 2 meeting, Geneva.
3. **Naldi M. (1998 c):** Internet access through the telephone network an analysis of traffic patterns, 14th European Network Planning Workshop, Les Arcs, paper no. 1.1, pp. 9-14.
4. **Naldi M. (1998 d):** The Internet's growth problems, Telecommunications, vol. 32, no.1, pp. 55-59.
5. **Naldi, M. (2002)** Internet traffic sharing in a Multi-user Environment, Computer network, 38:809-824.
6. **Shukla D. and Gadewar S. (2007):** Stochastic model for cell movement in a knockout switch in computer networks, Journal of High Speed Network, vol. 16, issue 3, pp. 310-332.
7. **Shukla D. and Jain Saurabh (2007 a):** A markov chain model for multi-level queue scheduler in operating system, Proceedings of the International Conference on Mathematics and Computer Science, ICMCS-07, pp. 522-526.
8. **Shukla D. and Jain Saurabh (2007 b):** Deadlock state study in security based multilevel queue scheduling scheme in operating system, Proceedings of National Conference on Network Security and Management, NCNSM-07, pp. 166-175.
9. **Shukla D. and Thakur Sanjay (2007):** Crime based user analysis in Internet traffic sharing under cyber crime, Proceedings of National Conference on Network Security and Management (NCSM-07), pp. 155-165.
10. **Shukla D., Gadewar S. and Pathak R.K. (2007 a):** A stochastic model for space-division switches in computer networks, Applied Mathematics and Computation (Elsevier Journal), vol. 184, issue 2, pp. 235-269.
11. **Shukla D., Pathak R.K. and Thakur Sanjay (2007 b):** Analysis of Internet traffic distribution between two markets using a Markov chain model in computer networks, Proceedings of National Conference on Network Security and Management (NCSM-07), pp. 142-153
12. **Szabo G., Szabo I. and Orincasy D. (2007):** Accurate traffic classification, in World of Wireless Mobile and Multimedia Networks (WoWMoM-07), Espoo, Finland, vol. 5, no. 5 pp. 01-08.
13. **Dainotti A., Donato W. De, Pescapè A. and Salvo Rossi P. (2008):** Classification of network traffic via packet-level hidden markov models, In IEEE GLOBECOM-08.
14. **John W., Tafvelin S. and Olovsson T. (2008):** Trends and differences in connection-behavior within classes of internet backbone traffic, PAM'08 Passive and Active Network Measurement Conference, Springer Berlin, Heidelberg, Vol. 4979/2008, pp. 192-201.
15. **Marnerides A., Pezaros D. P. and Hutchison D. (2008):** Detection and mitigation of abnormal traffic behaviour in autonomic networked environments, ACM CoNEXT 2008, Student Workshop, Madrid, Spain.
16. **Shevtekar A., Stille J. and Ansari N. (2008) :** On the impacts of low rate DoS attacks on VoIP traffic security and communication networks, vol. 1, issue 1, pp. 45-56.
17. **Shukla D. and Thakur Sanjay (2008 a):** Disconnectivity analysis in Internet traffic sharing, Electronic Proceedings of International Conference on Mathematics and Computer Science (ICMCS-08), pp. 278-287.
18. **Shukla D. and Thakur Sanjay (2008 b):** Rest state analysis in Internet traffic sharing under a Markov chain model, Proceedings of 2nd National Conference on Computer Science & Information Technology, Gaziabad, pp. 46-52.
19. **Shukla D. and Thakur Sanjay (2008 c):** Stochastic model for packet movement in a banyan switch in computer networks, Electronic Proceedings of the Second National Conference on Mathematical Techniques-Emerging Paradigms for Electronics and IT Industries (MATEIT-08), pp. 262-268.
20. **Shukla D., Tiwari M., Thakur S. and Tiwari V.(2008):** Rest state analysis in Internet traffic distribution in multi-operator environment, 2nd National Conference on Mathematical Techniques: Emerging Paradigms for Electronics and IT Industries, (MATEIT-2008), pp 269-281.
21. **Shukla, D., Jain Saurabh and Ojha, Shweta(2010 a):** Effect of data model approach for the analysis of multi-level queue scheduling, International Journal of Advanced Networking and Applications(IJANA), vol. 2 , no. 1, pp. 419-427.
22. **Shukla, D. , Jain , Saurabh and Ojha , Shweta (2010 b) :** Deadlock index analysis of multi-level queue scheduling in operating system using data model approach, GESJ: International Journal of Computer Science and Telecommunication ,Vol 6, no 29, pp 93-110.
23. **Shukla, D. ,Jain, Saurabh and Ojha, Shweta (2010 c):**Study of multi-level queue scheduling for deadlock state in operating system, Madhya Bharti Journal, Vol. 56, pp141-157.
24. **Shukla, D., Singhai, Rahul and Thakur, N.S. (2010 a):** Some imputation methods to treat missing values in knowledge discovery in data-warehouse, International Journal of Data Engineering (IJDE),vol. 1,no.2,pp140-151.
25. **Shukla, D., Singhai, Rahul and Thakur, N.S. (2010 b):** Data processing tasks and their importance in web-mining, Madhya Bharti Journal, Vol. 56, pp13-18.
26. **Shukla, D. and Thakur, Sanjay (2010):** Index based Internet traffic sharing analysis of users by a Markov chain probability model. , Karpagam Journal of Computer Science, vol. 4, no. 3, pp-1539-1545.
27. **Shukla, D. and Singhai, Rahul (2010):** Traffic analysis of message flow in three cross-bar architecture in space division switches , Karpagam Journal of Computer Science, vol. 4, no. 3, pp-1560-1569.
28. **Shukla, D. , Jain , Anjali and Chaudhary, Amita (2010) :** Estimation of Ready Queue processing time under usual group lottery scheduling(GLS) in multiprocessor environment, International Journal of Computer Applications, vol. 8,no. 4, pp 39-45.
29. **Shukla, D. ,Gangele, Sharad and Verma, Kapil (2010):** Internet traffic sharing under multi-market situations, Published in Proceedings of 2nd National conference on Software Engineering and Information Security, Acropolis Institute of Technology and Research, Indore, MP, (Dec. 23-24,2010), pp49-55.
30. **Shukla, D., Thakur, Sanjay and Tiwari, Virendra (2010):** Stochastic modeling of Internet traffic management, International Journal of the Computer the Internet and Management, Vol. 18, No. 2 pp. 48-54.
31. **Tiwari, Virendra, Thakur, Sanjay and Shukla, D.(2010):**Cyber crime analysis for multi-dimensional effect in computer network, Journal of Global Research in Computer Science, Vol.1, no. 4. pp 14-21.
32. **Thakur, Sanjay and Shukla, D. (2010):** Iso-share analysis of Internet traffic sharing in presence of favoured disconnectivity , GESJ: Computer Science and Telecommunications, 4(27), pp-16-22.
33. **Shukla, D., Gangele, Sharad, Verma, Kapil and Singh Pankaja (2011):** Elasticity of Internet Traffic Distribution Computer Network in two Market Environment, Journal of Global research in Computer Science (JGRCS) Vol.2, No. 6, pp.6-12.
34. **Shukla, D., Gangele, Sharad, Verma, Kapil and Singh, Pankaja (2011):** "Elasticities and Index Analysis of Usual Internet Traffic Share Problem", International Journal of Advanced Research in Computer Science (IJARCS),Vol. 02, No. 04, pp.473-478.

FACTORIAL STUDY OF STUDENTS ATTITUDE TOWARDS TECHNOLOGY ENABLED ACADEMIC LEARNING

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ABSTRACT

An attempt was made to develop a comprehensive scale for measuring students' attitude towards Technology Enabled Learning. A sample of 50 students whose age ranged between 19 – 21 was administered with 50 – items of the students' attitude towards Technology Enabled Learning. Results of the factor analysis show the outcome of five independent factors. They were labelled as: Self- Efficacy, Classroom Learning, Attitude Towards Technology, Learning Feasibility and Academic Achievement. Both Face and Content validities were established with the opinions of the experts in the field of investigation.

KEYWORDS

Classroom Technology, Learner Attitude, Educational Purposes, Academic Achievement.

INTRODUCTION

Attitudes can be considered both the determinants and consequences of learning experiences (Davies and Brember, 2001). Learning experience may be influenced by individuals, self-concept, parents and teachers' motivation, Learning environment, socio-economic status, objects, and situations (Coon, 1995; Weiner, 1994). Although these experiences may be satisfying or frustrating, attitudes are nevertheless developed, and once established, they enable or inhibit further learning opportunities. Technology impacts students' daily lives and certainly plays an important part in developing students' positive and negative attitudes toward it.

Recent technological advancements have provided educators and learners with new tools to support in-class instruction and coursework. Hence, integrating technology into classrooms is a growing initiative that is becoming an important and growing part of educational culture and university life (Bratina, Hayes, & Blumsack, 2002; Wiley 2001).

Classroom Technology is the collection of software, hardware and processes that facilitate learning (and teaching) and thus impact (mostly positively) the learner's attitude and performance (Govindasamy 2002; Khan 2000). Similarly, learner attitude is defined as the impact or influence of classroom technology on a student's disposition towards learning and this can be positive, negative, or neutral.

The introduction of technology to the learning environment has presented many opportunities and challenges for both students and educators alike. Bena and James (2001) claim that there are three reasons for investing in technology: (1) to increase students ability and interest in applying authentic settings, what district and states have identified as learning and tasks that students should know and able to do; (2) to prepare students for success in a technology centered world of work, and; (3) to prepare students to manage and use information so they can be productive life long learners and responsible citizens. Furthermore, integrating technologies in learning classrooms has been shown to promote teachers and students' performance and motivation.

According to a number of academics in the educational technologies field, through the implementation of educational technology student attitude tends to improve and the students are also better prepared to enter and succeed in the digital workplace (Chen, Lee, & Chen, 2005; Liaw, 2004). In the present study, an attempt was made to develop a comprehensive scale for measuring the effect of students' attitude towards Technology Enabled Academic Learning.

OBJECTIVES

1. To identify the various factors related to students' attitude towards Technology enabled academic learning.
2. To devise a reliable and valid scale for the use with students of Hotel Management and Catering Technology.

Review of literature reveals in the related area the availability of a few instruments but none was found to be adequate as they were standardised in the other countries. Hence, the need was felt by the investigator to develop a comprehensive scale to measure students' attitude towards Technology Enabled Academic Learning.

METHOD**SAMPLE**

The sample of the study comprised of 200 Degree students. Their age ranged from 19 – 21 years, studying in the first year B.Sc H&HA Degree. 50 subjects were selected by simple random sampling method for the present investigation.

DESCRIPTION OF TOOL

Students' Attitude towards Technology Enabled Academic Learning scale emerged out of an exhaustive survey of literature and suggestions made by educationists, management specialist's faculty members and students of Hotel Management course. It is a 5- point scale varying from the response of "Strongly Agree" to "Strongly Disagree". The raw scores of "5" to "1" were given and later the factor scoring method was adopted for the statistical analysis of the data. The items in the scale cover students various attitude towards technology used in the classroom for their academic learning.

FACTORIAL METHOD

The raw data from the study sample (N= 50) was computerised for factor analysis by the method of Principle Factoring Orthogonal Rotation: Varimax with 40- interactions (Kim, 1970). It involves 3 steps:

1. Preparation of the correlation matrix.
2. Extraction of the initial factors – the exploration of possible data reduction and
3. The rotation to a terminal solution - the search for simple and interpretable factors.

The factor analytic report of the scale consists of 5 factors which were labelled according to experts' suggestions. The final form of the scale consists of 50- items, after deleting 10-items which are below 0.50 in factor loading. The labelled factors were: Self-Efficacy, Classroom Learning, Attitude Towards

Technology, Learning Feasibility and Academic Achievement. To obtain the reliability measure, the internal consistency method was adopted which was done through the Factor Analysis. Moreover, the face validity and content validity were established by the opinions of the experts on labelling of these factors.

RESULTS AND DISCUSSION

The results of the Factorial Analysis showed that all the items were positively loaded with each other. These items were arranged in order of hierarchy and factor loading of 0.50 was taken into consideration for the each factor interpretation.

TABLE – 1: FACTOR I – SELF-EFFICACY

S.NO	ITEM.NO	STATEMENT	FACTOR LOADING
1	1	I am interested to learn new things through technology.	0.78
2	2	I have good knowledge in Computer Application.	0.77
3	3	Technology helps me to control my pace of learning.	0.76
4	4	Classroom Technologies help me to stimulate my problem solving skills through visual experiences.	0.76
5	5	Technology helps me to learn better now-a-days.	0.74
6	6	Technology helps to understand and retain the information on subject matter.	0.73
7	7	Technology motivates me in further learning.	0.70
8	8	I wish to be more attentive when Technology is used in the classroom.	0.69
9	9	Technology conveys theoretical concepts with practice for more understanding.	0.67
10	10	Technology enables me to be more creative.	0.65
11	11	Technology will change the way students learn in the class	0.65
12	12	Technology helps me to learn because it allows to express thinking in better and different ways.	0.63
13	13	Technology is used for self - evaluation.	0.61
14	14	I have good knowledge in using computers.	0.59

FACTOR I: SELF-EFFICACY

It is observed from the Table – 1 that the first factor contains 14 – items of which 7 items are fairly high loaded ($r = 0.70 - 0.78$) and rest 7-items are moderately loaded ($r = 0.59 - 0.69$). The 30-items contribute to the variance of 30.1%. The items in the factor of Self-Efficacy were expressed as: students learn new things through technology, good knowledge in computer application, technology helps students to control pace of learning, technology helps students to learn better, it motivates students further learning, etc., Hence the factor is labelled as “Self-Efficacy”.

TABLE – 2: FACTOR II – CLASSROOM LEARNING

S.NO	ITEM.NO	ITEM CONTENT	FACTOR LOADING
1	15	Classroom technologies help me in getting pro-actively involved with learning.	0.73
2	16	Working with technology creates academic interest among the learners.	0.72
3	17	Technology helps me to learn more than books	0.70
4	18	Students are more interactive with others when using technology.	0.69
5	19	Working with technology is more of time consuming and worthwhile.	0.68
6	20	Technology promotes active learning and avoids boredom, monotony, etc.,	0.65
7	21	Working with technology is quite safe when one can understand properly.	0.63
8	22	As per my opinion, everyone needs technology while learning.	0.62
9	23	Students learning capacity improves since the implementation of classroom technologies.	0.60
10	24	Technology improves the level of student's competency.	0.55
11.	25	Teacher serves to be the facilitator while using Technology	0.52

FACTOR II: CLASSROOM LEARNING

The items in the “Classroom Learning” Table-2 shows that the 3– items are highly loaded ($r = 0.70 - 0.73$) and 6 items are moderately loaded ($r = 0.55 - 0.69$) and also its found that 2- items are found in the correlation value of 0.52 and 0.55. The Table – 2 reveals 20.4% of variable accounted for factor 2. This factor is defined as “Classroom Learning”. Since most of the items in this factor are pertinent to students classroom learning through technology usage by the teachers in the classroom learning, the factor infers that working with technology creates academic interests among the learner, which helps to learn more than mere reading the books, though its of more time consuming and its worthwhile, etc.,

TABLE – 3: FACTOR III: ATTITUDE TOWARDS TECHNOLOGY

S.NO	ITEM.NO	ITEM CONTENT	FACTOR LOADING
1	26	Students must receive any support they need in order to use technology.	0.71
2	27	The use of technology provides richer experiences to the students.	0.70
3	28	Technology in the classroom is highly helpful in making classroom support assignment.	0.68
4	29	The use of technology improves the quality of communication.	0.65
5	30	Technologies may substitute class lectures for creating interest.	0.62
6	31	Using technology, students can interact with teacher by e-mail	0.62
7	32	Technology can improve the quality of education.	0.60
8	33	The use of technologies makes the course work as an interesting activity.	0.59
9	34	Technology increases learning skills.	0.55
10	35	When students use computer to do their assignments, the presentation is better in qualitywise.	0.52

FACTOR III: ATTITUDE TOWARDS TECHNOLOGY

It is obvious from the Table – 3 that first 2-items are highly loaded ($r = 0.70$ & 0.71) and rest are moderately loaded ($r = 0.52 - 0.68$). The 10-items of the factor contribute to 18.4% of variance. The labelling of the factor reveals that the students receive any support when they use the technology, technology provides richer experiences, its also helpful in making classroom support assignment, use of technology improves the quality of communication. Overall, the item in the factor reveals students perception over technology usage in the classroom teaching – learning process.

TABLE – 4: FACTOR IV: LEARNING FEASIBILITY

S.NO	ITEM.NO	ITEM CONTENT	FACTOR LOADING
1	36	Technology enabled learning is more useful for career search while on study.	0.69
2	37	Classroom technologies help explaining the subject more clearly and effectively.	0.65
3	38	Technologies help me to become an independent learner by doing more work on my own.	0.60
4	39	Classroom technologies help me to further develop and stimulate my presentation skills.	0.59
5	40	The use of technology improves probing skills.	0.59
6	41	I would work harder if I could use computers more often irrespective of time.	0.58
7	42	Technology improves one's level of competency.	0.57
8	43	The use of e-learning will enable me to do any studies.	0.55

FACTOR IV: LEARNING FEASIBILITY

Table– 4 shows the factor loadings of the items under factor IV. It is noted that the first 3-items have fairly high loading ($r = 0.60 - 0.69$) and the remaining 5-items are moderately loaded ($r = 0.55 - 0.59$). The factor is defined as “Learning Feasibility” as it emphasise on the technology enabled learning is more useful for career search while on a students study, technology explains the subject more clearly and effectively and it also develops and stimulates the presentation skills in the classroom. On the whole, the factor “Learning Feasibility” contributes to 12.1% of variance.

TABLE – 5: FACTOR V: ACADEMIC ACHIEVEMENT

S.NO	ITEM.NO	ITEM CONTENT	FACTOR LOADING
1	44	Learning through technology enables to improve the performance in the class test compared to the last test.	0.71
2	45	Learning with technology has helped to improve the practical knowledge.	0.70
3	46	Technology has helped to prepare for the classroom assignment.	0.65
4	47	Technology in the classroom is highly useful for supportive learning such as seminar presentation, discussion, etc.,	0.64
5	48	Technology enabled learning enables retention skills after learning.	0.62
6	49	Technology enabled learning improves recalling skills for further learning.	0.60
7	50	Technology helps for the classroom activities.	0.58

FACTOR V: ACADEMIC ACHIEVEMENT

It is observed from the Table – 5 that the factor contains 7-items of which 2-items are fairly high loaded ($r = 0.70$ & 0.71) and rest 5-items are moderately loaded ($r = 0.58 - 0.65$). The 7-items contribute to the variance of 6.9 % the items in the factors were expressed as: Technology enables students' performance at higher level, it helps to improve practical knowledge, helps to prepare for classroom assignment and it overall improves the recalling skills while students' learning. Hence, the factor is named as “Academic Achievement”.

TABLE – 6: EIGEN VALUE AND PROPORTION OF VARIANCE OF THE 5 ATTITUDE FACTORS

FACTORS	EIGEN VALUE	PROPORTION OF VARIANCE	CUMULATIVE PROPORTION
SELF EFFICACY	15.08	30.01	30.1
CLASSROOM LEARNING	10.17	20.4	50.5
ATTITUDE TOWARDS TECHNOLOGY	7.12	18.4	68.9
LEARNING FEASIBILITY	5.06	12.1	71.0
ACADEMIC ACHIEVEMENT	3.11	6.9	78.9

From the Table – 6 it is observed that self – efficacy has the highest Eigen value of 15.08 and academic achievement has the lowest Eigen value of 3.11. Further, the observation of the Table – 6 reveals that the total 5 factors explained a cumulative proportion of 78.9 of variance, which means most of the items in the scale are relevant and valid.

CONCLUSION

The results obtained from the study reveals that the identification of various factors related to students' attitude towards technology enabled learning may help the teaching faculty in developing appropriate strategies to deliver the classroom teaching- learning in an effective manner. The identified 5 – factors such as: Self- Efficacy, Classroom Learning, Attitude towards Technology, Learning Feasibility and Academic Achievement are relevant in day- to-day learning experiences of the students.

In a study of Stephen A.Sivo and Cheng-Chang “Sam” Pan (2005), a factorial study was carried on students' characteristics and Attitudes. Further, study of Gulsen Bagci Kilic (2001), students' attitude towards computer usage was identified using standard questionnaire. A model based investigation done by Nick-Naser manochehri and Khurram Sharif (2010), identified learner attitude towards classroom technology using well designed questionnaire.

The results of the present study show that there is a strong relationship among the study variables. In this respect, the development of this scale would enlighten to identify students attitude towards technology usage in the classroom.

On the whole, the development of this scale seems to be quite promising to serve the purpose for which it is developed.

