

**Assessment of Post-implementation Success
and Key Future Challenges of Banking
Information Systems: The Role of
Technological, Organizational, and Human
Factors**

By

SARIKA KAUSHAL



Department of Humanities & Social Sciences
Indian Institute of Technology Guwahati

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**Assessment of Post-implementation Success
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Information Systems: The Role of
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***A Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
DOCTOR OF PHILOSOPHY***

By
SARIKA KAUSHAL



Department of Humanities & Social Sciences
Indian Institute of Technology Guwahati

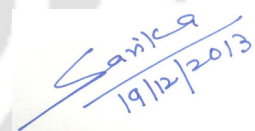
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STATEMENT

The work contained in the thesis entitled “Assessment of Post-implementation Success and Key Future Challenges of Banking Information Systems: The Role of Technological, Organizational, and Human Factors” has been carried out by me under the supervision of Dr. Dilwar Hussain, Assistant Professor, Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati. This work has not been submitted elsewhere for the award of any degree.

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December, 2013

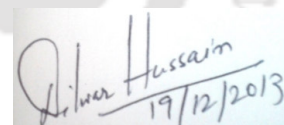


Sarika Kaushal
Research Scholar
Department of Humanities and Social Sciences
Indian Institute of Technology Guwahati
Guwahati- 781039, Assam
INDIA



CERTIFICATE

This is to certify that the work contained in the thesis entitled “Assessment of Post-implementation Success and Key Future Challenges of Banking Information Systems: The Role of Technological, Organizational, and Human Factors” by Sarika Kaushal (Roll No. 07614103), a student in the Department of Humanities & Social Sciences, Indian Institute of Technology Guwahati, for the award of the degree of Doctor of Philosophy was carried out under my supervision. The results embodied in the thesis have not been submitted to any other University or Institute for the award of any degree or diploma.



Guwahati
December, 2013

Dr. Dilwar Hussain

Assistant Professor

Department of Humanities and Social Sciences

Indian Institute of Technology Guwahati

Guwahati-781039, Assam,

INDIA



***Dedicated to
My Father***





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Synopsis

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Roll No. : 07614103
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Introduction

In today's technology driven society, organizations are undergoing massive transformations and encountering continuous pressure to survive in the changing business environments. The confluence of market forces such as domestic and global competition, consolidation, convergence, and technology has made business highly competitive. To cope effectively with these changing forces, organizations are investing heavily on information systems (IS). IS is bringing about tremendous improvement in the performance of an organization's operational, tactical, and strategic activities. However, such investment also raises the question of cost-benefit analysis of these information systems, that is, how much value these systems are adding to the organizations or to the businesses as compared to the investments made.

McKinsey (2008) in a recent survey reported that the huge amount of money invested in information technologies have not really served organizations as effectively as it was expected. A survey by IBM (2008) reveals that just 41% of IT projects were described as successful in meeting projects objectives as compared to 59% of projects which missed at least one objective or failed entirely. This survey found that achieving IS success does not entirely depend on technology- instead it depends largely on human factors. As IT initiatives are very costly and require huge investment, accordingly their failure will be an expensive failure.

Heavy investments on IS accelerated the demand for measuring the success of IS. Therefore, most of the organizations are interested in knowing the return on their IS investments (Iivari, 2005; Rai et al., 1992; Seddon, 1997; Sethi & King, 1994). According to DeLone & McLean (1992), measurement of Information systems success is critical for understanding the value and efficacy of IS management actions and IS investments. IS success assessment have been ranked as one of the most critical issue of IS research over the last thirty years (Sethi & King, 1994). Moreover, the impacts of IS are often indirect and influenced by human, organizational and environmental factors, therefore IS success assessment is complex and illusive (Petter, DeLone, and McLean, 2008).

An Information system/information technology is defined in this study as integrated systems that provide information to support operations, processes, management, analysis and decision-making process within an organization (DeLone & McLean, 1992). Furthermore, the term “*information systems*” (IS) and “*information technology*” (IT) has been used interchangeably in the IS literature.

Banking Industry has undergone a dramatic change over the past few decades. The structure of the Indian banks has changed considerably since 1990s due to

economic liberalization, adoption of new technologies, reforms and deregulation. Core banking solutions have revolutionized banking by automating core banking operations such as deposits, withdrawals, interest calculations, unifying various processes and allowing a single view of customer's various accounts with the bank. This resulted in phenomenal expansion in the size and activities of the Indian banks over the past decades. In 1969, there were only 8,000 bank branches; but in 2009, this number has crossed the figure of 80,000 branches with 171 banks (Reserve Bank of India, 2009). "Core banking information systems" (CBIS) is basically the heart of bank's IT infrastructure. Some major core banking solutions are: FINACLE core banking from Infosys, SAP core banking from SAP, Bancs24 from TCS, and so on. Such information technologies have become an indispensable tool for today's banking. However, as banks have invested enormous money in procuring the core banking systems, there is need to assess the benefits arising from these expenditure. Failure of such banking IS would be a costly failure. However, it became evident that there are not much published or systematic data available regarding the assessment of banking information systems especially in the context of the Indian banking sector. Many banks carry out ad hoc surveys of IS performance individually on an irregular basis. However, such surveys have been routine surveys and largely non-scientific and their results and implications are not available for publication. Therefore, the primary objective of this study is to assess the success of Indian banking information systems and to understand various factors affecting the success. Specifically, this research has following objectives:

- (1) To examine employee's perception regarding success of banking information system.

(2) To extend the DeLone and Mclean model of IS success in the context of the Indian banking sector using multidimensional factors such as technological, organizational and human factors.

(3) To explore and address the key future challenges of banking information systems.

Literature Review and Gap Analysis

The banking sector is one of the largest investors in information systems and communication technologies. These investments accelerated the demand to justify the investment by examining the value and contribution received from the information systems. However, effective and efficient use of information technology still remains a major elusive issue for the banking sector. Dr. Chakrabarty, Deputy Governor of RBI reported that in spite of the adoption of CBS technology, banks are still lacking in the information front, that is, information from the information technology seems to be missing (Chakrabarty, 2010). He said that Indian banks are yet to use CBS effectively. Optimal utilization of information systems is an important issue in the post CBS environment, and a lack of research in this direction may have serious repercussions. Literature review indicates a paucity of empirical research regarding banking IS adoption and utilization especially in the context of the developing countries such as India. This research is an important step in this direction. Moreover, due to lack of standard instruments to measure the success of banking IS, management is unable to justify its existing and future IS investments. Several research findings corroborates that researchers have measured the efficiency and performance of banking IS through various quantitative analysis techniques such as stochastic frontier approach, data envelopment analysis approach to calculate the

effectiveness of IS. However, these methods have not brought out the real worth of banking IS. Therefore, many researchers tried to search alternative ways of assessing success of information systems with non financial parameters.

Several researchers have used numerous non-financial measures to evaluate IS success in varied contexts (DeLone & McLean, 1992). However, literature clearly substantiates that the concept “IS success” is ill-defined due to the complex, interdependent, and multi-dimensional nature (Petter et al., 2008; Weill & Olson, 1989). Moreover, there is no consensus among researchers on the conceptual and operational definition of IS success (DeLone & McLean, 1992; Hamilton & Chervany, 1981; Ives & Olson, 1984; Miller & Doyle, 1987; Zmud, 1979). Despite the abundance of research studies, findings on IS success has been non-cumulative, fragmented, and lacking an overarching framework (Grover, Jeong, & Segars, 1996). However, DeLone and McLean (1992, 2003) proposed an IS success model which tried to integrate different perspectives of IS success research. This is considered as one of the most comprehensive IS success model and provided the needed direction for the researchers. DeLone and McLean articulated a model and an associated taxonomy with the aim to provide a general and comprehensive definition of IS success that covers different perspectives of evaluating information systems. Interrelated dimensions of DeLone and McLean models (original and updated) of IS success includes: system quality, information quality, service quality, use, user satisfaction, individual impact, organizational impact, and net benefits. Thus DeLone and McLean (D&M) IS success model (DeLone & McLean, 1992, 2003), is an interactive model for conceptualization and operationalization of IS success. The D&M IS success model turned up to be major milestone in the research of IS effectiveness/ IS success (Guimaraes, Armstrong, & Jones, 2009; Hu, 2003) as it gave

a proper direction to the IS success research. The review of relevant literature and couple of meta-analyses (Petter et al., 2008; Sabherwal, Jeyaraj, & Chowa, 2006) shows that several hundreds of empirical studies have attempted to validate, criticize, extend and re-specify the partial or whole D&M (1992, 2003) model in various contexts and in various countries to evaluate IS success. Furthermore, researchers observed that despite considerable empirical research in information systems success domain, findings on the interaction among various system related constructs and its determinants still remains inconsistent and inconclusive (Wang & Liao, 2008).

The present research conceptualizes an information system as successful if it supports individual user and organization to reach to their objectives (Malik, 2001). The term success and effectiveness are used interchangeably. This present study adapted both original and updated model of DeLone and McLean (1992, 2003) in the context of banking information systems. D&M model (2003) was originally developed in the context of e-commerce. Therefore, it is compatible with banking information systems which are also browser based systems. This makes the banking information system both a communication and system process that fit well with updated D&M model. Furthermore, to the best of our knowledge, there is not much published research study available associated with the D&M model in the context of developing countries such as India. Therefore, the applicability of the D&M model in the context of banking information systems of developing countries yet remains unexplored. Therefore, one of the major objectives of this study is to examine the applicability of the pathways of D&M model in the banking context by adopting major variables and pathways of DeLone and McLean model as part of the theoretical framework of this study.

The success of any information system depends on the outcomes of its multidimensional interactions with the environment and stakeholders. In this connection, DeLone and Mclean (1992) posited that “researchers should systematically combine individual measures from the IS success categories to create a comprehensive measurement instrument. The selection of success measures should also consider the contingency variables, such as the independent variables being researched; the organizational strategy, structure, size, and environment of the organization being studied; the technology being employed; and the task and individual characteristics of the system under investigation” (p. 88). This quote motivated and provided the primary rationale for this study. Recent theories and researches have recognized that IS is a multidimensional mechanism that requires an integrated approach that evaluates IS success from various views and contexts (Shore, 2005). Therefore, the role of organizational and human factors should be incorporated in addition to the technical factors while assessing IS success. Although, literature on IS success has been talking about the human factors and IS success, there is lack of proper models relating technical, contextual and individual’s characteristics especially in the context of the developing countries such as India. In this connection, present research developed and empirically tested a theoretical model of IS success using multidimensional variables such as organizational, individual, and technical factors.

There are substantial studies that offer insight into various factors that could enhance the success of information systems. Some of the identified factors include organizational culture and structure, leadership and management style, role and support of top management, organizational size, external and internal expertise and personal characteristics (Guimaraes & Igbaria, 1997; Ifinedo, 2007; Ifinedo, 2011; Ke & Wei, 2008; Martinsons & Chong, 1999; Miller & Doyle, 1987; Tarafdar & Vaidya,

2006; Saunders & Jones, 1992; Thong, Yap, & Raman, 1996; Zmud, 1979). However, there is dearth of studies that have investigated the effects of these variables on the success of information systems in context of DeLone and McLean model. Therefore, to fill some of these gaps in the existing literature, the current study identified four contextual and three personal variables that are expected to have an effect on IS success. The specific details of these variables are briefly discussed in the following paragraphs.

It is a well known fact that successful utilization of any information system needs leadership, commitment, and participation (Bernroider, 2008). However, little is known about the relationship between leadership and IS- related outcomes (Cho, Park, & Michel, 2011) due to scarcity of theoretical model explaining the influence of leadership in IS success. Very limited studies investigated the theoretical foundation to conceptualize why and how leadership influences IS success. A better understanding of the role of leadership on IS success is needed especially in the context of the banking sector as banking organizations would continue to adopt more information systems to strengthen the competitive advantage in this era of globalization. Therefore, this study will bridge these two research domains (leadership and IS success) by exploring the influence of leadership in making banking IS successful.

It has also been observed that culture is a challenging variable for research because of its multiple definitions, conceptualizations, and dimensions (Leidner & Kayworth, 2006). Scholars have defined culture in terms of ideologies, sets of beliefs, basic assumptions, shared sets of core values, important understandings, rituals, practices, symbols, heroes, artifacts, technology, established behaviour and the collective will (DeLong & Fahey, 2000; Hofstede, Neuijen, Ohayy, & Sanders, 1990;

Schein 1985; Sackmann, 1992). Despite differences in interpretations of the organizational culture, there seems to be an agreement that organizational culture is a multidimensional, multifaceted construct (Hofstede et al., 1990; Schein, 1985; Schein, 1992) that acts as a social glue that hold the organization together and that expresses the values and beliefs which organizational members share (Cooper, 1994). The organizational culture creates behavioral expectancies that influences the way employees think, make decisions, and accomplish their task. This relationship between culture and behaviour is the theoretical basis for the assumption that organizational culture influences IS effectiveness. Among various contingency factors, the role of culture is well recognized in the IS effectiveness literature (Wang & Yeoh, 2009). Researchers suggested that information systems that conflicts with the organizational culture will be resisted by the organizational members. This may result in under utilizing the system or sabotaging the implemented system. It reduces the potential of the system (Ke & Wei, 2008; Cooper, 1994). Literature review reveals that although many studies addressed the role of some cultural dimensions in organizational effectiveness and IS success; very few studies were conducted on the role of culture in the context of banking sector of the developing countries. Moreover, review of literature shows that only a handful of studies investigated the relationship between organizational culture and IS success using DeLone and McLean IS success model. Therefore, there is a felt need of more empirical evidence regarding the process in which culture impacts IS effectiveness. This study aims to investigate this aspect.

Other contextual factors include top management support and managerial IT expertise. Top management support is one of the most widely cited factors for IS success (DeLone, 1988; Guimaraes & Igbaria, 1997; Howell & Higgins, 1990;

Hussain, Selamat, Mamat, & Abdul, 2005; Igbaria, 1990; Ifinedo, 2008; Rai, Lang, & Welker, 1998; Sabherwal et al., 2006; Saunders & Jones, 1992). The literature suggests that management's commitment and support towards IS plays a significant role in creating more conducive environment for IS success and thus make the difference between successful and unsuccessful IS. On the other hand, absence of top management support is one of the greatest impediments towards proper allocation and utilization of IS resources (King & Teo, 1996). Managerial IT expertise refers to experience, knowledge, and expertise of senior executives in the area of information system. There are substantial empirical evidences to suggest that organizations with managers who have the necessary skills and technical knowledge are more able motivate and encourage employees for proper utilization of information system (Boynton, Zmud, & Jacobs, 1994; Hussein et al., 2005; Jarvenpaa & Ives, 1991; Lee & Kim, 2007). Manager's expertise helps employees to understand the user's IS related problems and are able to reduce knowledge barriers by provide them with relevant solution to the problem. However, it was also found that one of the reasons for the failure of many IS functions is the management's lack of technical expertise and know how (Thong, 1999). Given the significance of these factors, this study will explore the role of these factors on IS success.

Several prior studies found that individual differences or user-related factors play a major role in IS success (Aydin & Rice, 1991; Zmud, 1979). One such individual differences variable is computer related self efficacy. Computer self-efficacy refers to confidence in one's ability to use computer related skills to perform a task (Compeau & Higgins, 1995). Empirical evidence suggests that computer self-efficacy plays an important role in one's acceptance and use of information technology (Compeau & Higgins, 1995; Compeau, Higgins, & Huff, 1999; Hwang &

Yi, 2003; Igbaria, 1990; Zmud, 1979). A large number of researches have linked computer self-efficacy with satisfaction (Downey, 2006). On the other hand, it was found that lack of prior expertise is a major reason for the lack of IS success. Individuals with low level of computer self efficacy are more likely to avoid computer tasks or give up the task in the case of performance obstacles. Given that core banking solutions and its associated channels are relatively new way banking system, the present study expect that computer self efficacy will play critical role in influencing individuals satisfaction level to use a banking IS. The relationship between computer-self efficacy and IS success needs to be tested. Apart computer self- efficacy, individual characteristics like job level and length of job may also play a vital role in IS success. Therefore, this study will investigate the role of these user-related factors on IS success.

It is imperative to understand the interplay of user related factors and information systems effectiveness. However, most of the studies on these variables are confined to data from developed countries (Lucas, 1978; Khalil & Elkordy, 2001). Such findings would contribute little to the understanding of the user related factors that are associated with IS in the developing countries. Thus, these factors are left largely unexplored in the IS literature of the developing nations. There is a need to broaden the research on IS success by empirically investigating the relationship between user related variables and IS success especially in the context of the developing countries. This study is a step forward in this direction.

Research Questions and Conceptual Framework

The extensive literature survey revealed several issues and gaps in the literature, which became the foundation for the conceptualization of research

questions and theoretical model of this study. Therefore, following research questions are formulated and tested in this study:

1. What are the perceptions of employees regarding success of banking information system?
2. How private and public sector banks differ regarding the factors affecting IS success?
3. To what extent causal pathways proposed by DeLone and McLean model are valid in Indian banking context? How can DeLone and McLean's model be extended to understand multidimensional aspects of IS success?
4. What organizational, managerial, individual variables exert their influence on IS success in Indian banks, in addition to factors proposed by DeLone and McLean model?
5. What are the key future challenges of banking information systems in the context of developing countries such as India?

A conceptual model was developed to study relationship amongst various variables and thereby answer identified research questions (1- 4). Research question no. 5 was specifically addressed by a separate qualitative study. The research model of present study is an extension of DeLone and Mclean IS success model (1992, 2003) to measure post implementation success of banking information systems from the end users'(bank employee) perspective. Leadership (*transformational and transactional*), organizational culture (*support, structure, performance reward, conflict tolerance, risk tolerance, individual autonomy, and individual responsibility*), top management support, managerial IT expertise, computer self-efficacy, job level and length of job are some of the key variables believed to affect the effectiveness of

the information systems. Hence these variables are taken as *independent variables* along with three quality dimensions of D&M model, that is, system quality, information quality, and service quality. Individual impact, organizational impact and net benefits were conceptualized as *dependent variables*. Demographic variables such as age, education, salary and gender of the user were used as *control variables*. User satisfaction has been conceptualized as the *mediating variable* between the independent and dependent variables. Detailed plan of the variables of the research model includes:

1. Independent variables:

(a) *Organizational variables* – Leadership style, Top management support, Organizational culture, and Managerial IT expertise

(b) *System related variables* – System quality, Information quality, and Service quality

(c) *Individual variables* – Computer self- efficacy, Job level, and Length of job

2. Mediating variable:

(a) User satisfaction

3. Dependent variables:

(a) *IS Success outcomes* - Individual impact, Organizational impact, Net benefits

This theoretical model extended the D&M model by including organizational, and individual characteristics factors apart from quality variables of D&M model in order to understand the multidimensional nature of IS success. Another unique aspect of this research model is that IS success outcome measures are conceptualized in terms of individual impact, organizational impact, and the combined effect of both the individual and organizational impacts as *net benefits*. This model is built on the premise that system related variables (system quality, information quality and service

quality); organizational variables (leadership style, top management support, organizational culture, and managerial IT expertise) and Individual variables (computer self- efficacy, job level, and length of job) will influence user satisfaction. Further, user satisfaction in turn influences individual impact, organizational impact, and net benefits.

Based on the research questions, a set of 14 specific hypotheses were formulated based on the pathways proposed in the conceptual model to test the associations (H1-H2), direct effects (H3-H8) and mediating effects (H9-H14).

Research Methodology and Phases of the Study

In order to address research questions, a mixed method approach was adopted. *Mixed research* methods refer to combining both qualitative and quantitative research methods within a single study (Howe, 1988; Teddlie & Tashakkori, 2003). Teddlie and Tashakkori (2003) described mixed methods as the "third methodological movement" (following quantitatively and qualitatively oriented approaches). Creswell, Plano Clark, Gutmann, and Hanson (2003) defined a mixed methods study as "A mixed methods study involves the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research" (Creswell et al., 2003, p. 212).

This study was conducted in three phases. *In the first phase*, a pilot study on 50 bank employees was conducted for the adaptation and refinement of the various measures used for this study. *In the second phase*, a quantitative study (study 1) was conducted on 302 bank employees to test the 14 hypotheses proposed based on the pathways of the conceptual model of the study. *In the third phase*, a qualitative study

(study 2) on 50 branch managers and other senior executives was conducted to understand the key future challenges associated with banking information systems.

Phase 1: Pilot study

In the **phase 1**, a pilot study was conducted on a small sample of 50 bank employees (sample included branch managers, middle level managers and other employees) to check the ease of understanding and appropriateness of the questions used in the questionnaires. All the questionnaires used for the present study were pre-tested. The booklet of questionnaires included demographic information followed by three sections. *Section 1* comprises IS success measures, top management support, and computer self efficacy measures; *section 2* comprises measures of organizational culture and *section 3* comprises measures of leadership, and managerial IT expertise. Participants were satisfied with the content, structure, and language of the questionnaire to a large extent. However, they suggested few changes to be incorporated. Thus, on the basis of the feedback of the participants few changes were made in the questionnaire which primarily involved rephrasing of some difficult words and sentences into easier ones.

Phase 2: Conceptual Model Testing (Quantitative Study)

In the **phase 2**, a quantitative study (*study 1*) was conducted using survey method to test the conceptual model proposed in the study. 14 specific hypotheses were generated based on the pathways of the conceptual model. This quantitative study empirically tested these hypotheses.

Method

This study was conducted using survey method. Participants of this study included 302 bank employees from various banks of Guwahati, Lucknow, Delhi, Dehradun, and Mumbai. The data was collected from 14 banks (public = 8 and private = 6), which represented broad cross section of Indian banks. Out of which, 211 employees are from public banks (161 males and 50 females), and 91 employees (62 males and 29 females) from private banks, all having minimum of 2 years experience of using the Core Banking information system. A booklet containing all the questionnaires of the present study were distributed to the participants and collected after their completion (usually 1 to 2 weeks time period was given to them). All the questionnaires were self-administered. Booklet of questionnaire included measures of demographic information, IS success, top management support, and computer self efficacy, organizational culture, leadership, and managerial IT expertise. All the items used in the study were borrowed from the original source and modified to fit in the banking context. A total of 335 filled questionnaires were received. However, after closely scrutinizing the questionnaires, only 302 questionnaires could be used for the analysis. Remaining 33 questionnaires were incomplete and lacked necessary information. Appropriate statistical tests such as t-test, correlation, regression and mediation analysis were used for the analysis of data.

Summary of Results

Perception of employees regarding the success of banking information systems was calculated in terms of IS success factors such as information quality, system quality, ease to use, service quality, individual impact, organizational impact, and user satisfaction. Perception of employees was analyzed by calculating their mean

value of IS success factors on a scale of 1 to 5 indicating their level of agreement (1=strongly disagree, 2=disagree, 3=neutral, 4=agree, 5=strongly agree). The mean value of the level of agreement for each factor was calculated by dividing the mean scores of IS success factor with the number of items used to measure that dimension. In order to interpret the perception of employees, cut-offs were decided. If the mean value of a factor is less than or equal to 2.49, then the level of agreement with the statements measuring that factor is considered to be low. If the mean value ranges between 2.5 and 3.49, then the level of agreement with the statements measuring that factor is considered as medium. Moreover, if the mean value of a factor ranges between 3.5 and 4.49, then the level of agreement with the statements measuring that factor is considered high. Finally, if the mean value of a factor is more than or equal to 4.5, then the level of agreement with the statements measuring that factor is considered very high. The results shows that mean value of information quality is 4; system quality is 3.68; ease to use is 3.94; service quality is 3.49; individual impact is 4.17; organizational impact is 4.18; and user satisfaction is 4. In other words, information quality, system quality, ease to use, individual impact, organizational impact and user satisfaction falls under the category of high level of agreement. However, the perception regarding the service quality emerged as medium.

Independent sample t-test was performed to compare the mean scores of public and private sector banks on contextual variables, system related variables and individual differences. Results indicated that there is a significant difference in the scores of transactional leadership; conflict tolerance dimension of organizational culture; and computer self-efficacy. Public banks scored significant higher score in conflict tolerance. On the other hand, private banks scored higher in transactional leadership, and computer-self efficacy. However, there was no significant difference

in the scores of transformational leadership; structure, support and participation and risk tolerance dimensions of organizational culture; top management support; managerial IT expertise; and system quality, information quality, service quality, individual impact, organizational impact, and user satisfaction dimensions of IS related factors between public and private banks. This implies that types of bank did not play a significant role on these factors.

A Principle component analysis with Varimax rotation was performed in order to obtain the factors of IS success measure. Apart from six original factors, this analysis provided a new factor “*ease of use*” as an additional IS success factor. The results of the correlation analysis shows that system related factors (information quality, system quality, ease to use, and service quality), leadership (transformational and transactional), top management support, managerial IT expertise, all the four dimensions of organizational culture (conflict tolerance, structure, support and participation, and risk tolerance), individual variables (computer self-efficacy) have significant positive correlation with user satisfaction and all the three success outcomes (individual impact, organizational impact, and net benefits). Moreover, user satisfaction is positively associated with all the three IS success outcomes. While length of job variable showed weak association with individual impact ($r = .143$, $p < .05$) and net benefits ($r = .140$, $p < .05$). On the other hand, job level variable did not show any association with user satisfaction and three IS success outcomes. Length of job showed no association with user satisfaction and organizational impact.

This study found significant relationship between the thirteen additional relationships that were not originally the part of the DeLone and McLean model (1992, 2003). These thirteen relationships are: between, each quality dimensions (system, information and service quality) to each IS success outcomes (individual

impact, organizational impact and net benefits); ease of use to each IS success outcome and user satisfaction.

On further exploration of these relationships with hierarchical regression analysis and after controlling the effects of demographic variables (like age, gender, salary and education) the results found that the user satisfaction significantly predicts individual impact, and organizational impact. The additional path from user satisfaction to net benefits (i.e. combine effect of individual impact and organizational impact) also turned up to be significant. Moreover, transformational leadership style; structure and support-participation dimension of organizational culture; information quality, system quality, and ease to use dimensions of system related factors; top management support, managerial IT expertise and computer self-efficacy emerged as the significant predictor of user satisfaction, individual impact, organizational impact and net benefits. On the other hand, conflict tolerance significantly predicted individual impact and net benefits. While, service quality emerged as a significant predictor of only user satisfaction, organizational impact and net benefits. Analysis also found that transactional leadership style; risk tolerance dimension of organizational culture; job level and length of job individual variables did not predict user satisfaction and three IS success variables. Moreover, conflict tolerance dimension of organizational culture did not predict user satisfaction and organizational impact. Further, service quality did not predict individual impact.

Furthermore, hierarchical regression analysis revealed twelve additional significant pathways that were not originally the paths of DeLone and McLean model (1992, 2003). These additional pathways are from system quality to IS success outcomes (individual impact, organizational impact, and net benefits); information quality to three IS success outcomes; service quality to two IS success outcomes

(organizational impact, and net benefits); ease to use to three IS success outcomes and ease to use to user satisfaction. The key findings from the mediation analysis revealed that user satisfaction acts as a significant mediator in the relationship of transformational leadership; structure, support and participation dimensions of organizational culture; information quality, system quality, ease to use; top management support; managerial IT expertise and computer self-efficacy with three IS success outcomes (individual impact, organizational impact, and net benefits). However, user satisfaction mediated only the relationship of service quality with organizational impact and net benefits. Moreover, user satisfaction did not mediate the relation of transactional leadership, two dimensions of organizational culture (conflict tolerance, risk tolerance), job level and length of job, with any of the three IS success outcomes.

Phase 3: Key Future Challenges of Banking IS (Qualitative Study)

In phase 3 a qualitative study (study 2) was conducted to understand the subjective experiences and reflections of bank managers and other higher officials regarding the key future challenges of banking information systems' success. In the context of information system success research, qualitative research may help in understanding user's behavior with respect to the system, and the system's success and failures from the point of view of those involved with it (Kaplan and Shaw, 2004).

Method

In-depth interviews were conducted on 50 senior officials from 14 banks located in 3 cities of India namely, Delhi, Guwahati, Lucknow. Out of which, 30

senior officials are from public banks, and 20 senior officials are of private banks, all having minimum 10 years of banking experience. Interviewees comprised of employees at the managerial level such as branch manager, senior manager, cluster head, chief manager, zonal manager and assistant general manager. The present study used thematic analysis for the analysis of qualitative data and followed Braun and Clarke (2006) guidelines. Thematic analysis is one of the most widely used qualitative data analysis process. It is a process oriented approach which involves searching through data to identify and code recurrent patterns and themes.

Summary of Results

Three master themes emerged out of the data analysis of the participant's interviews regarding key future challenges of banking information systems associated with the post implementation phase of banking information systems. The advancement in banking technology has created several new challenges for the bank. These challenges were broadly categorized into: *technological challenges, human factors related challenges, and business related challenges.*

Technological challenges comprised of four sub themes: Fraud and security; Innovation and business restructuring; Data and system integration; and Customer relationship management. Almost all respondents rated security and fraud associated with online transaction as the most important issue in modern banking. They reported that lack of trust in technology and cyber-crime as one of the main inhibitors in the growth of the modern banking technology. It was found that despite using modern techniques to curb cyber fraud, security tools and standards are not yet sufficient. It was also reported by a large percentage of respondents that perception of customers is also responsible in the security and trust in online banking. 40% managers revealed

that a large section of public sector bank's customers include individuals in the age group of 40 and above, who seems to have aversion towards internet based banking transactions. On the other hand, list of private bank customers includes typically individuals from young generation.

Moreover, It has been found that some banks are unable to utilize the IS to its full potential as they failed to reorient and restructure their resources by redesigning the branch network, reducing operational cost, replacing unskilled workforce with skilled employees. In the restructured branch model, the banks has to adopt a one-stop- service which would enable them to offer all banking services to their customers under one umbrella. Respondents reported that effective implementation of banking IS requires proper re-engineering of business processes. However, in a hurry to meet the deadline regarding the regulatory directives from Central Vigilance Commission (CVC) to computerize a required percentage of banking business, several banks failed to adopt proper reengineering strategies. This resulted in adoption of CBS without properly estimating the problems associated with CBS adoption. Thus, even after a decade, these banks are still facing various challenges such as lack of resources and adequate technology. Moreover, the staff (especially front line workforce) also lacks proper technical competence and skills which is resulting as a barrier in the optimum utilization of the IS. This finding is consistent with the observations made in the Khandelwal Committee Report (2010). Even few respondents suggested that banks should ensure a full proof migration mechanism from legacy system to new system to ensure complete data integration.

Another big challenge raised by almost all participants is to develop customer data repository that can support cross-selling and fast decision-making. Customers are more demanding and have high expectations with the new age banking and dynamic

market. In such a situation, banks need to harness technology to create a data pool for better and effective decision-making. It was found that some large banks are planning to focus more on client segmentation based on attitude, behavior and interest rather than demographic segmentation (such as age and gender). So, in order to collect information and grouping information on the basis of attitudes, behavior, and interest bank needs highly advanced information technology, which is a challenge at present.

Lack of proper system integration was also found to be a key challenge. System integration means to integrate together all IS applications that are developed and implemented overtime on various platforms for catering different banking services. With proper integration it is possible for banks to meet all banking needs of customer through single banking solution. Respondents from few public sector banks also highlighted that during core banking implementation some banks did not upgrade the technology and continued banking operations with legacy systems and its peripherals. Thus, these legacy systems have problems like obsolescence and inflexibility, difficulty to integrate with multiple solutions and so on.

Human related challenges included sub-themes such as lack of technical knowledge and expertise of employees; Training programs; and resistance to change. One of the major future challenges for optimum utilization of banking information system success is lack of technical knowledge and expertise among end users' and managers. Results of this study indicated that a large number of interviewees have expressed that many employees especially their old (tenure wise) staff (clerical and managerial) does not have prior knowledge of computers and lacks proper knowledge for the effective use of the information systems. Moreover, it was found from the suggestions of majority of interviewees (around 95%) that rigorous training should be provided to staff members to ensure that they understand the functionality and

complexities of the system and its effective usage. It was found that in few banks there is no separate training for the clerical staff, the training programs are only for officers. It was observed that employees' attitude towards the IS plays a significant role in the success as well as failure of IS. Lack of proper training, competence and skills might results in resistance and indifferent attitude towards the IS in different ways. Resistance from the clerical staff is one of the biggest obstacles towards optimum utilization of CBS systems. It was found that many employees (especially elderly staff) still resists the change from the legacy banking to computerized banking because of the fear of making errors and under-performance due to lack of expertise. Contrary to this, it was also observed that employees with necessary expertise and knowledge perceive that IT has reduced their work load. Analysis of the data also revealed that most of the private banks enjoy the benefit of younger and computer literate workforce, but the percentage of such employees is less in public banks. An amalgamation of two generation employees can be witnessed more often in public banks than in private banks. So, the usage of IS and its features beyond mandatory functions was less evident in these public banks. Further, resistance from the customers also emerged as a key factor. A large percentage of the customer base of the public banks comes from rural and semi-urban areas. These customers lack exposure to computers and internets. Resistance associated with online transactions is more evident among such customers. Contrarily, private bank's clientele is mostly urban-based, falling in the 20-40 age group, and has higher exposure to technology. It was also found that younger generation customers are reluctant to physically visit branch, they feel working over internet and mobile is more time saving and convenient as compare to physically visiting the branch.

This study showed that banks are still facing many business related challenges. There are still many avenues left for banks to achieve, particularly in the area of rural banking, reorienting the existing core banking systems, and other technological solutions. Result show that only a very small percentage of the rural household has access to banking services. This is primarily because of the factors such as limited human resources, high transaction costs, lack of key resources, limited access to remote rural locations and lack of IT knowledge and awareness. These factors are the key obstacles in the financial inclusion initiatives. Similarly, private sector banks also did not stretch their presence in rural and remote India. Therefore, banks have ample opportunities to improve financial inclusion by improving and upgrading technology. Further, budget constraints for IT initiatives seem to be a major barrier in the expansion of IT applications for many banks. 65% of the respondents informed that even though the financial position of the bank is sound, the management has been allocating lesser funds for the IT initiatives. It was also reported by few participants that their bank is still struggling with its legacy systems and equipment's that lacks scalability and flexibility and are not robust to capture the growing volume of transactions and large range of products and services. It was evident from the interviews that there are few banks which implemented CBS just because of pressure from RBI's regulatory requirements. Their crucial processes are still not automated apart from mandatory functions and large amount of back office staff is still working manually. On the other hand, results also revealed that few banks appreciated their core banking solutions also. Moreover, it was observed that majority of participants pointed out the need for appropriate technology up gradation and adoption of new technologies like CRM solutions (customer relationship management), business

intelligence, Web 2.0 technologies, knowledge management and collaboration techniques.

Contributions and Implications

The results of the *quantitative study* (study 1) have several implications for successful core banking information systems. Findings of this study may be used by researchers as guiding pillar for future studies and by managers to structure their strategies so to optimally utilize their information systems and benefit their employees and businesses. The study findings will also be valuable for software designers and developers those who are involved with banking information system development. This study provides an empirical model and measurement instrument for evaluating IS success especially in the context of banking sector. This study presented a 7-factor, 39 item IS success instrument with satisfactory psychometric properties for measuring banking information systems success. This empirically validated instrument will be useful to researchers and practitioners for testing banking information system success especially for non-financial parameters. This study extended DeLone and McLean's model (1992, 2003) of IS success in the context of banking sector. To the best of our knowledge, no other study adopted or extended this model in the context of Indian banking sector. Theoretical model of this study provides insights into the dynamics among multidimensional variables affecting IS success. This study reveals that IS success may be influenced by multidimensional contextual factors such as organizational, system related, and individual characteristics of the end users. The empirical finding of the present study supports the impact of various contextual factors on IS success. Thus, this study adds to the literature especially on the role of contextual variables such as leadership style, organizational culture, top management

support, managerial IT expertise, and individual characteristics variables on IS success. Specifically, present study found that transformational leadership style, some organizational cultural dimensions (such as active support and participation, structured work environment), managerial IT expertise, top management support and end users computer self efficacy are some of the contextual variables influencing IS success. Therefore, IS success does not depend only on the smooth technological functioning; rather it depends on the constant interaction of the technological, organizational and human factors. This study showed that the system related variables of DeLone and McLean IS success model and pathways affecting outcome variables (individual impact, organizational impact and net benefits) holds true in the context of banking sector. Furthermore, very few empirical studies were conducted on the linkage between system related quality dimensions and IS outcomes (individual impact, organizational impact and net benefits) through user satisfaction. The findings of this study bridged this gap and found that user satisfaction mediates the relationship between system related construct and IS success outcomes. Therefore, authorities should emphasize on enhancing IS quality dimensions by focusing on up-to-date hardware and software, integrated IS infrastructure, user friendly systems. Moreover, the system should be well-designed, well-documented with concise and easy to understand outputs. Further, it should be noted that banks should have a mechanism for continuous improvement of IS quality dimensions (Gorla, Somers & Wong, 2010).

This study found significant relationship between the twelve additional relationships that were not originally the paths of DeLone and McLean model (1992, 2003). These pathways in the context of the banking sectors adds to the existing literature of IS success.

Lack of research and literature on the post implementation success of information systems is one of the key drivers for this research. Systematic literature review revealed that most of the studies focused on IS implementation success factors and issues. However, only limited studies evaluated a post implementation IS success. This study focused on the post implementation success of banking information systems from the end user's (bank employee) perspective. Therefore, this study contributes to the existing literature in this direction.

Results of the *qualitative study* (study 2) provided insights into some key future challenges of banking information systems. Reports of the participants revealed that banking information system has many future challenges which can be categorized into three broad categories: (a) *Technological challenges* comprises of four sub themes: Fraud and security; Innovation and business restructuring; Data and system integration; and Customer relationship management (b) *Human factor related* theme comprise of three subthemes: Technical knowledge and expertise of employees; Training programs; and Resistance to change, and (c) *Business related challenges* comprised of two subthemes: Reaching customers in rural areas; and Budgetary constraints. Results of this qualitative study is very significant as it reveals major barriers and future challenges of banking IS success in developing country settings. Moreover, these findings will contribute to IS theory and practice. Firstly, findings of this study will provide insights into the understanding of banking IS and its performance. Secondly, results of this study re-validates some of the earlier research studies on IS challenges (Abukhzam & Lee, 2010; Chan & Lu, 2004; Davenport, 2003; Khandelwal Committee Report, 2010; Lee & Turban, 2001; Lee & Kim, 2007; Tan & Teo, 2000). Third, this study articulates the experiences specific to Indian

banks, throwing light on the key inhibitors and future challenges of banking information systems.

This qualitative study also contributes to IS practice. This study provides insight for the managers and authorities at the top management position. This would help them in formulating future strategies and policies associated with banking information systems. The findings also indicate that there is significant scope for human resource department in banks to frame policies related to training programs, implementing adequate restructuring mechanism and change management programs and expanding business initiatives.





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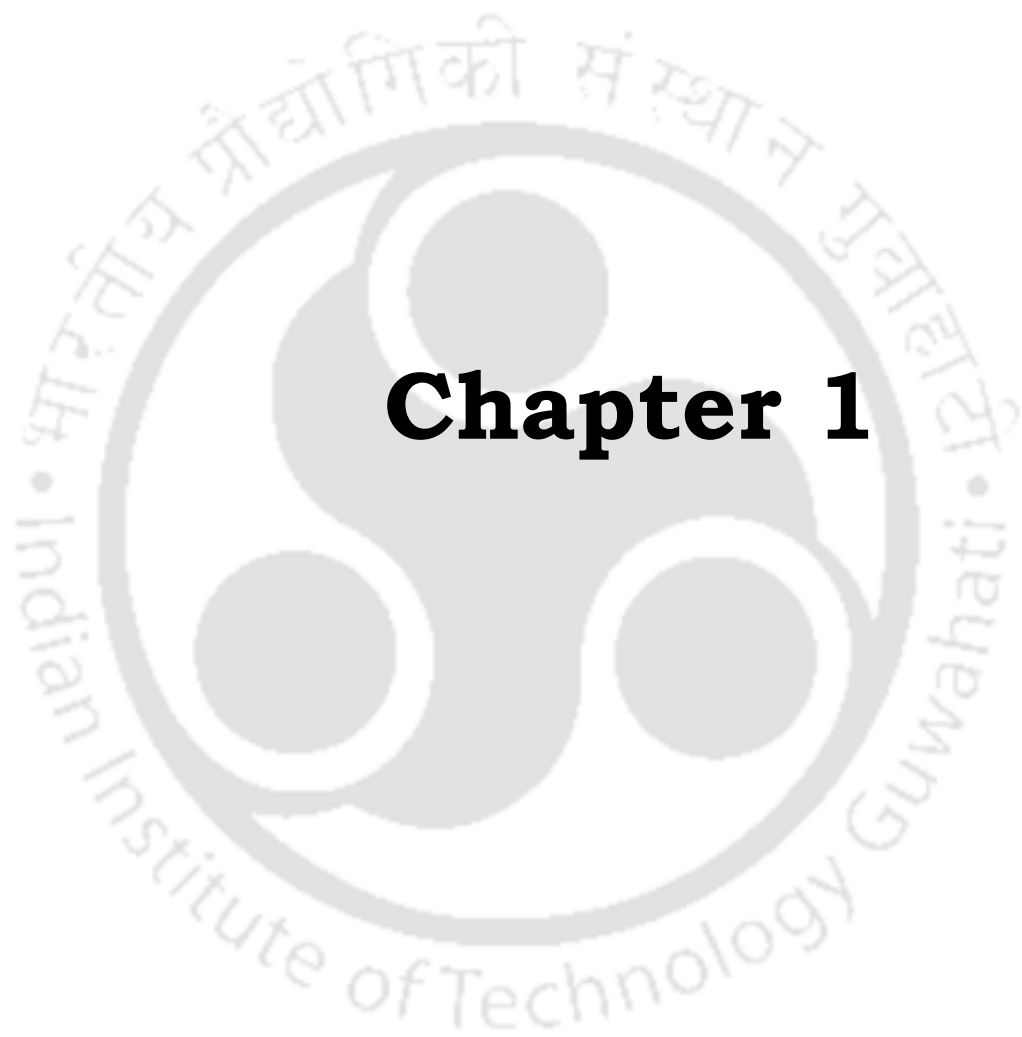




LIST of ABBREVIATIONS

Appendix No.	Title
ATM	Automatic Teller Machine
BIS	Banking Information System
BSNL	Bharat Sanchar Nigam Limited
CAIIB	Certified Associate of Indian Institute of Bankers
CBIS	Core Banking Information System
CBS	Core banking Solutions
CRM	Customer Relationship Management
CVC	Central Vigilance Commission
CVF	Competing Values Framework
D&M	DeLone and McLean
DOS	Disk Operating System
ERP	Enterprise Resource Planning
EUCS	End -User Computing Satisfaction
ICT	Information and Communication Technology
IS	Information System
IT	Information Technology
KMS	Knowledge Management Information System
MBA	Masters of Business Administration
MIS	Management Information System
MLQ	Multifactor Leadership Questionnaire
PMIS	Project Management Information System
RBI	Reserve Bank of India
SERVQUAL	Service Quality
TAM	Technology Acceptance Model





Chapter 1



Chapter 1

Introduction

Technology is not neutral. At its best, it is an enabler that helps companies to achieve their business goals –if they use it correctly.

-Griffith (1997)

1.1. Background and Overview of the Study

Organizations are undergoing paradigm shift with the Information Technology (IT) revolution. IT revolution is very similar to the industrial revolution that began in the 18th century in its potential scope, size, and impact on the economy. Therefore, Information technology revolution is called as the “third wave” (Thite, 1997) or identified as the third great revolution (Danziger & Kramer, 1986) following Scientific Revolution of 16th and 17th centuries and the Industrial Revolution of 18th and 19th centuries that has radically transformed human life.

The term information technology was coined in the late 1970s which refers to telecommunication technology, microelectronics, and computing technology (Er, 1989). Information technology can be defined as a collection of individual technology components that are typically organized into computer based information systems (Ihsaan & Ghassan, 2004). It refers to the technology of the production, storage, retrieval and communication of information using computers and microelectronics. The term “*information systems*” (IS) and “*information technology*” (IT) is used interchangeably in the literature (Dewett & Jones, 2001). This study also uses information system and information technology synonymously.

Literature review indicates that information systems offer substantial information efficiencies and synergies to an organization (Dewett & Jones, 2001). It is bringing a swift change in the way companies operate; especially by improving operational efficiency, decision making, delivery channels, customer friendly services and by enhancing organizational productivity. It facilitates efficient, effective and less expensive communication across time and various geographical locations.

In today's technology driven world, the use of information system is no longer an option, but is increasingly regarded as a key factor for survival of the organizations and achieving competitive edge over others. Computers, more than any other innovation, can be credited with bringing about tremendous improvement in the performance of an organization's operational, tactical, and strategic activities (Drucker, 1998). Over the past decade, organizations have been investing an enormous amount of money on information systems for various reasons such as pressures to cut costs, and produce more without increasing costs and improve the quality of services and products so to stay in the business and survive. A report by Gartner (2013) stated that in 2011, worldwide companies had spent more on information technology than any other form of investment. Overall, total IT spending on information technology was \$ 3.5 trillion in 2011 which showed an increase of 0.8% in 2013 (\$ 3.7 trillion in 2013) and is estimated to reach \$ 4.5 trillion in 2017, that is, an increase of 3.6% according to the latest forecast by Gartner (2013). However, McKinsey (2008) in a recent survey reported that the huge amounts of money invested in information systems have not really served organizations as effectively as it was expected. Wateridge (1998) in one of his surveys on IS projects found that twice as many projects are considered to be less successful than that are considered to be successful. A survey by IBM (2008) reveals that just 41% of IT projects were described as

successful in meeting projects objectives as compared to 59% of projects which missed at least one objective or failed entirely. This survey found that achieving success does not entirely depend on technology- instead success depends largely on human factors. As IT initiatives are very costly and require huge investment, accordingly their failure will be an expensive failure. Therefore, most of the organizations are interested in knowing the return on their IS investments (Rai et al., 1992; Sethi & King, 1994; Seddon, 1997; Iivari, 2005). Practitioners and researchers are concerned about how investment in information systems will influence individual and organizational level performance (Miller & Doyle, 1987; DeLone & McLean, 1992; Goodhue & Thompson, 1995; Seddon, 1997).

Literature review reveals that a heavy investments on IS accelerated the demand for measuring the success of IS. According to DeLone & McLean (1992), measurement of Information system success is critical for understanding the value and efficacy of IS management actions and IS investments. Review of the literature on IS evaluation (Petter, DeLone & McLean, 2008) reveal that variety of traditional financial measures such as revenues, profitability, costs-benefit analysis, payback period and productivity have been used to measure IS success. However, these measures seldom bring out the real worth of IS success due to its multidimensional nature. Therefore, despite significant research into the business impacts of IS, executives are still struggling to find appropriate parameters to assess IS value. Thus, a reliable and valid assessment of IS success and its associated factors seems to pose a great challenge for IS managers (Miller & Doyle, 1987) and IS researchers. It is imperative to note that IS literature consistently ranks the issue related to measuring the IS success as one of the top ten most critical issues (Sethi & King, 1994). In fact, effectiveness of the IS has proven practically impossible to define and measure. Some

organizations use weak surrogate measures of IS effectiveness that hide the true value of the IS. Others depend on qualitative measure rather than quantitative measures.

Petter et al. (2008) reported that the “impacts of IS are often indirect and influenced by human, organizational and environmental factors, therefore, measurement of IS success is both complex and illusive” (p.236). Several researchers have also attempted to measure IS success with a variety of non-financial constructs such as currency (Bailey & Pearson, 1983), accuracy (Doll & Torkzadeh, 1988), perceived usefulness (Davis, 1989); ease of use (Doll & Torkzadeh, 1988); and user satisfaction (Bailey & Pearson, 1983) and so on. Despite the contributions made by researchers in the development of success measures, there is no consensus among IS researchers on the conceptualization and operationalization of IS effectiveness (DeLone & McLean, 1992; Goodhue, 1992; Hamilton & Chervany, 1981; Ives & Olson, 1984; Miller & Doyle, 1987; Zmud, 1979). To address the need for better and more consistent success metrics, DeLone and McLean (1992) identified and unified the major components of IS success and its measures used till 1987. They articulated a model and an associated taxonomy of six dimensions for the success of IS. These six dimensions are: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. Researchers have shown strong interest in the original (1992) as well as in the updated (2003) model, as it has been cited by several hundreds of researchers for explaining IS success (Heo & Han, 2003; Petter et al., 2008). However, majority of these studies were conducted in the context of the developed countries. Very few studies were conducted in the context of the developing countries. Cross-cultural researchers have been questioning the applicability of western models in other cultures and contexts (Hofstede, 1985). Therefore, there is a need to test DeLone and McLean model in the context of the

developing countries. Furthermore, DeLone and McLean (2003) themselves make recommendations for continuously testing the interdependent relationships between the constructs of their model in various contexts. In order to provide a better understanding and a cumulative tradition to IS research, DeLone and McLean (2003) urged future researchers to consider using proven measures wherever possible. They argued that it is unlikely that any single overarching measure of IS effectiveness would emerge and so a multiple measures would be required to measure IS effectiveness. They strongly advocated the need for consistent and appropriate measures for IS success (Petter et al., 2008). Furthermore, researchers observed that despite considerable empirical research in information systems success domain, findings on the interaction among various system related constructs such as user satisfaction, individual impact, organizational impact and net benefits and their determinants still remains inconsistent and inconclusive (Wang & Liao, 2008).

DeLone and McLean's call for further development and validation of their IS success model provided major rationale and motivation for this study. This study utilized both original and the updated IS success model (DeLone & McLean, 1992, 2003) as the theoretical framework and attempted to extend the model by incorporating organizational and individual personality factors with the technical or system related factors. Furthermore, several research findings suggests that IS related issues are country-specific and context-specific and so effective management of IS requires identifying issues related to particular context (Hussein, 2009). Given the lack of empirical studies in the context of developing countries, this study focuses on the assessment of the Indian banking information system success and various factors influencing IS effectiveness.

Indian banks are one of the largest investors in IS which includes Core Banking Solution, mobile banking solutions, client relationship management solutions and so on involve investments in hardware, software, communication infrastructure, consulting, implantation and training. Bank strongly relies on IT to support their banking operations. The role of IT has become so integrated and pervasive with banking that it is impossible to think of banking processes without an effective IT system in place. These investments accelerated the demand for measuring the success of banking IS especially to determine return on investment at the post implementation stage. RBI in one of its publications (Chakarborty, 2010) reported that although banks have made considerable investment in IS, they have not reaped optimum benefits from these investments. Moreover, there are researches that indicate that the increased IS investments in developing countries have not resulted in adequate returns with firms facing risk of IS failures (Ranganathan & Kannabiran, 2004). It is stated by MD and CEO of one of the leading private sector banks that though large investment in IT has led to substantial benefits, but in this transition period serous efforts to measure the return on these investments have taken a back seat (KPMG, 2013). There is little research addressing various fundamental issues associated with banking information systems such as best way to measure banking IS, applicability of IS success models conceptualized for developed countries in the context of developing countries like India and so on. This research is an attempt to understand these issues.