REFERENCES

- Bena, K. & James, M. (2001). *Information technology for schools, creating practical knowledge to improve students' performance*. Jossey-Bass A Wiley Company San Francisco.
- Bratina, T. A., Hayes, D., & Blumsack, S. L. (2002). *Preparing teachers to use learning objects*. Retrieved Jan 12, 2002, from http://technologysource.org/article/preparing_teachers_to_use_learning_objects/
- Chen, C. M., Lee, H. M., & Chen, Y. H. (2005). Personalized e-learning system using item response theory. *Computers & Education*, 44, 237-255.
- Coon, D. (1995). *Introduction to Psychology*. Minneapolis, MN: West Publishing.
- Davies, J., & Brember, I. (2001). The closing gap in attitudes between boys and girls: A 5-year longitudinal study. *Educational Psychology*, 21(1), 103-114.
- Govindasamy, T. (2002). Successful implementation of e-learning pedagogical considerations. *The Internet and Higher Education*, 4, 287-299.
- Gulsen Bagci Kilic (2001). Turkish online Journal of distance Education – TOJDE January 2001, V2.
- Khan, B. H. (2000). *A framework for web-based learning*. Englewood Cliffs, NJ: Educational Technology Publications.
- Kim Jae (1970) Cited in Factor Analysis, Selected Topics from SPSS. 11nd Edition. Norman et al. Mc Graw-Hill Book Co., 485 – 500.
- Liaw, S. S. (2004). Considerations for developing constructivist Web-based learning. *International Journal of Instructional Media*, 31(3), 309-321.
- Nick-Naser manochehri and Khurram Sharif (2010). *Journal of Information Technology Education*, V9, 2010.
- Stephen A.Sivo & Cheng-Chang “Sam” Pan (2005). *The Journal of Technology Studies*, V31 n2 pg 4-103
- Weiner, G. (1994). *Feminisms in education: An introduction*. Buckingham, UK: Open University.
- Wiley, D. (2001). Peer –to-peer and learning objects: the new potential for collaborative constructivist learning online. *Proceedings of the IEEE International Conference on Advanced Learning Technology*. Madison, USA, 494-495. Retrieved May 16, 2009 From <http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=00943992>

ATTITUDE AND PERCEIVED IMPORTANCE TOWARDS WORK-LIFE BALANCE POLICIES: A COMPARATIVE EMPLOYEE ANALYSIS OF PRIVATE AND PUBLIC SECTOR BANKS

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ABSTRACT

Striking a balance between life and work is a daunting task for the employees of high pressure occupation like banking industry, irrespective of the fact that whether the bank is public sector or private sector one. The present study tries to look at the awareness, attitude, perceived importance and formalization of work-life balance (WLB) policies of employees in banking sector, both private and public sector banks. Conceptual framework of the study was developed and stratified random sampling technique was applied and a sample size of 122 taken. Questionnaire having five point Likert type scale, open and close ended questions was employed. Cronbach's alpha was applied as reliability statistics. Additional statistical methods engaged to analyze the data were descriptive statistics (Mean and Standard Deviation), chi square test, reliability statistics (Cronbach's Alpha), Analysis of Variance (ANOVA) and related procedures thereof like Multiple comparisons (Games-Howell test, Tukey HSD), Levene Statistics for Test of Homogeneity of Variances, Welch and Brown-Forsythe tests for Robust Test of Equality of Means. Findings suggest that employees perceive flexible work arrangements as most importance WLB policy; nonetheless their perception towards the implementation of work life balance policies in their respective organizations is negative. The study also revealed the extent of formalization of WLB policies in public sector and private sector banks and there were no written documents for the same in both the systems. The originality of the research paper is maintained from theory level to findings. Before embarking on the research the researchers had a clear vision, what were they about to do and in which manner. Background knowledge of the topic, review of related literature, formulation of theory, procedure, tools and instrument used and manpower used for the present research were used in untested ways in the universe of the study. The originality is upheld in the unprocessed data which was analyzed using the relevant software mentioned above, as the nature of data was primary. Needless to say despite of all the time and resource constraints, the study is unique as there is paucity of such studies in the NCR region, and we can say it is vastly unexplored. The study is bound to stimulate academic and scholarly pursuits. Lastly, it is stated that the results are open for review, counter review and discussions for further studies. The researchers would have much liked to carry on the study with bigger sample size and on a much bigger scale in terms of Universe of the study, though resource crunch did not allow it as the study was self sponsored. Variables like different hierarchy in the personnel employed in the banks can also be done in future researches. More hypotheses could also have been tested; nevertheless the present study can be used as a platform to develop and initialize further studies in the banking and allied sectors. The study can serve as a reference for prospective studies in this largely unexplored sector. The policy makers and human resource experts can take a leaf or two from the present study and design work-life balance policies which is appreciated by the over pressurized people working in banks so that they are motivated enough to serve the people and the nation.

KEYWORDS

Attitude, work-life balance, employees, banks.

INTRODUCTION

ustaining a balance between one's personal life and professional life is a concept which is hotly debated at the professional front across the countries and spheres of work. Banking and insurance sector people are one of the hardest working people, and this is not based on some study but what even an ordinary mortal can make out. To meet the ever increasing deadlines and targets, these overworked professionals often have to forsake a pleasurable life and balance between their work and private life, which is negatively affected. These experiences have been correlated directly to the quality of family life, psychological well-being and health (Greenhaus & Beutell, 1985).

Work-life balance (WLB) is about people having a measure of control over when, where and how they work. It is achieved when an individual's right to a fulfilled life inside and outside paid work is accepted and respected as the norm, to the mutual benefit of the individual, business and society. According to Clutterbuck (2003) work-life balance is "a state where an individual manages real or potential conflict between different demands on his or her time and energy in a way that satisfies his or her needs for well being and self fulfillment" (p.8).

A substantial minority of businesses are not aware that not offering and implementing flexible working practices could help to reduce their cost or contribute positively to their other key business challenges. Analysis of work-to-life and life-to-work conflicts and work hour adjustments are paramount in high pressure work environment. Employees may be willing to achieve a more integrated balance between paid work and leisure/family/community interests to lead a balanced healthier life. Therefore with the following objectives, the present research was done.

OBJECTIVES

1. To comparatively assess the perceived importance of work life balance policies among the professionals of private banks and nationalized banks.
 2. To appraise the extent of formalization of work-life balance policies private and nationalized sectors of banks.
 3. Investigation into the prevalence and practices of work-life balance policies in banking sector.
 4. To comparatively assess the attitudes of employees in private sector and public sector banks towards the implementation of work life balance policies.
- In the course of study below mentioned hypotheses were tested. According to Weathington et al., (2010), "a hypothesis is a specific prediction about the relation among two or more variables based on theory or previous research" (p.67).

STATEMENT OF HYPOTHESIS

HYPOTHESIS 1

NULL HYPOTHESIS (H_0)

There is no significant difference between males in private banks and females in private banks towards perceived importance of various work life balance policies.

ALTERNATIVE (H₁)

There is a significant difference between males in private banks and females in private banks towards perceived importance of various work life balance policies.

HYPOTHESIS 2**NULL HYPOTHESIS (H₀)**

There is no significant difference between males in private banks and females in public banks towards perceived importance of various work life balance policies.

ALTERNATIVE (H₁)

There is a significant difference between males in private banks and females in public banks towards perceived importance of various work life balance policies.

HYPOTHESIS 3**NULL HYPOTHESIS (H₀)**

There is no significant difference between males in private banks and males in public banks towards perceived importance of various work life balance policies.

ALTERNATIVE (H₁)

There is a significant difference between males in private banks and males in public banks towards perceived importance of various work life balance policies.

HYPOTHESIS 4**NULL HYPOTHESIS (H₀)**

There is no significant difference between males in public banks and females in private and public banks towards perceived importance of various work life balance policies.

ALTERNATIVE (H₁)

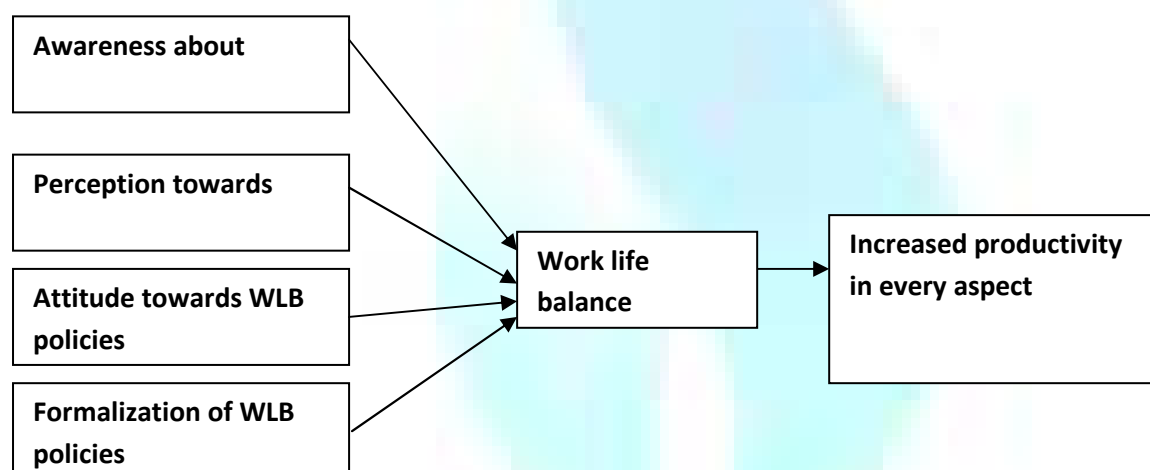
There is a significant difference between males in public banks and females in private and public banks towards perceived importance of various work life balance policies.

HYPOTHESIS 5**NULL HYPOTHESIS (H₀)**

There is no significant difference between groups (males and female employees in private and public sector banks) score vis-à-vis attitude towards the implementation of work life balance policies.

ALTERNATIVE (H₁)

There is a significant difference between groups (males and female employees in private and public sector banks) score vis-à-vis attitude towards the implementation of work life balance policies.

CONCEPTUAL FRAMEWORK OF STUDY

An understanding of factors which to contribute to work-life balance in an employee's existence is extremely important, to comprehend the conceptual framework of the present study. Different writers and experts discussed work life balance under the light of these factors but based on the research objectives, the work life balance factors are classified as attitude of employees towards work-life balance policies, their awareness and their perception towards the same. The main construct as defined in the research model consists of all very factors thus taken into account namely, attitude, awareness and perception towards the WLB policies. This study infers that there is a relationship between all the three factors which affect work life balance and thus in turn all the aspect of daily life.

REVIEW OF LITERATURE

Studies have constantly indicated that work life balance is a set of factors which have influenced the employers' and employees' sensibilities in many ways. They have at times being cause of concern for both of them. Many micro, small and medium employers in Scotland have expressed a generally supportive views of family friendly policies. They tend to be reactive to the request of employees in developing such policies (MacVicar et al., 2005). Administrative burdens, operational problems, management problems, time consumption and potential employee abuse have been deterring factors for these employers.

A support to the present study can be achieved by a survey which found that public sector organisations were more likely to implement work-life balance policies (Managing Work-Life Balance International, 2007) and this indicates that some barriers may be affecting the private sector more than the public sector. Researches have persistently highlighted the conflict between work and family for some chipping in in one was to the detriment of other. It (work-life balance) has been characterized by 'a lack of fit' between employees and their life responsibilities and the goals of their organization (Becker and Huselid, 1998).

During 1990's some Australian employers realized the benefits of adopting work-life balance strategies to recruit and retain best employees. In Australia the need for work-life balance was further increased by the changes to organizational structures where flatter, more participative and less hierarchal structures were introduced, and fewer employees were expected to manage increased workloads (De Cieri, 2002).

It is generally believed that women bear the brunt of family responsibilities and therefore the most pressure is likely on them (Konrad & Mangel, 2000; Abbott et al., 1998). On another extreme Lingard & Francis (2005) accounted that Australian males under 35 years of age reported more stress and were keen to change the corporate world to accommodate work-life balance. If truth be told, generation Y places more value on non-standard work model that permits them to balance work and family life better and the trend is for more dual earner families to scale back from work commitments (Becker & Moen, 1999).

Asadullah & Fernández (2008) found that WLB practices increase the likelihood of reporting higher satisfaction and the results of the study indicate that WLB practices at the forefront of worker welfare policy improve the wellbeing of the workforce.

Bird (2006) studied methods to accelerate the implementation of a very successful work-life strategy within organization. He found out four primary factors which affect work life balance viz. growth and profit impact, full engagement, competitive advantage for talent and health-care cost solution.

The awareness of work-life balance policies within the surveying profession in Australia and New Zealand found that of the issues and options is not evenly spread amongst professional surveyors in the region. The implication explored in the study is that employers ignore work-life balance issues at their peril (Wilkinson, 2008).

To explore the views of male workers in a male dominated occupation of bus on the issues of work-life balance a qualitative study was conducted in UK. It was found that work-life imbalance was not only a source of concern, but also that it was the major source of dissatisfaction for participants. The participants made an association between problems with work-life balance and withdrawal behaviours, including turnover and non-genuine sick absence (Hughes & Bozionelos, 2007).

METHODOLOGY

RESEARCH DESIGN AND SAMPLE: A non-experimental, descriptive, and quantitative research design was used in the present study, and primary data from a sample size of 122 bank employees of both private and public sector banks of Delhi NCR region using stratified random sampling was collected. The strata were male and female employees working in private and public sector banks (four strata). Banks included in the study were Canara Bank, State Bank of India, The Oriental Bank, Punjab National Bank, Corporation Bank, Indian Bank, ICICI Bank, HDFC Bank, Kotak Mahindra Bank, ING Vysya Bank and Axis Bank randomly selected from fifty banks. Due to certain discrepancies 23 responses were rejected. In all, out of the total 122 samples, 95 were males and 27 were females from the banks mentioned above, 28 respondents were married while the remaining were single.

INSTRUMENTATION

RELIABILITY STATISTICS

A pilot study with sample size 33 was conducted after discussions with senior faculty members and human resource experts (not included in the final study). The reliability coefficient for the factors were: Leave Policies, .646; Parenting related issues, .766; Flexible work arrangements, .640; Additional work provisions, .809; Perception of employees towards the implementation of work life balance policies, .745. Statistical Package Social Sciences (SPSS) version 16 was used for all type of analysis.

Agreeing with the recommendations of Churchill (1979) and Gerbing & Anderson (1988), reliability procedures for all reflective scales comprised the calculation of Cronbach's alphas. The values exceeding .7 threshold were deemed acceptable (Nunnally, 1978). The only exceptions are in the cases of Leave Policies, .646 and Flexible Work Arrangements, .640 in which the use of low alpha .657 followed the research standards of Song and Parry (1993). Table 1 details the reliability statistics of the present study. Thus constructs were deemed to have adequate reliability.

TABLE 1: RELIABILITY STATISTICS

Reliability Statistics		
Factors	Cronbach's Alpha	No. of Items
Leave Policies	.646	5
Parenting Related Issues	.766	5
Flexible work arrangements	.640	6
Additional work provisions	.809	5
Attitude of employees towards the implementation of work life balance policies	.745	13

DESCRIPTIVE STATISTICS

The descriptive statistics for the various factors of work life balance policies like Leave Policies, Parenting related issues, Flexible work arrangements, Additional work provisions, Perception of employees towards the implementation of work life balance policies, were calculated. Table 2 provides a summary of the means and standard deviations for the scores within each of the above mentioned factors. Overall, the respondents perceive flexible work arrangements as a policy which is most important in the organization they are working ($M = 3.20$, $SD = 4.50$) and while least important was obviously their perception towards the implementation of work life balance policies ($M = 2.2$, $SD = 4.1$).

TABLE 2: DESCRIPTIVE STATISTICS

Factors	No.	Mean	Std. Deviation
Leave Policies	122	2.8	5.0
Parenting Related Issues	122	2.6	5.0
Flexible work arrangements	28	3.2	4.5
Additional work provisions	122	2.6	5.0
Attitude of employees towards the implementation of work life balance policies	122	2.2	4.1

Various statistical methods have been employed to analyze the data. These methods include descriptive statistics (Mean and Standard Deviation), chi square test, reliability statistics (Cronbach's Alpha), Analysis of Variance (ANOVA) and related procedures thereof like Multiple comparisons (Games-Howell test, Tukey HSD), Levene Statistics for Test of Homogeneity of Variances, Welch and Brown-Forsythe tests for Robust Test of Equality of Means.

FINDINGS

FORMALIZATION OF POLICIES

How formal is the system of work life balance policies in an organization is, was also ascertained. Majority of banks whether they are private sector ones (93.44%) or the public sector ones (83.60%) do not have written copies of work life balance policies. Comparatively private sector banks have better position. 88.52% employees of private sector banks and 77.04% of public sector bank employees have not been provided with a copy of work life balance policies.

HYPOTHESES TESTING

According to Aron et al. (2007) "Hypothesis testing is a systematic procedure for deciding whether the results of a research study, which examines a sample, support a particular theory or practical innovation, which applies to a population" (p.115). There is a significant difference between the groups towards perceived importance of various work life balance policies, as (males and female employees in private and public sector banks) $F(3,118) = 3.536$, $p < .05$.

TABLE 3: MULTIPLE COMPARISON OF GROUPS

ANOVA					
	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	1.352	3	.451	3.536	.017
Within Groups	15.041	118	.127		
Total	16.393	121			

Levene statistic (4.683), presented in table 4 further rejects the assumption that group variances are equal as .004 significance show that variances of four groups are significantly different (value of significance is less than 0.05).

TABLE 4: TEST OF HOMOGENEITY OF VARIANCES

Levene Statistic	df1	df2	Sig.
4.683	3	118	.004

Thus after having the result that variances in standard deviation is not homogeneous, Games-Howell test was applied to the data, which assumes that there is no homogeneity of variances. The outcome of the test is revealed in table 5 and it is coherent that each group of subjects is compared with all of the remaining groups. For each pair of groups the difference between group means is shown, the standard error of that difference, the significance level of that difference and a 95% confidence interval.

TABLE 5: MULTIPLE COMPARISONS (GAMES-HOWELL PROCEDURE)

(I) Bank and Gender	(J) Bank and Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Males in Private Bank	Females in Private Banks	-.281*	.101	.046	-.56	.00
	Males in Public Banks	.024	.077	.989	-.18	.23
	Females in Public Bank	-.156*	.055	.033	-.30	.00
Females in Private Banks	Males in Private Bank	.281*	.101	.046	.00	.56
	Males in Public Banks	.305*	.102	.027	.03	.58
	Females in Public Bank	.125	.085	.482	-.12	.37
Males in Public Banks	Males in Private Bank	-.024	.077	.989	-.23	.18
	Females in Private Banks	-.305*	.102	.027	-.58	-.03
	Females in Public Bank	-.180*	.055	.010	-.33	-.03
Females in Public Bank	Males in Private Bank	.156*	.055	.033	.01	.30
	Females in Private Banks	-.125	.085	.482	-.37	.12
	Males in Public Banks	.180*	.055	.010	.03	.33

*. The mean difference is significant at the 0.05 level.

Games-Howell test shows that the mean difference in score are there for males in private bank as compared to females in private and public banks ($p < .05$). At the onset Games-Howell procedure further compares Males in Private Bank group is compared to Females in Private Banks group which reveals a significant difference of .046 (Sig. is less than .05), thus null hypothesis 1 is rejected. Same is the case when Males in Private Banks are compared with Females in Public Bank group. It reveals a significant difference of .033 (Sig. is less than .05), thus null hypothesis 2 is rejected. Interestingly when Males in Private Bank group is compared to Males in Public Banks group, we find that it has a non-significant difference of .989 (Sig. is greater than .05). This null hypothesis 3 is accepted. Likewise Games-Howell procedure further compares Males in Public Banks group with Females in Private Banks and Females in Public Bank, which reveal a significant difference of .027, as significance is less than .05, null hypothesis 4 is rejected. Thus all the multiple comparisons but one reveals a significant difference in the perceived importance of work life balance policies by the employees in private sector and public sector banks.

There is a no significant difference between the attitude of the groups towards the implementation of work life balance policies, as (males and female employees in private and public sector banks) $F(3,118) = .855, p > .05$ (table 6).

TABLE 6: ONE WAY ANALYSIS OF VARIANCE (ANOVA)

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	1.244	3	.415	.855	.467
Within Groups	57.247	118	.485		
Total	58.492	121			

Levene statistic (.190) further accepts the null hypothesis that group variances are equal as .903 significance, as displayed in table 7 show that variances of four groups are not significantly different (value of significance is greater than 0.05).

TABLE 7: TEST OF HOMOGENEITY OF VARIANCES

Levene Statistic	df1	df2	Sig.
.190	3	118	.903

As the group sizes were unequal we further conducted Welch and Brown-Forsythe test statistic, as with the standard F statistic, the Welch statistic is not significant below .05. The Welch statistic is more powerful than the standard F or Brown-Forsythe statistics when sample sizes and variances are unequal. The results of the statistics are shown in table 8 conform that the differences between group score vis-à-vis attitude towards the implementation of work life balance policies is not significant.

TABLE 8: ROBUST TESTS OF EQUALITY OF MEANS

	Statistic ^a	df1	df2	Sig.
Welch	.735	3	32.814	.539
Brown-Forsythe	.805	3	54.159	.496

a. Asymptotically F distributed.

Tukey HSD test shown in the above table further conforms that there is a no significant difference between the attitudes of the four groups (males and female employees in private and public sector banks) towards the implementation of work life balance policies, thus null hypothesis 5 is rejected.

TABLE 9: MULTIPLE COMPARISONS (TUKEY HSD)

(I) Bank and Gender	(J) Bank and Gender	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Males in Private Bank	Females in Private Banks	-.056	.203	.993	-.58	.47
	Males in Public Banks	-.056	.143	.980	-.43	.32
	Females in Public Bank	-.374	.234	.385	-.98	.24
Females in Private Banks	Males in Private Bank	.056	.203	.993	-.47	.58
	Males in Public Banks	.000	.200	1.000	-.52	.52
	Females in Public Bank	-.318	.273	.649	-1.03	.39
Males in Public Banks	Males in Private Bank	.056	.143	.980	-.32	.43
	Females in Private Banks	.000	.200	1.000	-.52	.52
	Females in Public Bank	-.318	.232	.520	-.92	.29
Females in Public Bank	Males in Private Bank	.374	.234	.385	-.24	.98
	Females in Private Banks	.318	.273	.649	-.39	1.03
	Males in Public Banks	.318	.232	.520	-.29	.92

DISCUSSION AND CONCLUSION

An exploration the desired and preferred work hour choices by bankers and the impact of work life balance and desired work hour adjustments on employees well being is very important. In the study four factors have been evaluated namely Awareness about WLB, Perception towards WLB, Attitude towards WLB policies and Formalization of WLB policies. The relationship of these factors was established in determining the work life balance in between the employees of public sector and private sector of banks.

Means and standard deviations of the descriptive statistics showed that employees perceive flexible work arrangements as a policy which is most important in the organization they are working ($M = 3.20$, $SD = 4.50$) and while least important was obviously their perception towards the implementation of work life balance policies ($M = 2.2$, $SD = 4.1$)

The study also revealed the extent of formalization in the banks which was found that most of the public sector banks (93.44%) are not having any written documents regarding the same but conditions of private sector banks (83.60%) was found to be better than Public sector banks.

ANOVA test (Table 3) revealed that there is a significant difference between the groups towards perceived importance of various work life balance policies, as (males and female employees in private and public sector banks) $F(3,118) = 3.536$, $p < .05$. Levene statistic (4.683) also rebuff the assumption that group variances are equal as .004 significance show that variances of four groups are significantly different (value of significance is less than 0.05).