Several researchers in the past have shown concerned over the fact that huge chunk of IT projects fail to meet their performance goals (Thite, 2000; Ifinedo, 2011), and this is in part due to the fact that organizations give inadequate attention to the non-technical, that is, human and organizational factors which are critical determinants of the IS effectiveness. Further, an analysis of critical success factors

reveals that non technical factors such as managerial, organizational and cultural factors play a vital role in determining the success or failure of information systems (Thite, 2000; Martinsons & Chong, 1999). However, consistent relationships between these managerial and organizational variables and systems effectiveness are yet to emerge. Further, most of IS effectiveness research has centered on data gathered from the western culture. Research findings obtained from organizations operating in a Western environment may not be generalizable to other environments without further verification of their external validity (Khalil & Elkordy, 1997). Thus, this study attempted to provide insights in this direction. Given this background, this thesis makes an attempt to fill the above mentioned gaps with the specific focus on the Indian banking Industry. The primary objective of this study is to assess the post-implementation success of Indian banking information systems and to understand various factors affecting the success. Specifically, this research has following objectives-

- (1) To examine employee's perception regarding success of banking information system.
- (2) To extend the DeLone and Mclean model of IS success in the context of the Indian banking sector using multidimensional factors such as technological, organizational and human factors.
- (3) To explore and address the key future challenges of banking information systems.

The following section gives a detailed description of the Indian banking sector.

1.2. Overview of Indian Banking Sector

Since the establishment of first bank in pre-independence period till today, several significant changes have taken place in the banking industry. The journey of Indian banking system can be segregated into three distinct phases. These phases are: *Phase I-* pre-independence period (1786-1947), *Phase II-* post-independence pre reforms (Nationalization of Indian banks and up to 1991 prior to Indian banking sector reforms), and *Phase III-* post nationalization (1991 –till date).

1.2.1. Evolution of Indian Banking Sector

Phase I: Pre-Independence Period (1786-1947)

The Indian banking industry has its foundations in the 18th century, and has had a varied evolutionary experience since then. The initial banks in India were primarily traders' banks engaged only in financing activities. Banking industry in the pre-independence era developed with the Presidency Banks, which were transformed into the Imperial Bank of India. The Reserve Bank of India came into existence in 1935. It is one of the oldest central banks among the developing countries. In 1860, the concept of limited liability was introduced in Indian banking resulting in the establishment of joint-stock banks. In 1865, the Allahabad Bank was established with purely Indian shareholders. Punjab National Bank came into being in 1895. Between 1906 and 1913, other banks like Bank of India, Central Bank of India, Bank of Baroda, Canara Bank, Indian Bank, and Bank of Mysore were set up.

Phase II: Post Independence, Pre Reforms Period (1947-1990)

After independence, the Government of India started taking steps to encourage the spread of banking in India and recommended the creation of a state-partnered and

state-sponsored bank by taking over the Imperial Bank of India and integrating with it the former state-owned and state-associate banks. So, State Bank of India (SBI) was constituted in 1955. To better align the banking system to the needs of planning and economic policy, it was considered necessary to have social control over banks. In 1969, 14 of the major private sector banks were nationalized. This was an important milestone in the history of Indian banking. This was followed by the nationalization of another six private banks in 1980. With the nationalization of these banks, the major segment of the banking sector came under the control of the Government. The nationalization of banks imparted major impetus to branch expansion in un-banked rural and semi-urban areas. The commercial banks (public sector banks) continued to dominate the banking industry in terms of lending and borrowing. Banks provided liquidity, payments and safekeeping for depositors and channelize these funds into investments and working capital requirements. They were mainly concerned with providing financial support to the weaker section of the society and development of priority sectors.

Phase III: Period of Banking Sector Reforms and Liberalization (1991 –till date)

By 1991, the financial system was loaded with an inefficient and financially unsound banking sector. So, to create a strong and competitive banking system, a number of reform measures were initiated. The thrust of the reforms was on increasing operational efficiency, strengthening supervision over banks, creating competitive conditions and developing technological and institutional infrastructure. Thus, the banking sector in India faced structural reforms (1991) by Reserve bank of India (RBI) easing out internal and external constraints in the working of the banks. These measures led to the improvement in the financial health, soundness and

efficiency of the banking system. One important feature of the reforms of the 1990s was that the entry of new private sector banks was permitted. Following this decision, new generation tech-savvy banks such as ICICI Bank, HDFC Bank, IDBI Bank and UTI Bank were set up. This move along with the rapid growth in the economy of India revolutionized the banking sector in India. Thus, the new wave gave way to modern outlook and tech-savvy methods of working for the traditional banks. This all led to intense competition for attracting and retaining customers. Under these circumstances use of technology has become inevitable. Therefore, understanding the need of the time, Reserve bank of India in 1984 appointed a committee known as the *Rangarajan Committee on Mechanization in banking industry*. Its report laid the blueprint for computerization in India. In 1994, Reserve bank of India constituted a committee on “Technology Upgradation in the Banking Sector”. The second Narasimhan Committee Report (1998) focused on issues like strengthening of the banking system, upgrading of technology and human resource development. The second Narasimhan Committee (1998) recommended several reforms that have greatly changed the face of the Indian banking system. Several reforms were introduced that included reduction of reserve requirements, de-regulation, introduction of prudential norms, entry of new generation tech-savvy private sector banks, and adoption of Basel accord.

1.2.2. Structure of Indian Banking Sector

Indian financial service industry is dominated by the banking industry. Over the last thirty years, there has been a phenomenal expansion in the size, reach, and activities of the Indian banks. From approximately 8000 bank branches in 1969, the number has now crossed the figure of 80000 branches with total of 171 banks.

Moreover, the structure of the Indian banks has changed considerably due to adoption of new technologies, reforms and deregulation. Indian banking structure (see figure 1.1) is broadly classified into: (1). *Reserve bank of India* is the central bank and the monetary authority of India. It serves as the Bankers bank and acts as the regulator and controller of the commercial banks. (2). *Scheduled banks* comprise scheduled commercial banks and scheduled co-operative banks. Scheduled commercial banks form the bedrock of the Indian financial system. A scheduled bank is a bank that is listed under the second schedule of the RBI Act, 1934. Scheduled banks are further classified into *schedule commercial* and *schedule cooperative banks*. The basic difference between scheduled commercial banks and scheduled cooperative banks is in their holding pattern. Scheduled commercial banks account for a major proportion of the business of the scheduled banks. Scheduled commercial banks in India are categorized into the five groups based on their ownership and/or their nature of operations. (a) *State Bank of India* and its six associates are recognized as a separate category, because of the distinct statutes (SBI Act, 1955 and SBI Subsidiary Banks Act, 1959) that govern them. (b) *Nationalized banks* (20) and SBI and associates (6), together form the *public sector banks* group. IDBI Ltd. has been included in the nationalized banks group since December 2004. (c) *Private sector banks* include the *old private sector banks* and the *new generation private sector banks*- which were incorporated according to the revised guidelines issued by the Reserve bank of India regarding the entry of private sector banks in 1993. As at end March 2013, there were 13 old and 7 new generation private sector banks operating in India. (d) At the end of March 2013, 43 *foreign banks* were operating in India. (e) *Regional Rural Banks* were set up in September 1975 in order to develop the rural economy by providing banking services in such areas. While, (3) *scheduled cooperative banks* in India can be broadly

classified into *urban credit cooperative institutions* and *rural cooperative credit institutions*. (4) Financial institutions include various financial institutions at the national state such as National Bank for Agriculture and Rural Development, export and Import Bank of India, and Small Industries Development Bank of India.

1.2.3. Adoption of Information Technology in Indian Banking Sector

The economic liberalization in India and worldwide Internet revolution simultaneously impacted the Indian private and public sector banks. IT revolution altered the landscape of Indian banking by enhancing customer service, reduced manpower costs, and increased profitability. The Reserve Bank of India (RBI), which is the central bank of India, played crucial role in this transformative journey by issuing regulations and recommendations regarding mechanization and computerization. Establishment of computerized inter-connectivity across banks branches, MICR-based cheque clearing, modernization of payment and settlement services through Electronic clearing services (ECS), Real time gross settlement system (RTGS), National electronic fund transfer (NEFT) were some of the significant landmarks of the banking technology revolution. Moreover, technological advancements and innovations can be also seen from the various milestones achieved by the banks in the recent past. The most noteworthy is the introduction of the ATM technology. The ultimate success of ATMs encouraged the banking sector to develop more innovative delivery channels to build on cost and service efficiencies. Thus, several banks have introduced tele-banking, call centers, Internet banking and mobile banking. In other words, there is a significant advancement in the usage of technology in the banking sector. However, it would not be possible for the banks to operate these delivery channels without an appropriate banking solution. Centralized Core Banking

Solution (CBS) is one such technological advancement that has revolutionized the banking sector. Core banking systems are organization-wide information systems that bring substantial changes to a bank's methods of working and information flows. It contains record of all customer transactions and the processing of those transactions. It enables banks to offer a multitude of customer-centric services from a single location, supporting all possible delivery channels (Chakrabarty, 2010). Consequently, it enabled customers to access their accounts from any branch, anywhere, irrespective of where they have physically opened their accounts. Moreover, it also helped banks in preparing MIS reports for the top management and in submission of various reports to the RBI and the government. Most branches of the commercial banks including Regional Rural Banks are progressively brought into the core-banking net. Today, all the public sector banks have completed 100 per cent computerization of their branches with Core Banking Solution.

It is evident that Indian banks today operate in a highly globalized, liberalized, privatized and a competitive environment. As they have realized the power of technology as the key to survive in this environment, they are making huge investment in procuring highly advanced and sophisticated state-of-art technological products. Recent studies have indicated that the Indian banking and security companies have significantly increased their investment in information technology. This investment is projected to be 462 billion rupees in 2014 on IT products and services, which reflects an increase of nearly 9.8% over 2013 revenue of 421 billion rupees (Gartner, 2013). This spending includes spending by financial institutions on internal IT services, software, devices and Telecom services. Indian banks are making huge investments in modernization and legacy replacements of banking information systems (Gartner, 2013). Thus, it is clear that Indian banks need to focus on swift and

continued infusion of technology while ensuring its effectiveness. However, mergers, acquisitions, consolidation, expansion, diversification, changing consumer preferences, and changing regulatory environment (Gartner, 2007; Capgemini, 2008) have pressurized the bank management to evaluate the returns they are getting out of their huge investment in banking information systems. A banking information system (Core banking solutions) is the backbone of bank's IT infrastructure. Core banking systems require a large investment in terms of time, money and efforts. So a minor error could cause serious repercussions and can even tarnish bank's reputation (Capgemini, 2008). Thus, effective and efficient use of information technology still remains a major issue for the banking sector. Dr. Chakrabarty, Deputy Governor of Reserve bank of India reported that in spite of the adoption of CBS technology, banks are still lacking in the information front, that is, information from the information technology seems to be missing (Chakrabarty, 2010). He said that Indian banks are yet not using CBS effectively as they are unable to provide one-window-for-all-functions solutions.

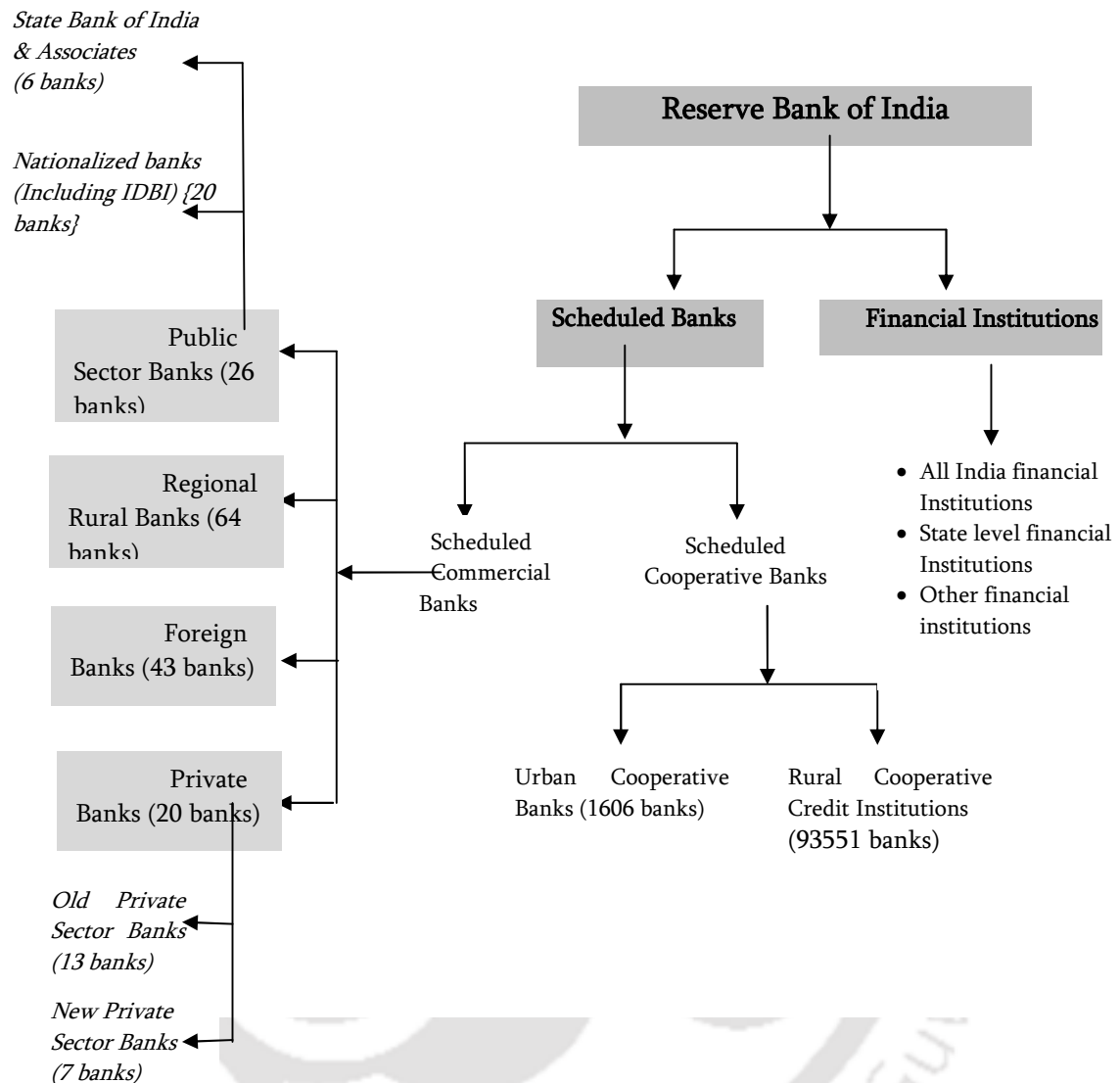


Figure 1.1: Structure of Indian Banking Industry

1.3. Plan of the Thesis

The present thesis is divided in nine chapters. They are as follows:

Chapter 1 provides the background and overview of this study. It also discusses major objectives of this study and provides an overview of the Indian banking industry.

Chapter 2 presents detailed literature review associated with this study. This chapter covers historical overview of IS theories and research, various models of IS evaluation, review of empirical studies associated with all the variables of this study. Additionally, this chapter explained the justification for selecting all the variables associated with this study.

Chapter 3 discusses major gaps identified from the literature review, thereby providing rationale for this study. Further, this chapter presents research questions, hypotheses and conceptual framework used for this study.

Chapter 4 presents methodological details of the present study including detailed descriptions of all the measures used for data collection and their psychometric properties reported in various studies.

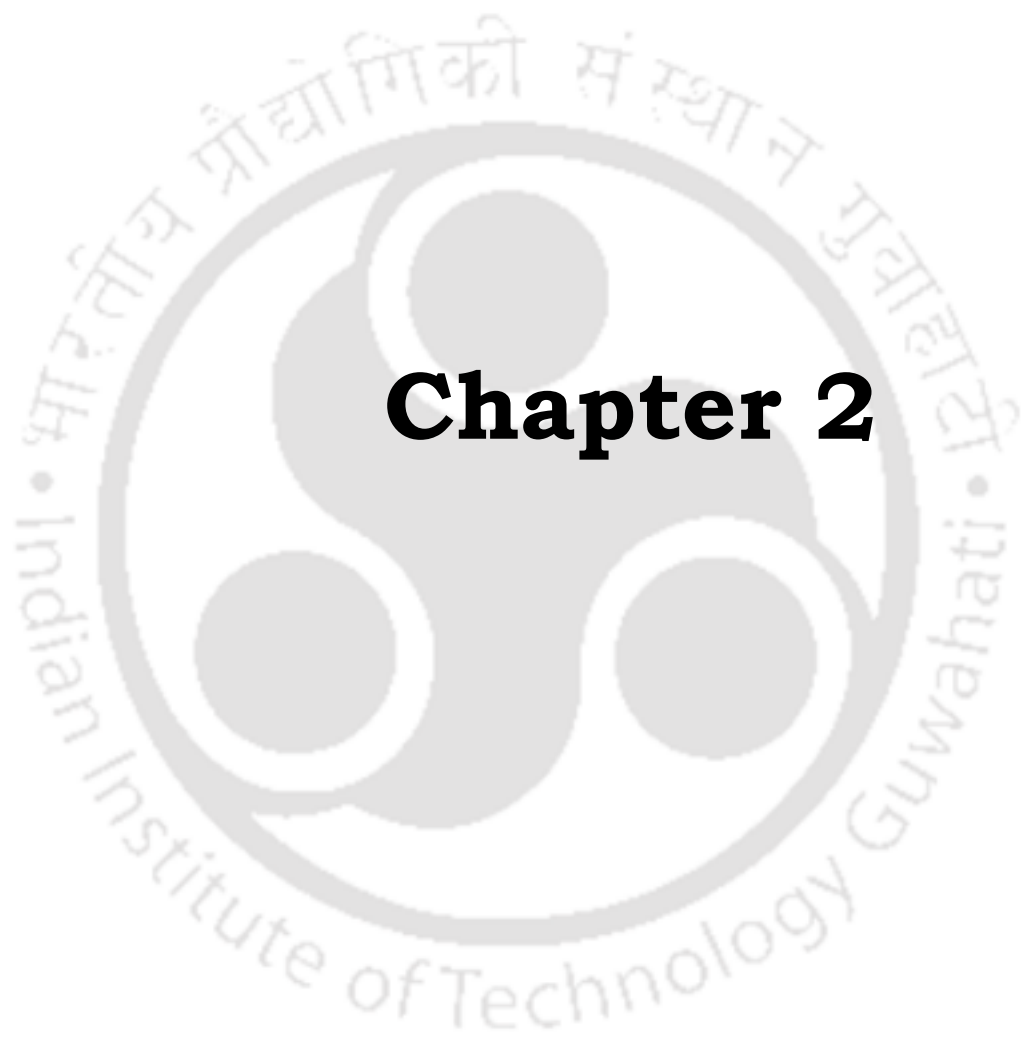
Chapter 5 reports the results of the quantitative study (study 1) conducted to test the hypothesis drawn from the conceptual model.

Chapter 6 reports the discussion of the quantitative findings in light of the theories and past researches.

Chapter 7 reports the results of the qualitative study (study 2) conducted on the senior bank executives.

Chapter 8 presents the discussion of the qualitative study.

Chapter 9 summarizes the key findings of the present research work, draws conclusions and implications. Further, it cites potential limitations of the present study and explores the directions for the future research.



Chapter 2



Chapter 2

Literature Review

2.1. Introduction

This chapter reviews various relevant literature associated with the present research. The primary aim is to review significant past research in order to set a background for the present study. Specifically, this chapter will focus on the (1) prevalent evaluation frameworks and models of IS success and issues in IS success research, (2) current state of global and Indian IS success research specifically applied to banking contexts, and (3) review of the existing studies linking IS success and various contextual and individual factors. Thus, the primary scope of this chapter is to identify key theories and models that will help us to identify the theoretical basis, research framework and research gaps for the present study.

2.2. Meaning of Information System (IS)/Information Technology (IT)

The term “information systems” (IS) has been defined in many ways. For example, DeLone and McLean (1992) defined information system as integrated systems that provide information to support operations, processes, management, analysis and decision- making process within an organization. Alter (1999) defined IS as a system in which user perform business processes using information, hardware and software to capture, transit, store, retrieve, manipulate and/or display information for internal and external customers. Iivari (2005) defined information system as computer based systems that provide its user with information on specified topics in certain organizational context. Moreover, Kim, Garrity, and Sanders (2003) defined IS as a system composed of interdependent computer based technology and a human

element that are brought together to accomplish one or more objectives. This definition treats information system as a purposeful entity and a tool.

Thus, it is clear that IS includes some form of computer based systems that helps individual and organization to perform several operations to reach their goals and objectives. The present study is based on DeLone and McLean IS success model (1992, 2003) applied to the Indian banking context. Therefore, this study has adopted their definition to conceptualize information system, that is, information system is an integrated system that provides information to support operations, and decision-making.

Furthermore, for the convenience of the readers as said earlier (Chapter 1) the term “*information systems*” (IS) and “*information technology*” (IT) has been used synonymously in the present research work. Moreover, in the present study, the term “*success*” and “*effectiveness*” are used interchangeably.

2.3. Meaning of Information Systems Success/ Effectiveness

Most of the research associated with IS/IT related applications has been focusing primarily on the concept of IS success measures and evaluations. Kim et al. (2003) suggests that when evaluating a tool, it is important to evaluate its effectiveness in particular context and purpose. So, IS success should be determined by taking into consideration that how effective a tool (IS) is in particular context in achieving individual and organizational goals.

Different stakeholders defined “IS success” in different ways. For example, for an *individual user* perspective, a successful IS may mean enhancement of work satisfaction and performance; from a *manager’s perspective*, a successful IS may mean reduction of uncertainty of outcomes and risks; and from an *organizational*

perspective, a successful IS may mean increase in organizational profits and achieving competitive advantage (Urbach, Smolnik, & Riemp, 2009). IS literature clearly reveals that the concept “IS success” is ill-defined (Weill & Olson, 1989). A review of literature reveals numerous categories and measures used by several researchers to evaluate IS success. DeLone and McLean (1992) stated that there are nearly as many measures as there are studies. For example, Wateridge (1998) noted that the common assessment criteria’s are cost, time and user specifications, technical performance, impact on computer operations, and user satisfaction. Further, many researchers conceptualized IS success or effectiveness as the extent to which IS helps organizations to attain their goals (Hamilton & Chervany, 1981; Wang & Yeoh, 2009). The present research conceptualizes an information system as successful if it supports individual user and organization to reach to their objectives (Malik, 2001).

2.4. Meaning of Banking Information Systems

Banks and other financial institutions are one of the largest investors in technology. Banks use technology as a powerful competitive weapon to capture market, improve customer service, reduce operating costs and create new products and services. Core banking solutions have revolutionized banking by automating core banking operations such as deposits, withdrawals, interest calculations, unifying various processes and allowing a ‘single view of customers various accounts with the bank. A “Core banking information system” (CBIS) or “Banking information system” (BIS) in the bank is basically the heart of bank’s IT infrastructure. It forms the core of the bank’s IT platform and may be referred as the nerve centre of the bank’s IT department. Overall it generates a complete view of customer’s relationship with the bank. A typical core banking system is composed of five components: customer

information file, general ledger system, transaction processing, plain vanilla loans and deposits systems, basic MIS reporting.

According to Wang and Lin (2012) core banking information system is the application responsible for major banking operations such as performing deposit accounting, processing and posting transactions, maintaining loan accounts, keeping securities positions, clearing payments, and managing client information. With the advancement of technology CBISs are capable of completing these tasks in an integrated, browser-based environment across multiple delivery platforms. Some major core banking solutions are: FINACLE core banking from Infosys, SAP core banking from SAP, Bancs24 from TCS, FLEXCUBE universal banking solution from i-flex, Orbi one core from Polaris, and so on.

Following section will discuss historical background, theoretical models, and various empirical research associated with IS success.

2.5. Historical Background of IS Success Research

A brief description of historical background of IS success research will help us to better understand the evolution of various models and conceptualization of IS success literature. Many authors discussed the history and nature of IS success research using various frameworks and approaches. For example, the history of IS research has been divided on the basis of eras (Hirschheim & Klein, 2011), artifacts and hardware (Dahlbom, 1996); and types of IS that dominated the period (O'Brien, 1999). Garrity and Sanders (2003) identified that the research on IS success has evolved into four streams: *the impact of individual differences on IS success* (Zmud, 1979), *user involvement and IS success* (Baroudi, Olson & Ives, 1986; Ives & Olson, 1984), *the fit-IS success relationship* (Goodhue, 1990; Goodhue & Thompson, 1995),

and *user information satisfaction* (Doll & Torkzadeh, 1988; Ives, Olson & Baroudi, 1983).

Recently, Peter, DeLone and McLean (2012) discussed five eras depicting the gradual evolution of IS success research. The five overlapping era's do not have well defined boundaries. This division will help us to understand the key technological changes, events, change in research themes of these eras. These five eras can be categorized as:

1. The data processing era (1950s-1960s)
2. The management reporting and decision support era (1960s-1980s)
3. The strategic and personal computing era (1980s-1990s)
4. The enterprise system and networking era (1990s-2000s) and
5. The customer focused era (2000s and beyond)

The Data Processing Era (1950s-1960s)

This era was the budding stage of IS research. In this era, computing tools included sophisticated calculators primarily used by military and financial industry (Dahlbom, 1996). IS developed during this period were of low quality and their success was measured by the technical features such as speed and accuracy of the systems. In this period, only individuals those are highly trained and knowledgeable was able to use these computing technologies (Hirschheim & Klien, 2011). Information systems of this era were mainly used to automate the processes and did not influence management practices (Petter, DeLone, & McLean, 2012).

Management Reporting and Decision Support Era (1960s-1980s):

Around 1960s, IS field was generally referred as “Management Information Systems” (MIS). Computing technology gradually advanced during 1970s and is increasingly used for monitoring and controlling the production process and even used for various administrative purposes (Dahlbom, 1996). During this period, the complexity of the information systems increased and gradually the number of users was also increasing. However, most managers at that time were untrained and lacked technical knowledge needed for interpreting the structured data produced by the information systems. Thus, only limited numbers of managers are able to use that data for their decision making purposes. Further, most researchers considered factors other than technical quality of the system to evaluate IS success. Various studies have considered “use” as a measure of success. However, some researchers even considered factors like cost reduction, accuracy, speed, improved decision making and control, while others were of the view that it is difficult to quantify the benefits of information systems.