ANOVA test (Table 6) showed that there is a no significant difference between the attitude of the groups towards the implementation of work life balance policies, as (males and female employees in private and public sector banks) $F(3,118) = .855$, $p > .05$. Levene statistic (.190) further accepts the null hypothesis that group variances are equal as .903 significance show that variances of four groups are not significantly different (value of significance is greater than 0.05).

Further we find that the results of Games-Howell procedure revealed that males in private banks versus females in private banks, males in private banks versus females in public banks and males in public banks against females in private and public banks have a significant difference in perceived importance of work life balance policies, thereby rejecting the null hypotheses 1, 2 and 4. In addition the procedure also divulges no significant difference between males in private bank and males in public banks which rejects the hypothesis 3.

Welch test statistic (Table 8), in comparison with the standard F statistic, (the Welch statistic is not significant below .05) conformed that the differences between group score vis-à-vis attitude towards the implementation of work life balance policies is not significant. Findings of HSD Tukey test reveal no significant difference between males and females in private and public banks towards the implementation of work-life balance policies, therefore rejecting the null hypothesis 5.

LIMITATION AND IMPLICATION

The study with bigger sample size and on a much bigger scale in terms of universe of the study could have been done, though resource crunch did not allow it as the study was self sponsored. Variables like different hierarchy in the personnel employed in the banks can also be done in future researches. More hypotheses could also have been tested; nevertheless the present study can be used as a platform to develop and initialize further studies in the banking and allied sectors.

The study can serve as a reference for prospective studies in this largely unexplored sector. The policy makers and human resource experts can take a leaf or two from the present study and design work-life balance policies which is appreciated by the over pressurized people working in banks so that they are motivated enough to serve the people and the nation. There is major implication of the study on the employees of private and public sector banks in India. The paper can be a guiding light for the banks for possible causes of discontent among the employees in terms of work life balance problems which may affect their job satisfaction. The factors discussed in the paper must be kept in mind by the bank administrations as these very factors are indicated by the respondents as aspects which are having a psychological bearing on the employees' performance.

REFERENCE

- Abbott J., De Cieri, H. & Iverson, R. D. (1998). Costing turnover: Implications of work family conflict at management level. *Asia Pacific Journal of Human Resource*, 36(1), 25-43.
- Aron, A., Aron, E. N. & Coups, E. J. (2007). *Statistics for psychology (4th ed.)*. Delhi: Dorling Kindersley.

- Asadullah, N. M. & Fernandez, M. R. (2008). *Work-life balance practices and the gender gap in job satisfaction in the UK: Evidence from matched employer-employee data*. (IZA, Discussion Paper no. 3582).
- Becker, B. & Huselid, M. (1998). High performance work systems and firm performance: A synthesis of research and managerial implications. *Research in Personnel and Human Resources Management*, 16, 53-101.
- Becker, P. E. & Moen, P. (1999). Scaling back: Dual earner couples work family strategies. *Journal of Marriage and the Family*, 61, 995-1007.
- Bird, J. (2006). Work life balance doing it right and avoiding the pitfalls. *Employment Relations Today*, 33(3), 21-30.
- Churchill, G. A. (1979). A paradigm for developing better measures of marketing constructs. *Journal of Marketing Research*, 16, 64-73.
- Clutterbuck, D. (2003). *Managing the work-life balance*. London: Chartered Institute of Personnel and Development.
- Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297-334.
- De Cieri, H., Holmes, B., Abbott, J. & Pettit, T. (2002). *Work life balance strategies: Progress and problems in Australian organizations*. (Working Paper 58/02). Victoria: Monash University.
- Gerbing, D. W. & Anderson, J. C. (1988). Updated paradigm for scale development incorporating unidimensionality and its assessment. *Journal of Marketing Research*, 25, 186-192.
- Greenhaus, J. H. & Beutell, N. J. (1985). Sources of conflict between work and family roles. *Academy of Management Review*, 10(1), 76-88.
- Hughes, J. & Bozionelos, N. (2007). Work-life balance as source of job dissatisfaction and withdrawal attitudes: An exploratory study on the views of male workers. *Personnel Review*, 36(1), 145-154.
- Konrad, A. M. & Mangel, R. (2000). The impact of work-life programs on firm productivity. *Strategic Management Journal*, 21, 1225-37.
- Lingard, H. & Francis, V. (2005). The decline of the 'traditional' family: Work-life benefits as a means of promoting a diverse workforce in the construction industry of Australia. *Construction Management and Economics* December, 23(10), 1045-57.
- Lockwood, R. N. (2003). Work/Life Balance Challenges and Solutions. *SHRM Research Quarterly*, 1-10.
- Mac Vicar, A., McDougall, M., Bell, S., Maxwell, G. & Rankine, L. (2005). *Work-life balance in smaller businesses in Scotland: Encouraging the expansion of flexible working policies and practices*. Scotland: Glasgow Caledonian University.
- Malik, A. & Khan, K. G. (2008). Work/life conflicts and desired work hour adjustments: Banking perspective in Pakistan. *International Review of Business Research Papers*, 4(5), 267-276.
- Managing Work Life Balance: Maintaining the Balance. Work Life Initiatives, The Way Ahead Report of the Year 2007 Survey. (2007). Retrieved from www.worklifebalance.com.au
- Nunnally, J. C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.
- Song, X. M. & Parry, M. E. (1993). R&D-marketing integration in Japanese high-technology firms: Hypotheses and empirical evidence. *Journal of the Academy of Marketing Science*, 21(2), 125-133.
- Weathington, B. L., Cunningham, C. J. L. & Pittenger, D. J. (2010). *Research methods for the behavioral and social sciences*. New Jersey: John Wiley and Sons.
- Wilkinson, S.J. (2008). Work-life balance in the Australian and New Zealand surveying profession. *Structural Survey*, 26(2), 120-130.

AUDIENCE AWARENESS AND MULTICULTURAL COMMUNICATION

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ABSTRACT

Multicultural communication is gaining importance with the increasing globalization. Since borders are disappearing as companies merge with overseas companies, need for translating various marketing slogans into different languages is being felt. If this will not happen, it may result in miscommunication and misinterpretation. For instance, when Chevrolet tried to sell Nova to Spanish-speaking countries, it didn't work because in Spanish No-va means, "it does not go". Also when Pepsi used the slogan, "Pepsi Brings You Back to Life", it was translated quite literally in China which meant "Pepsi Brings Your Ancestors Back from the Grave". Such instances draw our attention towards the need to better assess how our audiences are going to interpret our messages. Audience awareness is always placed at a height when it comes to communicating effectively. This paper will take up the analysis of certain Indian advertisements where the stakeholders and the promoters of a particular product could not achieve the expected targets due to the misinterpretation of the advertisements by the audience leading to a negative response.

KEYWORDS

Audience awareness, Indian Advertisements, Multicultural communication, Stakeholders.

INTRODUCTION

With the expansion of global markets along national and cultural lines, it has become essential for the organizations aiming at growth to add some degree of multicultural marketing to their advertising strategies if they wish to convey their messages effectively to the target audience. Without making an effective appeal to the diverse cultures, an organization could end up facing missed opportunities, damaged brands, and poor relationships with existing customers, severe threats from competitors or even compliance issues. For instance, when Chevrolet tried to sell Nova to Spanish-speaking countries, it didn't work because in Spanish No-va means, "it does not go". (<http://www.grammarlady.com>). Also when Pepsi used the slogan, "Pepsi Brings You Back to Life", it was translated quite literally in China which meant "Pepsi Brings Your Ancestors Back from the Grave". (<http://www.grammarlady.com>). Such instances draw our attention towards the need to better assess how our audiences are going to interpret our messages. Audience awareness should always be taken into consideration when it comes to communicating effectively. The paper is an attempt to emphasize upon this aspect of marketing for effective understanding of the advertisements by the audience and consequent better and improved response from them.

METHODOLOGY

Being the qualitative type of research, the study relies more on the secondary sources of data mainly articles from newspapers, magazines, websites etc. The paper also reviews certain advertisements in order to bring out communication related challenges and issues, the audience's perspective and understanding of the ads; for this information and analysis the sources of data are television, online reviews and blogs.

CRITERIA OF CROSS-CULTURAL COMMUNICATION

In the economy of the new century, communication means communicating cross-culturally and it should stress on the three criteria:

- **CONTENT CRITERIA** - In today's world of greater interdependency and interconnectedness, the need for effective communication in conjunction with cultural awareness, sensitivity, and understanding is intensified. For any message to be successful across cultures, it is important that it must embrace the social nuances of separate markets and take a serious note of culturally sensitive imagery, appropriate inter- personal communication dynamics and the right jargon or slang.
- **DELIVERY CRITERIA** - The medium of delivery should be selected keeping in mind the largest likelihood of audience comprehension.
- **CULTURAL CRITERIA** - Constructing the right message in a non native culture is even more complicated. For winning the credibility of the audience, content should be assessed for the following areas:
 - Culturally inappropriate or confusing analogies, metaphors, puns, idioms and slang;
 - Cultural references that are inappropriate or could lose meaning (e.g. gender-specific roles, humor, ethnic, geographical or historic references);
 - Names and slogans that are culturally inappropriate;
 - Confusing graphics or icons;
 - Grammar issues (e.g., ambiguous use of direct and indirect objects, gerunds, nouns, adjectives, relative pronouns, questions in negative form etc.).

COMPONENTS OF MULTICULTURAL COMMUNICATION

Multicultural Communication should include the following components in its construction:

- **MARKET RESEARCH:** Audience analysis is very important before one starts planning a strategy for marketing. Who is being targeted? What are the relevant demographic issues? What are the sensitive ethnic oriented issues?
- **CULTURAL ADAPTATION:** Cultural adaptation will help in avoiding certain potential obstacles that could lead to interference with the building up of rapport with the audience. A culture's communication dynamics can be listed as grammar, humor, analogies, ethnic or historic references and symbolism.
- **LOCALIZATION:** Texts which are borrowed and adopted must be translated with efficacy so as to make them culturally acceptable with the use of unique locale-specific references and examples.
- **INTERNATIONALIZATION:** There are few elements that can be internationalized and made global. Such elements appeal to masses globally and should be incorporated in the communication.
- **GLOBALIZATION:** It is communication skills, both in sending and receiving, that determines how well an individual, an organization, an industry, or a nation does and broadens its chances of success. Certainly, the ability to effectively negotiate the inherent cultural issues in communication becomes more of a competitive edge in a global world. Therefore 'Localization' of marketing, sales and customer support should be integrated with the 'Internationalized' management processes and procedures. (*World Trade 100 Magazine*, 2006)

CHALLENGES IN COMMUNICATING ACROSS CULTURES

When we come to talk about communicating with the multicultural audience, the first thing that one has to keep in mind is the best way to communicate with the audience in order to build trust and loyalty because even within single language groups there are significant differences in vocabulary, usage and vernacular. Consider, for example, a word as simple as "insect". It can have different meanings, depending on the audience. Sometimes it is just one word of a slogan that

changes the whole meaning. When Parker Pen marketed a ballpoint pen in Mexico, its ads were supposed to say "It won't leak in your pocket and embarrass you." (Source: <http://www.takingontobacco.org/intro/funny.html>). However, the company mistakenly thought the Spanish word "embarazar" meant embarrass. Instead the ad said "It won't leak in your pocket and make you pregnant!!"

Besides these, marketers have to also consider certain differences between generations within a culture. One may also find variations in the use of language and the imageries in the successive generations. While constructing a message, such factors must be taken into account.

MULTICULTURALISM AND INDIAN ADVERTISEMENTS

Talking about the Indian scenario, we can say that since globalization is a growing trend, and India is playing a major role in this, it is important for advertisers to know the trends within the country and outside so as to be able to integrate the local culture with the global culture. One has to keep in mind the difference in cultural nuances while constructing a message. We may consider for example the difference in men –women equation in different cultures. Caste hierarchy and caste consideration is also different in different societies. Westerners do not have caste as a consideration as the Indians have.

In *Fair & Lovely* fairness cream ad – Beta Ek Coffee Milega (*Can I have some more coffee*), the commercial shows a girl is earning for her family meanwhile her dad asks for coffee. The mom says don't waste your daughter's money by drinking coffee which doesn't go well with the dad as he says "Kaash hamara beta hota" (*I wish we had a son!*). Suddenly after the use of *Fair & Lovely*, the daughter becomes beautiful and gets an Air Hostess's job and is able to afford more than the desired cup of coffee. This Ad shows nothing but negativity and gender bias which is not acceptable in all cultural contexts.

Similarly an ad showing a Bollywood star will have a greater effect on the Indian audience than on the western audience as they do not have that sort of craze or stardom fever that Indians have.

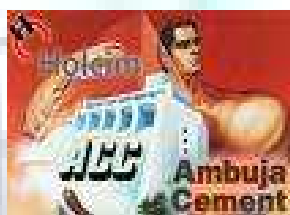


Besides this we may notice that often the symbols, ideals and mores that Indian advertisers portray and promote are those of Western society and culture. It is through the projection of advertisements that brands such as Levi's, Nike, Marlboro and McDonalds are disseminated in and become objects of desire for teens and young adults throughout India and the world. Similarly, images and scenes depicted are either Western in origin or reflect Western consumption behavior and values. Even where adapted to local scenarios and role models, those shown often come from the elite sections of society, such as the upwardly mobile urban middle class, which embrace or are receptive to Western values and mores.

If the product is to be marketed globally, it must be advertised globally but then care must be taken to adapt it culturally to make it acceptable across the cultures. When Western advertising depicts sexually explicit situations or shows women in situations considered as inappropriate or immoral, it is likely to be considered a subversive force undermining established cultural mores and values in India. For example, an ad for *Axe*, a men's deodorant shows a number of females with pseudo-coy expressions on their faces coming out of a room where a handsome male model is lying prostrate with telltale lipstick marks across his body. The product advertised does not really bear a direct relationship with the message or script since Indian males would be caught dead before females catch them like this. A single public kiss can become a case of condemnation and raise a furor, then how can nudity plus scores of lip imprints be accepted. These are western concepts imposed on Indian ad scripts and misrepresent the social norms of the society.



Another instance being noticed in the Indian context is that the ads which appeal to the local market fail to reach to the global audience. In an ad of *Ambuja Cement* we have a family reluctant to let a girl uproot their *tulsi* plant for her parking space. Now this *tulsi* plant has a religious value for the Indian audience but it will not have a similar significance for the audience across the cultures.



Besides the above we also have some ads which fail at communicating the message in the right perspective or are so confusing that the audience is left with a sense of discontentment at the end of the commercial. In an advertisement for *Iodex*, a pain reliever cream, we are shown a 500 rupee note lying on the street. An old person notices it and wants to pick it up but he can not do so due to back ache. Now this ad implies that if that person would have used *Iodex* he would have surrendered to his instinct of turning dishonest. The message conveyed is in no way related to the promotion of the product. It, infact, leaves a negative impact in the minds of the audience.



Chevrolet Forester started its promotion with campaign "*I am your light ...sunshine ...prayer and all*". It went on for over 3 months before the Chevrolet was actually shown. This ad was very misleading and confusing because many people thought it is Engineering Co. and some thought it is a Mutual Funds Co... BUT it turned out to be an out of reach Rs.16 lakhs SUV.

But then, there are certain ads which have appealed to the audience across various cultures because their promoters have realized the importance of communicating the product information while blending it with the cultures of the countries they serve.

In this we can quote the ad of *McDonald's* featuring *Dilip Kumar/ Dev Anand*, the Bollywood heroes of the 60's and 70's. The commercial, shot at one of the *McDonald's* outlets, shows a 'black and white' Dev Anand / Dilip Kumar entering the outlet and enquiring about McDonald's burgers, which were available at a price from their hey days. This bears reference to the Happy Price Menu which is available at Rs 20. Wittily done, the ad drives home the point that McDonald's is a reasonably priced food joint and is being loved since the bygone ages.



We can also consider the ad of Asian paints which has taken up a global setting for conveying the message. The advertisement does complete justice to the brand Asian Paints "Exterior Emulsion". The exterior paints are exposed to harsh weather conditions of our country where there are extreme conditions across length and breadth of the country. The advertisement is trying to put forth the basic proposition of "Time Proof Beauty" through portraying various changes happening in the life of one Sunil Babu. The story starts from the younger days of Sunil Babu when he purchases a new house, new car and gets himself a new wife. Now the story develops wherein everything changes from receding hairline of Sunil Babu to the expanding contours of his wife and the deteriorating car, but there is only one constant, the exteriors of his house which withstands the onslaught of time and extreme conditions and still looks brand new. The subtle use of humor actually reinforces the benefits of the brand. Now this ad will be comprehended in a universal context as the message conveyed is universal showing the different stages of a man's life from his youth to old age.

CONCLUSION

We can conclude that there are a few factors which should be kept in mind while communicating with the multicultural audience. First, simply translating a message from English can undercut the intended message completely, or worse yet, result in an entirely different meaning. There are too many linguistic and cultural nuances which are to be considered while attempting a translation. For example, one multinational financial institution's new marketing campaign revolved around their 'revolutionary' approach to banking. But in the multicultural community, the financial services industry is seen as being very reliable and trusted, so the 'revolutionary' approach did not resonate with them. The financial institution failed to understand the difference between the English-speaking market and other cultural segments. It is to be kept in mind that the multicultural consumer is different from its mainstream counterpart. Their culture, their language and their values are all different.

Secondly, many ad agencies have translation done by the particular multicultural media source they purchase space from, whether it be newspapers, radio, or TV. In marketing to the mainstream, a local TV station is not very likely to produce television commercial targeting high net worth consumers. This might be one of the biggest reasons why companies have not been successful in reaching the multicultural markets.

Moving forward, companies should use multicultural people who work for them as resources for these markets. They will be able to provide them with the information regarding communication to the multicultural markets for a particular product or service.

Therefore, companies looking for achieving success in a multicultural market need to address the changing demographics of their consumer base. There will be an increase in affluence in multicultural communities and therefore companies cannot ignore local multicultural markets. And in order to successfully reach to the multicultural audience, companies should take care to avoid cultural errors. They should realize the importance of not only communicating key product information in the native language of the countries they serve but also applying the appropriate cultural context so as to make their products universally acceptable.

REFERENCES

- Chatterjee, Aditya. Lost in translation: How Coke, Pepsi and P&G got it wrong too". *Afaqs*. Viewed on Dec 2009. <<http://www.afaqs.com/news/story.html?sid=10548>>
- "Effective Multicultural Communication". *World Trade 100 Magazine*. Viewed on Aug 2011. <<http://www.worldtradewt100.com/articles/print/83941>>
- "Some Humorous Cross-Cultural Advertising Gaffes!" Viewed on Feb 2010. <<http://www.takingontobacco.org/intro/funny.html>>

FINANCIAL ANALYSIS OF INDIAN AUTOMOBILE INDUSTRY

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ABSTRACT

Recent recession caused torrid impact on the financial performance of several industries worldwide. Most of them failed to confront with the market oscillations and produced crummy results. In the perfidious market conditions only that industry could remain resilient which is competent enough to make best possible use of assets and liabilities of organisation. In this context, Indian Automobile industry witnessed its worthiness to cope up the needs of precarious market. During last few decades it emerged out as one of the strong motors of Indian economy. However, in the recent year 2010-11 the sector faced some adverse changes in market which caused a significant downfall in the performance of many organisations. In this context, the present paper analyse the financial performance of seven monarchs companies of four-wheel segment (i.e., passenger car sector and commercial vehicle sector) of automobile industry for the period of 10 years from 2001-02 to 2010-11. It analyse the financial performance of selected units on the basis of 11 financial variables representing four different parameters viz., profitability, liquidity, managerial efficiency (activity) and leverage (long-term solvency) of the organisation. The paper also attempts to investigate whether the performance of different companies is similar to each other or is there any significant difference in that. It further assigns ranks to different companies on the basis of their performance and suggests some measures for the further improvement of the sector.

KEYWORDS

Automobile Industry, Leverage, Liquidity, Managerial Efficiency and Profitability.

INTRODUCTION

Indian automobile industry can broadly be classified into three prominent segments viz., passenger vehicle segment, low/high commercial vehicle segment and two/three wheeler segment. According to OICA (2009) India's passenger car and commercial vehicle manufacturing industry is the seventh largest industry in the world with an annual production of more than 2.6 million units in 2009. Studies have found that in the forthcoming decades, there are very well prospective to Indian automobile sector in comparison to many other countries. IBEF (2010) also found that recent acquisition of Jaguar and Land Rover brands by Tata Motors and launch of world's cheapest car, 'Tata Nano' has taken the Indian automobile market on the global map. The increased availability of smaller and affordable cars is one of the strong reasons claiming expansion of the passenger vehicles market in India.

But rising interest rate, sharp increment in the price of petrol and high inflationary pressure on the cost of auto-components have brought serious downfall in the performance of many companies. In this context, the present paper analyse the financial performance of the passenger vehicle manufacturers and commercial vehicle manufacturers of the industry for a period of 10 years from 2001-02 to 2010-11. Though the players in this sector have risen from five to more than thirty five during last three decades (IBEF 2010), Indian four-wheel segment is still dominated by few business tycoons. The present paper studies the performance of seven leading Indian companies of the industry. The selection of the company is done on the basis of their market share. The companies selected from passenger vehicle segment, are Tata Motors Limited, Maruti Suzuki India Limited, Mahindra & Mahindra Limited and Hindustan Motors Limited. The companies studied from commercial vehicle segment are SML Isuzu, Ashok Leyland and VST Tillers. The paper attempts to investigate that whether the financial performance of selected companies is similar to each other or is there any significant difference in that. The paper also assigns ranks to different companies on the basis of their past performance and offers some suggestions for the further improvement of the industry.