Strategic and Personal Computing Era (1980s- 1990s)

During this era, organizations began to realize the potential of information system as a strategic tool. In 1980s, with the introduction of personal computer, the focus of the organizations shifted to personal productivity. The development of user friendly interfaces has brought manifold increase in the use of personal computers by back office employees as well as by managers for their decision making. Thus, more employees were able to use the information systems with only little training. The widely-cited methods of evaluating IS success during this period were: alignment between IS and the organization (Petter et al., 2012); influence on productivity,

profitability and customer surplus (Hitt & Brynjolfsson, 1995); ability to meet individual needs and organizational goals (Hamilton & Chervany, 1981); users perception; degree of technology acceptance (Davis, 1989); usage and improved performance (Goodhue & Thompson, 1995). As more employees began to use information systems in organizations, research related to IS success focused on user's perception and user satisfaction (Bailey & Pearson, 1983; Ives et al., 1983). Thus, researchers have started evaluating information systems from variety of perspectives like management, users, IS staff and internal auditors (Hamilton & Chervany, 1981).

This era has also witnessed many developments in IS research such as the development of the user information satisfaction (UIS) instrument (Bailey & Pearson, 1983), end user computing satisfaction (EUCS) instrument (Doll & Torkzadeh, 1988) and the landmark IS success model proposed by DeLone and McLean, (1992). This model gave a comprehensive framework that brought together varied views of success from previous eras and organized them into six dimensions of success: *information quality, system quality, user satisfaction, use, individual impact and organizational impact*. In addition to organizational benefits, this era had a strong focus on individual's benefits as well. Therefore, to evaluate IS success researcher's started using user satisfaction along with technical measures. This era offered a more holistic view of IS success by measuring success from a socio-technical perspective with emphasis on organizational and individual impacts.

Enterprise System and Networking Era (1990s-2000s)

This era has brought a paradigm shift in the computing world by making it possible to share the data among applications and managers rather than data being isolated to a single machine or with a single individual (Dahlbom, 1996). The focus

shifted towards improving collaboration among individuals, groups and organizations. Enterprise wide applications connected various isolated applications with various departments and organizations through a dedicated network.

Use of enterprise systems like enterprise resource planning (ERP), expert systems and so on increased manifold. Consequently, research on success of these systems also increased. Primarily, two types of research streams evolved: one line of research focused on the development of measures for evaluating success of ERP systems. Most of these measures primarily used DeLone and McLean IS success model (1992, 2003) such as measure developed by Sedera, Gable and Chan (2004). While, other line of research focused on the balance scorecard approach (Kaplan & Norton, 1992) or key performance indicator framework. Balance scorecard approach is a process in which evaluation is done by using a feedback loop, so that specific actions can be taken to improve ERP in such a way that it meets the organizational goals (Petter et al., 2012).

As reflected in the researches published during this era, improved decision making, collaboration and overall organizational impacts became the focal points. So, the success of information systems is evaluated not just from the perspective of individuals, and organization but also from the perspective of team and society. Several key developments of this era included Seddon, Staples, and Patnayakuni's (1999) IS effectiveness matrix (suggests that different stakeholders and systems require different measure of IS effectiveness), identification of productivity and team performance as separate dimension of success, introduction of net benefits, and service quality (Pitt, Watson, & Kavan, 1995) construct in the DeLone and Mclean model (1992).

Customer Focused Era (2000s and beyond)

The current customer focused era reflects the continuous advancement and growth of information systems. In this era, customers are highly interested in using Internet for varied purposes ranging from online shopping and social networking to knowledge seeking activities. This has encouraged companies to personalize or customize their websites according the preferences and interests of the individual customers. Thus, the scope of technology has widened and now its use is not just limited to improve individual and organization performance but have also been used for entertainment and knowledge seeking purposes.

In this era, information systems are increasingly being used by consumers and suppliers of that organization apart from employees and managers of the organization. Many measured IS success in terms of the quality of the system (easy to use and learn, useful, user-friendly, and enjoyable). In this era, due to enormous growth of e-commerce, various measures to evaluate success of ecommerce and customer facing information system gained popularity (DeLone & McLean, 2004). Though the dimensions of DeLone and McLean model (1992) were relevant in this era also but the context in which the system is evaluated and attributes related to these dimensions have changed significantly over time. So, they updated their model updated their model to broaden the scope of their model (DeLone & McLean, 2003). In this era, the scope of information system has shifted from purely utilitarian purposes to hedonic (entertainment) purposes (Petter et al., 2012). Measurement of IS success has become more complex and multidimensional. Table 2.1 shows the gradual progression of measures of success during these five eras.

Table 2.1: Past and Present Measures of Information Systems Success

(source: Petter et al., 2012)

Five Eras of IS success	Past and Present Measures of IS Success
Data Processing Era (1950s-1960s)	Research on evaluating the IS success was scant
Management reporting and Decision Support Era (1960s-1980s)	Research laid emphasis on • Decision making • System use • Cost reduction
Strategic and Personal Computing Era (1980s-1990s)	Prominent focus on • Productivity • Strategic alignment • Value of IT • User needs • Technology acceptance • User satisfaction • Quality of system and its output
Enterprise Systems and Networking Era (1990s-2000s)	Studies focused on • Task performance • Service quality • Net benefits
Customer-Focused Era (2000s and beyond)	• Customer impacts • Social impacts

2.6. Major Evaluation Models of IS Success

Over past thirty years, defining and evaluating information systems success has been a crucial issue and remains a challenge for IS researchers and practitioners. Both have paid considerable attention to this issue and much work has been done in this area (DeLone & McLean, 1992; Goodhue & Thompson, 1995; Ives & Olson, 1984; Mason, 1978; Miller & Doyle, 1987; Seddon 1997; Zmud, 1979). The IS management literature reflects that “measuring and improving IS effectiveness” is one of the top ten issues. Literature reveals two streams of research measuring success of information systems. One stream focuses on the *attitudinal and subjective measures*, while another stream emphasizes on the *financial and objective parameters* like cost-benefit analysis, utility analysis, decision making effectiveness, IS use estimation,

balanced scorecard approach and other analytical approach (Ives & Olson, 1984). However, lack of consensus among IS researchers regarding the conceptualization and operationalization of IS success dimensions and measures still remains a major issue (DeLone & McLean, 1992; Hamilton & Chervany, 1981; Ives & Olson, 1984; Miller & Doyle, 1987; Zmud, 1979).

This section will highlight prominent models that were developed for measuring information systems such as model of individual differences as predictor of success (Zmud, 1979), model of user involvement (Ives & Olson, 1984), technology acceptance model (Davis, 1989), DeLone and McLean model of IS success (DeLone & McLean 1992), Seddon IS success model of perceived usefulness (Seddon, 1997), Garrity and Sanders model of IS success (Garrity & Sanders 1998), and the updated DeLone and McLean IS success model (DeLone & McLean 2003).

2.6.1. Individual Differences as Predictor of Success (Zmud, 1979)

Zmud (1979) proposed a model illustrating that individual differences are best predictors of management information systems success. He derived taxonomy of individual differences which included the categories of *cognitive style*, *personality*, and *demographic/ situational variables*. Figure 2.1 illustrates the manner in which individual differences are believed to influence IS success. As shown in the upper path of the figure 2.1, individual differences affects cognitive behaviour (*cognitive influences*) which in turn influences MIS design alternatives, that finally affects the success or failure. The lower path of the model reflects the impact of individual differences on the attitudes (*attitudinal influences*) of the user towards the system before and after the use, which then affects the ultimate success or failure of the system.

Zmud (1979) reported that general intellect and specific knowledge significantly influence MIS usage. He observed that users with higher intelligence process information faster and more effectively. Zmud (1979) suggested that (a) *in terms of information-* user are more satisfied if the output generated by the system exactly meets their information needs, (b) *in terms of delivery system-* easy to use systems are positively related to user satisfaction, and (c) *in terms of user attitudes towards system-* extrovert individuals possess a positive attitude towards MIS. (d) *in terms of use-* users tend to use the system more if they are aware of the system's potential and have strong top management support. Moreover, he suggested researchers to link user attitude towards MIS design characteristics. He emphasized that much is still unknown in the area of individual differences and appealed for more empirical research.

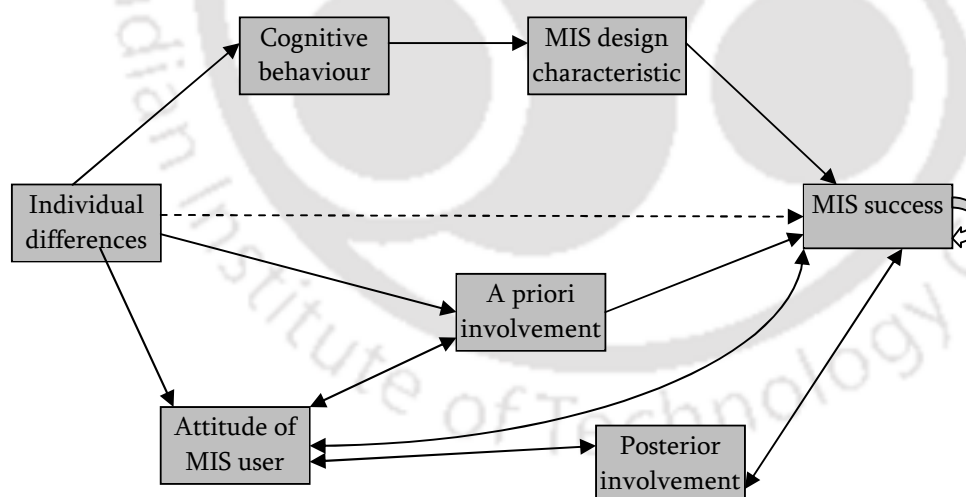


Figure 2.1: Impact of Individual Differences upon MIS Success (Zmud, 1979)

2.6.2. User Involvement and IS Success (Ives & Olson, 1984)

Ives and Olson (1984) focused on the importance of user involvement in the development of computer-based information systems. They conceptualized user

involvement as the participation of target user group in the development process of the system. They proposed a descriptive model which conceptualizes that success of an information system can be assessed based on its outputs and is represented by *perceived quality* and *level of system acceptance*. Furthermore, this model also focuses on the underlying complex variables like *cognitive* and *motivational factors* which are responsible for improved quality or improved acceptance. This model proposes that the system quality and system acceptance is mediated by cognitive factors and motivational factors (see figure 2.2). Cognitive factors include improved understanding of the system, system requirements, and improved evaluation of system features. While motivational factors includes increased ownership, decreased resistance to change and increased commitment. They further emphasized that the user participation with the development of the information system has a positive effect on its success. Further, they reported that “It is almost an axiom of the MIS literature that user involvement is a necessary condition for successful development of computer-based information systems” (Ives & Olson, 1984, p. 586)

Ives and Olson (1984) argued that the benefits of user participation in the success measure have not been properly identified in the academic research. They concluded that majority of the studies have not reported a strong support for the relationship between user involvement and MIS success. He further stated that there is lack of consensus on operationalization of user involvement construct. Thus, they called for more rigorous study in the area of user involvement. In response to their call for rigorous research many studied the relationship between some measures of user involvement and user satisfaction (Baroudi et al., 1986; Doll & Torkzadeh, 1989). Nevertheless, the relationship between user participation and successful systems development has not been clearly established by empirical research.

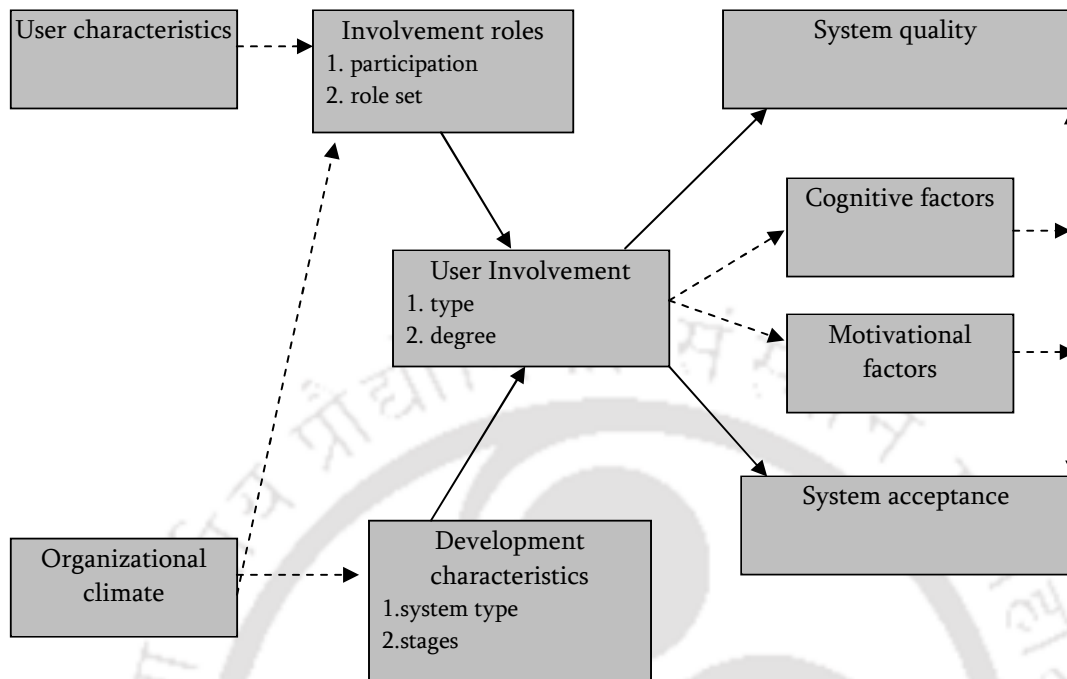


Figure 2.2: Descriptive Model of IS Success (Ives & Olson, 1984)

2.6.3. Technology Acceptance Model (Davis, 1986)

Understanding individual behaviour for acceptance or rejection of information systems has proven to be one of the most challenging issues in IS research. Davis (1986) developed the Technology Acceptance Model (TAM) to explain human computer usage behaviour using Theory of Reasoned Action (Ajzen & Fishbein, 1980) and the Theory of Planned Behavior (Ajzen, 1985) as the theoretical basis. TAM is a mechanism that explains the relationship among beliefs, attitudes, behavioral intentions, and system usage (Garritty & Sanders, 2003). The TAM model explains why some systems are more readily accepted by users than others. The model (see figure 2.3) posits that behavioral intention to use a system is determined by two salient beliefs, which are, *perceived usefulness* and *perceived ease of use*. Further, the behavioral intention to use a system determines the actual system use. Additionally,

perceived ease of use is considered as a determinant of perceived usefulness because users consider a system more useful when it is more effort-free.

TAM has been validated as a powerful and parsimonious framework with high predictive power for explaining the adoption of information technology by its users (Davis, Bagozzi, & Warshaw, 1989). However, it is criticized for lack of sufficient information to predict user acceptance of new systems. IS researchers argued that TAM has limited explanatory power. Garrity, Glassberg, Kim, Sanders, and Shin (2005) noted that this model does not capture psychological and social influences on technology adoption.

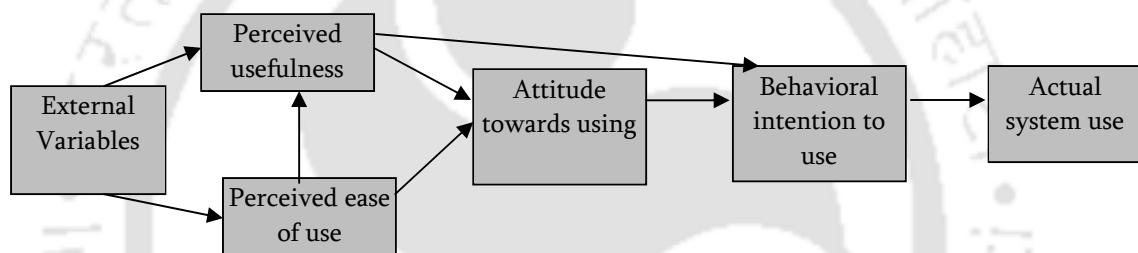


Figure 2.3: Technology Acceptance Model (Davis, 1986)

2.6.4. IS Success Model (DeLone & McLean, 1992)

Several attempts by researchers to define IS success were ill-defined due to the complex, interdependent, and multi-dimensional nature of IS success (Petter et al., 2008). To address this problem, DeLone and McLean (1992) identified and unified the major components of information system success measures after extensively reviewing and synthesizing the IS success literature until 1987. DeLone and McLean articulated a model and an associated taxonomy with the aim to provide a general and comprehensive definition of IS success that covers different perspectives of evaluating information systems. Thus DeLone and McLean IS success model (DeLone & McLean, 1992), is an interactive model for conceptualization and

operationalization of IS success. As evident from figure 2.4, this model suggests that the system quality and information quality separately and jointly affect both use and user satisfaction. The amount of use can affect the degree of user satisfaction either positively or negatively. Use and user satisfaction are direct antecedents of individual impact and then individual performance eventually have some organizational impact. The model was developed based on the Shannon's Communication theory (Shannon & Weaver, 1949), Mason's Information Influence theory (Mason, 1978) and the review of several research articles related to definitions of IS success and their corresponding measures. Shannon and Weaver (1949) organized communication problems into three hierarchical levels: *technical*, *semantic*, and *effectiveness*. The technical level investigates the accuracy and efficiency of the communication system producing information; the semantic level focuses on the success of information in conveying intended meaning; and the effectiveness level is concerned with the effect of information on the receiver.

Thus, considering both process and causal flows, they created a multidimensional model with interdependencies between six different success categories. In terms of the communication theory, in the model (DeLone & McLean 1992), system quality measures *technical success* and information quality measures *semantic success*, whereas, use, user satisfaction, individual impact and organizational impact dimensions measures *effectiveness success*.

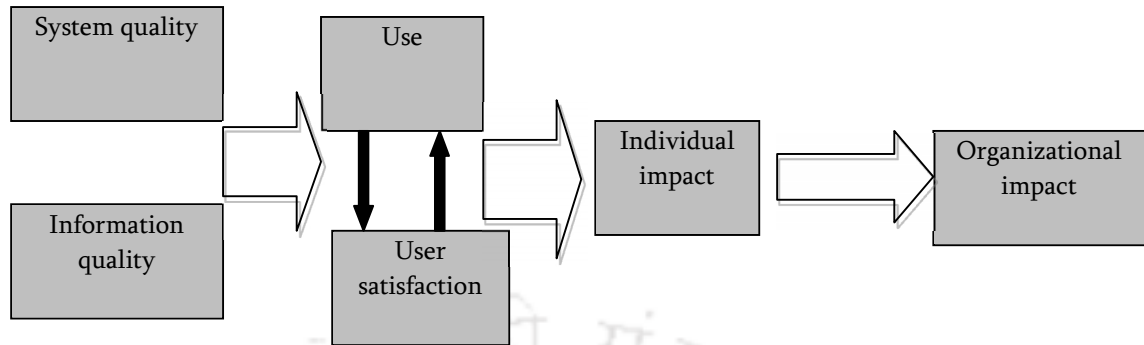


Figure 2.4: Information Systems Success Model (DeLone & McLean, 1992)

It is clear from the above description that the DeLone and McLean (D&M) model is both causal and process model (see figure 2.5). A temporal, process model suggests that an information system follows a series of stages. First an information *system is created* with various features which can be categorized as system quality and information quality. Next, the user experiences these features by using the system. He would either be satisfied or dissatisfied with the system. The use of the system then impacts or influences individual's task performance, and then these individual impacts collectively result in organizational impact (DeLone & McLean, 2003). Moreover, the model can also be examined or viewed from a *causal* or variance perspective. The causal model studies the covariance of the success dimensions to determine if there is any causal relationship among them. For example, higher information quality is expected to lead to higher user satisfaction and use, which in turn would lead to positive impacts on individual productivity and results in organizational productivity.

Each of the six dimensions is succinctly defined as follows:

1. *System Quality*: this dimension measure characteristic of the information system, that is, the hardware and software quality. Fundamental facets of system quality include reliability, response time, accuracy, ease of integration, flexibility, functionality, ease of use and ease of learning.

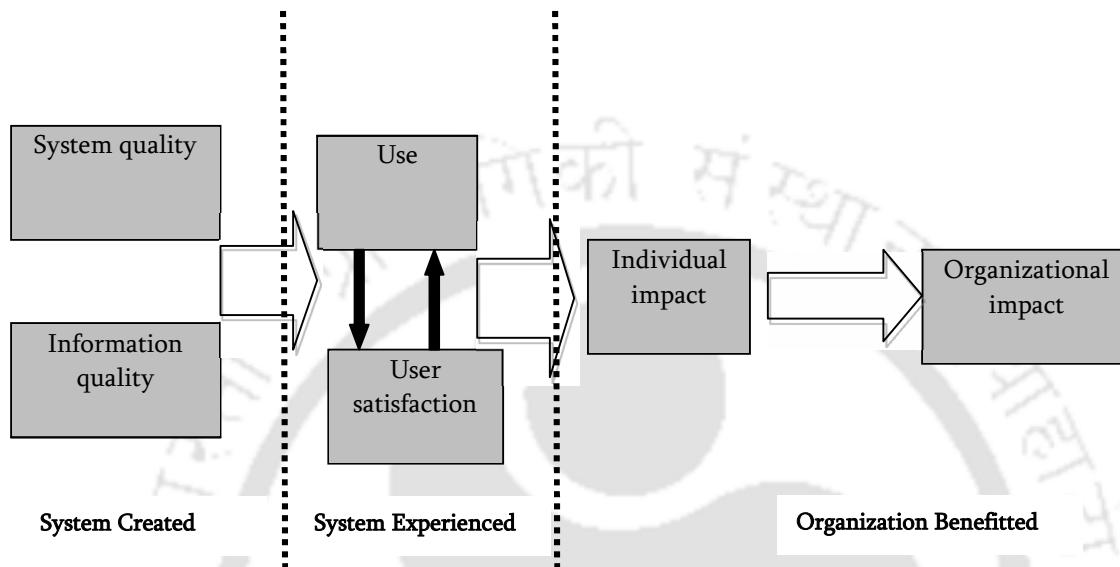


Figure 2.5: The Original DeLone and McLean IS Success Model (DeLone & McLean, 1992) with the Process Aspect

2. *Information Quality*: It is a measure of information system output, that is, quality of the information produced or reports generated by a system such as information timeliness, accuracy, completeness, ease of understanding or interpretability, relevance, conciseness, currency, and usability.

3. *System Use*: It is a measure of recipient consumption of the output of information system. In other words, it is the degree and manner in which staff and customers utilize the capabilities of an information system. System use has to be examined using both objective and subjective measurements. Objective measurements concentrate on the behavioral aspect of system use. It may include amount of time used, frequency, intensity with respect to total services rendered or individual service encounters, appropriateness of use, extent of use, purpose of use and specific system

functions used or not used. Meanwhile, system use should also be assessed subjectively, that is, treated as a surrogate for (perceived) system benefits such as perceived system usefulness, ease of use, ease of learning, and convenience access, and user support.

4. *User Satisfaction*: It is a measure of the recipient's response to the use of the output of an information system. User satisfaction refers to the degree to which an individual is satisfied with his or her overall use of the information system under evaluation. Collective findings from prior IS research has suggested that user satisfaction is a strong and critical manifestation of systems success.

5. *Individual Impact*: It is a measure of the effect brought by the information system on individual users in terms of change in productivity, performance, and decision making.

6. *Organizational Impact*: It is a measure of the effect of information system on organizational performance such as decrease in operating costs, saving in labour costs, and growth in profits.

The D&M model of IS success makes two significant contributions to the understanding of IS success. Firstly, it provides a scheme for categorizing the multitude of available IS success measures. Secondly, it suggests a model of temporal and causal interdependencies between the categories (McGill, Hobbs, & Klobas, 2003; Seddon, 1997). Thus, this model is one of the most comprehensive IS assessment models (Heo & Han, 2003).

2.6.5. Seddon IS Success Model of Perceived Usefulness (1997)

Seddon (1997) contends that an attempt to combine process and variance aspects in the same framework (D&M model) leads to confusions and diminishes the value of

the model. A variance aspect of a model means that any one of the independent variable is necessary and sufficient to cause variance in the dependent variable (Newman & Robey, 1992). Seddon (1997) criticized the D&M model on the ground that three distinct models are intermingled in D&M model, each reflecting a different interpretation of IS 'use' dimension:

1. the first model is a process model of IS success that describes the sequence of events relating to an IS success, that is, an event in the process leading to individual or organizational impact.
2. the second model is a representation of the behaviour that manifests as a result of IS success, that is, 'use' act as a proxy for the benefits.
3. the third is a variance model of IS success, that is, 'use' acts as a dependent variable in a variance model.

Thus, a principal difference in Seddon's and D&M model (1992) is the meaning of IS 'use' and its placement in the model.

To clarify the confusion over the three distinct meanings of IS 'use', Seddon (1997) proposed an alternative IS success model, that focuses on the variance aspects of the interrelationships among the six categories of the D&M model. As shown in figure 2.6, Seddon (1997) eliminated the process aspect from the D&M model and the rest of their model has been split into two variance sub-models: *partial variance model of IS use* and *variance model of IS success*. Seddon (1997) further claims that 'use' is a behavior appropriate for inclusion in a process model but not in causal model. He argues that 'use' must precede impacts and benefits, but it does not cause them. Thus, he replaces D&M's (1992) IS 'use' dimension with "*perceived usefulness*". This replacement made Seddon's model suitable for both volitional and non volitional usage context.

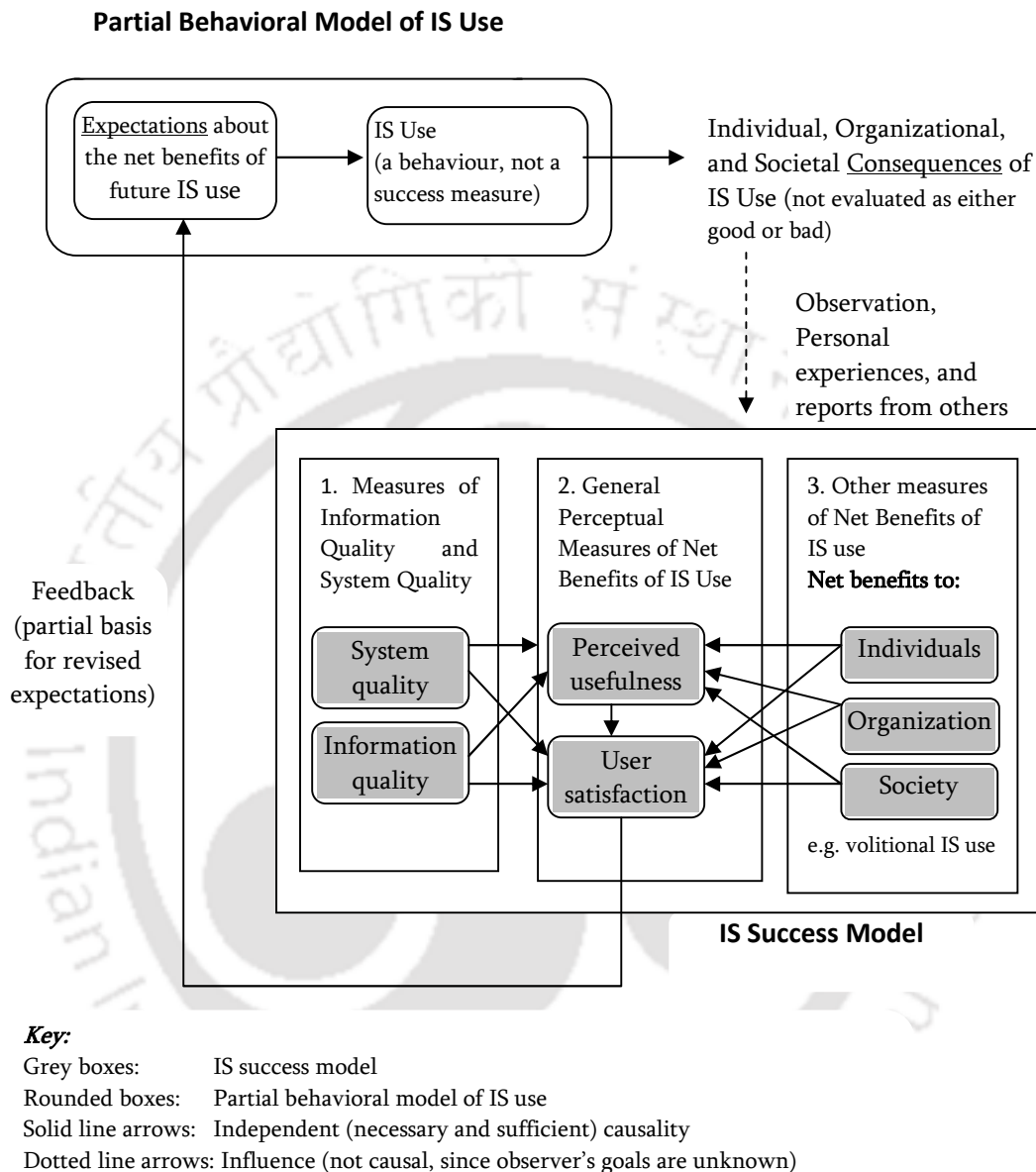


Figure 2.6: Respecified Version of DeLone & McLean (1992) Model of IS Success (Seddon, 1997)

As shown in figure 2.6, Seddon's IS success model includes three classes of variables: (1) measures of information and system quality, (2) general perceptual measures of net benefits of IS use, that is, perceived usefulness and user satisfaction, and (3) other measures of net benefits of IS use. However, according to DeLone and McLean

(2002), Seddon's recreation of D&M model makes the success model more complicated.

2.6.6. Garrity and Sander Model of IS Success (1998)

Garrity and Sanders (1998) adapted and improved D&M IS success model (1992) and proposed an alternative model applicable to organizational systems and socio-technical systems. They developed a User Satisfaction Inventory comprised of the items from the six well developed instruments: Franz and Robey (1986), Doll and Torkzadeh (1988), Baroudi and Orlikowski (1988), Sanders (1984), Davis (1989), and Goodhue (1990). As shown in figure 2.7, they expanded the DeLone and McLean (1992) model by identifying four sub dimensions of user satisfaction: *interface satisfaction*, *decision support satisfaction*, *task support satisfaction*, and *quality of work life satisfaction*.

The Garrity and Sanders model has been empirically tested and validated by Sherman, Garrity, Kim, and Sanders (2002), and Garrity et al. (2005). These four factors, covers three perspectives of information systems: (1) *the socio-technical viewpoint* that regards humans who are influenced by technical artifacts in the organization, (2) *the human-machine viewpoint* which points out that the computer interface and user are to be considered as components of a work system, and (3) *the organizational viewpoint* that views IS as a component of a larger organization system. The authors of the model view the task support satisfaction and decision support satisfaction as an access to the effectiveness of an information system in the context of organizational viewpoint. Interface satisfaction is put into the human machine viewpoint. The final factor, quality of the interface has a relationship to both task support and decision support satisfaction.

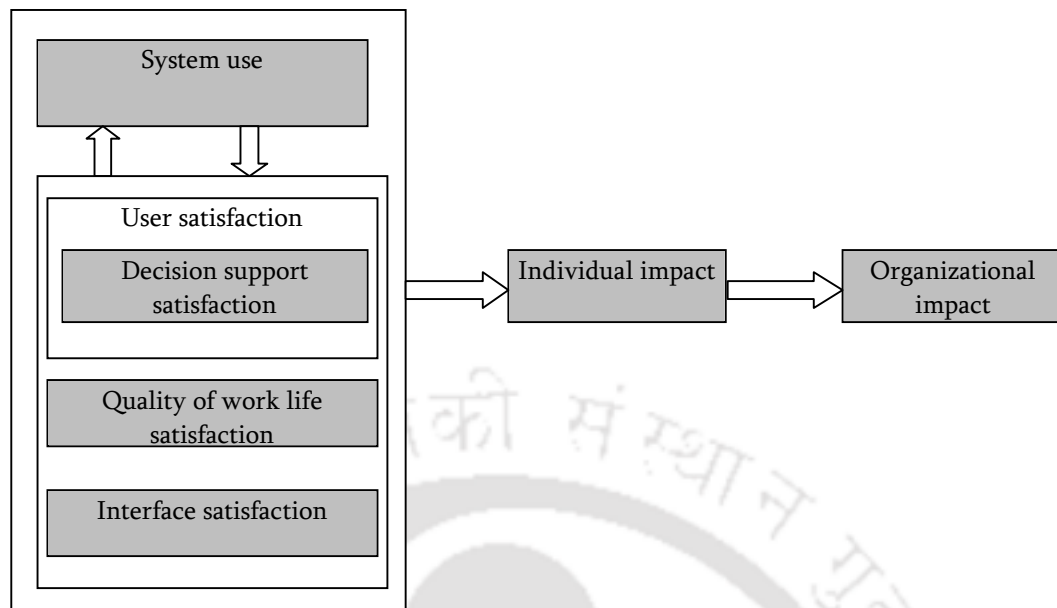


Figure 2.7: Garrity and Sanders Model of IS Success (1998)

2.6.7. Updated IS Success Model (DeLone and McLean, 2003)

DeLone and McLean (2003) updated their model of IS success after considering various criticism and empirical and theoretical contributions of other researchers who have tested or discussed their original model (DeLone & McLean, 2002). They added *service quality* as a new dimension in their model. Further, they combined both the impact measures (individual and organizational impact) into a single dimension, that is, *net benefits*. DeLone and McLean's updated model consists of six interrelated dimensions of IS success: information quality, system quality, service quality, use/intention to use, user satisfaction, and net benefits. Conceptualization and pathways among these components are depicted in figure 2.8. Various components of the model and the rationales for updating their model are described below:

- *Service Quality* as a construct is included on the recommendations of the Pitt, et al., (1995). This dimension reflects the importance of service and support in the

success of IS and increases the usefulness of the model in the light of the dramatic changes in IS practice.

- In response to Seddon's (1997) suggestions regarding the multidimensional aspects of the construct 'use', DeLone and McLean (2003) introduced the construct '*intention to use*' and was placed alongside 'use' to measure user's attitude. In the updated model, authors made it clear that 'use' must precede 'user satisfaction' in a process sense but positive experience with use would lead to greater user satisfaction in causal sense.

- This model also addressed the criticism that an information system can affect other levels apart from the individual and organizational levels. Researchers suggested several IS impact measures such as individual and organizational impacts (DeLone & McLean, 1992; Torkzadeh & Doll, 1999), work group impacts (Myers, Kappelman, & Prybutok, 1997), consumer impacts (Brynjolfsson, 1996), and societal impacts (Seddon, 1997). In this updated model, authors grouped all the possible IS impact measures into a single category called as *Net Benefits*'. This revision made the model parsimonious and allowed the model to be applied to any level.

The details of this model can be seen in figure 2.8. According to this model, a system can be evaluated in terms of three major quality dimensions: information, system, and service quality. These three quality dimensions will singularly or jointly affect subsequent use or intention to use and user satisfaction. The use must precede user satisfaction in a process sense but positive experience with use would lead to greater user satisfaction in causal sense (refer description of D&M model, 1992). Similarly, increased user satisfaction would lead to increased intention to use. As a result of interplay of use and user satisfaction, certain net benefits would be achieved,

which in turn positively or negatively influence user satisfaction and the further reinforce use of the information system.

This model has been widely used for understanding and measuring the dimensions of IS success. The updated model has been found useful in organizing IS success measurements. However, DeLone and McLean suggested that further development and validation is needed for the model.

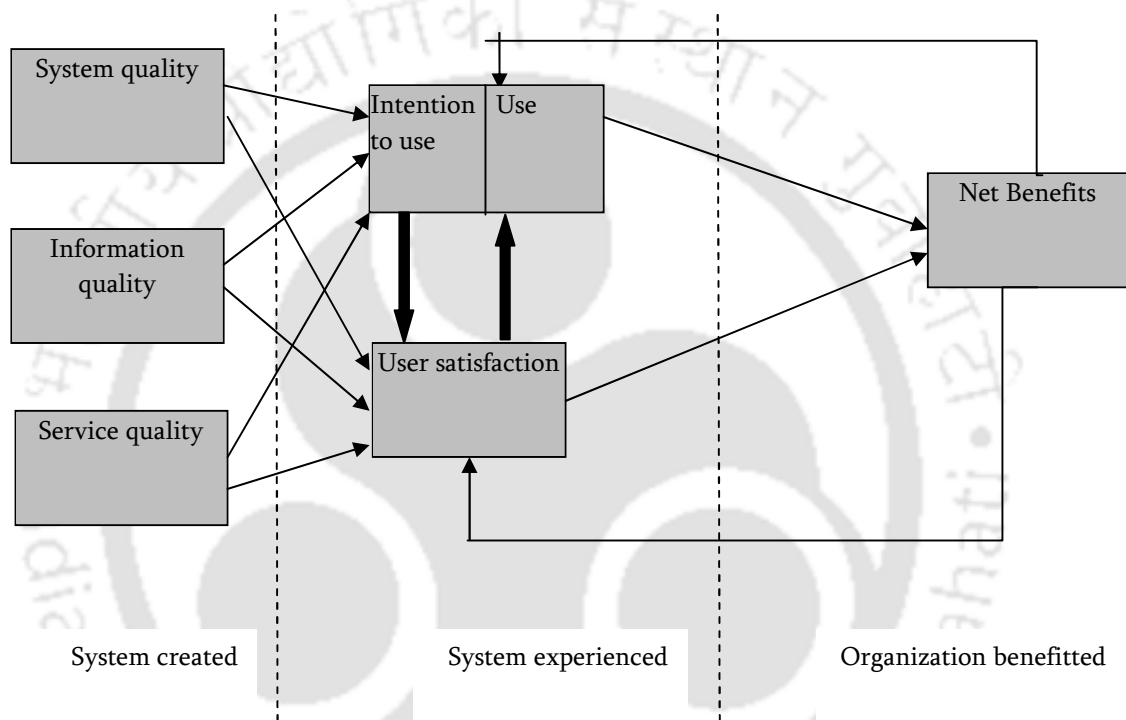


Figure 2.8: The Updated DeLone and Mclean Model (2003) showing Both Variance and Process Aspects

The present study aims to utilize both original and updated D&M model as a theoretical framework. DeLone and McLean's model is considered one of the most comprehensive assessment model of IS success which makes it feasible to study the explosive changes in the IS field. Both the models of DeLone and McLean (1992, 2003) make it explicit that the evaluation of information system cannot be done in isolation, but the whole mechanism requires an integrated approach that evaluates IS

from various views and contexts. This model has evolved as a dominant model for measuring IS success (Hu, 2003).

2.7. State of IS Success Research

Organizations need information technology to improve information flow, reduce costs, streamline their business processes, offer variety of products, establish linkages with suppliers, and reduce response time to customer needs and expectations. Hence many organizations are interested to improve their competitive position by implementing varieties of information systems. Proper and judicious investment in the information technology may lead to sustainable growth and development of the organization.

The financial industry, especially the banking sector is one of the largest investors in information systems and communication technologies. Information systems have become critical for bank's growth and survival. However, the implementation of the information systems is a very costly affair. Therefore, organizations are under increasing pressure to justify their IS expenditure by examining the value and contribution received from the information systems in terms of the productivity, quality and gaining competitive advantage. However, the assessment of the benefits of IS is very complex as it depends on multiple tangible and intangible factors. Further, research shows productivity paradox of IS (Brynjolfsson & Hitt, 1996). It means that in spite of massive investment in information systems, organizations have not been able to establish a correlation between investment and productivity. Therefore, the evaluation of IS has received a lot of attention from researchers (Barua & Mukhopadhyay, 2000; Brynjolfsson & Hitt, 1996).

The difficulty in quantifying the benefits of IS resulted in use of various proxies to measure IS success like ease of use (Doll & Torkzadeh, 1988; Davis, 1989), information quality (Bailey & Pearson, 1983; Doll & Torkzadeh, 1988), user satisfaction (Bailey & Pearson, 1983; Doll & Torkzadeh, 1988; Ives et al. 1983; Seddon, 1997), IS use (Davis, 1989; Ein-Dor & Segev, 1978; Goodhue & Thompson, 1995), and system quality (Franz & Robey, 1986). Many studies also used extent to which the system is used by management (Zmud, 1979), user involvement/participation (Ives et al., 1983), or the impact of IS on individual or organizational performance (Ein-Dor & Segev, 1978; Hamilton & Chervany, 1981), quality of decision making, productivity from cost benefit analysis (Crawford, 1982), as measures of system success. Further, several researchers described IS success in terms of improved productivity (Bailey & Pearson, 1983), organizational effectiveness, utility in decision making (Ives et al., 1983), difference between IS performance and predefined objectives (Hamilton & Chervany, 1981).

Literature clearly reveals that there is no consensus among IS researchers on the conceptualization and operationalization of IS effectiveness (DeLone & McLean, 1992; Hamilton & Chervany, 1981; Ives & Olson, 1984; Miller & Doyle, 1987; Zmud, 1979). It seems that research on IS success has been non-cumulative and fragmented, lacking an overarching framework (Grover, Jeong, & Segars, 1996). Moreover, Seddon et al. (1999) suggested that success of information systems also depends on the type of system being evaluated. To make the assessment issue more complicated, IS researchers have also considered different aspects of the information systems being assessed such as product, process, service dimension, stakeholders, and user satisfaction. However, DeLone and McLean (1992, 2003) proposed an IS success model which tried to integrate different perspectives of IS success research. These

models are considered as the most comprehensive IS success models and provided the needed direction for the researchers. But, clearly past researches corroborates that theorists are still struggling to find the best way to measure IS success (Rai, Lang, & Welker, 2002). Therefore, to address the above problem of IS research, the present study attempts to conceptualize a theoretical model on the basis of D&M model (1992, 2003). Details of the theoretical model will be discussed in chapter 3. Next section will review various empirical investigations associated with the DeLone and McLean Model of IS success.

2.8. Dimensions of the DeLone and McLean Model of IS Success (original and updated)

The D&M IS success model turned up to be major milestone in the research of IS effectiveness/ IS success (Guimaraes, Armstrong, & Jones, 2009) as it gave a proper direction to the IS success research. Interrelated dimensions of D&M models (original and updated) of IS success includes: system quality, information quality, service quality, use, user satisfaction, individual impact, organizational impact, and net benefits.

(a) System Quality

System quality is the individual's perception of a system's performance. DeLone and McLean (1992) and Shannon and Weaver (1949) mentioned that the system quality resides at the technical level of IS success. It can be defined as the quality of the organization's IT communication systems, hardware, and operating systems. DeLone and McLean (1992) defined system quality as the desirable characteristics of information systems. The desirable characteristics may include: error free system, stability, ease of use, system flexibility, ease of learning, features of

intuitiveness (Petter et al., 2008), sophistication, flexibility and response times. Seddon and Kiew (1994) suggested that system quality construct is related to whether or not there are bugs in the system, consistency of use interface, ease of use, maintainability, program code quality, and interactive systems response rates. Gable, Sedera, and Chan (2008) define system quality as the best proxy measure to evaluate probable future impacts. They conceptualized system quality as a measure of the performance of the IS from a technical and design perspective. System quality has been examined extensively in the IS research literature as a predictor of IS success and has been widely accepted among researchers (e.g. Doll & Torkzadeh, 1988; Davis, 1989).

System quality is a multidimensional construct. There is no generic and consistent measure of system quality as it can be assessed at various levels. Past studies used single item to multi-item scale to measure system quality (Rai et al., 2002; DeLone & McLean, 2003). Researchers have used several measures for measuring system quality. Perceived ease of use is one of the most common surrogates for measuring system quality (Davis, 1989). Bailey and Pearson (1983) developed and validated an instrument to measure user satisfaction and seven items were assigned to measure system quality. This instrument has been validated by several researchers (Almutairi, 2001; Khalil & Elkordy, 1997; Ives et al., 1983) and thus has become an standardized measure in the IS field. Peter et al. (2008) incorporated four scales from Bailey and Pearson (1983) instrument for measuring system quality in terms of convenience of access, flexibility of the system, integration of the system and response time. Byrd, Thrasher, Lang, and Davidson (2006) measured system quality using IS executive's estimate of satisfaction in terms of reliability, availability, and response times of the organizations hardware, and

operating systems. DeLone and McLean (2003) reported that system quality can be measured in terms of performance, such as, portability, integration, facility in use, reliability, data quality and flexibility.

(b) Information Quality

Information quality refers to measure of system output, that is, the quality of the information that the system produces in the form of reports. It is defined as the information provided to the organization by its information systems in terms of reliability, relevance, accuracy, timeliness, format and completeness of the information (Seddon & Kiew, 1994).

Literature suggests the existence of a number of dimensions for defining information quality. DeLone and McLean (1992) characterize information quality as desired characteristics of the information product. They incorporated nine scales from Bailey and Pearson (1983) to define information quality: accuracy, precision, currency, timeliness, reliability, completeness, conciseness, format and relevance. Huang, Lee, and Wang (1999) divided information quality in four groups: intrinsic (such as, accuracy, reliability, believability); contextual (such as, relevancy, completeness, timeliness); representational (such as, conciseness, consistency, interpretability); accessibility (such as, access, security). The growing body of knowledge on information quality is mostly prescriptive and focuses primarily on definitions, dimensions, attributes and quality measurement approaches (Khalil & Elkordy, 2007). Seddon and Kiew (1996) described it as related to timeliness, accuracy, relevance, and format of information provided by an IS. Information quality is considered as a key dimension of end-user satisfaction instruments (Doll &

Torkzadeh, 1988; Ives et al., 1983) where information quality is used as a component of user satisfaction.

(c) Service Quality

Service quality is applicable to the IS function, since IS can be considered a service function that serves the information technology needs of the larger organization. Recognition of the importance of measuring the service quality of the IS function has only recently appeared in IS literature. Pitt et al. (1995) observed that commonly used measures of IS success evaluate success or effectiveness by focusing on only products rather than on services. Thus, there are chances that researchers might misjudge IS success if they do not include IS service quality while measuring IS success. Therefore, Pitt et al. (1995) suggested the need to add service quality measure as a part of IS success.

The marketing literature provides considerable help for the IS manager in knowing how to measure and improve service quality. Service quality was initially founded on a comparison between what the customer feels should be offered and what actually he gets (Parasuraman, Zeithaml, & Berry, 1988). Other marketing researchers (Kettinger & Lee, 1994) view it as the discrepancy between customers' perception and expectation (Pitt et al., 1995). Parasuraman et al. (1988) suggests that service quality be measured as the difference between the sum of customer's expectations and perceptions of actual performance levels for a set of service attributes, which is named SERVQUAL instrument. This instrument has five dimensions: tangibles, reliability, responsiveness, assurance, and empathy. Many researchers have applied and tested the SERVQUAL measurement instrument from marketing to an IS context (Kettinger & Lee, 1994). In response to the advancement in information systems, DeLone and

McLean (2003) added service quality in their updated model as an additional measure of IS success. DeLone and McLean (2003, 2004) measured service quality with respect to responsiveness, assurance and empathy.

In practice, IT department measures satisfaction of users of the information system basically to improve their service quality. Poor support either from the MIS department or from the vendors and consultants results in loss of satisfaction of the end users which results in loss of customers, and overall reduction in sales (DeLone & McLean, 2003). The quality of service provided by the MIS department, becomes a key indicator of IS success. In the present study, service quality has been conceptualized as the extent to which IS department and IS support staff fosters relevant and high quality services and maintains a good relationship with the users.

(d) Use

System use is one of the most frequently assessed dimensions in measuring IS success. DeLone and McLean (1992) considered 'use' as an IS success variable. They conceptualized use as an explicit antecedent of individual impact. They suggest that the nature, quality and appropriateness of the system use are important rather than a simple measure considering the time spent on the system is inappropriate.

Several studies (Seddon, 1997; Szajna, 1993) argued that 'use' as an IS success construct is problematic. Szajna (1993) argued that 'use' cannot indicate IS success, especially in the mandatory system use environment. Seddon (1997) pointed that 'use' is a good proxy of IS success in the non mandatory context. However, many researchers argued that 'use' is an appropriate measure of IS success. For example, DeLone and McLean (2003) argued that, even in the mandatory systems, there can be considerable variability of 'use' and hence can act as an indicator of IS success.

Melone (1990) suggested that some degree of discrepancy may exist between actual usage and perceptual system use because many systems are not voluntarily used. Therefore, the present study eliminated the construct use/ intention to use as the use of information systems in the banks is mandatory in nature and thus causing little measurable variation in use of the system (Sedera et al., 2004).

(e) User Satisfaction

With the advancement of technology, users are becoming far more knowledgeable and are less tolerant towards complex, ill-defined and time consuming procedures. User satisfaction can be defined as the extent to which users believe the information system available to them meets their requirements (Ives & Olsen, 1984). It examines the successful interaction between the information system and its users. If a system meets the requirements of the user, their satisfaction with the system will enhance. On the other hand, if system does not provide the necessary information to its users, they will become dissatisfied. User satisfaction is considered as useful measure of system effectiveness (Bailey & Pearson, 1983; Baroudi et al., 1986; DeLone & McLean, 1992; Torkzadeh & Doll, 1993; Seddon, 1997; Zmud, 1979).

Cyert and March (1963) introduced the concept of IS user satisfaction. They proposed that the information system that meets the requirement of the users would reinforce satisfaction with the system (Ives et al., 1983). Powers and Dickson (1973) studied factors affecting IS success and identified user satisfaction as one of the important factors affecting IS. They proposed that if the users are satisfied with system they will re-use it and if they do not perceive the system as satisfactory they are unlikely to use it no matter how the good the system may be. Thus, in order to

improve the system, it is imperative to know how users perceive it (Zviran & Erlich, 2003).

Satisfaction refers to an emotional reaction or effect towards a thing. Petter et al. (2008) defined user satisfaction as the users' level of satisfaction with reports, web sites, and support services. Bailey and Pearson (1983) defined satisfaction as the sum of positive and negative feelings or reactions to a set of factors affecting the success of an information system. User satisfaction is a key criterion in evaluating the success of information systems (Bailey & Pearson, 1983; Ives et al., 1983). It results from the users attitudes and feelings from aggregating all the benefits that he hopes to receive from interaction with the system (Ives et al., 1983). The premise of the user satisfaction approach is that "a 'good' information system perceived by its users as a 'poor' system is a poor system" (Ives et al. 1983, pg. 786). It is a subjective measure of IS success for the individual level of analysis. It is the most prevalent measure of IS success due to its universal applicability. Higher user satisfaction indicated that there would be higher intention to continue using the system and less likely to complain about the system (DeLone & McLean, 2003).

Users' satisfaction with the system has been considered to be one of the most useful assessments of system effectiveness (Hamilton & Chervany, 1981). User satisfaction has received considerable attention of researchers since the 1980s as an important surrogate measure of information systems success (Bailey & Pearson, 1983; Baroudi et al., 1986; DeLone & McLean, 1992; Ives et al., 1983).