REVIEW OF RELATED LITERATURE

The growth of Indian automobile sector is more witnessed after the liberalisation of economy. Since that period, an exponential growth has been observed in production, domestic sales, product designs, export etc. According to an estimate, the unprecedented growth and innovative practices of the industry assure that it will shortly achieve an annual growth rate perhaps more than double of China and the triad of North America, Europe and Japan. Due to the immense importance of the industry, its performance has always been a lucrative area for the researchers. During last decade many researchers have agreed upon the better prospective of the sector. According to the report of Automotive Component Manufacturers Association of India (2010), Indian automobile sector's export to Western Europe expected to rise by more than five times in the forthcoming decade and particularly for compact cars, India would become a global hub very shortly. McKinsey (2005) estimated that growth potential of India-based automotive component manufacturing will become around 500 per cent, from 2005 to 2015. Sagar and Chandra (2004) found that the substantial deepening of technological capabilities in the Indian automobile industry augurs well for the future. Ghosh et.al. (2011) recognised India's per capita real GDP growth as one of the key drivers of growth for the country's automobile industry. During last decade the performance of the industry was analysed on the basis of different variables. For instance, Tendulkar et al., (2006) finds that in a regulated regime, vertical integration plays a positive role. Piplai (2001) examines the effects of liberalisation on the Indian vehicle industry, in terms of production, marketing, export, technology tie-up, product up gradation and profitability.

NEED OF THE STUDY

As shown above most of the research has been undertaken to analyse the growth of Indian automobile sector, but still there is a dearth of comparative study to analyse the financial performance of individual company. In this context, the present paper attempts to analyse the financial performance of seven leading companies of passenger and commercial vehicle segment of Indian automobile industry. It analyse them on the basis of four financial parameters viz., profitability, liquidity, managerial efficiency and leverage condition for the period of 10 years from 2001-02 to 2010-11.

OBJECTIVES OF THE STUDY

The present paper aims at the following objectives:

- To analyse the financial performance of Indian automobile industry.
- To compare profitability of selected companies.
- To compare liquidity of selected automobile companies.
- To compare the efficiency of managers of selected units.
- To compare leverage position of selected automobile companies.
- To test the significance of difference (if any) in selected variables.
- To assign ranks to selected companies on the basis of their average financial performance during 2001-11.

RESEARCH METHODOLOGY

Indian automobile industry has two distinct set of players viz., automobile component manufacturers and the vehicle manufacturers, which are also referred as OEMs. From the view point of the segments, it may be broadly categorized into three segments viz., low/high commercial vehicle manufacturers, passenger vehicle manufacturers, two/three wheeler producers. The present paper studies the performance of commercial and passenger vehicle segment of the industry in terms of four different financial parameters.

SAMPLE

The paper studies the performance of seven automobile companies of this segment. The selection of the company is done on the basis of their market share. Companies selected from passenger vehicle segment are Tata Motors Limited, Maruti Suzuki India Limited, Mahindra and Mahindra Limited and Hindustan Motors Limited. Leading Indian companies selected from low/high commercial vehicle segment are SML Isuzu, Ashok Leyland and VST Tillers.

NULL HYPOTHESES

The study proposes to test the following null hypotheses:

H01: There is no significant difference in profitability of selected units.

H02: There is no significant difference in liquidity of selected units.

H03: There is no significant difference in managerial efficiency of selected units.

H04: There is no significant difference in leverage of selected units.

DATA

The present study is largely analytical in nature and focuses on financial analysis of automobile industry in India. It analyse the performance of seven leading companies of four-wheel segment of Indian automobile industry. There are different tools to investigate the efficiency level, but the ratio analysis has been found most suitable and has been applied in the paper for analysis. The study attempts to investigate significant difference (if any) in the financial performance of the selected units on the basis of four parameters viz., profitability, liquidity, managerial efficiency and leverage. Profitability of companies has been analysed on the basis of five variables viz., Operating Margin (%), Net Profit Margin (%), Adjusted Earnings per Share (EPS), Adjusted Return on Net Worth (%) and Dividend per Share. The analysis of liquidity position has been done on the basis of current ratio and quick ratio. As managerial efficiency of a company lies with effective use of the assets therefore, managerial efficiency has been tested on the basis of inventory turnover ratio and fixed asset turnover ratio. The leverage (long term solvency) of selected companies has been analysed through the ratio of long-term debt to equity and proprietary ratio i.e., the proportion of owner's fund to total resources. The data used for analysis is a secondary data (taken from way2wealth.com). The data has been collected for a period of 10 years from 2001-02 to 2010-11.

ANALYSIS OF DATA

The financial performance of selected companies have been analysed through financial ratios. Simple statistical techniques: averages, standard deviation, minimum and maximum value have been used to interpret the data. As the study also attempts to investigate whether the financial performance in terms of ratios are similar or is there any significance difference in that. To test the difference in the performance of companies one way ANOVA test has been applied. The statistical results have been tested at 95% confidence level (5% level of significance) as well as at 99% confidence level (1% level of significance). If the computed value of F ratio is found more than the critical value at the respective level of significance the null hypothesis will be rejected and if the same is lesser than the critical value of F-test the corresponding hypothesis will be accepted. Further ranks will also been assigned to different companies on the basis of their financial performance.

LIMITATIONS

The study is based on the secondary data and is subject to the authenticity of the available data. Further, the percentage of different models produced by the company could not be taken into account due to non-availability of sales composition. The study also suffers from the limitation of sample size and period of study.

FINDINGS

COMPARISON OF SELECTED COMPANIES

PROFITABILITY ANALYSIS

Profitability indicates company's efficiency to manage the resources and generate profit for its stakeholders. It could be analysed through various ratios. The present paper studies five profitability ratios viz., operating margin, net margin, return on net worth, earning per share and dividend per share. Return on net worth and earnings per share have been taken after adjustment. The results of ratio analysis of profitability are shown in table 1:

TABLE 1: ANALYSIS OF PROFITABILITY RATIO OF SELECTED COMPANIES (APRIL 2001 TO MARCH 2011)

Profitability Ratio	Tata Motors	Maruti Suzuki	Mahindra & Mahindra	Hindustan Motors	SML Isuzu	Ashok Leyland	VST Tillers
Operating Margin (%)							
Mean	10.329	11.465	11.107	-2.6090	6.6770	10.387	12.991
Standard Deviation	1.93	3.54	2.57	5.78	1.07	1.39	3.50
High	13.25	15.29	16.29	6.170	7.810	12.65	18.90
Low	6.710	6.220	8.210	-9.530	4.960	7.660	6.450
Net Profit Margin (%)							
Mean	5.0600	6.5850	8.0330	-2.9580	3.1800	5.1950	7.4050
Standard Deviation	2.58	3.06	2.86	5.79	1.09	1.09	2.92
High	7.350	10.29	11.12	5.320	4.390	6.290	12.19
Low	-0.8400	1.420	3.580	-10.98	0.8700	3.040	2.720
Adjusted Return On Net Worth (%)							
Mean	15.882	15.993	19.408	-92.147	28.084	17.609	19.462
Standard Deviation	10.5	6.79	7.40	99.7	16.1	5.38	10.1
High	30.12	23.24	27.28	4.310	51.69	23.72	34.46
Low	-4.060	3.930	5.820	-348.1	4.650	8.650	0.4500
Adjusted EPS							
Mean	25.980	50.644	30.613	-3.9130	15.989	5.4940	23.764
Standard Deviation	14.8	28.6	13.0	2.13	7.14	4.89	20.0
High	43.76	93.66	43.83	0.1000	25.71	16.65	53.46
Low	-3.130	4.100	7.610	-6.990	4.280	1.370	0.2300
Dividend Per Share							
Mean	10.850	6.5000	9.6500	0.00	5.1500	2.6700	4.4000
Standard Deviation	6.14	8.49	2.60	0.00	2.10	2.22	2.74
High	20.00	30.00	13.00	0.00	8.000	7.500	9.000
Low	0.000	1.500	5.000	0.00	1.500	1.000	1.000

The analysis of operating and net margin reveals that commercial vehicle manufacturer VST Tillers is leading and is followed by Maruti Suzuki and Mahindra and Mahindra. The performance of SML Isuzu remained lesser volatile during the study period however margin secured by it is not very satisfactory. The competitive performance of Mahindra and Mahindra shows its strength to maintain its resilience. Its worst performance on this parameter, during the study period, is better than that of its peer group. The average adjusted EPS of Maruti Suzuki is far ahead from other enterprises. However, average dividend payout ratio of the company is not so liberal. Dividend declared by Tata Motors is comparatively more than the other companies of the group but undoubtedly, it is highly volatile. The average profitability of Hindustan Motors is not so sound throughout the study period and that resulted into non-declaration of dividend. The study further found that the operating and net margins of automobile industry in India are not so volatile as compared to return on net worth and earnings per share.

LIQUIDITY ANALYSIS

Liquidity analysis attempts to analyse the firm's ability to meet its immediate maturing short-term obligations. It is usually done through the calculation of current ratio and quick (liquid) ratio. A company must attempt to maintain optimum (ideal) ratio which undoubting depends upon the type of manufacturing industry. If liquidity ratios of a company are higher than the ideal ratios, the company is said to be having idle investment. Likewise, if ratio is lesser to required one, the deficit will represent possible difficulties in the payment of current liabilities of firm and it is surely not a healthy sign for the company. The results of liquidity analysis have been shown in table 2.

TABLE 2: ANALYSIS OF LIQUIDITY RATIO OF SELECTED COMPANIES (APRIL 2001 TO MARCH 2011)

Liquidity Ratio	Tata Motors	Maruti Suzuki	Mahindra & Mahindra	Hindustan Motors	SML Isuzu	Ashok Leyland	VST Tillers
Current Ratio							
Mean	0.91900	1.4130	1.1610	1.0750	1.5030	1.4200	1.8150
Standard Deviation	0.208	0.259	0.173	0.276	0.310	0.304	0.188
High	1.240	1.770	1.430	1.480	2.180	2.040	2.110
Low	0.6200	1.020	0.8600	0.7000	1.100	1.090	1.540
Quick Ratio							
Mean	0.64800	1.0460	0.81700	0.53600	0.95800	0.86900	1.0470
Standard Deviation	0.179	0.244	0.127	0.124	0.194	0.268	0.208
High	0.9600	1.310	1.010	0.7200	1.230	1.260	1.420
Low	0.4300	0.6600	0.6200	0.3700	0.6400	0.5300	0.7600

Liquidity ratios of selected companies reveal that liquidity position of commercial vehicle segment is better than that of passenger car manufacturers. VST Tillers' proportion of current as well as liquid assets is sufficient enough to meet its current liabilities. However, liquidity positions of Tata Motors and Hindustan Motors are not so healthy in comparison to other units.

MANAGERIAL EFFICIENCY ANALYSIS

Managerial efficiency of a company lies in making optimum utilisation of the assets of the companies. In this context, the paper studies inventory turnover ratio and fixed assets ratio of selected companies. Inventory is the most crucial asset for a manufacturing organisation. Particularly with reference to inventory turnover ratio, the cost of materials in Indian auto industry is the major component in production cost and its share is increasing (Narayanan and Vashishth 2008). The managerial efficiency to keep an optimum level of asset lies in maintaining an adequate ratio of assets to turnover. For instance inventory turnover ratio depicts how long a company takes on an average to sale its stock and replaces its inventory. Higher inventory turnover is considered to be desirable as it usually implies strong sales. On the contrary, lower turnover ratio reflects the poor volume of sales and excess inventory which ultimately accounts for an investment with a zero rate of return. Likewise, Higher fixed asset ratio implies that company has invested lesser amount in fixed assets to generate sales revenue hence it depicts better ability of company to utilise the fixed assets. On the contrary, lower ratio expresses the company's efficiency to use its fixed assets in an optimum manner. The results of ratio analysis are shown in table 3.

TABLE 3: ANALYSIS OF MANAGERIAL EFFICIENCY RATIO OF SELECTED COMPANIES (APRIL 2001 TO MARCH 2011)

Efficiency Ratio	Tata Motors	Maruti Suzuki	Mahindra & Mahindra	Hindustan Motors	SML Isuzu	Ashok Leyland	VST Tillers
Inventory Turnover Ratio							
Mean	12.977	25.077	12.989	9.2350	6.7220	7.0400	6.7200
Standard Deviation	1.67	5.49	2.39	3.66	1.65	1.62	1.72
High	14.91	30.47	17.91	17.94	9.110	9.240	10.07
Low	9.900	15.00	10.04	5.250	4.080	4.800	4.070
Fixed Asset Turnover Ratio							
Mean	2.1940	2.3190	2.7210	1.3720	10.109	1.9410	3.1290
Standard Deviation	0.557	0.458	0.830	0.393	4.26	0.617	1.06
High	3.080	3.090	3.850	2.370	14.73	2.860	5.070
Low	1.270	1.640	1.520	0.9500	4.040	1.250	1.710

The analysis of inventory turnover ratio shows that the performance of passenger vehicle manufacturers (Maruti Suzuki followed by Mahindra and Tata group) could be called satisfactory. However the study of fixed asset turnover ratio indicates the efficiency of SML Isuzu of commercial vehicle segment to generate revenue from its fixed assets.

LEVERAGE (LONG-TERM SOLVENCY) ANALYSIS

Leverage ratios are designed to depict the future prospects of company to get finance. These ratios also give an idea about the degree of risk caused as a result of debt financing. The present study analyse the leverage of the selected companies though the study of two ratios viz., debt-equity ratio and proprietary ratio. Here, it is important to mention that only long term debts have been considered for the calculation of the ratio. Usually, lower the debt-equity ratio, higher is the degree of protection enjoyed by the creditors. This is so because company has to pay fixed obligation in the form of interest irrespective of the volume of the profit. On the contrary as proprietary ratio represents the owner's fund to assets. Higher ratio generally indicates secured position to creditors and a lower ratio indicates greater risk to creditors. The solvency ratios may be studied through table 4.

TABLE 4: ANALYSIS OF LEVERAGE RATIO OF SELECTED COMPANIES (APRIL 2001 TO MARCH 2011)

Leverage Ratio	Tata Motors	Maruti Suzuki	Mahindra & Mahindra	Hindustan Motors	SML Isuzu	Ashok Leyland	VST Tillers
Long Term Debt / Equity							
Mean	0.5500	0.0690	0.5900	1.8750	0.1020	0.6290	0.0650
Standard Deviation	0.1860	0.0489	0.2130	0.9930	0.2190	0.3070	0.0943
High	0.7900	0.1600	0.9100	3.7700	0.6200	1.0000	0.2400
Low	0.3100	0.0100	0.2300	0.8700	0.0000	0.2400	0.0000
Proprietary Ratio							
Mean	58.6840	91.8040	66.3860	32.4130	56.4530	59.7560	91.7540
Standard Deviation	8.4800	5.1900	9.3500	9.6500	22.5000	9.1200	7.7600
High	74.0200	98.7000	81.0300	49.2300	88.0500	74.5000	99.3800
Low	47.0500	80.4900	51.9300	16.5600	30.4600	49.9800	77.1100

Leverage analysis of selected companies reveals that the long-term solvency position of VST Tillers and Maruti Suzuki is very satisfactory to their creditors. These companies enjoy least average long-term equity ratio and higher average proprietary ratio in comparison to their peer group. Further the leverage position of these companies is relatively lesser volatile. The study also shows that the leverage position of Hindustan Motors is not very pleasant for its creditors.

TEST OF HYPOTHESES

TEST OF SIGNIFICANCE OF DIFFERENCE

To test the null hypotheses, financial ratios have further been analysed through ANOVA test. The results of ANOVA are tested at 5% level of significance (95% confidence level) as well as at 1% level of significance (99% confidence level). The null hypothesis is acceptable if the calculated value of F ratio is less than the critical value of F ratio. On the contrary, if calculated value is more than the critical value, the respective null hypothesis will be rejected. The results of ANOVA test for all 11 variables are presented in table 5.

TABLE 5: RESULTS OF ANOVA TEST

Analysis	F-ratio (for degree of freedoms 6 and 63)
Profitability	
Operating Margin (%)	27.61
Net Profit Margin (%)	14.15
Adjusted Return On Net Worth (%)	11.91
Adjusted EPS	13.07
Dividend Per Share	7.561
Liquidity	
Current Ratio	14.38
Quick Ratio	9.704
Managerial Efficiency (Activity)	
Inventory Turnover Ratio	50.17
Fixed Assets Turnover Ratio	30.23
Leverage (Long term Solvency)	
Long Term Debt / Equity	23.23
Proprietary (Owners fund as % of total Source)	33.20

The critical value of F-ratio at 95% level of significance is 2.25 and at 99% level of significance is 3.10. As the calculated values of F ratio, for all selected variables, are greater than the critical value at both of the level of significance therefore all null hypotheses have been rejected and we may conclude that there is a significant difference in the financial performance of selected units in terms of selected variables. As the management practice of selected companies significantly differs with each other, the following section provides ranks to these companies on the basis of their average performance during 2001-11.

RANKING OF THE COMPANIES

This section assigns ranks to different companies for selected variables on the basis of their average performance. A company showing best average performance for a particular variable has been assigned 1st rank for that variable and likewise company securing least ratio has been assigned 7th rank for that variable. However, for long-term debt to equity ratio the methodology has been reversed as lower ratio is preferable by creditors. After the assignment of ranks to all the variables, the composite score for each parameter has been computed and again ranks are been assigned for each parameter. The parameter having least value of composite score has been assigned First rank and parameter having highest score has been assigned last rank. The assignment of ranks could be understood through table 6:

TABLE 6: ASSIGNMENT OF RANKS TO SELECTED COMPANIES ON THE BASIS OF THEIR AVERAGE PERFORMANCE (2001-11)

Particulars	Tata Motors	Maruti Suzuki	Mahindra & Mahindra	Hindustan Motors	SML Isuzu	Ashok Leyland	VST Tillers
Profitability							
Operating Margin (%)	5	2	3	7	6	4	1
Net Profit Margin (%)	5	3	1	7	6	4	2
Adjusted Return On Net Worth (%)	6	5	3	7	1	4	2
Adjusted EPS	3	1	2	7	5	6	4
Dividend Per Share	1	3	2	7	4	6	5
Composite Score	20	14	11	35	22	24	14
Rank on the basis of Profitability	III	II	I	VI	IV	V	II
Liquidity							
Current Ratio	7	4	5	6	2	3	1
Quick Ratio	6	2	5	7	3	4	1
Composite Score	13	6	10	13	5	7	2
Rank on the basis of Liquidity	VI	III	V	VI	II	IV	I
Managerial Efficiency (Activity)							
Inventory Turnover Ratio	3	1	2	4	6	5	7
Fixed Assets Turnover Ratio	5	4	3	7	1	6	2
Composite Score	8	5	5	11	7	11	9
Rank on the basis of Efficiency	III	I	I	V	II	V	IV
Leverage (Long term Solvency)							
Long Term Debt / Equity	4	2	5	7	3	6	1
Proprietary (Owners fund as % of total Source)	5	1	3	7	6	4	2
Composite Ratio	9	3	8	14	9	10	3
Rank on the basis of Leverage	III	I	II	V	III	IV	I

Source: Author's Calculation

As shown from table 6, Mahindra & Mahindra Limited found best in terms of profitability among all the peer companies of the industry. It is followed by Maruti Suzuki, VST Tillers and Tata Motors. In terms of liquidity, commercial vehicle manufacturers are more efficient. However, passenger vehicle manufacturer Maruti Suzuki also demonstrates sound liquidity position. The managerial efficiency of Maruti is also very satisfactory in the industry. The leverage positions of Maruti

Suzuki and VST Tillers are very satisfactory. However the same for Hindustan Motors is not very rosy. Further, here it is important to note that the pre-indicated ranks are not the sole indicator of business efficiency. As a matter of fact the interpretation of ratio depends upon number of factors. In the present paper a general criteria for assessment of ratio has been used. According to which the firm with higher profitability, higher liquidity ratios (not more than ideal ratio), lower debt-equity ratio (not less than ideal ratio), higher proprietary ratio (not more than ideal ratio) and higher turnover ratio is assumed to be more efficient.

CONCLUSION

The analysis reveals that the management of asset is a matter of great concern for every segment of automobile sector (as decision regarding investment in any asset or reallocating the fund makes a substantial difference to company's profitability). The study of selected pioneer companies for the period from 2001-02 to 2010-11 demonstrates the difference in the financial management of the companies. The financial performance of Mahindra & Mahindra Limited as well as Tata Motors is very satisfactory in terms of profitability as well as managerial efficiency to generate sales from the use of assets. But their liquidity positions are not so sound. The liquidity position of commercial vehicle manufacture is better than passenger vehicle manufacturers. Further, the financial performance of Ashok Leyland is comparatively poor to its competitors SML Isuzu and VST Tillers. Leverage analysis found that there is better long term solvency scenario for passenger vehicle industry Maruti Suzuki and commercial vehicle industry VST Tillers. The performance of Hindustan Motors, from the passenger vehicle segment, is not very satisfactory and requires better strategies to meet the challenges of tycoons. The trend of profitability of selected units particularly that of passenger vehicle manufacturers, shows a downward slope which is a consequent of rapid rise in the price of petrol (causing reduction in potential of volume purchased by customers), increment in the price of components used for production and growing incidence of interest rate. Thus in order to mitigate the involved risk and volatility of performance, government should initiate immediate steps to control the price of petrol, components and interest rates. Further there is a good scope to produce compact products to meet the current requirements.

REFERENCES

- Automotive Component Manufacturers Association of India (2010), "Indian Auto Component Industry: An Overview", retrieved from http://acmainfo.com/docmgr/Status_of_Auto_Industry/Status_Indian_Auto_Industry.pdf, accessed on May 2011
- Ghosh, A., Ray, S. And Makkar, J. (2011) "Two-Wheeler Industry: Growth Drivers Intact", Report of Investment Information and Credit Rating Agency of India. Retrieved from <http://www.icra.in/Files/ticker/Two-Wheeler%20Industry%20Note,%20June%202011.pdf> accessed on September 2011
- IBEF (2010), "India Brand Equity Foundation report on Automotives", April 2010, retrieved from http://www.ibef.org/download/Automotives_060710.pdf, accessed on March 2011.
- McKinsey (2005), "Vision 2015 for the Indian Automotive Components Industry", Automotive Component Manufacturers Association of India and McKinsey and Company. Retrieved from http://www.mckinsey.com/locations/india/mckinseyonindia/pdf/New_Global_Order_Automotive_Suppliers.pdf, accessed on April 2011.
- Narayanan, G., and Vashishth, P. (2008), "Determinants of Competitiveness of the Indian Auto Industry", Working Paper No.201, Indian Council for Research on International Economic Relations. Retrieved from http://www.icrier.org/pdf/Working%20Paper%20201_final.pdf accessed on January 2011
- Organisation Internationale des Constructeurs d'Automobiles (2009), "OICA Production Statistics" retrieved from <http://oica.net/category/production-statistics>, accessed on April 2011.
- Piplai, T. (2001), "Automobile Industry: Shifting Strategic Focus", Economic and Political Weekly, 36(30), pp. 2892-2897.
- Sagar, A. D. and Chandra, P. (2004), "Technological Change in the Indian Passenger Car Industry" BCSIA Discussion Paper 2004-05, Energy Technology Innovation Project, Kennedy School of Government, Harvard University, 2004. Retrieved from http://belfercenter.ksg.harvard.edu/files/2004_Sagar_Chandra.pdf, accessed on May 2011
- Tendulkar, S. D., Mitra, A., Narayanan, K. and Das, D.K. (2006), "India: Industrialisation in a Reforming Economy", Academic Foundation, New Delhi, pp. 439-470.