Most of the research on user satisfaction has studied it with specific features of the system (Doll & Torkzadeh, 1988) or IS function (Bailey & Pearson, 1983). Moreover, traditionally, user satisfaction has been measured indirectly through information quality, system quality, service quality and other variables (Bailey &

Pearson, 1983; Doll & Torkzadeh, 1988; Ives et al., 1983; Rai et al., 2002). Ives et al. (1983) stated that user satisfaction is a subjective or perceptual measure of the information system success. User's satisfaction in the D&M model refers to the overall user satisfaction measured independently of system quality and information quality (Iivari, 2005). User satisfaction, that is, the measurement of how satisfied a user is with the information system has become a pervasive measure of the success or effectiveness of an information system. Many prominent measurement instruments have been developed to measure user satisfaction. For example, Bailey and Pearson (1983) developed a tool to measure computer user satisfaction consisting of 39 items and several adjective pairs. This instrument included many factors ranging from information quality, systems performance, personal relationship with staff and top management involvement. Ives et al. (1983) built on Bailey and Pearson (1983) work by improving the reliability and reducing the size of the instrument to 33 items. Further, they also developed a short form of this instrument with only 13 items, and a four-item general scale for measuring user information satisfaction. Baroudi et al. (1986) also adopted the Bailey and Pearson (1983) instrument. Doll and Torkzadeh (1988) developed another measure called End User Computing Satisfaction (EUCS) by contrasting traditional data processing environment and end-user computing environment. This instrument is also widely accepted and adopted in other researches (Xiao & Dasgupta, 2002).

(f) Individual Impact

Individual impact examines the effect of information system on the users' performance. Researchers have defined individual impact in different ways. For example, DeLone and McLean (1992) characterizes individual impact as “an

indication that an information system has given a user a better understanding of the decision context, has improved his or her decision making productivity, has produced a change in users activity, or has changed the decision makers perception of the importance or usefulness of the information system” (DeLone & McLean, 1992, p. 69). According to Seddon (1997) individual impact covers benefits accruing to individuals from use of system. Torkzadeh and Doll (1999) measured individual impact of information system on four work aspects: task productivity, task innovation, customer satisfaction, and management control. Rainer and Watson (1995) measured impact on executive work with the operational variables like: improve executive efficiency, enable executives to make higher-quality decisions, improve communications, improve operational control, and improve executives' mental model of the firm. DeLone and Mclean (1992) stated that of all the dimensions of their model, individual impact is probably the most difficult to define. Impact is closely associated with performance and so once individual's performance is improved, it can be said that the information system has had a positive impact on the individual.

Several studies have found that the impact an information system has on users' job directly effects his/her satisfaction (Seddon & Kiew, 1996; Wu & Wang, 2006). Hussein (2009) reported that user satisfaction had the strongest direct effect on individual impact. Use and user satisfaction are the direct antecedents of individual impact in the D&M model.

(g) Organizational Impact

Organizational impact dimension examines the influence of the information system on the overall performance of the organization (DeLone & McLean, 1992). Researchers have attempted to measure organizational impact by studying the results

of the IS function, such as, measuring the customer service quality, and assessing the amount of competitive advantage (Hitt & Brynjolfsson, 1994; Stone, 1990). Some practitioners as well as researchers measured the benefits or impact to the organization in terms of influence on the organization's financial performance. But DeLone and McLean (1992) defined organizational impact as the effect of information on organizational performance. Similarly, Byrd et al. (2006) defined it as the degree to which the benefit of using IS and the impact of these systems on the organization's process influences the total operational costs. For the purpose of this study, we define organizational impact as the degree to which the benefits of using information system influence the on the overall organizational performance in terms of increased capacity to manage growing business and customers, productivity, and improved business processes.

Sabherwal (1999) developed an instrument to measure organizational impact in terms of reduction of administrative costs, improvement of organizations image, enhancement of internal operations, and customer satisfaction. Cost benefit analysis is also used to quantify the impact of the IS function on the organization. However, such cost benefit analysis is often difficult due to the difficulty in quantifying intangible or qualitative benefits (Myers et al., 1997).

(h) Net Benefits

Several researchers operationally defined net benefits in terms of quantifiable financial measures or numeric costs (such as, cost savings, expanded markets, incremental sales, investments and rate of return, market share and reduction in time). But such measures are not often possible due to indirect system impacts and other intervening environmental variables that may exert their influence. Few other studies

have investigated relationship between information systems and qualitative measures like organizational structure, efficiency, responsiveness, coordination, quality of work life (Bailey & Pearson, 1983; Ives et al., 1983).

There has been little consensus over the operational definition of net benefits. Consequently, it is usually measured by the perceptions of those who use the systems (Wu & Wang, 2006). Petter et al. (2008) defined net benefit as the degree to which IS are contributing towards the success of individuals, groups, organizations, industries and society. Seddon (1997) suggested that continued research is needed to search for a more comprehensive and reliable measure of net benefits. Wu and Wang (2006) empirically assessed knowledge management system (KMS) and operationalized net benefits as perceived system benefits, which they define as the degree to which a user believes that use of the system results in benefits to the user or the organization.

DeLone and McLean updated the IS success model to address the criticism that an IS can affect multiple-levels other than individual and organizational. They replaced the individual impact and organizational impact variables, with net benefits which will include all the possible benefits for IS. DeLone and McLean (2003, 2004) suggested that net benefit is most important success measures as they capture balance of positive and negative impact. Positive net benefits may encourage the use of information systems and increase user satisfaction, while negative net benefits can decrease the use and user satisfaction (Chien & Tsaur, 2007).

DeLone and McLean (2003) suggested that the researcher should define clearly the context and the stakeholders for which net benefit is to be measured. Different stakeholders may have different opinions as what is benefit for them. The focus of the present study is to measure banking information systems success from the perspective of the users, and this study separately measures the impact on individual

and organization. Therefore, in this study net benefit refers to sum total of individual and organizational impact. Many other past studies also operationally defined net benefits as the combination of individual and organizational impact (Chien & Tsuar, 2007; Prybutok, Zhang, & Ryan, 2008).

2.9. Review of Empirical Studies Associated with DeLone and McLean Model of IS Success

This section will review various empirical studies associated with D&M model (1992, 2003). Studies of varied nature have been conducted on D&M model of IS success. Studies have attempted to validate, criticize, extend and re-specify the model in various contexts. Further, some studies developed standardized assessment instruments to evaluate the dimensions of D&M IS success. Following section will review these studies.

Since 1992, a large number of studies have undertaken empirical investigations to test the D&M model of IS success. DeLone and McLean (2003) identified 16 studies (Etezadi-Amoli & Farhoomand, 1996; Gelderman, 1998; Goodhue & Thompson, 1995; Guimaraes & Igbaria, 1997; Igbaria & Tan, 1997; Igbaria, Zinatelli, Cragg, & Cavaye, 1997; Jurison, 1996; Seddon & Kiew, 1994; Taylor & Todd, 1995; Teng & Calhoun, 1996; Teo & Wong, 1998; Torkzadeh & Doll, 1999; Yoon, Guimaraes, & Clevenson, 1999; Yuthas & Young, 1998; Weil & Vitale, 1999; Wixom & Watson, 2001) that rendered support for the associations among the six dimensions of D&M (1992) IS success model.

Several studies validated D&M model in various contexts. For example, Rai et al. (2002) empirically and theoretically assessed the DeLone and McLean (1992) and Seddon (1997) models of IS success in a quasi- voluntary IS use context, and found

that both the models exhibited reasonable fit with the collected data. They compared the original D&M model (1992) to the re-specified model created by Seddon (1997) and found that the D&M model stood up reasonably well to the validation attempt and outperformed the Seddon model. They reported significant path coefficients between ease of use (used to measure system quality) and user satisfaction; and between information quality and user satisfaction. Sedera et al. (2004) developed and validated standardized multidimensional instrument that can be used to evaluate various dimensions of IS success. They empirically tested several IS success models, including the D&M and Seddon models. They found that the D&M model provided the best fit for measuring enterprise systems success.

Li (1997) studied the D&M model and found that the accuracy of output, reliability of output, relationship between users and staff, users confidence in the system, and timeliness of the outpost were the most important factors responsible for IS success. Iivari (2005) tested the D&M model using a field study and concluded that the perceived system quality and perceived information quality were significant predictors of user satisfaction and suggested that user satisfaction may be a reasonably good surrogate for individual impact. Many empirical studies supported the relationship of system quality, information quality and service quality with use and user satisfaction of D&M model. However, the model's assumption of linear causality between system use, user satisfaction, individual impact, and organizational impact has not received much empirical support (Hussein, 2009; Wu & Wang, 2006).

Several researchers attempted to use whole or part of the D&M model to evaluate the success of information system in specific contexts. For example, Brown and JayaKody (2008) empirically investigated the determinants of e-commerce system adoption. The results confirmed the relationship among the seven dimensions:

information quality, system quality, service quality, trust, perceived usefulness, user satisfaction, and intention to continue. In the context of warehousing system success Wixom and Watson (2001) found a significant relationship between system quality and net benefits; IS use and net benefits; system quality and individual impact; and information quality and individual impact. Wang and Liao (2008) proposed and validated a multidimensional, comprehensive e-government system success model on the basis of D&M (2003) IS success model and found that information quality, system quality, service quality, use, user satisfaction and perceived net benefits are valid measures for e-government systems. Rainer and Watson (1995) applied D&M model in the context of the success of executive information system. They found that ease of use, information quality, and impact on work were critical success factors.

Khayun, Ractham, and Firpo (2012) identified the e-excise systems success factors by extending the updated D&M IS success model (2003). The results of the study suggested that trust in the e-government website, perception of system quality, information quality, and service quality will influence system usage and user satisfaction and will ultimately influence the perceived net benefits. This study also reported a significant support for the relationship between individual characteristics and system use. However, the study reported a non-significant relationship between system quality and user satisfaction; information quality and use; and use and perceived net benefits. Wang (2008) re-specifies and validates a research model on the basis of D&M (2003) IS success model and TAM (Davis, 1986). The validated model consists of three quality dimensions, perceived value in the ecommerce context (substitute for perceived usefulness), user satisfaction and intention to reuse (substitute for system use). The model considered perceived value, user satisfaction, and intention to reuse as forms of net benefits measures. Thus, they re-specified the

scope of net benefits construct. The results found that all three quality dimensions positively affect user satisfaction and perceived value. Significant association between perceived value and intention to reuse, perceived value and user satisfaction, and user satisfaction and intention to reuse were also reported. Chen and Cheng (2009) re-specified the D&M (2003) model in the context of online shopping. They separate the use construct into intention to use and actual use. The results of the study suggest that consumer's intention to use significantly predicts the usage behaviour of the customer. While they also found that consumer satisfaction have significant impact on intention to use, but found no direct association with actual use. Almutairi and Subramanian (2005) empirically analyzed the relationship among the variables in D&M model through a survey of employees and managers in the Kuwaiti private sector such as banking sector, service sector, insurance sector, and food sector. The results indicated that information quality and system quality influence user satisfaction significantly and system usage has significant impact on individual impact. In the context of e-government information system success, Prybutok et al. (2008) found that user satisfaction acts as a mediator between quality variables and net benefits. Jennex and Olfman (2005), and Wu and Wang (2006) used DeLone and McLean's (2003) IS Success Model as the theoretical guidance for a knowledge management systems (KMS) success model. Their studies testified knowledge quality, system quality and service quality as important parts of KMS success. Chen (2009) examined the factors that may facilitate the success of KMS. They integrated constructs of social capital theory (like trust, shared vision, social interaction ties), and IT capability with the constructs of D&M (2003) model. The results suggest that social capital and organizational IT capability are important preconditions of the success of knowledge management systems.

Several studies also attempted to modify certain aspects of the D&M to make it suitable for specific contexts. For example, Gable et al. (2008) reviewed D&M dimensions and used it as reference for assessment of enterprise systems success. They developed an IS Impact model which has four dimensions in two halves: individual impact, organizational impact, information quality and system quality. The impact dimensions measures benefits to date and the quality dimensions reflects future potential (Gable et al., 2008). They argued that a holistic measure for evaluating an IS should consists of dimensions that together consider both backward (impacts), and forward (quality). Myers et al. (1997) proposed an IS success model by extending the model of DeLone and McLean (1992) and Pitt et al. (1995). Their model included service quality as the third quality dimension and included workgroup impact as the third impact dimension for considering organization and external environment. Recently, Lee and Yu (2012) developed and validated the project management information system (PMIS) success model which is based on the D&M (2003) IS success model. They hypothesized that PMIS quality (system, information, and service) will positively influence intention to use and user satisfaction will have positive impact on efficient construction management. The results of the study showed that information quality and service quality had a positive effect on user satisfaction. Further, both user satisfaction and intention to use showed a significant impact on effective construction management and efficient construction management. Urbach et al. (2009) proposed a conceptual model to assess employee portal success on the basis of D&M IS success model (2003). In addition to six D&M constructs, they proposed knowledge intensity of tasks, the level of process standardization, and the organizational culture as control variables. Perez-Mira (2010) applied the D&M (2003) IS success model at the organizational level of analysis in the e-commerce

environment. The study extended the D&M model by adding direct paths from all three quality variables to net benefits. Results of this extension of the model suggested that information quality and system quality directly affects net benefits.

Several meta-analyses have also been conducted on the studies associated with D&M model. Sabherwal, Jeyaraj, and Chowa (2006) conducted a comprehensive meta-analysis of quantitative studies on D&M model. They developed a detailed theoretical model which included context related constructs (top management support and facilitating conditions), user related constructs (user attitude, user experience, user participation, and user training), and the IS success related constructs (system quality, perceived usefulness, user satisfaction, and system use). They tested the model through a combination of meta-analysis and structural equation modeling. IS literature suggests that this meta-analysis is instrumental in synthesizing the quantitative IS research and it has validated a considerable portion of the D&M model, that is, the path between system quality and use, system quality and user satisfaction, system quality and perceived usefulness, perceived usefulness to use, use and perceived usefulness were found significant. While the path between user satisfaction and use, perceived usefulness and user satisfaction were found insignificant. Further, Petter et al. (2008) extended the meta-analysis of Sabherwal, et al. (2006) by synthesizing the qualitative research related to IS success. They performed the meta-analysis on ninety studies that partly or fully applied D&M model. Their results suggested mixed support for the relationship between system quality and use, service quality and user satisfaction in the IS literature; strong support for the relationship between system quality and user satisfaction, information quality and user satisfaction, user satisfaction and net benefits, and net benefits and user satisfaction; moderate support for the association between system quality and net

benefits, information quality and net benefits, service quality and net benefits, use and net benefits, and user satisfaction and use. Therefore, literature review and meta-analyses shows the empirical support received by the D&M model from the wide range of studies.

Although D&M model received support from the wide range of empirical studies, but several researchers challenged, criticized, or suggested an extension of the model (Garritty & Sanders, 1998; Myers et al., 1997; Pitt et al., 1995; Rai et al., 2002; Seddon, 1997; Seddon & Kiew, 1996). These criticisms played vital role in development of updated D&M model (2003). For example, Seddon & Kiew (1996) critically examined only four constructs (system and information quality, use and user satisfaction) of the D&M IS success model (1992). They replaced the construct use with usefulness and added user involvement as a new variable. They suggested that user involvement is a fundamental factor of IS success and thus it should be included in the model. They argued that for voluntary usage, use is an appropriate measure, but when system use is mandatory, usefulness is more appropriate construct. Moreover, Seddon and Kiew (1996) found significant relationship between system quality with user satisfaction and individual impact; information quality with user satisfaction and individual impact; user satisfaction and individual impact. This study provided substantial support for the DeLone and McLean model (1992). Seddon (1997) affirms his dissatisfaction with the original DeLone and McLean model especially, with the construct 'IS use'. He suggested that the concept of IS use is highly ambiguous and suggested that further clarification is needed. He further criticized the model on the ground of mixing process and variance aspects in the same framework. However, DeLone and McLean (2003) responded that combining both process and variance models in a single frameworks is one of the biggest strength of their model.

Pitt et al. (1995) evaluated the SERVQUAL (an instrument from the marketing literature generally used to measure service quality) instrument from the IS perspective and suggested that the construct service quality construct should be included to the D&M model. Pitt et al. (1997) applied SERVQUAL to the D&M IS success model by including service quality as a predictor for usage and satisfaction. Later, DeLone and McLean (2003) reviewed the debates and critics on original model and thus modified their original model through further clarification of the construct 'use', adding service quality and clubbing individual impact and organizational impact as net benefits. Further, they addressed the criticism of removing construct 'use' in a mandatory system use by saying that even in mandatory systems there can be considerable variability of use and therefore the construct 'use' should be retained in the model. Although DeLone and McLean proposed an updated conceptual IS success model, but it clearly needed further validation before it could serve as a basis for the selection of appropriate measures (Wu & Wang, 2006). There are few studies that did not support some pathways of D&M model. For example, Gelderman (1998) investigated the relation among user satisfaction, IS usage and performance. The results indicated that user satisfaction is significantly related to performance but system usage is not significantly related to performance. McGill et al. (2003) examined the D&M model in the user-developed application domain. The study reported that no association between system quality and perceived individual impact; system quality and use; information quality and use; and perceived individual impact did not influence organizational impact. Though, the study provided support for the relationship between system quality and user satisfaction; information quality and user satisfaction; user satisfaction and intended use; and user satisfaction and individual impact. This study indicates that user perceptions of information systems

success play a significant role in the user developed application domain. Cates, Chong, and Rauniar (2009) conducted an empirical analysis on updated D&M model and suggested that the model provides appropriate framework for measuring e-commerce success. However, this study found that information quality and service quality did not relate to system use. Similarly, user satisfaction did not relate to system use.

To conclude, the review of literature shows that partial or whole D&M (1992, 2003) model have been used in several hundreds of empirical studies to assess and evaluate IS success in different information systems contexts and in various countries. Many studies even criticized certain aspects of the model and suggested modifications. Several studies even attempted to extend the model by adding few variables. However, past literature substantiates that there is dearth of studies that looked at IS success from multidimensional perspective that includes individual and organizational variables along with system related variables. Further, there is a dearth of studies associated with the D&M model of IS success especially in the context of developing countries such as India. Therefore, this study will try to fill some of these gaps in the existing literature. Details of the rationale of this study and literature gap analysis will be discussed in chapter 3.

2.10. State of IS Success Research in the Banking Sector

Information systems have become the backbone of banking industry. Bank's survival, growth, and gaining competitive advantage depends on IS success. Consequently, banks are investing huge amount of money on information systems. Therefore, assessments of the various returns they are getting out of such investments

remain an important agenda for researchers. This section will review various empirical research of IS success in the context of the banks.

Miller and Doyle (1987) studied IS effectiveness in the context of financial sector and suggested that IS effectiveness is a function of the relationship between perceived importance and performance of individual information systems attributes. It was found that the better performers were those where the value of performance matched the perceived importance of the particular aspect of IS. They concluded that the organizations that concentrate their resources in the most important areas will achieve greater success than those that spread their resources too thinly-over day to day operations. Kamel and Hassan (2003) extended the TAM (Davis, 1986) by adding trust variable and examined the adoption and usage of advanced banking technology. The study found that trust had a highly significant effect on perceived ease of use. Liu and Louvieris (2006) investigated the TAM by adding two variables: trust and commitment. Their study strongly supported the TAM for online banking in predicting customer's retention. Pikkarainen, Pikkarainen, Karjaluoto, and Pahnla (2006) tested and validated EUCS model to investigate online banking user's satisfaction in Finland. The results of their study supported the significant role of the three constructs, that is, content, ease of use and accuracy on banking user's satisfaction. Moreover, Pikkarainen, Pikkarainen, Karjaluoto, and Pahnla (2004) investigated consumer acceptance of online-banking using TAM. They found that perceived usefulness and information displayed were main factors influencing acceptance of online-banking. Gu, Lee, and Suh (2009) examined and validated the effect of perceived ease of use, trust and perceived usefulness on behavioural intention of user's in mobile banking. Results of the study found that self-efficacy was the strongest antecedent of perceive ease of use. The result supported the effect of

trust, perceived usefulness and perceived ease of use on behavioural intention in mobile banking. Khalil and Elkordy (2001) found that the system usage and user satisfaction are related to individual and contextual variables in the Egyptian banking context. They found user satisfaction is positively associated with age, organization level and user involvement and system usage is negatively associated with age, organization level and user involvement. Khalil and Elkordy (1996) tested the relationship of decision structuredness, and task environment complexity with IS effectiveness in the context of Egyptian banks. IS effectiveness was measured by user satisfaction and IS use. Their results showed a negative association of decision structuredness with IS use and a positive association of the task environment complexity with overall satisfaction. Furthermore, in the context of executive information systems, Khalil and Elkordy (2007) investigated the impact of user involvement, ease of use, IS maturity, and system sophistication on information quality and the influence of information quality on 'use'. They collected the data from 216 executives out of whom 44 executives were from banks and other financial sector. The results supported their hypothesized relationships. Lee and Chung (2009) proposed a research model based on D&M model to assess how system quality, information quality and interface design quality affect consumers trust and satisfaction with mobile banking. Their study showed that system quality and information quality significantly influenced customers' trust and satisfaction, whereas, interface design quality did not influence trust and satisfaction. Andoh-Baidoo, Villarreal, Liu, and Wuddah-Martey (2010) examined the success of e-banking systems implementation by comparing the national and international banks of developing countries using D&M IS success model (2003). The results of the study indicated that both types of banks had high perception of IS implementations success

on all dimensions. Further, they found significant differences in users' perception of information quality, system quality, user's perception of information quality and intend to use/use were statistically significant, while the difference in user satisfaction and net benefits were not significant. Hussein (2009) proposed a model for IS success by extending updated D&M model in the context of Egyptian banks. His study investigated the success of IS in the socio technical perspective. The results indicated that system information, service quality, level of training, age of user, length of system use, user involvement and top management support were the main predictors of user satisfaction and individual impacts. Rawani and Gupta (2002) explored empirically the differences in the role of IS in the banking industry, that is, between public sector, private sector and foreign sector banks operating in India. The result of the study indicated that IS plays a supportive role in public banks and a strategic role in private and foreign sector banks.

Looking at the dependence of banks on information technology, there is no doubt that technology has become indispensable for the banking sector. Banks invest heavily in IT to stay ahead of their competitors in terms of offering state-of-art products, value added services and customer satisfaction. However, banking management is handicapped by lack of appropriate instruments to measure the success of information systems and thus, is unable to justify investment in existing and future information systems. Though the literature review suggest that earlier studies in the banking context have measured the efficiency and performance of banking IS through various quantitative analysis techniques such as stochastic frontier approach, data envelopment analysis approach to calculate the effectiveness of IT. However, these methods have not brought out the real worth of IT, instead contributed to the phenomenon called the "IT investment paradox", or the "IT black

hole”. It means that huge amount of money that is invested in IT seems to be swallowed by a large black hole without rendering any returns. This productivity paradox attracted various researchers to search for alternative ways of assessing success of the systems with non financial parameters.

Literature review reveals that there is a paucity of empirical research on the IS adoption and successful utilization in the banking sector, specifically in the context of the banking sector of the developing countries such as India. Optimal utilization of banking information systems is an important issue, and a lack of research in this direction may have serious repercussions. This research is an important step in this direction.

2.11. Relationship of Contextual and Individual Variables with IS Success

Evaluation of IS success is a complex task. The success of an information system depends on the outcomes of its multidimensional interactions with the environment and stakeholders. Therefore, technical aspects of an IS may provide only a partial picture. It would be a mistake to describe IS success from a merely informatics point of view, and ignoring organizational and human factors. IS cannot be effectively utilized if researcher ignores organizational and human factors. Recent theories and researches have recognized the importance of organizational, socio-technical and individual traits in the IS success (Shore, 2005).

There are substantial studies that offer insight into various factors that could enhance the success or effectiveness of information systems. Some of the identified factors relate to organizational culture and structure, leadership and management style, role and support of top management, organizational size, external and internal expertise and personal characteristics (Ang, Davis, & Finlay, 2001; Guimaraes &

Igbaria, 1997; Ifinedo, 2011; Ke & Wei, 2008; Martinsons & Chong, 1999; Miller & Doyle, 1987; Tarafdar & Vaidya, 2006; Saunders & Jones, 1992; Thong, Yap, & Raman, 1996; Zmud, 1979). However, there is dearth of studies that have investigated the effects of these variables on the success of information systems in context of DeLone and Mclean model. Therefore, the current study identified four contextual and three personal variables that are expected to have an effect on IS success. Thus, this section will review the role of leadership, top management support, organizational culture, managerial IT expertise, computer self efficacy, length of job and job level on the success of information systems especially banking information systems.

2.11.1. Leadership and IS Success

Leadership is considered to be the single most critical success factor in the organization (Bass, 1990). Leader tries to influence the potential behaviour of people to get the job done effectively over a substantial period. Leadership is required to change the existing mindset and practice prevalent in the organizations. A review of the recent literature suggest that there are as many definitions of leadership as there are persons who have attempted to define the concept. For example, Tannenbaum, Weschler, and Massarik (1961) view leadership as interpersonal influence exercised in particular situation and directed through communication process toward the attainment of a specific goal or goals. According to Northouse (2004), leadership is a process in which an individual influences a group of individuals to achieve a common goal. Ke and Wei (2008) defined leadership as the leader's ability to mobilize followers towards a particular goal. Whereas, McLean and Smits (2003) defined leadership as the use of non-coercive influences to direct and coordinate the activities

of group members toward goal attainment. The terms *leader* and *manager* are used interchangeably in this study to refer to people who occupy positions in which they are expected to exert leadership role (Yukl, 1994). Further the terms *style* and *behaviour* are used interchangeably in this study to describe leader's actions and words they use to influence subordinates (Thite, 1997; 2000).