ANALYTICAL STUDY OF VARIOUS APPROACHES IN SERVICE QUALITY, DESIGN AND DEVELOPMENTS

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ABSTRACT

There have been various research studies undertaken by management experts and academicians in the field of services management to understand the dynamic nature of services as whole and service industry. All these studies help us to understand the intricacies of various services products. There are many concepts and theories are proposed on how to make services more profitable to the organizations. The very important factor in services management is to create more value to the customer by fulfilling the customer expectations. Through this paper an attempt is made to find out the various research approaches provided to analyze the service process, the various steps involve in service creations, the service delivery system, the service quality aspects, the customer expectations, services as customer experiences, the challenges in services creations and innovation etc.

KEYWORDS

Challenges, Design, Development, Experience, Service quality, Value.

INTRODUCTION

The services sector has grown over the last 50 years to dominate economic activity in most advanced industrial economies, yet scientific understanding of modern services is rudimentary (Henry, C., Jim S., July 2006). Service companies are facing problems to create, innovate and market the services. It's necessary for service organizations to dig out the problem areas by adopting various tools and concepts and come up with innovative solutions in services design and development.

The world economy is witnessing a major contribution of service sector in its growth. Services represent approximately 80 percent of the U.S. GDP and a growing percentage of the GDPs of countries around the world. There are many giant service providers which provide different kind of service products like Restaurants, Banking, Insurance, Healthcare, Information Technology and Enable Services (ITES) etc. to their customers but they are facing various problems while marketing their services because of the service characteristics and service quality related issues.

There have been various research studies undertaken by management experts and academicians in the field of services management to understand the dynamic nature of services as whole and service industry. All these studies help us to understand the intricacies of various services products. There are many concepts and theories are proposed on how to make services more profitable to the organizations.

The very important factor in services management is to create more value to the customer by fulfilling the customer expectations. Through this paper an attempt is made to answer the various questions like what are the various research approaches provided to analyze the service process, which are the various steps involve in service creations, how to deliver the service, what are the various service quality aspects, what are the customer expectations, how to make services as customer experiences, what are the challenges in services creations and innovation etc.

The plan of the paper is like; Section 1 brief about the contribution of services in the economy and the the various questions related with service design and development. Section 2 explains about the characteristics of the services and how to tackles the challenges associated with it. Section 3 focuses light on quality dimensions and quality gap in service creations and its delivery. Section 4 speaks about service design and development through service blueprinting, red and blue oceans strategy and the innovation strategy in service development. Section 5 concludes the research paper.

SERVICE PRODUCT CONCEPT

It is very important first to understand the service product concept before its design and development. The service product concept can be defined as activity or benefit that one party can offer to another that is essentially intangible and does not result in the ownership of anything. Its production may or may not be tied to a physical product. A service is the action of doing something for someone or something. It is largely intangible (i.e. not material). A product is tangible (i.e. material) since you can touch it and own it. A service tends to be an experience that is consumed at the point where it is purchased, and cannot be owned since it is quickly perishes.

A person could go to a hotel or restaurant one day and have excellent service, and then return the next day and have a poor experience.

It's also very important to know exactly all the characteristics of services and how the services are different from the product. In fact many organizations do have service elements to the product they sell, for example McDonald's sell physical products i.e. burgers but consumers are also concerned about the quality and speed of service, are staff cheerful and welcoming and do they serve with a smile on their face. This same concept is applicable to many other service businesses.

Hence the researchers talks about the nature of services and tries to devices various marketing strategies to satisfy their customers. To consistently deliver the service excellence, service organizations must get right the four things Service offering, Funding Mechanism, Employment Management and Customer Management (Frances X. Frei, 2008). These are the four parameters organizations need to control to deliver the best service to their customers.

The world economic data shows that the service industry contributing almost 70% into the economic development (Drejer, 2004; Gallouj, 2002b; Hauknes, 1998; Tether et al., 2001). This sector is providing various employment opportunities to all level of the people. At the same time there is great competition among the service companies in same service product line. There are many characteristics which differentiates service products from physical products (S. L. Vargo and R. F. Lusch, 2004). All these service characteristics are creating many challenges for service providers in service design and its creation. Hence it's very important to understand all those service characteristics before designing services.

1. *Lack of ownership* - You cannot own and store a service like you can a product. Services are used or hired for a period of time. For example when buying a air ticket to fly abroad the service lasts maybe specific hours each way, but consumers want and expect excellent service for that time. Because you can measure the duration of the service consumers become more demanding of it.

2. *Intangibility* - You cannot hold or touch a service unlike a product. In saying that although services are intangible the experience consumers obtain from the service has an impact on how they will perceive it. What do consumers perceive from customer service - the location, and the inner presentation of where they are purchasing the service.

3. *Inseparability* - Services cannot be separated from the service providers. A product when produced can be taken away from the producer. However a service is produced at or near the point of purchase. Take the example of visiting a restaurant, you order your meal, the waiting and delivery of the meal, the service provided by the waiter is all a part of the service production process and is inseparable, the staff in a restaurant are as a part of the process as well as the quality of food provided.

4. *Perishability* - Services last a specific time and cannot be stored like a product for later use. If travelling by train, coach or air the service will only last the duration of the journey. The service is developed and used almost simultaneously. Again because of this time constraint consumers demand more.

5. *Variability* - Since the human involvement in service means that no two services will be completely identical. For example, returning to the same garage time and time again for a service of your car might see different levels of customer satisfaction, or speediness of work.

7. *Right of ownership* - One cannot own the service, since you merely experience it. For example, an engineer may service your air-conditioning, but you do not own the service, the engineer or his equipment. You cannot sell it on once it has been consumed, and do not take ownership of it.

The service organization needs to understand the above mentioned nature/characteristics of the services. Based on it they can develop standards to assure consistency in service offerings. Systems and procedures can be put into place to make sure the service provided is consistent all the time, training in service organizations is essential for this, however in saying this there will always be subtle differences.

SERVICE QUALITY MODELS

The various researchers and experts in services management have developed service quality models. All those models tried to define the concept of "Service Quality". They each have their strengths, and weaknesses. The definition of Service quality is: Customers thinking they are getting better service than expected. This is often referred to as the perception gap. ie the gap between what the customers expects and what they think they got. It's worth noting that both sides of the gap are in the customers mind. You may actually deliver better service than your competitors, but if the customer thinks that your service is worse than that's all that matters. Because the perception gap is based on the difference between what a customer expects to receive from a service and what they think they received both sides of the gap are "soft" - they are based on customer impressions rather than a "hard" definable quality. This means the perception gap is difficult to measure, difficult to manage and is likely to change with time and experience. Nevertheless it's vital to business success. Before considering quick wins and strategic improvements there are a number of key questions which contribute to our understanding of the perception gap. Following models are the result of significant research which helps us to understand various services dimensions:

RATER

A complementary analysis of the perception gap is the RATER model produced by Zeithaml (1990). RATER identifies the 5 key areas which together form the qualities of a service offering from a customer perspective. Where the Gap model describes how the *provider* can minimize the perception gap RATER focuses on the dimensions of *customers expectations*. The research also suggests the relative importance of each of the factors.

RATER dimensions sorted by relative importance (Zeithaml 1990)		
Dimension	Description	Relative importance
Reliability	Ability to perform the promised service dependably and accurately	32%
Responsiveness	Willingness to help customers and provide prompt service	22%
Assurance	Knowledge and courtesy of employees and their ability to convey trust and confidence	19%
Empathy	Caring individualized attention the firm provides its customers	16%
Tangibles	Appearance of physical facilities, equipment, personnel and communication materials	11%

- *RATER dimensions sorted by relative importance*

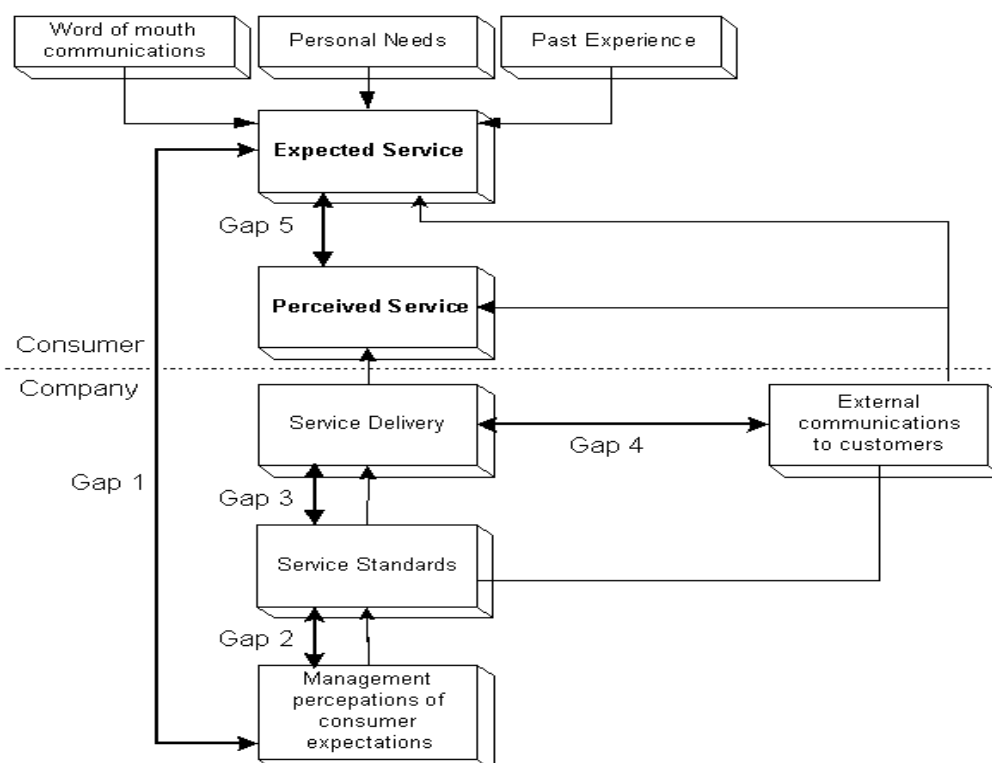
The RATER factors help provides specific dimensions which can be used to analyze and measure customer expectations.

THE GAP MODEL

The figure below shows the "GAP" model of service quality from Parasuraman et al. (Zeithaml & Bitner 1996). This model offers an integrated view of the consumer-company relationship. It is based on substantial research amongst a number of service providers. In common with the Grönroos model it shows the perception gap (Gap 5) and outlines contributory factors. In this case expected service is a function of word of mouth communication, personal need and past experience, and perceived service is a product of service delivery and external communications to consumers.

However the GAP model goes further in its analysis of these key contributory factors. It not only provides a more rigorous description of the contributory Gaps, it lists key drivers for each gap and generic breakdown of each of these drivers. These are illustrated below in summary form below.

GAP model of service quality



- Parasuraman et al. GAP model (Zeithaml 1996)

Gap 1 Inadequate market research orientation Lack of upward communication Insufficient relationship focus
Gap 2 Absence of customer driven standards Inadequate service leadership Poor service design
Gap 3 Deficiencies of human resource policies Failure to match supply and demand Customers not fulfilling roles
Gap 4 Ineffective management of customer expectations Overpromising Inadequate horizontal communications

- Key factors in the GAP model (Zeithaml 1990)

This level of detail allows powerful analysis of the contributory factors to a perception gap at a practical level. The model shows the importance of marketing, business leadership quality and HR systems in the management of the expectation gap.

Above mentioned both the quality models helps to find out the quality dimensions and quality gaps respectively. Organizations must try to find out all those possible gaps in service creation and its delivery. This will assist the organizations to design and develop the various services as per customer requirements.

SERVICE DESIGN AND DEVELOPMENT

The nature and qualities of services as discussed above have imposed many challenges for service innovation and development. The organizations can establish service standards to design consistent service. The various service quality dimensions and gaps are to be considered while designing and developing the services. The compelling need for service innovation in competitive market and the current focus of many businesses on creating value through customer experiences suggest a need for innovative methods, techniques, and R&D practices for services design and development. There are many approaches and theories proposed by various researchers and experts to service innovations and development. All those concepts and theories are helpful to devices new services or innovate and develop existing services. We can study the most popular approaches in services innovation and deployment as detailed below-

SERVICE BLUEPRINTING

This is a customer-focused approach for service innovation and service improvement. The foundations of service blueprinting were introduced two decades ago in seminal articles by G. Lynn Shostack, the method has evolved significantly as a useful approach for addressing many of the challenges in services design and innovation, and it is particularly amenable to customer experience design. In comparison to other process-oriented design techniques and tools, service blueprints are first and foremost customer-focused, allowing firms to visualize the service processes, points of customer contact, and the physical evidence associated with their services from their customer's perspective. Blueprints also illuminate and connect the underlying support processes throughout the organization that drive and support customer- focused service execution.

While designing service concept organizations must be able to describe service process characteristics and depict them so that employees, customers, and managers alike can know in concrete terms what the service involves and understand their respective roles in its delivery or co-creation. Because service blueprinting results in a visual representation of the service process and an underlying organizational structure that everyone can see, it is highly useful in the concept development stage of service development. The main blueprint forms a common point of reference for all parties concerned with achieving a successful launch of the service. It also serves as a focal point for later refinements or last-minute changes.

RED AND BLUE OCEANS CONCEPT IN SERVICE DESIGN AND DEVELOPMENT

Business universe consists of two distinct kinds of space, which we think of as red and blue oceans. Red oceans represent all the industries in existence today—the known market space. In red oceans, industry boundaries are defined and accepted, and the competitive rules of the game are well understood. Here, companies try to outperform their rivals in order to grab a greater share of existing demand. As the space gets more and more crowded, prospects for profits and growth are reduced. Products turn into commodities, and increasing competition turns the water bloody. Blue oceans denote all the industries not in existence today—the unknown market space, untainted by competition. In blue oceans, demand is created rather than fought over. There is ample opportunity for growth that is both profitable and rapid. There are two ways to create blue oceans. In a few cases, companies can give rise to completely new industries, as eBay did with the online auction industry. But in most cases, a blue ocean is created from within a red ocean when a company alters the boundaries of an existing industry. There are companies that created those blue oceans and their less successful competitors, which were caught in red oceans.

In studying these data, we can observe a consistent pattern of strategic thinking behind the creation of new markets and industries, what we call blue ocean strategy. The logic behind blue ocean strategy parts with traditional models focused on competing in existing market space. Indeed, it can be argued that manager's failure to realize the differences between red and blue ocean strategy lies behind the difficulties many companies encounter as they try to break from the competition. We believe that an understanding of blue ocean strategy will help today's companies as they struggle to thrive in an accelerating and expanding business universe.

THE INNOVATION STRATEGY IN SERVICE DEVELOPMENT

Most of the companies follow traditional approach for new business development processes and the marketing of new products within the firm boundaries. The fear of competitors makes the companies not to involve external agents in business development activities.

Recently, growing attention has been devoted to the concept of "Open Innovation", both in academia as well as in practice. Chesbrough, who coined the term "Open Innovation" describes in his book *"Open Innovation: The New Imperative for Creating and Profiting from Technology"* (2003) how companies have shifted from so-called closed innovation processes towards a more open way of innovating.

However, several factors have led to the erosion of closed innovation (Chesbrough, 2003). First of all, the mobility and availability of highly educated people has increased over the years. As a result, large amounts of knowledge exist outside the research laboratories of large companies. In addition to that, when employees change jobs, they take their knowledge with them, resulting in knowledge flows between firms. Second, the availability of venture capital has increased significantly recently, which makes it possible for good and promising ideas and technologies to be further developed outside the firm, for instance in the form entrepreneurial firms. Besides, the possibilities to further develop ideas and technologies outside the firm, for instance in the form of spin-offs or through licensing agreements, are growing. Finally, other companies in the supply chain, for instance suppliers, play an increasingly important role in the innovation process.

As a result, companies have started to look for other ways to increase the efficiency and effectiveness of their innovation processes. For instance through active search for new technologies and ideas outside of the firm, but also through cooperation with suppliers and competitors, in order to create customer value. Open Innovation can thus be described as: combining internal and external ideas as well as internal and external paths to market to advance the development of new technologies.

Now day's companies have to become aware of the increasing importance of open innovation. Not all good ideas are developed within the own company, and not all ideas should necessarily be further developed within the own firm's boundaries. The table below further illustrates this:

Closed innovation principles	Open innovation principles
The smart people in the field work for us.	Not all the smart people in the field work for us. We need to work with smart people inside and outside the company
To profit from R&D, we must discover it, develop it, and ship it ourselves.	External R&D can create significant value: internal R&D is needed to claim some portion of that value.
If we discover it ourselves, we will get it to the market first	We don't have to originate the research to profit from it.
The company that gets an innovation to the market first will win.	Building a better business model is better than getting to the market first.
If we create the most and the best ideas in the industry, we will win.	If we make the best use of internal and external ideas, we will win.
We should control our IP, so that our competitors don't profit from our ideas.	We should profit from others' use of our IP, and we should buy others' IP whenever it advances our business model.

This means that within the company a shift should take place in the way people look at the company and its environment. Involving other parties when developing new products and technologies can be of great added value. Think for instance about cooperation with other firms in your sector, suppliers, universities, and of course end-users.

The business model plays a crucial role in this is. After all, how and when external knowledge is required and used is to a large extent determined by the companies' business model which describes how value can be created from innovations and which elements have to be sourced internally or externally.

CONCLUSIONS

The statistical data shows the growth in service sector over last fifty years and dominated the world economy. The understanding about services is not so matured and still at nascent stage. It is required to research and understand the services and service sector, so that the various opportunities can be exploited by designing and developing services. New services can be design and existing services can be developed further.

The characteristics of services which differentiate from physical products are major concern for service organizations. All these service characteristics are creating many challenges for service providers in service design and its creation. Hence it's very important to understand all those service characteristics before designing services. The services organizations can develop standards to standardized the services and assure consistency in service offerings.

The service organizations must find out the perceived quality dimensions as mentioned in RATER model produced by Zeithaml (1990) to design and develop the services. Also the organizations must find out all quality related gaps as proposed by *Parasuraman*; it will be helpful to design and develop services as per customer requirements.

After knowing the various service characteristics, quality dimensions, customer requirements and gaps service organizations can establish their own standards to design and develop various services. Service blueprints is one such tool which is helpful to design and develop services by considering all service characteristics, quality dimensions, customer requirements and gaps.

The market is always full of competition all players fights for maximum share in the market. This increasing competition turns the water bloody called Red oceans. Blue oceans denote all the industries not in existence today—the unknown market space, untainted by competition. Services organization can follow the Blue oceans strategies by creating completely new market by designing completely new services. Also the companies can develop new market into the exiting competitive market with service innovation. The organizations can use optimum mix of open and closed innovation to design and develop various services to create Blue oceans for themselves.

REFERENCES

- Berry, L., et al, (2006), "Creating New Markets Through Service Innovation". MIT Sloan Management Review, Vol 47, No. 2, 52-63.
- Bitner, M., Ostrom, A., Morgan, M., (2008), "Service Blueprinting: A Practical Technique for Service Innovation". California management review vol. 50, No. 3, 66-94.
- Chan, W., Mauborgne. R., (2007), "Blue Ocean Strategy". Harvard Business School Press. 1-11.
- Chesbrough, H. (2003), "Open Innovation: The New Imperative for Creating and Profiting from Technology". Harvard Business School Press.
- Frances X. Frei, (2008), "The Four Things a Service Business Must Get Right". Harvard Business School Press.
- Henry, W., (2003), "The Era of Open Innovation". MIT Sloan Management Review, Vol 44, No. 3, 35-41.
- Parasuraman, A., Valarie, A., Zeithaml, Leonard, L., Berry, (1985), "A Conceptual Model of Service Quality and Its Implications for Future Research". Journal of Marketing, Vol. 49, No. 4, 41-50.

WORK – FAMILY ROLE CONFLICT OF WOMEN TEACHERS IN ENGINEERING COLLEGES IN TIRUCHIRAPPALLI DISTRICT

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ABSTRACT

"The myth of separate worlds" to describe a widely held assumption that work life and family life constitute two separate and non-overlapping worlds. Work and the family connected in many subtle and non-subtle, social, economic and psychological ways. The conflicts arising out of women performing double role in the home and at place of work makes sense only on the backdrop of this patriarchal-bourgeois concept of society according to which woman is defined by her biological functions. This is more true in the case of women employees in engineering colleges. In the modern world, the women employees in engineering colleges play an active role not only within their homes but also in society by taking up full-time carriers. The extra-role they play is either to meet their financial needs or to satisfy their inner urge to gain 'social identity'. The burden on the women employees in engineering colleges as a care taker of the family and as a full-time worker leads to conflict and problems. Work-family conflict has ever been the concern of individuals and Government as it leads to negative consequences like increased health risks, unsatisfactory parent roles, decreased productivity, tardiness, absenteeism, poor morale and the like. These negative consequences highlight the need for understanding the type of relationships that exists between work and family among women employees in engineering colleges. This study examines how the work-family conflict can lead to cause problems among women employees in engineering colleges. The impact of work – family conflict is analysed with the help of work-family conflict constructs like work involvement, work-expectations, family involvement, family expectations, work conflict, family conflict, work-family conflict, quality of work-life, quality of family-life and life satisfaction. The 200 women employees in engineering colleges in Tiruchirappalli City are selected on the basis of Random Sampling method to identify the work family conflict for the purpose this study. Each of the constructs is measured with the help of responses to relevant questions by adopting four point scaling technique. These questions are presented in the Questionnaire to elicit the work family conflict of the women employees in engineering colleges. After measuring the score value of each construct of work-family conflict, mean score value of each construct has been calculated for this purpose. In order to study internal consistency of 10 constructs of work-family conflict, Standard Deviation Technique has been applied. The values of Standard Deviation of each construct have been calculated and compared with different level of work family role conflict. Further, an attempt has been made to analyse the relationship among the constructs, Correlation Coefficient Technique has been adopted and compared with different levels of work family conflict under study. The work-family conflict is analysed by comparing the mean score values of work-family conflict constructs and by comparing the internal consistency of work-family conflict constructs. On the basis of the findings of the study, suitable suggestions for reducing work family conflict are made.

KEYWORDS

Work - Family Role Conflict, Women and Work Conflicts.

INTRODUCTION

A working woman has to perform the duties of a wife and a mother at home and perform the role of a superior, a peer or a sub-ordinate outside the home. The working women are required to perform multiple and at times, conflicting roles. Being simultaneously confronted with the multiple demands of home and outside, women have to face the problem of role conflict. At home in addition to biological functions, there are other duties, which they have to perform because of the prevailing cultural norms and value. They are required at the same time to undertake responsibilities, duties and certain commitment connected with their employment. Difficulty arises because often divergent and conflicting roles make demands on the women without taking into consideration their physical capability, energy, endurance and time, which are certainly finite.

The conflicts arising out of women performing double role in the home and at place of work makes sense only on the backdrop of this patriarchal-bourgeois concept of society according to which woman is defined by her biological functions. This is more true in the case of women who are working in the organized sector. With the two contradictory roles which demand her time and energy, often put her in conflicts.

CONCEPT OF WORK – FAMILY ROLE CONFLICT

"The myth of separate worlds" to describe a widely held assumption that work life and family life constitute two separate and non-overlapping worlds. Work and the family connected in many subtle and non-subtle, social, economic and psychological ways. A women's life pattern has a unique time of hibernation, reward postponement and actualization on account of dual role played by them. A woman's self-identification is delayed because of the conflicting expectations faced by her from the different roles she performs in home and office.

Kapoor has opined; "Now she has two roles to perform, one as a house wife and the other as a wage earner. Both these roles make demand on her time and energy. She is quite often torn between the conflicting pulls of the dual role."¹ The outer reality characterized by conflict in roles creates inner conflict in mind. Kapoor has rightly observed, "In the transitional era there is a role-confusion because of the absence of fitness between her roles as an employee and as a house wife because of the tension that is created due to her inner conflict."² This gets reflected overtly in many forms and creates conflicting social situations, thus further aggravating the intensity of conflict. Gerland R. Grace has explained the cause of conflict in the following manner: Role-Conflict, role-strain or role-stress are all concerned with problems for the individual which arise as the result of incapability.³ Among the women teachers role conflict arises out of the problems of differences in the expectations of the individuals. A women employee is emotionally, more evolved and socially aware of her rights and privileges and it increases the level of her role conflict.

Gandhiji had also pointed out the awakening of civil and political consciousness among Indian women creating a conflict between the traditional domestic duties and the duty towards the society.⁴ A state of confusion is created because of the contradictory nature of the dual role of the women employees. "Work-family conflict occurs when an individual has to perform multiple roles: worker, spouse and in many cases parent. Each of these roles imposes demands requiring time, energy and commitment. The cumulative demands of multiple roles can result in role strain of two types: overload and interference".⁵ Overload existing when the total demands of time and energy associated with the prescribed activity of multiple roles is too great for the roles to be performed adequately or

comfortably. Interference occurs when conflicting demands make it difficult to fulfill the requirements of multiple roles. "The vulnerability of the female work role to family demands ought to be a major source of work-family conflict because of the sex-role norm that women should take responsibility for the conflict with the norms of the work role".⁶

Under this context, the work-family conflict among Women Teachers in Engineering Colleges in Tiruchirappalli District is taken up for the purpose of this study.

WOMEN TEACHERS IN ENGINEERING COLLEGES

The era of Liberalisation and Globalisation in India has led to Privatisation and growth of self financing private colleges particularly self financing engineering colleges. In the changing economic scenario where the employment opportunities are dwindling, the mushroom growth of engineering colleges helps to create employment opportunities to technically educated women.

The jobs in the self financing engineering colleges are often the easiest to seek. However, the women teachers face several problems due to male dominance in decision making, long working hours, poor salary and absence of job security. Though there is concentration of women teachers in self financing engineering colleges, most of them are not employed on regular basis. They perform more or less the same job as men do, but receive poor salary due to high turnover of women teachers. Furthermore, the women teachers play dual role at home and college which causes the work family conflict.

The women teachers play an active role not only within their homes but also in society by taking up full-time careers and participating in social activities. The extra-role they play is either to meet their financial needs or to satisfy their inner urge to gain 'social identity'. The burden on the women as a care taker of the family and as an employee leads to conflict and problems. Work-family conflict has ever been the concern of individuals and management of the college as it leads to negative consequences like increased health risks, unsatisfactory parent roles, stress, absenteeism, high turnover and the like. These negative consequences highlight the need for understanding the factors which are connected with the work – family conflict of the women teachers.

WORK – FAMILY CONFLICT CONSTRUCTS

The factors which are connected with work – family conflict is identified with the help of work-family conflict constructs. These constructs include work involvement, work-expectations, family involvement, family expectations, work conflict, family conflict, work-family conflict, quality of work-life, quality of family-life and life satisfaction. These work – family conflict constructs are explained in the following paragraphs.

INVOLVEMENT IN WORK

"Work involvement is conceptualized as a person's psychological response to his or her current work-role, the degree to which a person identifies psychologically with the work and the importance of the work to the person's self-image and self concept".⁷

The work involvement of the women teachers depends on the number of hours spent in work. "These hours, in turn, have been linked to increased work and family conflict".⁸ High work involvement leads to more work-family conflict for Women Teachers because they are adding a non-traditional role to a traditional family role.

EXPECTATIONS IN WORK

Expectations in work by the employer are goals of pressure an individual experiences when she assumes increased responsibilities. "High work expectations have been significantly linked to high levels work-family conflict".⁹ "Women do not have mutually supportive work and family roles".¹⁰

Central to the traditional roles of wife and mother is the obligation to be available to meet the needs of the family. The work base is in terms of position rather than gender. So, the Women Teachers are unable to take time away from their family roles to satisfy work expectations.

INVOLVEMENT IN FAMILY

"Family involvement is conceptualized as the degree to which a person identifies psychologically with family roles, the importance of the family to the person's self-image and self-concept and the individual's commitment to family roles".¹¹

"Women's self-concept has traditionally been associated with their performance of the parenting and spouse roles".¹²

The family involvement of the women teachers raises anxiety and guilt regarding their performance in non-traditional roles. High family involvement leads to more work-family conflict for Women Teachers because they are playing a traditionally family role along with a non-traditional role.

EXPECTATIONS IN FAMILY

High family expectations in family may be more among women teachers and these expectations lead to role overload for the individual within the family domain. Expectations surrounding the family role can evoke pressures that dominate the time of an individual. Family expectations are associated with performance of the work role.

So, high family expectations are linked to increased work-family conflict. The Women Teacher's lack of control in balancing family needs against the demands of their jobs leads to greater work-family conflict.

CONFLICT IN WORK

The work expectations may cause work conflict since the women teachers have to play two roles as mother and teacher. The work role characteristics, such as the amount and scheduling of work time, place demands and restrictions on an individual's work behaviour that must be accommodated by the Women Teachers. These requirements may contribute to work conflict. The conflict at work, drain and pre-occupy the individual, making it difficult for her to participate adequately in family. The inaccessibility of the Women Teachers to family members while she is working can create psychological problems in the family and lead to family conflicts.

CONFLICT IN FAMILY

The spread of satisfaction and stimulation at work influences her satisfaction at home. The women teachers are expected to manage their home domain and such family responsibilities are likely to enter their work life. Since, the Women Teachers have to take full responsibility for domestic work, their families are expected to make adjustments to accommodate the demands of her work-roles. The family conflict may highly influence the work-family conflict among the Women Teachers in Engineering Colleges.

QUALITY OF WORK LIFE

"Quality of work life is a comprehensive construct that includes an individual's work-related well-being to the extent to which work experiences are rewarding, fulfilling and devoid of stress and other negative personal consequences".¹³

There is a link between the quality of work life and work family conflict of Women Teachers on account of the influence of quality of work life on work family conflict.

QUALITY OF FAMILY LIFE

"Quality of family life is a construct that includes an individual's family-related

well-being and the extent to which his or her roles as parent and spouse are rewarding, fulfilling and devoid of stress and other negative personal consequences".¹⁴ Family conflict has been related with quality of family life and marital satisfaction of the Women Teachers in Engineering Colleges.

SATISFACTION IN LIFE

"Life satisfaction is conceptualised as deriving from satisfaction experienced through having a good work and family life".¹⁵ The women teachers receive more life satisfaction from family on account of their traditional roles. The life satisfaction also determines the work-family conflict constructs of the Women Teachers in Engineering Colleges.

ANALYTICAL FRAMEWORK – MEASUREMENT OF WORK-FAMILY CONFLICT CONSTRUCTS

The 200 Women Teachers who are working in 14 Self Financing Engineering Colleges in Tiruchirappalli District are selected on the basis of Random Sampling method to identify the causes for work family conflict for the purpose this study. They belong to different departments like Electronics & Communication, Electrical & Electronics, computer Science, Information Technology, Civil, Mechanical, Science, Humanities and Business Administration. Among these women teachers 138 are in the cadre of lecturer, 58 are in the cadre of assistant professor and only 4 in the cadre of professor.

Each of the work – family conflict constructs is measured with the help of responses to relevant questions by adopting four point scaling technique. These questions are presented in the Questionnaire to elicit the work family conflict of the Women Teachers in Engineering Colleges. Each statement incorporated in the Questionnaire had four alternative responses – 'Always', 'Usually', 'Sometimes' and 'Never'. A score of 0 was given to 'Always', 1 to 'Usually', 2 to 'Sometimes' and 3 to 'Never'. There are twenty four items in the work-family conflict constructs in the Questionnaire.

After measuring the score value of each construct of work-family conflict, an attempt has been made to ascertain the relationship between the constructs and work family conflict using co-efficient of correlation technique. The relationship between the work – family conflict constructs and work family conflict helps to ascertain the causes for work – family conflict of the Women Teachers in Engineering colleges.

TABLE - 1: CORRELATION OF WORK-FAMILY CONFLICT CONSTRUCTS WITH WORK – FAMILY CONFLICT OF WOMEN TEACHERS

Factors	(i)	(ii)	(iii)	(iv)	(v)	(vi)	(vii)	(viii)	(ix)
Work Involvement	.207	-							
Family Involvement	.281	.327	-						
Work Expectations	.313	.419	.405	-					
Family Expectations	-.029	-.004	-.257	.056	-				
Work Conflict	-.300	-.285	-.319	-.369	.276	-			
Family Conflict	-.427	-.101	-.164	-.214	-.058	.056	-		
Quality of Work Life	.265	.353	.221	.188	-.159	-.248	.496	-	
Quality of Family Life	-.086	-.212	-.344	-.277	.196	.423	.090	.097	-
Life Satisfaction	-.047	-.009	-.099	-.046	.370	.234	.045	-.092	.109

Analysis of the Table – I reveals that the work-family conflict constructs: Work

Involvement, Family Involvement and Work Expectations are positively correlated with Work – Family Conflict. It indicates that these constructs are causes for work family conflict of the Women Teachers in the Engineering Colleges. Quality of Work life is most positively correlated with work family conflict and it shows that this construct causes much work family conflict. Further, Family Expectation, Work Conflict, Family Conflict, Quality of Family Life and Life Satisfaction are negatively correlated with work family conflict. It indicates that these constructs are not at all increasing the work family conflict of the Women Teachers in the Engineering Colleges. On the basis of these findings suggestions are made.

POLICY IMPLICATIONS

Looking for help outside the family for domestic, maintenance and child-care needs and seeking help from the management to make adjustments in the work setting are imperative for women teachers in Engineering Colleges. Since, the work-family conflict is found to be associated with the high quality of work life, work involvement, family involvement and work expectations, it is suggested that the management of the self financing engineering colleges should plan for instituting a comprehensive counselling programme specifically suitable for their Women Teachers in Engineering Colleges. Such a counselling programme aim at identifying the specific causes for such conflicts, providing expert counselling and helping in sorting out their problems.

Lack of co-operation from husband and a feeling of aloofness and divided attention between work and family responsibilities lead to work-family conflict. A tendency to dominate over the other members of the family and an impulse for extravagance also lead to Work family conflict. Hence, counselling particularly for the Women Teachers in Engineering Colleges is considered an essential step to be taken by the Government and Management for reducing the work-family conflict because women in our society play multi-faceted roles, often leading to inter-role conflict and consequent emotional imbalances. In order to overcome the practical difficulties of balancing a family and work and to improve and maximize human resource potentials, the Government and management must consider alternative work schedules such as virtual working and flexi time for the women teachers through proper legislation. If the above suggestions are carried out, it may go a long way in reducing the work – family role conflict of women teachers in Engineering Colleges.

REFERENCES

1. Kapoor, Promila: The Changing Status of Working Women, Vikas Publishing House Pvt, Ltd., New Delhi 1979, p.19.
2. Ibid., p.07.
3. Gerald, R.Grace: Role Conflict and the Teacher, Routledge and Kegan Paul, London, 1972, p.01.
4. Gandhi, M.K. : Women and Social Injustice; Navjeevan Publishing House, Ahemadabad, 1958, p.178.
5. Kelly and P.Voydanoff, (1985), "Work-Family Role Strain among Employed Parents", Family Relations, Vol. 34, p.374.
6. J.Pleck, G.Staines and L.Lang, (1980), "Conflicts between Work and Family Life", Monthly Labour Review, Vol. 103(3), p.32.
7. T.M.Lodahl and N.Kehner, (1965), "The Definition and Measurement of Work Involvement", Journal of Applied Psychology, Vol.49, p.32.
8. J.Greenhaul and N. Beutell, (1985), Op. Cit., p.83.
9. Ibid., p.88.
10. R.C.Barnett and G.K.Baruch, Social Roles, Gender and Psychological Distress, (Free Press, New York, 1987), p.123.
11. Ibid., p.143.
12. J.Pleck, (1979), "Work-Family Conflict", Social Problems, Vol.24, p.428.
13. B.Shamir and G.Solomon, (1985), "Work-at-home and the Quality of Working Life ", Academy of Management, Vol.10, p.460.
14. R.Burke and T.Weir, (1976), "Relationship of wife's Employment Status to Husband, Wife Pair satisfaction and Performance", Journal of Marriage and the Family, Vol.38, p.282.
15. U.Sekaran, (1983), "The Path to Mental Health", Journal of Occupational Psychology, Vol.58, p.135.

APPENDIX

APPENDIX - I: WORK – FAMILY ROLE CONFLICT OF WOMEN TEACHERS IN ENGINEERING COLLEGES IN TIRUCHIRAPPALLI DISTRICT - A SAMPLE SURVEY

	Always	Usually	Sometimes	Never
1. Work Involvement				
a. Insufficient attention to work	()	()	()	()
b. Shirking responsibility for work	()	()	()	()
2. Work Expectations				
a. Job requires high level of energy	()	()	()	()
b. More time is required to complete the job	()	()	()	()
3. Family Involvement				
a. Attention to family inadequate	()	()	()	()
b. Conjugal relationship not satisfactory	()	()	()	()
4. Family Expectations				
a. No possibility of shifting domestic work	()	()	()	()
b. Adequate attention to children's education not possible	()	()	()	()
5. Work Conflict				
a. Easily provoked	()	()	()	()
b. Blaming others	()	()	()	()
6. Family Conflict				
a. Not co – operating with the husband	()	()	()	()
b. Aloofness preferred	()	()	()	()
7. Quality of Work Life				
a. Experiencing friction in the office daily	()	()	()	()
b. Feeling tired and bored with office work	()	()	()	()
c. Bad office environment as cause of tension	()	()	()	()
d. Not satisfied with the employers	()	()	()	()
8. Quality of Family Life				
a. Relationship with other family members poor	()	()	()	()
b. Tendency to dominate	()	()	()	()
c. Being extra – vagant	()	()	()	()
d. Bad home atmosphere	()	()	()	()
9. Life – satisfaction				
a. No interest in religion	()	()	()	()
b. No recognition in society	()	()	()	()
c. Feeling of no achievement in life	()	()	()	()
d. Friends not respecting job status	()	()	()	()

INTERROGATION OF PACKAGING AND ADVERTISING

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ABSTRACT

Packaging is an activity which is concerned with the protection, economy, convenience and promotional consideration. Packaging is the general group of activities in designing the containers or wrappers for the products. It is fifth p of production mix. This research utilized a focus group methodology to understand consumer behavior toward such products. The challenge for researchers is to integrate packaging into an effective purchasing decision model, by understanding consumer's behavior towards the packaging of FMCG products. When consumers search for and process information in-store, the product's package can contain relevant and useful information for the consumer. Product packaging forms the end of the 'promotion-chain' and is close in time to the actual purchase and may therefore play an important role in predicting consumer outcomes. Packages also deliver brand identification and label information like usage instructions, contents, and list of ingredients or raw materials, warnings for use and directives for care of product. Finally the researcher found through survey that packaging and advertising plays a vital role in building good image for the company. Can earn huge market share, not only because of packaging and advertising but quality and quantity too. Packaging induces the consumer to have a try on it but it is quality which retains them for life longer. It is highly advisable that the manufacturer can go for innovative packaging but they should adhere to the quality and quantity too.

KEYWORDS

Advertisement, advertising, Indian and foreign packaging, interrogation of packaging packaging,

INTRODUCTION

In recent years packaging has developed well beyond its original function as merely a means of product protection and now plays a key marketing role in developing on shelf appeal, providing product information and establishing brand image and awareness. As packaging's role in the marketing mix gains momentum, so research into this arena becomes increasingly important. The importance of packaging design as a vehicle for communication and branding is growing in competitive markets for packaged FMCG products. Fast Moving Consumer Goods (FMCG), also known as Consumer Packaged Goods (CPG), are products that are sold quickly at relatively low cost.

"Never underestimate the importance of packaging. Marketers often measure consumer brand perceptions and ignore the pack. Yet we know from the way that consumers react to unbranded products that packaging plays a huge role in reinforcing consumer perceptions. Packaging helps to drive the way consumers experience a product. Yet, we spend little time researching the connections between packaging and the direct experience of the product". Packaging has a huge role to play in the positioning of products. Package design shapes consumer perceptions and can be the determining factor in point-of-purchase decisions which characterize the majority of shopping occasions. In recent years the marketing environment has become increasingly complex and competitive. Although advertising can be a highly effective means of communication for those consumers who are exposed to it, reaching the entire target market for most products is generally not a feasible prospect. Media fragmentation has meant that it is becoming increasingly difficult (and expensive) to reach and communicate with customers and potential customers, forcing marketers to adopt more innovative means of reaching their target market. In contrast to advertising, which has limited reach, a product's packaging is something which all buyers experience and which has strong potential to engage the majority of the target market. This makes it an extremely powerful and unique tool in the modern marketing environment. In addition to its benefits in terms of reach, some marketers believe that packaging is actually more influential than advertising in influencing consumers, as it has a more direct impact on how they perceive and experience the product. "In most cases, our experience has been that pack designs are more likely to influence the consumer perception of the brand than advertising". For products with low advertising support, packaging takes on an even more significant role as the key vehicle for communicating the brand positioning. Packaging's dual role is what makes it a truly unique marketing tool. Unlike other forms of communication which tend to be fleeting, packaging plays a crucial role not only at the point of sale, but also after the actual purchase of the product. "The packaging has to provide consumers with the right cues and clues – both at the point of purchase and during usage. The first moment of truth is about obtaining customers attention and communicating the benefits of the offer. The second moment of truth is about providing the tools the customer needs to experience the benefits when using the product"

An innovative pack design can help to set a brand apart from its competitors.

OBJECTIVES

- To know about the consumer opinion towards FMCG packaging
- To find out which attribute attract the consumer.
- To determine the mostly preferred aesthetic component of the FMCG packaging.
- To bring out the difference between the Indian and foreign FMCG packaging.

RESEARCH METHODOLOGY

This research utilized a focus group methodology to understand consumer behavior toward package of the FMCG products. The challenge for researchers is to integrate packaging into an effective purchasing decision model, by understanding Consumer's behavior towards the packaging of FMCG products.

Research design specifies the methods and procedures for collection of requisite information and its measurements and analysis to arrive at certain meaningful conclusion at the end of the proposed study.

This research was conducted with the help of Questionnaire and from the initial stages, to the final designing of questionnaire; and conducted the research through exploratory research as well as Descriptive research.

The sample size is 100 and the researcher concentrated only on women of age between 20-40 as they are the key role in deciding in purchasing the FMCG products.

REVIEW OF LITERATURE

So many researchers have done a research on packaging but my research is completely differing from others as this study carries the difference between the Indian and Foreign packaging.

Packages also deliver brand identification and label information like usage instructions, contents, and list of ingredients or raw materials, warnings for use and directives for care of product. When consumers search for and process information in-store, the product's package can contain relevant and useful information for the consumer. Product packaging forms the end of the 'promotion-chain' and is close in time to the actual purchase and may therefore play an important role in predicting consumer outcomes.