Early studies on leadership concentrated on identifying personality traits which characterized successful leaders. *Trait theories* assume (1930s-1940s) that successful leaders are born and they have certain innate qualities (such as adaptability, alertness, and achievement orientation) which distinguish them from non-leaders (Stogdill, 1948). However, the difficulty in characterizing these qualities led to widespread criticism of the trait approach, which signals the emergence of *style* and *behavioral approaches* to leadership (Stogdill, 1948). During 1950s to 70s, theorists shifted their emphasis towards behaviour and style the leader adopted. The principal conclusion of these studies appears to be that leaders who adopt democratic or participative styles are more successful. This approach focused on identifying the 'one best way of leading'. However, this approach ignored the role of situations and contexts in determining the effectiveness of the leaders (Mullins, 1999). It is this limitation that gave rise to *situational and contingency theories* (1970s to early 1980s) of leadership (for example: Fiedler, 1967; House, 1971; Vroom & Yetton, 1974). This approach shifted the focus from 'one best way to lead' to context- specific leadership (Ogbonna & Harris, 2000). Fiedler's contingency model (Fiedler, 1967) is one of the most prominent examples of this leadership approach. A central aspect of this theory is the notion of situational conditions, or contingencies, which may influence the effectiveness of different leadership styles. According to this theory, specific leadership style should match specific situations or contexts for the effective

leadership. Another central theory on situational approach is the Path-Goal theory (House & Mitchell, 1974). This theory also reflects the situational embedding of targeted leadership styles and behaviors. Its central premise is that subordinates will be willing to work if the disposed job can be accomplished (expectancy), the rewards are appropriate (instrumentality), and the rewards are also meaningful to the employee (valence) (House, 1971). In short, although different researchers emphasized the importance of different factors, the general premise of this approach is that leadership effectiveness is dependent on the leader's diagnosis and understanding of situational factors, followed by the adoption of appropriate style to deal with each situation. Since 1980s, new leadership approaches were proposed typically dominated by charismatic, visionary, and transformational leadership theories. These theories identified the type of behaviour used by the leader and traits that help in increasing leader's effectiveness. This approach classifies leadership as transformational, transactional and laissez-faire (Bass & Avolio, 1990).

The concepts of transformational and transactional leadership were included in this study. Therefore, they are discussed in details below:

(a) Transformational Leadership

Advocates of transformational leadership suggest that by means of their behavior, transformational leaders create personal and professional commitment from subordinates toward higher-level needs like self-esteem and self-actualization (Bass, 1985; Gardner & Avolio, 1998). This in turn increases the latter's intrinsic motivation, which has been identified as an important driver of employees extra efforts to work hard and achieve better results. Bass (1985) expended the Burns' work (Burns, 1978) and presented a conceptual model of transformational leadership. He defines

transformational leader as the person who has the capability to stimulate followers to perform more than they are expected to do. Burns (1978) opined that a transformational leader arouses or alters the intensity of needs those are laid dormant in one of the three interrelated ways, that is, by raising followers' level of awareness, by encouraging followers to transcend their self-interest for the interest of the team, group or organization, and thirdly by developing followers' needs to higher levels. According to Podsakoff, Mackenzie, Moorman, and Fetter (1990) transformational leader active involvement changes follower's values and encourage them to work towards common group goals and shared vision. A transformational leadership results in a strong internalization of the leader's values and goals by the followers, moral commitment to these values, and a tendency by the followers to transcend their self-interest for the interest of the group (Wang, Chou, & Jiang, 2005).

(b) Transactional Leadership

Transactional leadership motivates subordinates by appealing to their personal desires. It focuses on maintaining the status quo and motivating people through contractual agreement (Bass, 1985). This leadership style tends to emphasize extrinsic rewards, such as monetary incentives and promotion, as a means to increase followers' motivation.

Bass (1985) is of the view that leaders will exhibit a variety of patterns of transactional and transformational leadership. Burns (1978) suggested that leaders must go beyond transactional leadership in order to strengthen follower's motivation, enhance their understanding, elevate their maturity and increase their sense of self-worth. Bass & Avolio (1991) clearly identifies various components of transformational and transactional leadership. This model (Bass & Avolio, 1991)

covers three types of leadership behavior: transformational, transactional, and laissez-faire (non-leadership). The components of this model have undergone several refinements in the past and presently the model has nine components comprising five dimensions of transformational leadership, three dimensions of transactional leadership and one non-leadership factor. Bass and Avolio (1990) developed a measurement instrument called as Multifactor leadership Questionnaire (MLQ). MLQ is the primary quantitative instrument to measure both transactional and transformational leadership behaviour. It is also used to investigate the nature of the relationship between these leadership styles. Bass called the transformational leadership factors as the four I's: idealized influence, inspirational motivation, intellectual stimulation and individualized consideration. They suggested that followers would demonstrate three outcomes: extra effort, satisfaction and effectiveness. All the three outcomes are from the view of the employee (Bass, 1985). These components of transformational leadership are described below:

1. *Idealized Influence (Idealized Attributes/ Idealized Behaviour)*: leaders with idealized influence tend to place followers' needs over their own needs, share risks with followers, and follow a set of underlying principles and values. Followers trust, respect, imitate and identify with, their leaders. These leaders have much referent powers, have high standards and set challenging goals for their followers. Idealized influence is subdivided into idealized attribute and Idealized behaviour. Some researchers (House, Spangler, & Woycke, 1991; Hunt, 1991) leveled criticisms that charisma could be conceptualized and measured as both an attribution and behaviour. Bass and Avolio (1993) addressed the criticism by subdividing the idealized influence into *idealized attributed and idealized behaviour*. Idealized influence (attributed) refers to charisma, being confident and powerful, focusing on ethics, and followers

identifying with the leader. Whereas, idealized influence (behaviour) refers to charismatic actions focused on values and missions, as well as role model to follow (Antonakis, Avolio, & Sivasubramaniam, 2003).

2. *Inspirational Motivation*: this characteristic is expressed in the leaders' ability to motivate through inspiration. Leader provides followers with symbols and emotional appeals to increase awareness and understanding of mutually desired goals. Leader provides clear vision about the future and challenge followers to high standards and morals. Leaders display optimism and confidence that vision and standards will be achieved.

3. *Intellectual Stimulation*: transformational leader stimulate followers to question assumptions, reframe problems, and to approach old problems in new ways. Leader questions routine way of doing things. New ideas and creative solutions are solicited from followers, and there is no public criticism of individuals' mistakes. A transformational leader's intellectual stimulation characteristics can facilitate unconventional and innovative thinking and working processes that lead to new knowledge and efficient use of technology.

4. *Individualized Consideration*: leaders who provide individualized consideration are seen as ones who pay attention to followers' individual needs for achievement and growth. He spends lot of time in guiding and mentoring his/her subordinates. They do so by creating learning opportunities as well as a supportive climate in which to grow. Leader help subordinates to achieve higher order needs and thus helps in increasing their satisfaction (Bass, 1985).

Whereas, components of transactional leadership include:

1. *Contingent Reward*: refers to an exchange of rewards between leader and follower. Leader provides rewards for the good performance and threats and punishment for the poor performance.

2. *Management by- Exception (Active)*: leaders who engage in active management by exception actively searches mistakes of the subordinates. Leader monitors follower's performance to take corrective actions if deviations occur from the standards behavior.

3. *Management by-Exception (Passive)*: leaders who engage in passive management by exception generally fails to intervene until problem become critical. They remain passive until mistakes are brought to their notice. The modes of reinforcement are correction, criticism, negative feedback, and negative reinforcement, rather than positive reinforcement used with the contingent reward leadership.

Passive/Avoidant or Laissez-faire leadership delays decisions, is not accountable or responsible to others, and takes a hands-off approach to management (Bass, 1985). Thus, in the context of present study, we have not considered laissez-faire leadership style as it refers to absence or avoidance of leadership, and is the most inactive style.

Burns (1978) specified the distinction between a transactional and a transformational leader. According to him, transactional leaders attempt to satisfy the current needs of followers by focusing attention on exchanges while transformational leaders attempt to raise the need of followers and promote dramatic changes of individuals, groups, or organizations (Yammarino & Bass, 1990). A transactional leader tries to appeal to the subordinates to fulfill their own self-interest. Thus, they focus on exchange process and not on the substance of the relationship (Bass, 1985).

The distinctive characteristic that differentiates transformational leadership with other styles is leader's active involvement with followers and engagement of personal values among followers. Transactional leader on the other hand, motivate followers according to the existing set of values and is mainly based on contingent reinforcement. Transformational leader tries to change the current value framework among followers so that they can go beyond their self-interest for the betterment of organization. Due to this, the effect of transformational leadership on follower motivation is stronger and more sustainable (Shamir & Howell, 1999). It is found that transformational leadership yielded higher employee job satisfaction and increased their autonomous goal-directed motivation as compared to transactional leadership.

Transformational leadership has been shown to be positively related to the following subordinate outcomes: intrinsic motivation, self-efficacy, creativity, job satisfaction, employee's willingness to exert extra effort, justice perceptions, work engagement, and job performance (Cho & Dansereau, 2010; Dvir, Eden, Avolio, & Shamir, 2002; Howell & Avolio, 1993; Podsakoff, MacKenzie, & Bommer, 1996). In addition, transformational leadership has been shown to be positively related to organizational performance and effectiveness, leader effectiveness (Judge & Piccolo, 2004), productivity (Bass, 1985; Bass & Avolio, 1993). Transformational leadership can determine the success and failure of the organization (Bennett, 2009). As workers think beyond themselves, they would provide extra effort to do the work, take more satisfaction from their work, would be effective in getting the job done, and increase productivity.

Similarly, contingent reward behaviors are also positively related to various subordinate outcomes such as extra effort, organizational commitment, and managerial satisfaction and effectiveness (Bass, 1998; Bycio, Hackett, & Allen, 1995;

Judge & Piccolo, 2004; Lowe, Kroeck, & Sivasubramaniam, 1996). However, both management-by-exception-Passive and management-by-exception-Active typically have a negative relationship with the aforementioned outcomes (Bycio et al., 1995; Judge & Piccolo, 2004).

Transformational leader tries to fuse each member's personal goals with the organizational goals, which results in strong internalization of leaders values and goals by the subordinates. Bass (1985) stated that the transformational leadership appeal's to employee's ideals, morals and vision and encourages greater commitment, loyalty, trust and respect from employees and increases the overall effectiveness of the organization. Increased organizational effectiveness is also an indicator that the organization is optimally using its resources including the technological resources. There is strong evidence to indicate that transformational leadership is particularly effective during periods of turbulence and has produced empirical support in a high technology context (Einstein & Humphreys, 2002). Bass (1985) suggested that transformational leaders are more likely to emerge in times of growth, change and crisis. This no way means that in a stable environment transformational leadership is absent. But it means that they have to work little harder in such conditions to push for improvements (Bass & Avolio, 1990). Humphreys (2001) suggested that leaders who support information technology exhibit more transformational leader behaviours than those who offer no such support.

Lowe et al. (1996) conducted a meta-analytic review of 39 studies and concluded that transformational leadership significantly predicted leader's effectiveness. Contingent reward has also been found associated with leader's effectiveness though the strength of association was weak. However, management-by-exception was having low correlation with effectiveness and was generally found to

have negative correlation with effectiveness. The results of this study further indicated that public-sector leaders demonstrated more frequent transformational behaviour than leaders in private-sector organizations across studies. They also found result contrary to widely held beliefs that lower-level leaders were rated higher than higher level leaders on all transformational leadership scales.

Leadership may play a crucial role in the success of IT/IS related organizations. Stone (1994) reviewed empirical and conceptual research on leadership styles in the information systems environment. The review showed that leadership style is a significant factor in influencing IS success. In technology intensive organizations like banks, there is high degree of technological obsolescence. So, it's a great challenge for the leader to bring about technological change. Beatty and Lee (1992) used data from empirical case studies of the implementation of computer-aided design and manufacturing systems. The study found that transformational approach that involves finding new solutions to problems with the help of followers is more effective in overcoming barriers to technological change rather than the transactional approach of leadership that concentrate only on technical problem solving. Bennett (2009) examined the relationship of subordinate's perception of the leadership style of IT managers with perceived subordinate extra effort, manager effectiveness, and satisfaction with management. They found partial support for these relationships. The findings of the study suggested that transformational and passive/avoidant leadership was able to predict subordinate extra effort. Whereas, transformational, transactional and passive/avoidant leadership were able to predict management effectiveness, and only transformational and transactional styles are able to predict subordinate's satisfaction with their leaders. Prybutok et al. (2008) examined leadership and IT quality and their effect on positive outcomes in an e-government environment. They

developed a theoretical model which was based on DeLone and McLean's IS success model. The results supported the hypothesis that leadership had a positive effect on IS quality dimension (information, system, and service quality) and leadership is positively related to net benefits. Schildt, Beaumaster, and Bailey (2006) found that the leader's support and guidance regarding the dynamic nature of technology results in greater success in information systems implementation. Kim and Kim (2003) concluded that the successful information system requires leaders who take initiatives to develop strategic plans and clarify the relationships between evaluation criteria and effectiveness. Shore (2005) conducted a qualitative study and found a positive correlation between IT project manager's leadership style and the success of the software project. He found that charismatic leadership is suitable in the initial phases of project, task oriented leadership is suitable during development and implementation stage, whereas, relationship oriented leadership style is needed in all stages of project. Igarria and Nachman (1990) investigated the relationship between leadership styles and user satisfaction and found that leadership style of IS managers and user satisfaction correlate significantly and positively. Thite (1997) conducted an empirical study to examine the nature and characteristics of leadership behaviours (transactional, transformational and technical leadership) that are most effective in the execution of IT projects. The study found that subordinates perceived that managers of more successful projects exhibited transformational and technical leadership behaviours to a greater extent than managers of less successful projects. Lu and Wang (1997) investigated the relationship between management styles with user participation and systems success over MIS growth stages. The authors reported mixed results. They found that management styles were related to system success differently over the MIS growth stages. They pointed that many studies have

categorized management style into people-oriented and task oriented. They suggest that people oriented styles consider interpersonal relationship and give importance to mutual trust, respect and warmth. On the other hand, task-oriented style focuses more on task and deals with defining and organizing task for goal attainment. Hussein, Selamat, Mamat, and Abdul (2005) investigated the influence of organizational factors (management style is one of them) on IS success (D&M factors). They found that management style is highly correlated to system quality, information quality, perceived usefulness and user satisfaction. Rezaei, Asadi, Rezvanfar, and Hassanshahi (2009) investigated the influence of management style along with other organizational factors on MIS success. They study found that management style is positively associated with MIS success dimensions (system information quality, perceived ease of use, and individual impact). They found that delegating management style is more suitable than the directing management style.

Few studies also investigated the role of leadership in the context of the banking sector. For example, Cho, Park, and Michel (2011) used the data collected from multinational banks to examine the positive impact of transformational leadership on IS success when the relationship is mediated by perceived organizational support and system's self-efficacy. They found that transformational leadership was positively related to system users' IS success and both perceived organizational support and system's self-efficacy mediated the relationship transformational leadership and IS success.

Moreover, transactional leadership style is most often exhibited in industry (Yammarino & Bass, 1990). Contingent reward behaviour has been positively correlated to follower attitudes and performance (Bass & Avolio, 1990). Though it is evident that different styles are needed for different situations and leaders need to

know when to use a particular approach. By using appropriate leadership styles, leaders can affect employee job satisfaction, commitment, productivity and, ultimately, the organization's performance.

In short, the literature suggests that the transformational leadership style and some aspects of transactional leadership style (such as contingent reward) may be considered effective leadership styles in the context of IS success. Literature review reveals that leadership serves as a sound theoretical basis that is needed as an addition to the DeLone & McLean model's factors of IS success. A better understanding of this phenomenon is needed as banking organizations would continue to adopt more and more information systems to strengthen the edge over its competitors and survive. Several changes are required in employee's attitudes, knowledge, organizational structure and business process during the technology adoption process due to which achieving success becomes a real challenge for organizations. Moreover, leadership is touted again and again as a critical variable in defining the success or failure of organizations. A successful utilization of any information system needs leadership, commitment, and participation (Bernroider, 2008). Further, there have been evidences that indicate that transformational leadership relates to both individual and organizational level outcomes (Cho et al., 2011). However, little is known about the relationship between leadership and IS- related outcomes (Cho et al., 2011) due to scarcity of theoretical model framing the influence of leadership in IS success. Despite, the fact that several studies investigated leadership in various IS related contexts and found that leadership relates to various organizational outcomes, only a few studies seek theoretical foundation to conceptualize why and how leadership influences IS success. Review of literature clearly indicates the role of leadership especially in the context of the IS success and banking sector needs further research.

By bridging the gap between these two research domains (leadership and IS success) this study tries to study the influence of leadership in making banking IS successful. Thus, this research is a step forward in this direction.

2.11.2. Organizational Culture and IS Success

The concept of culture has an important place in various disciplines including anthropology, sociology, psychology, management, and other social sciences and humanities. Culture is a challenging variable for research because of the multiple divergent definitions, conceptualizations, and dimensions that have been used to describe the concept of culture (Leidner & Kayworth, 2006). Scholars have defined culture in terms of ideologies, sets of beliefs, basic assumptions, share sets of core values, important understandings, rituals, practices, symbols, heroes, artifacts, technology, established behaviour and the collective will (Hofstede, Neuijen, Ohayy, & Sanders, 1990; Sackmann, 1992; Schein 1985). Others suggest that culture includes more explicit, observable cultural artifacts such as norms and practices (DeLong & Fahey, 2000), symbols, and language, ideology, rituals, myths, and ceremony (Pettigrew, 1979).

The study of organizational culture as a distinct area came into existence during late 70s. Pettigrew (1979), defined organizational culture as “the system of publicly and collectively accepted meanings operating for a given group at a given time” (1979, p. 574). Schein (1985) defined organizational culture as “a pattern of basic assumptions that a given group has invented, discovered or developed in learning to cope with its problems of external adaptation and internal integration and that have worked well enough to be considered valid and therefore to be taught to new members as the correct way to perceive, think and feel in relation to those problems”

(p. 9). Organizational culture instructs its members to hold particular assumptions and suggests specific actions for them (Schein, 1985). Robbins (1984) proposed that culture “is a relatively uniform perception held by the organization; it is a descriptive concept; and it has common and stable characteristics that make it possible to distinguish one organization from another” (p. 46). When cultural norms become significantly assimilated, organizational members may view the appropriate way of conduct as the only way (Robey & Azevedo, 1994). The term *strong culture* is generally used to describe such organizations. Schein (1985) argues that strong cultures are more likely to be associated with organizational effectiveness than the weak cultures. Schein (1985) propounded three-level model of organizational culture, that is, *deepest level* consists of non-observable aspects of culture like patterns of basic assumptions that members hold without awareness; at an *intermediate level* lies the values and beliefs of organizational members which provide the basis for appropriate behaviour or “why people behave the way they do”; and *surface level* includes observable aspects of culture such as organizational symbols and artifacts, its routines and practices. Therefore, despite differences in interpretations of the organizational culture, there seems to be an agreement that organizational culture includes several levels with a varying degree of awareness on the part of the culture-bearers (Hofstede et al., 1990; Schein 1985). It is clear that culture is a multidimensional, multifaceted construct (Schein, 1992). It reflects how social groups interact to cope and learn. Culture at all levels either national, organizational or group level exerts a subtle and yet powerful influence on people and organizations.

Organizational culture acts as a social or normative glue that hold the organization together and that expresses the values and beliefs which organizational members share (Cooper, 1994). Culture of the organization exerts significant

influence on how its employees perceive events and how they behave (Schein 1985). Schein (1985) further argues that the process of embedding a culture is a 'teaching' process, although not necessarily an explicit one. For example, a manager encourages his employees to try particular methods to solve a problem, which, if effective, become embedded into the organization as part of its culture. He further reports that the underlying values have an influence on the way people think, make decisions, and guides their actions. Organizational culture has the capability to teach and shape the behaviour of the employees to achieve common goals. It works as a stabilizing force that operates within the organization to resolve the existing conflicts. Organizational culture therefore, is a combine effect of shared subjective interpretations of group experiences which help organizations to successfully cope with the challenges of external and internal environment (Schein, 1990). Organizational culture may promote or hinder growth of the organization depending on the value system and flexibility. In other words, organizational culture may promote growth if it helps the organization to adapt itself to the changing environment, learn from the past mistakes, supports and encourages the employees to take risk, and anticipate and respond to the future challenges. It may hinder growth if it does not help the organization to adapt with changing environment.

Hofstede (1985) conducted pioneering research in the area of culture and stated that organizational culture is significantly influenced by national culture. He identified five dimensions of national culture: 1) *power distance* is the extent to which a society accepts the fact that power in organizations is distributed unequally; 2) *uncertainty avoidance* is the extent to which a society feels threatened by uncertain and ambiguous situations and tries to avoid them; 3) *individualism versus collectivism* refers the extent to which people see themselves as a member of the group. Members

in cultures that are high on individualism place much emphasis on individual initiative and achievement; 4) *masculinity versus femininity* refers the extent to which the dominant values in society is masculine (e.g. strong tendency to perform, achieve, make money, show off, assertive and consider big as beautiful) or feminine (e.g. not to show off, pay attention to quality of life rather than making money etc.); and 5) in *long versus short term orientation*, long-term orientation stands for the fostering of virtues oriented towards future rewards, in particular, perseverance and thrift. While short-term orientation stands for the fostering of virtues related to the past and present, in particular, respect for tradition, and fulfilling social obligations. Hofstede (1991) further argued that organizations are culture-bound and the culture affects not only the behaviour of people within the organization but also the functioning of the organization as a whole. He stated that organizations work efficiently when its culture is in harmony with the values and beliefs of the society in which organization exist. Moreover, Quinn and Rohrbaugh (1983) developed Competing Values Framework (CVF) to address the issue of organizational effectiveness. CVF divides Organizational culture along two dimensions: *internal versus external orientation* (extent to which organizational improvements are driven by a focus on internal business process improvements and people caring, or by external stakeholder desires); and *stability versus flexibility* orientation of an organization (extent to which an organization is more stable in nature, or tends to encourage innovation, personal growth, continuous organizational improvement and change). Based on these two cultural dimensions, four types of organizational culture are identified: 1) *Group culture or Clan culture*: organizations with a group culture tend to focus on the importance of cohesion and morale, with an emphasis on job satisfaction and employee involvement. It is an employee-focused culture. The value drivers of such

organizations are commitment, cohesion, communication and development; 2) *Development culture or Adhocracy culture*: organizations are effective because they are organic, adaptable, creative, innovative and good at obtaining external resources. The value drivers of development culture are innovative outputs, transformation, and agility, and employees are bonded by entrepreneurship, flexibility and risk taking; 3) *Hierarchy culture*: there is a great emphasis on measurement, documentation and information management. People are given well-defined roles and are expected to follow rules that define what they should do. The value drivers of this type of organization are efficiency, timeliness, consistency and uniformity; 4) *Market culture*: assumes that planning and goal-setting result in productivity and efficiency. Tasks are clarified, objectives are set, and action is taken. People are rewarded financially if they perform well, while if they don't perform well, they are asked to leave. The elements that bond this type of organization are goal-orientation, production and competition. Another well established classification of culture that is commonly cited in the organizational culture literature is entrepreneurial and formal culture (Russell, 1989). *Entrepreneurial culture* represents organizations with an emphasis on spontaneity, flexibility, individuality, innovation. Employees at all levels in entrepreneurial firms are included in making decisions because of the decentralized nature of this type of organization. On the other hand, *Formal culture* represents organizations with an emphasis on control, stability, order, and bureaucracy. Formal firms have operation that are more routine, repetitive, and specialized. Formal firms operate under a relatively low level of uncertainty compared with entrepreneurial firms. Formal organizations usually employ a rigid, mechanistic organizational structure (Sabharwal & Chan, 2001). It means that organizations that fit this profile rarely undergo major adjustments. An organization that is entrepreneurial, by nature

will not employ or utilize technology in the same manner that a formal organization will.

Many more classification of the organizational culture was proposed. For example, Robbins (1984) suggested seven characteristics that best represents an organizations culture are: individual autonomy, structure, support, identity, performance reward, conflict tolerance and risk tolerance. He further suggested that an organization culture is a composite picture formed from these seven characteristics. Amsa (1986) measured the sub culture in terms of beliefs, values, norms and traditions prevailing in organizations. Margulies (1969) opined that there are two types of culture: observable culture and inferable culture. Parida, Mathur, and Khurana (1990) considered the views of Robbins (1984), Margulies (1969), and Amsa (1986) to develop a instrument to measure organizational culture. They divided organizational culture into observable and inferable culture. Observable culture includes the way in which work is organized, the way people interact, and organizational structure. Inferable culture comprises of values, attitudinal and behavioral norms. Parida et al. (1990) defined observable cultural dimensions as follows:-

1. *Individual autonomy*: it is the degree of responsibility, independence and opportunity for exercising initiative by the employees.
2. *Structure*: the degree to which rules, regulations and direct supervision are used to control the behaviour of the employee.
3. *Support*: the degree of warmth and support provided by managers to their subordinates.
4. *Risk tolerance*: the degree to which employees are encouraged to be aggressive, innovative and risk-seeking.

5. *Performance reward*: the degree to which reward allocations in the organizations, such as salary increments, promotion and bonus are based on employees' performance criteria.

6. *Conflict tolerance*: the degree of conflicts present in the relationship between peers and work groups and their willingness to be honest and open about differences.

7. *Individual responsibility*: the degree to which individuals are encouraged to take responsibility and can be held responsible for their acts.

On the other hand, Parida et al. (1990) defined inferable culture dimensions as follows:

1. *Identity*: the extent to which members identify with the organization as a whole rather than with their particular work group.

2. *Beliefs*: the degree of widely shared beliefs among the workers regarding the supervisor's concern for discipline among workers.

3. *Group norms*: the degree of work group norms regarding appropriate on-the-job behaviour.

4. *Exercise of authority*: the degree to which senior's shows leniency in taking action, and the enforcement of discipline.