According to Nacarrow, Wright and Brace (1998) there are typically seven Reasons/occasions when research agencies are asked to get consumer response on Packaging design:

1. New product development (NPD)
2. Revitalizing a dated/tired pack
3. Repositioning a product (changing what it competes with and/or its functional or Symbolic benefits)
4. Changing a product's target market
5. When cost reductions in packaging are required
6. When legal or regulation requirements demand it
7. When new packaging technology becomes available

MESSAGE PLACEMENT INFLUENCES PERCEPTION

The term 'sensation transference' was coined by Louis Cheskin in the 1930's and is discussed further in the book, Blink, by Malcolm Gladwell. Cheskin was one of the first marketers to notice that people's perceptions of a product or service were directly related to the aesthetic elements of their design. He believed that people didn't make a distinction between the product and the package. Instead how we feel about the package is often transferred to how we feel about the product itself. In essence, for consumers the product is the package AND the product combined.

The placement/positioning of messages on the package influence how a package will be read.

"Research in psychology on brain laterality, shows that perception is not symmetrical; for instance, words are recalled better if they are perceived from the right-hand side of the individual, while pictorial or non-verbal cues are more successful if coming from the left-hand side. Under conditions of rapid perception, e.g. scanning packs while walking along the aisle in a supermarket, this differential perception and the positioning of the elements in a pack design may make the difference between identifying and missing the item concerned."

Brain laterality research has found that verbal stimuli are recalled better when they are on the right-hand side of the visual field, and non-verbal stimuli are better recalled when on the left-hand side of the visual field.



If we accept this theory, this would imply that in order to maximize consumer recall, pictorial elements (such as product photography) should be positioned on the left hand side of the package and important pack copy (such as brand name or flavour description) and visuals should be placed centrally or on the right-hand side of the pack.

Other elements, such as an unappealing legal descriptions or a product disclaimer, of which recall is not very important for brand building, should rather be placed on the left-hand side or back of the label. It is also found that it is best to group the key messages/benefits in one location, and to create a consistent/dominant viewing pattern by leading shoppers from the main visual or product visual (their typical starting point) to the key messages. "When labeling messages are positioned on either side of the main visual, it pulls viewers in two different directions, and often results in some messages getting lost outside of the primary viewing flow".

CREATIVITY IN PACKAGING

Even though the goal of **modern retail packaging** is to encourage potential buyers to purchase the product, clever packages can also be a great source of inspiration. The post showcases **innovative and creative packaging design ideas** from all over the world.

People always want to be different and want to have different things. Consumer mind can be easily attracted and captured by creative packing. If not creative ad establish inspiration in the mind of consumer then the FMCG manufacturer can go for innovative pack. People will definitely come forward to purchase and will create a word of mouth.

BANANA GUARD PACKAGING

A robust case that ensures the banana survives the travels in perfect condition.



MR. CLEAN DUMBBELL PACKAGING

Tommaso Ceschi designed this lovely innovative packaging which can act as a cleaning detergent container and a dumbbell!



HANGER TEA

One can't think of a better or more obvious way to pack teabags than this hanger & T-shirt design. It's a funny take on how the simple motion of hanging a used teabag on the rim of the cup, be done. Color-coded for different varieties, the hangers are rather cute and so are the tea-shirts!



INDIAN PACKAGING AND FOREIGN PACKAGING COMPARISON

THE PACKAGE OF VERMICELLI IN INDIA AND FOREIGN RESPECTIVELY

In India the packet of vermicelli looks simple but it is easily understood by illiterate that product is manufactured by Anil Company as the picture of squirrel is shown on the packet. The prepared vermicelli in the plate is also shown on the packet which indicates it's delicious.

Everyone will definitely like this packaging manufactured in US, both in the plain or red version. The red tone chosen is calm and earthy, not too much saturate. It reminds the cornfields at the sunset in Italian hot summer. The font is linear, an egg icon show how many eggs has been employed. Beautiful and modern. Is unnecessary to remind that Vignelli is a great and famous Italian designer.



JUICE OR COOL DRINKS IN THE STYLE OF INDIAN AND FOREIGN PACKAGING

The Maaza word derived from Hindi word Maaza means fun. Its packages are in PET bottle. This is compact to carry for any travelling. The yellow color wrapper touches the heart of the Indian people as yellow color is auspicious. The shape of bottle is quite attracting. The mangoes shown on picture itself will create saliva from the mouth it indicates that Maaza is consist of sweet taste.

Cawston juice is an apple-centered product. The various juices are a mix of apple and something else. The modern packaging shape is in contrast with the old style lettering and the general sign that remind a journal but this is the interesting thing: Cawston Press. The meaning is double press" as "printed journal" and "press" as "pressed apple", a juice coming from pressed fruit and not from water concentrate juice. Real juice.



First Juice packaging is fresh and colored. The "hand sketched" style is aimed to the target of little boys going around with their bikes. What's the best thing to drink after a crazy cycling? A fresh juice!



COFFEE PACKAGE IS VERY DIFFERENT IN FOREIGN COUNTRIES

The packaging is really modern and tries to be different from other more traditional coffee packaging. Bright colors, no coffee beans, it looks more like a cosmetic packaging. Everyone will like very much the green version. Generally, tin packaging for a coffee brand will bring good inspiration.



Indian coffee packages are also eye catching as the green color attracts the Indian people. The cup of coffee shown on packages induces them to buy as it reveals the taste. Bru aroma lock coffee bag attracts more than ordinary one.



PACKING OF NOODLES IN INDIA AND FOREIGN

Aluminium foil cover for noodles has very much attracted the foreign people. Instant noodle in cup become a hot sales because of beautiful design on packaging. The Maggi and top roman packages has attracted the kids because of the noodles is shown on the pack which puts in their mind that the food will be more delicious.



FINDINGS

1. Most of the respondents used to have a glance on the packaging. As they are interested in knowing about the product that too only when they get time.
2. Safety is the main factor for packaging followed by convenience of packaging. Less number of respondents reveals that message on packaging is read only when they get time otherwise they don't look at it. But most of the respondents just look at the instruction for preparation if it is a food product. Both Indian and Foreigner pay less attention on the color of the packages.
3. Most of the respondents are very well attached to the packaging they are even ready to shift from one brand to another brand because of packaging. Hence, packaging plays a vital role than brand name.
4. Advertisement is one where the message is being transformed to the nook and corner of the world. Respondents get information about the new package mostly through ad
5. Respondents highlight that in order to compete the manufacturer change their packages design followed by attracting the consumer.
6. Even some of respondents (19 %) indicate that quantity get change due to changes in packaging's followed by changes in price and quality.
7. It is wonder that the respondents are much affirmed to refuse to buy the product if packaging is not quite good.
8. More than half of the respondents are willing to buy the product because of beautiful packaging than unknown brand name.
9. Most of the respondents agree that message on packaging is best than message communicated through advertisement.
10. 87% of the respondents strongly believes that packaging is kind of advertisement.
11. Respondents are very much confident that there is differentiation between the Indian and Foreign FMCG packages.
12. Foreign FMCG packaging's are more creative than Indian FMCG packaging.
13. The difference between the Indian and Foreign FMCG packaging is based on its shape and size followed by color, text and graphics.
14. There are various material used for packaging but the material used in India and Foreign are mostly one the same
15. Respondents claim that cosmetics packaging are more attractive than others followed by food packaging in India
16. Rest of the Indian FMCG product like personal care, Hair care and Oral care brings less inspiration by the respondents.
17. In case of Foreign FMCG packaging the best packaging is food followed by cosmetics.
18. Rest of the Foreign FMCG product like personal care, Hair care and Oral care brings less inspiration by the respondents.
19. Always the picture captures the mind of the people followed by logo on the FMCG packaging. Most of the respondents express that the picture and logo is the first thing seen on the packaging.
20. The price, offer and date of manufacturing and expiry is next thing that the respondents would like to see followed by instruction, ingredients, brand name, company name and slogan.
21. Last but not least the most inspired aesthetic component is material, shape and size, color and text and graphics respectively.

SUGGESTION

The researcher would like to suggest that

1. Manufacturer should carefully put more concentration on FMCG product packaging as it plays a important role in the mind of the consumer.
2. The first thing in the FMCG product packaging is its material therefore one should pack the FMCG product in such a clever packaging which shall be reusable even after the quantity gets over.

3. The more important for the manufacturer is that the consumer think if packages get changed the quality also can be changed that false notion is to be removed by frequent advertisement.
4. The taste of Color, shape, size, text and graphics varies from person to person so the manufacturer should identify the target market and according to their perception, the FMCG product packaging must show some difference
5. Compact FMCG product packaging is highly preferable by the both Indian and Foreign society hence more concentration is to be given for the same.
6. It is advisable for the advertise to show various FMCG product packaging under one product line because the consumer notice the information on advertisement.
7. Manufacturer can adopt innovation and creativity as mentioned earlier in order to capture huge market share as the foreign manufacturer do.

CONCLUSION

FMCG Packaging design is an essential part of product marketing. When a customer is browsing the shelves and choosing at a glance between brands, packaging is the main thing they notice. Consumers buy based on emotion, and the right packaging design can make a product desirable.

Thus FMCG product packaging induces the consumer to step forward and make a purchase. Packaging alone is not enough to create awareness among the public but the advertisement is necessary too. To become a healthy manufacturer both packaging and advertising should go in same pace. Innovative and clever FMCG product packaging makes the business life longer.

REFERENCES

BOOKS

- Anon: "Packaging Matters",. Institute of Packaging Professionals, 1993
Robertson, G. L., "Food Packaging", 2005,
Y. Schneider; C. Kluge, U. Weiß, H. Rohm (2010). "Packaging Materials and Equipment".
Selke, S., "Plastics Packaging", 2004,
Opie, R., *Packaging Source Book*, 1991,
Jankowski, J. *Shelf Space: Modern Package Design, 1945–1965*, Chronicle Books. 1988
Calver, G., *What Is Packaging Design*, Rotovision. 2004,

ONLINE SOURCE

- <http://www.businessmantra.net/category/packaging/page/4>
<http://ezinearticles.com/?Successful-packaging-Strategies&id=1423716>
<http://drypen.in/packaging/defining-packaging-concept.html>

A COMPARATIVE STUDY OF THE DOT.COM CRISIS AND THE SUB-PRIME CRISIS

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ABSTRACT

The global economy has been affected because of the sub-prime crisis which has brought about serious damage to the economic system across the world. The collapse of "tech boom" in 2000, also called the dotcom crisis and the incident of 9/11 bombing of the World Trade Centre grew more concerned about the downturn of US economy. To prevent the situation from worsening in 2001, US Federal Reserve Board dropped the key interest rate from 6.5% to 1% and kept it for a year and then gradually raised it. This led to the result of "subprime" mortgages where lending was at higher rates to the people who would normally never qualify for lower cost prime loans. The growth of the subprime industry is largely attributable to the increase in securitization. These securities, which have high risk, were then repackaged and sold to investors globally which led to the subprime crisis. The immediate agenda for every nation that is affected by this crisis is to tackle it efficiently and also to take steps to avoid such crisis in the future. Thus, it becomes important to study the similarities and dissimilarities in the dotcom and subprime crisis. A study on the movement of certain variables, like the interest rate, money supply, inflation rate, stock market index, etc., is likely to throw some light on how to avoid such risks in the future. This study focuses on the causes and effects of the recent sub-prime crisis and compares it with the causes and effects of the dotcom crisis of 2000 and offers certain suggestions to avoid such crisis in the future.

KEYWORDS

Dot.com crisis, Sub-prime crisis, Economic system.

INTRODUCTION

ub-prime crisis is the crisis that the economy has been facing since mid 2007 which has befallen the US and the UK economies because of lending to the sub-prime market, i.e., the not-so-worthy borrowers. Most of the countries have been affected by the recent sub-prime financial crisis. India has also been significantly affected and the immediate agenda of every nation is to address this issue and come out of this crisis as early as possible. Every nation has already started to work upon this area to revive the economy. However, one is also interested to know whether there are any similarities in the earlier dot-com crisis of 2001 and the present sub-prime crisis, so that some preventive measures can be taken to avoid such crisis in the future. This paper aims to analyse the similarities and dissimilarities of both these crises in order to identify warning signals and suggest certain measures to be taken to avoid such crisis in the future.

NEED FOR THE STUDY

The recent subprime crisis and the meltdown in the US and the UK economy had a tremendous effect on the businesses in other countries. Under such situations, it becomes very important to find out the causes of such crisis so that such crisis can be avoided in the future. In order to avoid such crisis it is essential to study certain macro-economic variables and to analyse them and find out whether the movement in such variables can provide some warning signals of the economy in the future so that we are well prepared to tackle such issues and face the future.

OBJECTIVES OF THE STUDY

The main objectives of the study are as follows.

- 1) To study the causes of the dot com crisis and the subprime crisis
- 2) To analyse the movements of certain variables like the M3, GDP, interest rates, inflation rate and share price indices of both the US and India.
- 3) To suggest certain measures to avoid such crisis in the future.

METHODOLOGY

The study analyses the movements in the variables like the money supply (M3), GDP, interest rates, inflation rate and Share Price Index of both the US and India for the past ten years, i.e., from 1999 - 2000 to 2008 - 2009. As we do not have a perfect cut-off date for deciding on the meltdown point, we assume 2006-07 as the pre-meltdown period and 2008-09 as the post-meltdown period, as most of the Financial Institutions started to slowly write-off their loans from their balance sheets since the beginning of the year 2008 which is an indication of the start of the sub-prime crisis.

Graphical charts were used to study the trend in these variables. The analysis also involved the calculation of the Paired Mean Comparison Test (using the SPSS package) to compare the average of the pre-meltdown values of these variables and the post-meltdown values of these variables.

H0: The pre-meltdown values of these variables are not significantly different from the post meltdown values of the variables

H1: The pre-meltdown values of these variables are significantly different from the post meltdown values of the variables

SCHEME OF PRESENTATION

The first section introduces the study. The second section discusses the causes of the dot.com crisis and the sub-prime crisis. The analysis of the movements in certain variables like the M3, GDP, interest rates, inflation rates and share price indices of both the US and India pre and post crisis is done in the third section. The fourth section examines the effects of both these crisis on these variables. The last section aims at offering some warning signals / suggestions to avoid such crisis in the future.

CAUSES OF THE DOT.COM CRISIS AND THE SUB-PRIME CRISIS

A dot.com company is any internet-based company. The dot.com crisis started due to the downfall of many internet companies. A dot.com company depends on a huge customer database. The performance of a dot.com was measured on number of customers rather than the actual yearly profit. When the market was at its peak, many dot-com companies made an initial public offer of its stock and raised a hefty amount of money. The stock prices of such companies were rising. A combination of rapidly increasing stock prices, market confidence that the companies would earn huge profits, individual speculation in stocks, and widely available venture capital created an environment in which many investors were willing to overlook traditional metrics such as price to earnings ratios in favor of confidence in technological advancements.

In March 2000, the NASDAQ index peaked at 5132.52, which was thought of as the highest point of the bubble¹. The major NASDAQ collapse is also attributed to multibillion dollar stock sell of Cisco, Dell, IBM, etc. Simultaneously NASDAQ opened lower by four percentage point. The massive selling was the main trigger for the after chain reaction.

During this period, many network companies loaded with debts, sold their assets and also filed for bankruptcy. Among them, WorldCom, was involved in illegal accounting procedures and had overstated the profits. The stocks of WorldCom came crashing down as soon as these irregularities were revealed; it went on to file the biggest bankruptcy in the US history. Many other dot-com companies also vanished quickly, some of the companies and their executives were accused of misusing the stock money. The Dot-com crash finished of USD five trillion of technology market value. Another major cause was the hefty money spending by major companies in the preparation for Y2K. Special soft wares and programs were brought into effect for nullifying the effect of Y2K.

Sub-prime crisis is the meltdown of the financial system of the US that has arisen because of lending to the not-so-worthy borrowers. After the dotcom bust and the recession that followed in 2001, the US Government followed a policy of Consumerism as Patriotism, thereby motivating people to spend. The Government Sponsored Enterprises (GSE) such as Freddie Mac and Fannie Mae have been spearheading government subsidized housing needs of the weaker section of the society in the US till the year 2002. The US real estate industry boomed between 2001 and 2005 as property prices reached historic highs on account of low interest rates. The Prices of the real-estate started to increase. Because of increased credit and growth, interest rates also started to increase.

As the real estate market picked up, there has been a mushrooming growth of mortgage companies, since 2003, who competed with each other in extending high interest rate loans to such borrowers with low credit rating. These were packaged into Asset Backed Securities (ABS) and placed in the debt market. Thus when the share of GSE exposure to housing mortgage outstanding dropped to 47% from 57% the share of ABS went up from 7% to 19% by 2006. In the year 2006, this accounted for 45% of the fresh mortgages extended. These ABS were further modified into exotic derivatives and took the final shape of agency rated CDOs, making it marketable to the best of the financial institutions around the world. Bankers don't hold mortgages till maturity. They create mortgage-backed securities or collateralized debt obligations (CDOs), which were sold to other banks and financial institutions. The housing boom in the US since January 2003 created many trillions of dollars of CDOs that were bought as assets by banks and financial institutions throughout the developed world.

The market for collateralized debt obligations grew continuously. In 2005, it was the second largest credit derivative market after credit default swaps. The CDOs were sold to investors, including hedge funds, insurance companies, pension plans, and mutual funds that were looking for high yield, given the excellent ratings by Rating Agencies. Although the CDO market began with cash CDOs, the most commonly traded CDO type was the synthetic CDO that builds on other credit instruments (like CDS) instead of the direct sale of the underlying assets. Because of the CDO structure and the diversification gained by bundling different debts, underwriters have tried to package these high-risk debt instruments in such a manner to receive investment grade ratings. Greedy bankers mixed sub prime loans with good paper and traded it as Collateralised Debt Obligations.

The major Sub-Prime Impact started from March 2007 and reached its peak during June to August 2007, when property prices began to fall due to saturation or lack of demand. The borrowers had to pay mortgage loan, which was higher compared to property value and they started defaulting. The banks bought all such houses owned by such defaulted borrowers, in the market for selling them to recover their loans which led to housing market collapse. Many hedge funds and other institutional investors who had invested in CDOs incurred significant losses, because the borrowers were not paying the coupon payments. Even if the SPV had to sell the collateral at the market, they had to sell them at low prices.

Also, valuation of CDOs became complex as it is derived from the collectibility of subprime mortgage payments, which was difficult to predict due to lack of precedent and rising delinquency rates. Banks and institutional investors have recognized substantial losses as they have to revalue their CDO assets downward. This made the CDOs illiquid and burdened them with mark-to-market losses as the value of portfolios had grossly depreciated. As the CDOs were illiquid and did not trade regularly, it was also difficult to value the CDOs accurately. The financial Institutions do not know the exact amount of the default of their borrowers and the portion of CDOs for which there is no asset backing. Unlike stocks listed on an exchange or US Treasury bonds, CDOs are rarely traded. So holders of the instruments are still finding it difficult to sell these papers and price discovery has become a problem.²

The liquidity concerns drove central banks to take action to provide funds to member banks and encourage lending. The impacts of credit risk and liquidity risk caused several major corporations and hedge funds to shut down or file for bankruptcy. Many institutional investors and mutual funds incurred huge losses. Many of the mortgage finance companies in the US closed down operations. Those who intermediated in extending the loans to sub-prime individuals and packaged them as first level asset backed securitized collaterals (ABS) to investors disappeared. Major mortgage companies have gone for closure.

AN ANALYSIS OF THE MOVEMENTS OF CERTAIN MACRO-ECONOMIC VARIABLES

The causes of the dot com crisis and the subprime crisis are very different. But, it is very clear that just before both the crisis happened the market was booming with much optimism. Money Supply, interest rates, stock market index, etc., were all increasing. So, it was of interest to analyse the movements in these variables. Table 1 gives the data on M3 and its growth rate, GDP and its growth rate and interest rates of the US and India. Table 2 gives the Share Price Index of India and the US and the returns from them, the WPI and the growth rate of India, Inflation rate of the US and the Exchange rate. Table 3 gives only the growth rate of these variables which was used in the analysis. Growth rates are used in the analysis as they are better measures compared to absolute values.

TABLE 1: DATA ON M3 AND ITS GROWTH RATE, GDP AND ITS GROWTH RATE AND INTEREST RATES OF THE US AND INDIA

Yr	Money supply		Money Supply		GDP		GDP		Interest rate	
	India	gM	US	gM	India	gGDP	US	gGDP	India	US
	Rs.crores		US \$ Bns.		Rs. crore		Billions of \$		PLR	Short term interest rate
			M2 (US has stopped making M3 public since 2005)						(average of the range)	
99	980960		4406.00		1817752		8793.5		12.00	4.64
0	1124174	14.60	4668.80	5.96	1952035	7.39	9353.5	6.37	11.50	5.82
1	1313220	16.82	4983.70	6.74	2030711	4.03	9951.5	6.39	11.50	3.40
2	1498355	14.10	5468.20	9.72	2136651	5.22	10286.2	3.36	11.13	1.61
3	1717960	14.66	5821.80	6.47	2217133	3.77	10642.3	3.46	10.63	1.01
4	2005676	16.75	6098.70	4.76	2402727	8.37	11142.1	4.70	10.50	1.37
5	2245677	11.97	6449.10	5.75	2602065	8.30	11867.8	6.51	10.50	3.15
6	2719519	21.10	6734.00	4.42	2844942	9.33	12638.4	6.49	12.38	4.73
7	3310068	21.72	7085.70	5.22	3120031	9.67	13398.9	6.02	12.50	4.36
8	4017882	21.38	7448.90	5.13	3402716	9.06	14077.6	5.07	12.00	1.37
9	4764019	18.57	8214.00	10.27	3609425	6.07	14441.4	2.58	11.63	0.17

¹ http://en.wikipedia.org/wiki/Dot-com_bubble

² http://www.ft.com/cms/s/0/547fe852-24da-11dc-bf47-000b5df10621.html?n&ncklick_check=1

TABLE 2: SHARE PRICE INDEX OF INDIA AND THE US AND THE RETURNS FROM THEM, THE WPI AND ITS GROWTH RATE OF INDIA, INFLATION RATE OF THE US AND THE EXCHANGE RATE

Yr	Share price index		Share price index		WPI		Inflation rate	Ex. Rate
	India	Index returns	US	Index returns	India	gWPI	US	INR/\$
99	5005.82		1279.64		143.8		1.67	42.43
0	3972.12	-20.65	1394.46	8.97	152.8	6.26	2.74	43.6
1	3262.33	-17.87	1366.01	-2.04	160.7	5.17	3.73	46.63
2	3377.28	3.52	1130.2	-17.26	164.7	2.49	1.14	48.8
3	5838.96	72.89	855.7	-24.29	173.4	5.28	2.6	47.5
4	6602.69	13.08	1131.13	32.19	184.9	6.63	1.93	43.39
5	9397.93	42.33	1181.27	4.43	193.7	4.76	2.97	43.75
6	13786.91	46.70	1280.08	8.36	203	4.80	3.99	44.61
7	20286.99	47.15	1438.24	12.36	212.8	4.83	2.08	43.59
8	9647.31	-52.45	1378.55	-4.15	232.2	9.12	4.28	39.97
9	16123.67	67.13	825.88	-40.09	228.9	-1.42	0.03	50.95

TABLE 3: GROWTH RATE OF THE VARIABLES USED IN THE ANALYSIS

Yr	gM India	gM US	gGDP India	gGDP US	India PLR	US ST int rate	Index returns India	Index returns US	gWPI India	Inflation rate US	Ex rate INR/\$
1999					12	4.64				1.67	42.43
2000	14.6	5.96	7.39	6.37	11.5	5.82	-20.7	8.97	6.26	2.74	43.6
2001	16.82	6.74	4.03	6.39	11.5	3.4	-17.9	-2.04	5.17	3.73	46.63
2002	14.1	9.72	5.22	3.36	11.13	1.61	3.52	-17.26	2.49	1.14	48.8
2003	14.66	6.47	3.77	3.46	10.63	1.01	72.89	-24.29	5.28	2.6	47.5
2004	16.75	4.76	8.37	4.7	10.5	1.37	13.08	32.19	6.63	1.93	43.39
2005	11.97	5.75	8.3	6.51	10.5	3.15	42.33	4.43	4.76	2.97	43.75
2006	21.1	4.42	9.33	6.49	12.38	4.73	46.7	8.36	4.8	3.99	44.61
2007	21.72	5.22	9.67	6.02	12.5	4.36	47.15	12.36	4.83	2.08	43.59
2008	21.38	5.13	9.06	5.07	12	1.37	-52.5	-4.15	9.12	4.28	39.97
2009	18.57	10.27	6.07	2.58	11.63	0.17	67.13	-40.09	-1.42	0.03	50.95

SOURCES OF DATA

The different data that were used in the analysis have been collected from various sources. The different variables for which data was collected and the sources from where these data were taken are given below.

Exchange Rate: Rakshitra - CCIL Monthly Newsletter on Money, G-Sec and Forex markets, The Clearing Corporation of India Ltd., July 2009, pp. 66

<http://www.docstoc.com/docs/11386100/Exchange-Rate-Rupees-Dollars>

M3 of India: <http://rbidocs.rbi.org.in/rbiadmin/Scripts/PublicationsView.aspx?id=11628>

GDP: <http://www.rbi.org.in/scripts/PublicationsView.aspx?id=11587>

PLR of India: Rakshitra - CCIL Monthly Newsletter on Money, G-Sec and Forex markets, The Clearing Corporation of India Ltd., July 2009, pp. 65

PLR of 1999: <http://www.indianexpress.com/ie/daily/19990302/ibu02057.html>

Share price Index of US: (S&P 500)

<http://finance.yahoo.com/q/hp?s=%5EGSPC&a=00&b=3&c=1999&d=01&e=2&f=2009&g=m>

Inflation rate of US:

http://inflationdata.com/inflation/Inflation_Rate/HistoricalInflation.aspx?dsInflation_currentPage=0

M3 of US:

<http://www.federalreserve.gov/releases/h6/>

WPI of India

<http://eaindustry.nic.in/>

Interest rates of US:

<http://www.measuringworth.org/interestrates/>

http://www.newyorkfed.org/research/directors_charts/short.pdf

BSE Sensex data

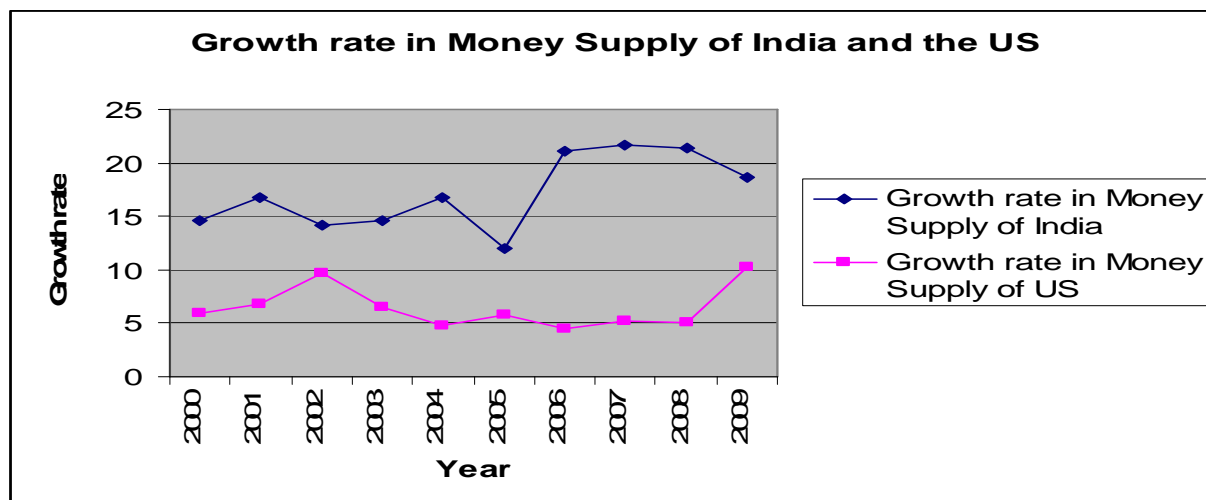
<http://www.bseindia.com/histdata/hindices2.asp>

GDP data of US

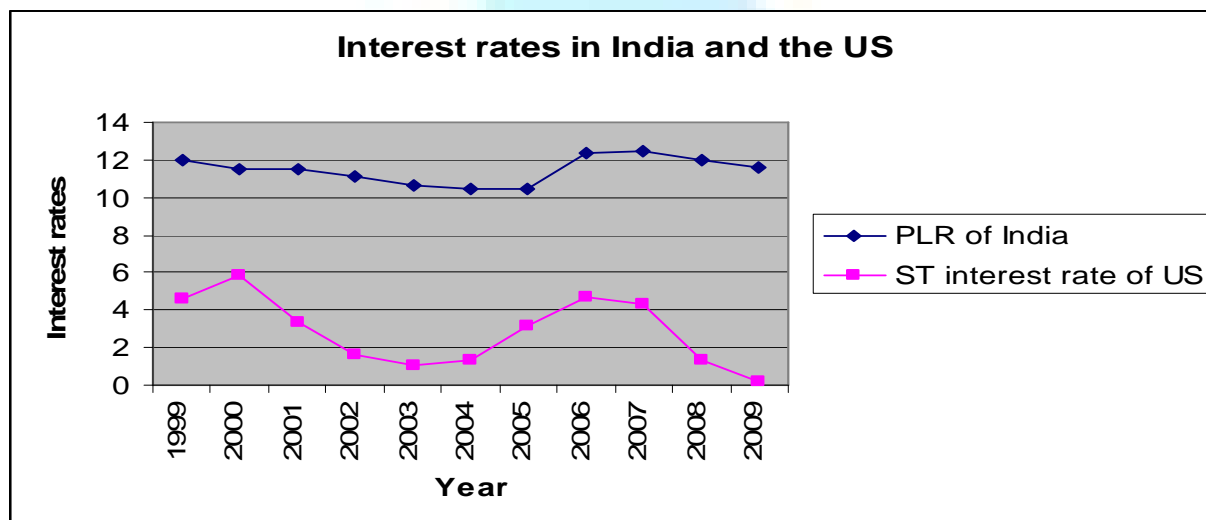
<http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=5&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1999&LastYear=2009&3Place=N&AllYearsChk=YES&Update=Update&JavaBox=no>

ANALYSIS

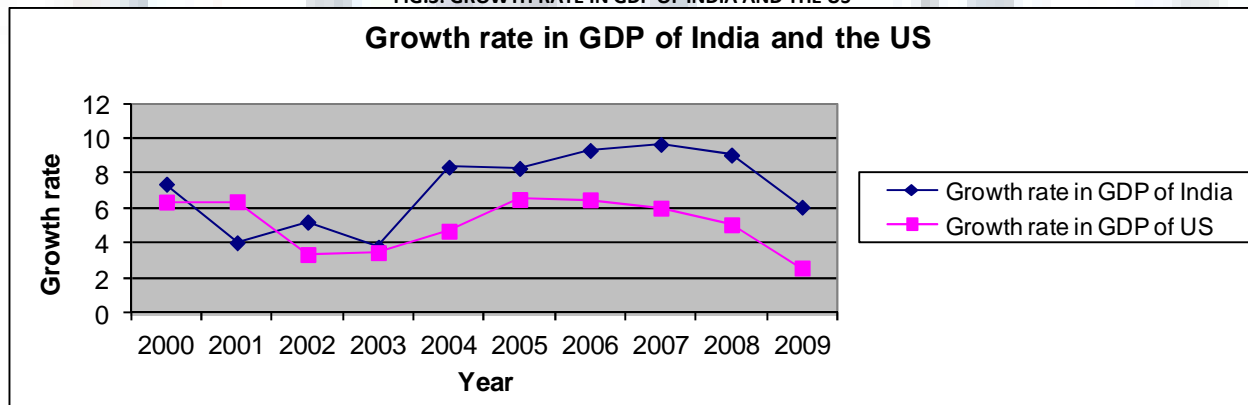
Graphical charts were prepared to study the movements of these variables. The Graphical charts depicting the movements in the variables under study are given below.

FIG.1: GROWTH RATE IN MONEY SUPPLY OF INDIA AND THE US

The analysis of growth rate in the money supply from Fig.1 indicates that in India the growth rate is high during the boom period and has started to decline during and after the crisis. In the case of US, the growth rate has increased after the crisis, indicating that the Government has pumped in liquidity to meet the crisis.

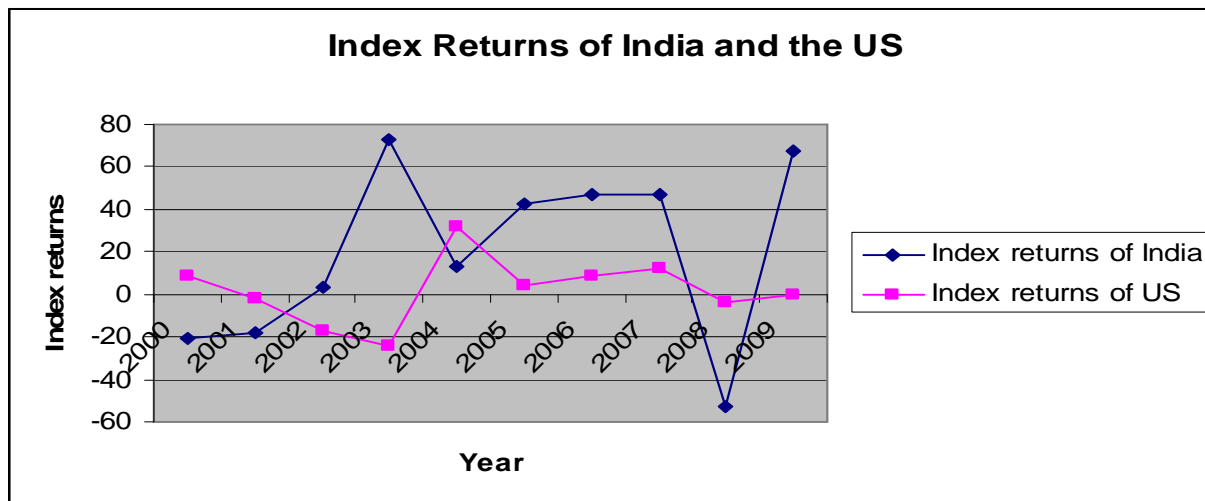
FIG.2: INTEREST RATES IN INDIA AND THE US

A close look at the movement of the Interest rates in India and the US, shown in Fig.2, indicates that the interest rates have increased between 2005-2007, but later the rates have declined following the crisis indicating that measures are being taken by both the governments to revive the economy. The interest rates were kept low after the dot.com crisis so as to revive the economy. The demand for housing loans increased and many mortgage lenders started offering loans. As the interest rates were low, the demand for loans picked up. This pushed up the interest rates. The borrowers found it difficult to pay as they had borrowed on floating rate of interest, which was the basis of the sub-prime crisis. From the chart it is clear that the interest rates are low, the reasons might be, i) due to decrease in the demand for loan and ii) the policy to keep interest rates low to revive the economy.

FIG.3: GROWTH RATE IN GDP OF INDIA AND THE US

The chart shown in Fig.3 on GDP Growth rate clearly indicates that there is an increase in growth rate just before the crisis. A very high growth rate achieved because of a great push to revive the economy might come as a warning signal for a downfall in the economy. The Growth rate in GDP of US has started falling much ahead compared to the fall in the rate of growth of GDP in India. This might be due to the fact that India had strong fundamentals and the GDP growth rate was affected only after its severe impact in the US.

FIG.4: INDEX RETURNS OF INDIA AND THE US



The analysis of the movements in Index returns shown in Fig.4, indicates that the markets are at a high just before a crisis and are at a low during the crisis. A highly overvalued market acts as a warning signal and investors should be extra cautious while investing in an overvalued market.

FIG.5: INFLATION RATES IN INDIA AND THE US

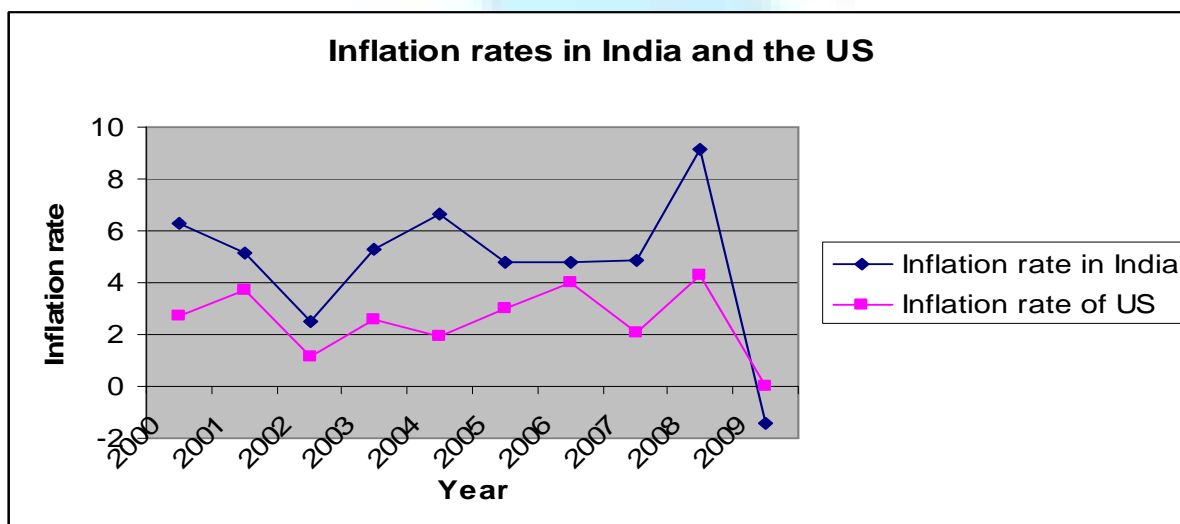
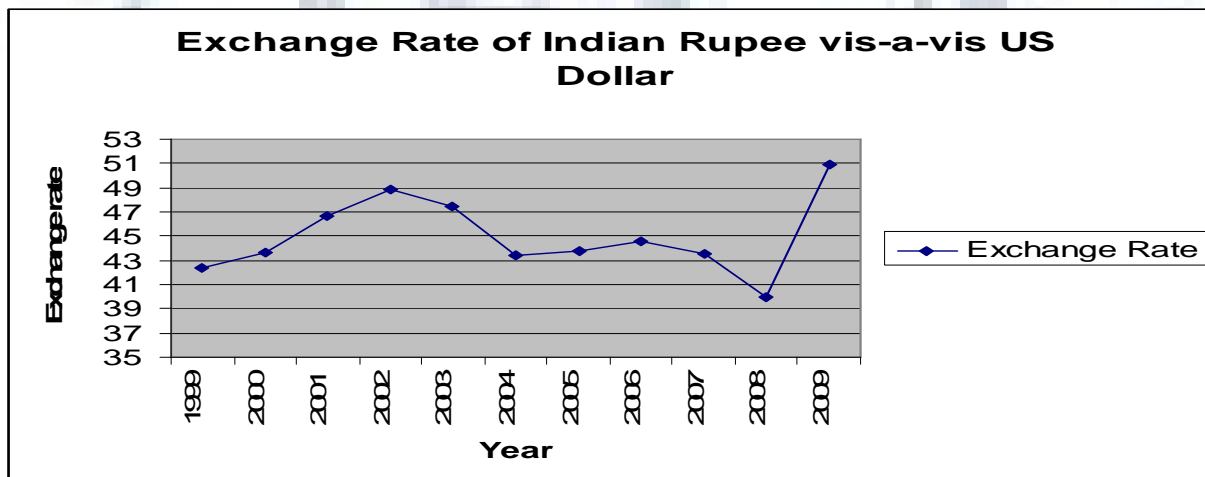


Fig.5 indicates that the inflation rates are rising and are high just before the crisis. As the economy is booming people have more money in their hands and the inflation rate increases. When markets fall as people are not able to pay off their debts when the interest rates are on the rise, the demand for products fall and the inflation rates also decrease.

FIG.6: EXCHANGE RATE OF INDIAN RUPEE VIS-À-VIS US DOLLAR



From Fig.6 it is clear that, immediately after the crisis the dollar is appreciating as the demand for other currencies decline since the confidence in other markets decline. The chart shows that Indian Rupee has been appreciating from 2004 to 2006, when the markets were picking up and when Indian companies received orders from abroad. Later, when the markets fell Indian companies lost business as there were no orders from the US. Demand for Indian currencies fall and dollar starts appreciating.

It was also of interest to analyse the extent to which these variables were correlated during the crisis period and the post crisis period.

TABLE 4: DATA ON THE VARIABLES USED FOR CORRELATION ANALYSIS FOR THE YEARS 2008 AND 2009

Yr	y2008	y2009
gM India	21.38	18.57
gM US	5.13	10.27
gGDP India	9.06	6.07
gGDP US	5.07	2.58
India PLR	12.00	11.63
US ST int rate	1.37	0.17
Index returns India	-52.45	67.13
Index returns US	-40.09	69.47
gWPI India	9.12	-1.42
Inflation rate US	4.28	0.03
Ex rate INR/\$	39.97	50.95

CORRELATION COEFFICIENTS

		y2008	y2009
y2008	Pearson Correlation	1	-.552
	Sig. (2-tailed)	.	.078
	N	11	11
y2009	Pearson Correlation	-.552	1
	Sig. (2-tailed)	.078	.
	N	11	11

The correlation coefficient of -0.552 indicates that there is a negative correlation between the data of the two periods. This indicates that the variables are moving in opposite direction pre and post crisis and is significant at 10% level of significance. It is clear from the above analysis that the movement in certain variables can act as warning signals and help the economy from getting into a crisis.

SUMMARY AND CONCLUSION

The subprime crisis and the meltdown in the US and the UK economy have become a global phenomenon and have had a tremendous effect on the businesses in other countries. Hence it was of interest to know whether such crisis can be avoided by studying the movement in important macroeconomic variables. The study included the graphical analysis of the movement in variables such as, M3, GDP, interest rates, inflation rate and returns from share price indices of both the US and India. The analysis of the charts indicates that the movements in the macroeconomic variables can provide warning signals. For e.g., too high an index of share prices indicating that the share price of certain companies are highly overvalued without strong fundamentals, a very high interest rate, a high inflation rate, etc. can send a signal to the economy. The Government and the Central Bank should be very cautious during such peaks and devise policies to attain a sustainable growth instead of being very bullish on an already bullish market. This will help in reducing the impact of such crisis.

BIBLIOGRAPHY

- Rakshitra, CCIL Monthly Newsletter on Money, G-Sec and Forex markets, The Clearing Corporation of India Ltd., July 2009, pp. 65, 66
- Credit Derivatives – The great untangling, The Economist, 8th November 2008, pp79-80
- http://www.ft.com/cms/s/0/547fe852-24da-11dc-bf47-000b5df10621.html?n&nckick_check=1
- http://en.wikipedia.org/wiki/Dot-com_bubble
- <http://missionisi.wordpress.com/2007/11/27/what-is-subprime-crisis-how-to-solve-the-subprime-crisis/>
- <http://www.bim.edu/pdf/Larticle/sivasankaran.pdf>
- <http://www.stradley.com/articles.php?action=view&id=279>
- http://en.wikipedia.org/wiki/Financial_crisis_of_2007%E2%80%932009
- <http://www.docstoc.com/docs/11386100/Exchange-Rate-Rupees-Dollars>
- <http://rbidocs.rbi.org.in/rbiadmin/Scripts/PublicationsView.aspx?id=11628>
- <http://www.rbi.org.in/scripts/PublicationsView.aspx?id=11587>
- <http://www.indianexpress.com/ie/daily/19990302/ibu02057.html>
- <http://finance.yahoo.com/q/hp?s=%5EGSPC&a=00&b=3&c=1999&d=01&e=2&f=2009&g=m>
- http://inflationdata.com/inflation/Inflation_Rate/HistoricalInflation.aspx?dsInflation_currentPage=0
- <http://www.federalreserve.gov/releases/h6/>
- <http://eaindustry.nic.in/>
- <http://www.measuringworth.org/interestrates/>
- http://www.newyorkfed.org/research/directors_charts/short.pdf
- <http://www.bseindia.com/histdata/hindices2.asp>
- <http://www.bea.gov/national/nipaweb/TableView.asp?SelectedTable=5&ViewSeries=NO&Java=no&Request3Place=N&3Place=N&FromView=YES&Freq=Year&FirstYear=1999&LastYear=2009&3Place=N&AllYearsChk=YES&Update=Update&JavaBox=no>

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