Culture theories has been used to a wide array of social behaviours and outcomes in organizational settings including firm effectiveness, firm performance, corporate strategy, job attitudes, administrative practices, merger and acquisition outcomes, and technology transfer conflicts (Birnbaum & Sommers, 1996; Cameron & Freeman, 1991; Denison, 1990; Denison & Mishra, 1995; Wallach, 1983). Denison and Mishra (1995) stated the relationship of organizational culture and effectiveness

on the basis of four traits of culture: involvement, consistency, adaptability, and mission. The results of the study supports that four traits were strong predictors of effectiveness criteria measured with quality, satisfaction, and overall performance. Certain organizational cultural dimensions plays vital role in organizational effectiveness. Some researchers argue that higher risk tolerance is associated with more effectiveness (Schein, 1992). Schein further states that as environment becomes more turbulent, the ability to tolerate uncertainty and take risks becomes necessary for survival and learning, suggesting that organizations that accept uncertainty more easily will be inherently more adaptive. Other dimensions like supportive culture where subordinates receive warmth and support from their superiors may have positive impact on organization. In a supportive environment, employees will feel obliged and committed towards their organization. They will build a sense of family with the organization. Employees would like to reciprocate such support through their hard work and dedication towards achieving the organizational goals.

Among various contingency factors, the role of culture is well recognized in the IS effectiveness literature (Wang & Yeoh, 2009). The organizational culture creates behavioral expectancies that influences the way employees accomplish their task. This relationship between culture and behaviour is the theoretical basis for the assumption that culture influences effectiveness. Gregory, Harris, Armenakis, and Shook (2009) empirically examined employee attitude as a potential mediator of the relationship between organizational culture and effectiveness. The results of this study provide evidence that suggests that employee's attitude mediates the culture and effectiveness relationship. Culture can influence the successful implementation and adoption of information technology and influence managerial practices that may directly or indirectly influence IS success. IS researcher's interested in the

relationship of culture to IS, have studied the impact of both national and organizational culture on various IS related issues. Robey and Azevedo (1994) reported that cultural analysis has been applied to several issues related to organization and information systems such as ethics, resistance to change (Schein, 1985), failure to implement new technology, organizational commitment, satisfaction, and productivity (O'Reilly, Chatman, & Caldwell, 1991). Leidner and Kayworth (2006) in their review paper stated that the impacts of culture on IT adoption, diffusion, use, and consequences are among the most frequently studied topics by researchers.

IS literature suggest that without a match between the culture of an organization and the cultural assumptions embedded within an information system may lead to the users' dissatisfaction and resistance for using the system (Ke & Wei, 2008). In this connection, Martinsons and Chong (1999) noted that "even a good technology can be sabotaged if it is perceived to interfere with the established network" (p. 124). Similarly, Cooper (1994) suggested that information systems that conflicts with the organizational culture will be resisted by the organizational members. This may result in under utilizing the system or sabotaging the implemented system. It reduces the potential of the system. It is well established fact that organization's internal environment is represented by its culture. Since it shape's organizational procedures, provides solution to problems and thus it plays a key role in hindering or facilitating the organization's path towards goal attainment. Lu (1995) pointed that if the existing culture of the organization supports innovation and decision making in highly volatile environments, then IS will face lower opposition by its users.

Many studies investigated the role of culture in IS implementation (Ke & Wei, 2008; Martinsons & Chong, 1999; Cooper, 1994) and found that culture is an important determinant of IS implementation success (Sabherwal, Jeyaraj, & Chowa, 2004). Kendall, Buffington, and Kendall (1987) found that culture plays a crucial role in the degree of user satisfaction with decision support systems. Ke and Wei (2008) in a theoretical paper investigated the relationship among leadership, organizational culture, and ERP implementation success. They proposed that the organizational culture may play a mediating role in the relationship between leadership and ERP success. They hypothesized that ERP implementation success will be positively related with certain organizational cultural dimensions such as participative decision making, risk and conflict tolerance, power sharing, support and collaboration, and learning and development culture. Hoffman and Klepper (2000) studied the role of organizational culture on IT adoption by using the Goffee and Jones' (2000) cultural dimensions of *sociability* (friendliness among members) and *solidarity* (tendency to pursue shared objectives). They found that mercenary cultures (low in sociability and high in solidarity) were found to be more supportive for new technology assimilation as compared to the networked cultures (high sociability and low solidarity). Ruppel and Harrington (2001) using the competing values framework (Quinn & Rohrbaugh, 1983) reported that intranet adoption is much more likely to succeed in an *ethical culture* (culture that emphasizes organizational values related to trust and concern for others) and *developmental culture* (focuses on flexibility and innovation). Harper and Utley (2001) used the organizational culture profile (O'Reilly et al., 1991) to study the link between organizational culture and IT implementation success. Results showed that *people-oriented cultures* (characterized by autonomy, trust, team-oriented work, flexibility, and free flow of information) were more positively associated to IT

implementation success as compared to *production-oriented cultures* (characterized by rules, compliance, carefulness, preciseness and predictability). Kanungo (1998) found that computer-network use had an impact on user-satisfaction in more task-oriented cultures as opposed to people oriented cultures. Baltahazard and Cooke (2003) studied organizational culture in the context of knowledge management information systems success. Findings show that different types of organizational culture (constructive, passive/defensive, aggressive/defensive) lead to different individual and organizational outcomes that may hinder or facilitate knowledge management success outcomes. Bradley, Pridmore, and Byrd (2006) reported the relationship among IT plan quality construct in the D&M model in the context of different organizational culture types (entrepreneurial and formal). Furthermore, this study assessed how the relationships in the DeLone and McLean model of IS success differ in diverse corporate cultural types. The results of the study suggest that IT plan quality has a greater impact on IS success in organizations that exhibit an entrepreneurial corporate culture (emphasis on spontaneity, flexibility, and individuality) than in those that exhibit a formal corporate culture (emphasis on control, stability, order, and bureaucracy).

Literature review reveals that although many studies addressed the role of some cultural dimensions in organizational effectiveness and IS success; very few studies were conducted on the role of culture in the context of banking sector of the developing countries. Moreover, review of literature shows that only a handful of studies investigated the relationship between organizational culture and IS success using DeLone and McLean IS success model (DeLone & McLean, 1992, 2003). Therefore, there is a felt need of more empirical evidence regarding the process in which culture impacts IS effectiveness. This study aims to investigate this aspect.

Organizations require a culture that emphasizes characteristics like individuality, risk taking, high integration, tolerance for internal conflicts, and high horizontal communication (Schein, 1992) to work and survive in dynamic and volatile environments. Banks and other financial institutions have highly dynamic and volatile environment and due to heavy use of information technology in their day to day working. Financial institutions like banks require a fit between culture and technology for its success. So, it can be assumed that observable cultural dimensions such as risk-seeking, conflict tolerance, support of the supervisor, and compliance of rules and regulations and so on will have an impact on the performance of the information systems. In other words, the present study assumes that technology will reach to its full potential where the organization comprises of culture with characteristics like openness in communication, individual participation and involvement in decision making, cooperation, coordination, commitment, concern from superiors and individual responsibility. Thus, the present study makes an attempt to study the role of some of these observable cultural dimensions on IS success in the context of banking sector. It is to be noted here, that the present study focuses only on the observable dimensions of organizational culture of Parida et al. (1990) in the context of IS success.

2.11.3. Top Management Support and IS Success

Top management includes highest ranking executives who are involved in translating the policies (formulated by the board-of-directors) of the organizations into goals, objectives, strategies, and projects a shared-vision of the future. They makes decisions that affect everyone in the organization, and is held entirely responsible for the success or failure of the enterprise. Jarvenpaa and Ives (1991)

conceptualized top management support as the involvement and participation of the executive. They distinguished executive participation from executive involvement. They found that “executive involvement (a psychological state) is more strongly associated with the firm's progressive use of IT than executive participation (actual behaviors) in IT activities” (p. 205). While other researchers posit that both active involvement and participation are required for the IS activities. In the context of IS related activities, top management support refers to the degree to which top officials understand the importance of IS and its related activities and degree to which they are involved in IS related activities. Individuals in the top management are in the best position to identify business opportunities for the exploitation of IS. Thus, they can align IS with corporate objectives and strategies (Jarvenpaa & Ives, 1991). Top management’s beliefs, knowledge and participation help in pooling of financial resources as well as saves time and efforts (Armstrong & Sambamurthy, 1999). Managerial support encourages users to develop positive support towards IS use. Management’s commitment and support towards IS plays a significant role in creating more conducive environment for IS success and thus make the difference between successful and unsuccessful IS.

Support from the top management facilitates several operational and strategic IS related activities. In the context of the present study, top management is conceptualized as the extent of support, commitment, vision and involvement of top management in the allocation of resources and in creating positive environment for effective working of IS. Jarvenpaa and Ives (1990) noted that top management support is one of the most important factors in ensuring the success of IT initiatives and the efficient use of an IT investment. Igbaria et al. (1997) found that top

management support is positively associated with ease of use and perceived usefulness of IS.

Top management support is one of the most widely cited factors for IS success (DeLone, 1988; Guimaraes & Igbaria, 1997; Howell & Higgins, 1990; Hussein et al., 2005; Igbaria, 1990; Ifinedo, 2008; Rai, Patnayakuni, & Patnayakuni, 1997; Sabherwal et al., 2006; Saunders & Jones, 1992). Various studies shows that the top management support plays a critical role in the project outcomes, planning and implementation success of new information systems, IS performance, IS planning, IS plan quality, IS assimilation, IS usage, in the resource allocation for the existing system (Armstrong & Sambamurthy, 1999; Hussein et al., 2005; Ifinedo, 2008; Jarvenpaa & Ives, 1991) and so on. In the context of ERP implementation, Zhang, Lee, Huang, Zhang, and Huang (2005) reported that the top management support plays two major functions: providing the necessary resources and providing leadership. Research on large Indian companies (For example, Ranganathan & Kannabiran, 2004) has also shown that top management contributes to successful IS implementation by facilitating understanding of the strategic role of IS and active involvement in IS planning and providing IT/IS department with sufficient funds. King and Teo (1996) found knowledge of the upper management, especially, their understanding for the strategic potential of IS as a critical factor for enhancing the IS performance. Willocks and Sykes (2000) noted that senior-level sponsorship, championship, support, and participation influences ERP success. Thong et al. (1996) investigated the influence of managerial support on IS effectiveness. The results found that managerial support can overcome the problem of lack of resources and knowledge that firm face in IS implementation, and therefore, can influence effectiveness of IS.

The absence of top management support is one of the greatest impediments towards proper allocation and utilization of IS resources (King & Teo, 1996). Problems related to planning, development or usage of IS are attributed to the lack of top management support (Rai et al., 1997). Similarly Ives and Olson (1984) posit that successful introduction of any IS is impossible without the top management support. Top management's attitudes promotes the quality of the systems by facilitating the optimal allocation of IS resources. Top management's support and commitment conveys message to the users that the management is giving utmost priority to IS development which may help in boosting the confidence and satisfaction of the end - users. Armstrong and Sambamurthy (1999) found that top management's support, guidance, commitment and participation are key indicators enabling the adoption and assimilation of advance technologies. Chatterjee, Grewal, and Sambamurthy, (2002) suggested that supportive ideas, beliefs and attitudes of the top managers exert positive influence on the adoption of web based information systems. Rezaei et al., (2009) investigated the influence of organizational factors (structure, top management support, management style, managerial IT knowledge, goal alignment, resources allocation, and IS infrastructure) on MIS success. They study found that top management support is positively associated with MIS success dimensions (system quality, information quality, perceived ease of use, organizational impact and individual impact. Furthermore, they identified direct participation and contribution of top management as a significant predictor of IS success. Top management's direct participation in IS activities is regarded as an effective mechanism in signaling the importance of IS to employees, and also ensure that they extend their cooperation and efforts towards the better utilization of IS. Research also shows that the management support has positive effects on end-user satisfaction and computer usage (Guimaraes

& Igbaria, 1997; Igbaria, 1990). Furthermore, Ugboro and Obeng (2000) advocated that the goal of user satisfaction is achieved through commitment of senior officials in creating an organizational climate that empowers employees and focuses all efforts towards achievement of the goal of user satisfaction.

To summarize, the literature suggests that top managers can influence the way employees utilize the system, by clearly explaining them the potential benefits of the information system adopted by the organization. It has been found that senior executive's proactive approach and prompt decisions can timely provide technical resources and manpower for IT infrastructure, projects, and can ensure elimination of unnecessary bureaucratic procedures. Prompt and timely decisions in IS related activities has been seen to have positive effects on effective utilization of IS in organizations. Thus, in addition to providing support and encouragement to users, top management should have favorable attitudes towards the technology, should understand the implication of technology to people and organization, and should process strategic vision of the technology.

2.11.4. Managerial IT Expertise and IS Success

Managerial IT expertise refers to experience, knowledge, and expertise of senior executives in the area of information system. Several researchers suggested that this construct covers the wide gamut of manager's background, experience, awareness, and interest in IT/IS activities. Nelson (1990) stated that the acceptance of technology depends on the technology itself and the level of expertise of the individual using the technology. The present study conceptualized managerial IT expertise as the experience and knowledge of senior management especially in the field of information technology. This attribute involves experience and awareness in

IT related activities, keen interest, their recognition towards the potential of IT as well as their understanding of advanced technology and methodology.

Boynton, Zmud, and Jacobs (1994) examined the influence of IT management practice on IT use. They found that managerial IT knowledge directly and positively influence an organization's extent of IT use. They conceptualized managerial IT knowledge as the knowledge IT managers have on strategic issues and on potential of IT activities to improve organization's productivity. Their findings suggest that managerial IT knowledge is an important construct in promoting high levels of IT use. Jarvenpaa and Ives (1991) found that executives with IT skill and competency tend to be more productive, proactive and are more dedicated towards IS activities. When senior executives possess technological knowledge, they are more likely to be open towards understanding and implementing new technical ideas. Hussein et al. (2005) indicated that managerial IT knowledge is positively related to IS success dimensions of D&M model. Further, their findings suggest that managers who recognized the IS potentials in increasing productivity will show more favorable attitude towards IS and would promote IS success in their organization. However, one of the reasons for the failure of many IS functions is the management's lack of technical expertise and know how (Thong, 1999). Many a times manager's delay IS related decisions and innovations because of lack of IS knowledge and wait until they have enough expertise on the issue (DeLone, 1988). Ang et al. (2001) investigated the impact of organizational factors (managerial IT expertise, top management support, size, structure, goal alignment, financial resources) external factors and technological factors on IT usage. The result suggested that organizational and technological factors had more influence than external factors.

There are substantial empirical evidences to suggest that organizations with managers who have the necessary skills and technical knowledge are more able motivate and encourage employees for proper utilization of information system (Lee & Kim, 2007). Manager's expertise helps employees to understand the user's IS related problems and are able to reduce knowledge barriers by provide them with relevant solution to the problem. On the other hand organizations having managers with less IS expertise and less technical knowledge are likely to have less technical potential and lack in IS development and difficulty in experimenting with new ideas.

2.11.5. Computer Self Efficacy and IS Success

Several prior studies found that individual differences or user-related factors play a major role in IS success (Aydin & Rice, 1991; Zmud, 1979). One such individual difference variable is computer related self efficacy. The concept of self efficacy was first introduced by Bandura (1977) as a core concept in the social cognitive theory. Bandura (1977) postulated that people are neither driven by inner forces, nor simply by external stimuli. Instead, human behaviour is explained through a triadic reciprocity model in which behaviour, cognitive and personal factors and environmental factors all operate interactively as determinants of each other (Hwang, & Yi, 2003). Bandura (1977) defined self-efficacy as "people's judgments of their capabilities to organize and execute courses of action required, to attain designated types of performance". He suggested that self efficacy does not refer to assessments of the actual skills that people posses but is concerned with the evaluations of what people believe that they can accomplish. In other words self-efficacy describes individual belief in his ability to perform a specific behaviour. It not only reflects an individual's belief about his ability to perform a specific task, but is a major

determinant of individual's future intentions (Marakas, Yi, & Johnson, 1998). Self efficacy regulates human behaviour by influencing user's motivation, perseverance, and effort to face difficulties and perform successfully (Gist, 1987). People with stronger efficacy beliefs are expected to exert more effort and tend to be more persistent in their efforts. Bandura (1977) asserted that self-efficacy is a key determinant of performance. It is a task specific and dynamic variable which varies according to tasks and domains. Therefore, this concept has been applied to various specific domains such as computers and other IS related activities.

Computer self-efficacy is a contextual definition of self-efficacy. Computer self-efficacy refers to confidence in one's ability to use computer related skills to perform a task (Compeau & Higgins, 1995). Murphy, Coover, and Owen (1989) defined computer self-efficacy as an individual's belief that he can perform a specific computer related task. It is an important personal trait that influences an individual's decision to use or not to use computers (Compeau & Higgins, 1995). It examines the users' beliefs regarding his ability to perform specific tasks using a computer. Computer self-efficacy is a multilevel construct with general and system specific components (Marakas et al., 1998). General computer self-efficacy refers to general and system-independent individual characteristics while, system-specific computer self-efficacy refers to self efficacy towards a specific system or software package. General self efficacy evaluates person's perception to use a computer in general. It can also be defined as collection of computer related experiences. General self-efficacy has been positively related to measures of performance and motivation. In the context of the present study, computer self-efficacy is used as an individual's belief in his ability to use information system for problem solving, decision-making and for gathering and disseminating job related information (banking tasks).

In the IS literature, computer self-efficacy has been studied as the antecedent of perceived ease of use in the TAM model (Venkatesh & Davis, 1996). Studies have demonstrated that computer self-efficacy is a determinant of system use (Compeau & Higgins, 1995; Compeau, Higgins & Huff, 1999). Researchers have developed and validated several measures to operationalize computer self-efficacy. These measures have been used in various disciplines like education, healthcare, computer training (Compeau & Higgins, 1995; Johnson & Marakas, 2000), computer use (Compeau & Higgins, 1995), and technology adoption and computer performance. It has been found that high computer self-efficacy reduced individual's resistance to technological innovation and advancements. Empirical evidence indicates that individuals with high computer self efficacy are more likely to form positive perception towards IT (Venkatesh & Davis, 1996) and use IT more frequently (Compeau et al., 1999). Similarly, computer self-efficacy has demonstrated positive effect on intention to use information systems (Compeau et al., 1999). It is a reliable determinant of acceptance, intention and usage behaviour.

Zmud (1979) highlighted the importance of individual differences in the success of IS. The acceptance of technology depends on the technology itself and the level of skill or expertise possessed by the individual using the technology. User's past skills and expertise were found to be related to his beliefs and future usage of technology (Igbaria, 1990; Zmud, 1979). These studies suggest that computer self-efficacy is likely to increase user's confidence in their ability to master and use the system in their work. End-users past computer experience were found positively related to system usage (DeLone, 1988). It was found that lack of prior expertise is a major reason for the lack of IS success.

Olivier and Shapiro (1993) reported that failure in the information system use does not reduce the system usage for the individuals with high level of self efficacy. Novice users without sufficient computer self-efficacy may not even be willing to use a system. Some researchers have explored intrinsic and extrinsic motivational factors and found that high levels of computer self efficacy tend to promote intrinsic motivation (Bandura, 1982). Confident and competent computer users are more likely to consider innovative use of computers and invest the efforts necessary to identify and learn new techniques suitable for their specific task, so to improve their performance. Prior researches have confirmed the importance of increasing computer self-efficacy in order to achieve maximum benefit and outcomes from the system. Compeau et al. (1999) conducted a longitudinal study to determine relationship between self-efficacy, outcome expectations, affect, and anxiety. They found that self-efficacy and outcome expectations impact an individual's affective and behavioural reactions to information technology.

Johnson (2001) noted that individual's having a high computer self-efficacy are more likely to engage in computer tasks and show persistence in completing computer related tasks irrespective of difficulties. In contrast to this, individuals with low level of computer self efficacy are more likely to avoid computer tasks or give up the task in the case of performance obstacles. Several researchers have proved that high level computer self-efficacy contributes towards high degree of acceptance for system and usage (Hwang & Yi, 2003). Another study by Young (2001) found that computer self efficacy is one of the most critical factors affecting user satisfaction in using an intranet.

Dishaw, Strong, and Bandy (2002) studied that computer self-efficacy affects perceived ease of use and is affected by user's experience. They reported that user's

experience was significantly and positively related to both perceived ease of use and perceived usefulness. They argued that with increased knowledge through regular experience will make the use of computer easier. The experienced user will also explore more potential uses of the computer and thus they would perceive a software tool or system as more useful. The experienced user will thus attain more satisfaction by using the system as compared to non experienced users. Levy and Danet (2010) examined the impact of three dimensions: user involvement, user resistance, and computer self-efficacy on the success of a specific information systems implementation at NASA space center. Information system usage was the construct used to measure information systems implementation success. The result of the study indicated that computer self-efficacy and user involvement were positive significant predictors of system success.

Empirical evidence suggests that computer self-efficacy plays an important role in one's acceptance and use of information technology. Henry and Stone (1995) in an empirical study examined the impacts of computer self-efficacy and outcome expectancy on the end-user's satisfaction with their jobs. The results indicated that computer self-efficacy and outcome expectancy affect the end-user's job satisfaction as well as mediate the impacts of management support, system experience, and ease of use. They reported that dissatisfaction may be translated into actions such as complaints about the system, reluctance to use the system, and poor performance. In several studies satisfaction has been correlated with self efficacy (Davis, 1989). The literature demonstrated that computer self-efficacy can influence satisfaction or a person's positive affect towards computers and other technology (Downey, 2006). A large number of researches have linked computer self-efficacy with satisfaction (Downey, 2006). Huang, Yang, and Chang (2011) in their empirical study on online

learning system found that internet self-efficacy is a significant predictor of e-portfolio satisfaction.

Given that core banking solutions and its associated channels are relatively new way banking system, the present study expect that computer self efficacy will play critical role in influencing individuals satisfaction level to use a banking information system. The relationship between computer-self efficacy and user satisfaction needs to be tested in the context of the D&M model. The present study will also explore the relationship between computer self-efficacy and the outcome variables of the D&M model, that is, individual impact, organizational impact and net benefits.

2.11.6. Job Level, Length of Job and IS Success

User related variables may influence one's perception of IS and the way one process them and so individuals with distinct characteristics and backgrounds will have unique ways of interacting with IS (Senn, 1982) and consequently, will have different attitudes and behaviours towards the system. Individual characteristics like job level and length of job may also play a vital role in IS success. Length of job refers to the users' tenure in the job. It determines the years of work experience a person has. Literature suggests that generally job tenure of the user was operationalized in the recent studies by asking the respondents the numbers of years they had been in their current position in the organization (Taylor, Audia, & Gupta, 1996). Length of job or tenure of the job can have significant impact on individual's attitudes. User attitude and behaviour towards IS varies with the user's work experience. When an individual has been in job for longer period his investment in job and organization in terms of time and his efforts may be greater than someone

who has been in the job for shorter period. Thus he would have increased functional knowledge and will be more competent to handle unforeseen situations that may arise due to system usage. Such an employee over the period of time will overcome technophobia that they might have, and will be more comfortable in using IS. While some researchers argue that users who are new to their position bring with them new ideas and are more open to change.

Job level determines an employee's position within his/her organizational structure. People at different positions of organizational structure have different attitude about certain things, including IS. This difference in attitude generally arise because of differences in their expectations about the role of IS with their respective position (Hussein, 2009). Satisfaction levels and usage of the system varies with different organizational levels. For example, at higher organizational levels, managers may not interact directly with the IS and consequently evaluate the information systems on objective basis such as accuracy, and speed of doing work and cost reductions.

Mahmood, Hall, and Swanberg (2001) reported that individual's characteristics like education level, training level, and professional level exert a significant influence upon system usage. Masrek, Karim, and Hussein (2008) found that individual characteristics like web self-efficacy, personal IT innovation, length of service, and intranet experience had a significant impact upon the intranet utilization. Khalil and Elkordy (2001) tested the relationship of tenure in the job, organizational level, and some other personal factors (like age, education, training etc.) with the information systems effectiveness in the context of Egyptian banks. Tenure in the job is found to be positively associated with user satisfaction. However, organizational level is found to be negatively associated with system usage. Khayun et al. (2012)

extended the D&M model by adding the individual characteristics construct in their research model to identify the e-excise systems success factors. This study reported a significant support for the relationship between individual characteristics and system use. In the context of Egyptian banks, Hussein (2009) investigated the relationship between system quality, information quality, service quality, user involvement, top management support and user related variables like (gender, tenure, organization level, age, education, and training) with the system usage and user satisfaction. The study reported that three quality constructs, user involvement, top management support training, age, are the main predictors of user satisfaction and individual impacts. However, they also observed that relationship between these constructs varied according to age group of managers. The study found that education, tenure and organization level had an insignificant relationship with user satisfaction in terms of their perception of IS effectiveness. Franz and Robey (1986) investigated organizational factors (size, age, user's hierarchical level, MIS department scope, decentralization of authority) related to user involvement in IS development and perceived system usefulness. The results found that users at higher levels and those making more structured decisions found their systems more useful, although the user's level was found to moderate perceptions of system usefulness during the IS design stage. Lucas (1978) found that users possessing longer tenure display a more positive attitude towards information system. More recently, El-Attar (2006) investigated the extent to which users' perceived usefulness of IT was related to the user involvement in its design and implementation, the user hierarchical position, user years of service in the bank, and user years of experience in banking business. The results showed that there was a correlation between users' hierarchical position and their perceived usefulness of the IT system. This means that users who occupy high

hierarchical position tend to perceive IT as more useful than those on the lower side of the hierarchy. The results also showed that users with more years of service in the bank regard the IT system as more useful than those who have less years of service in the bank. Sharma and Rai (2003) examined the relationship between IS innovation adoption and leadership characteristics in information systems departments. They found that both positional power and job tenure of the leader in the IS department are negatively related to adoption of IS innovation. Taylor et al. (1996) found that executives with longer job tenure may have more psychological commitment to the organizational status quo and organizational values. As a result, they resist change and are less inclined to engage in organizational innovative activities. Additionally, they also observed that longer one stays in an organization, the more he loses freshness of ideas. This might be one of the reasons that reengineering literature recommends that organizations should start their business process reengineering initiative with “new blood” at the helm (Davenport, 1993).

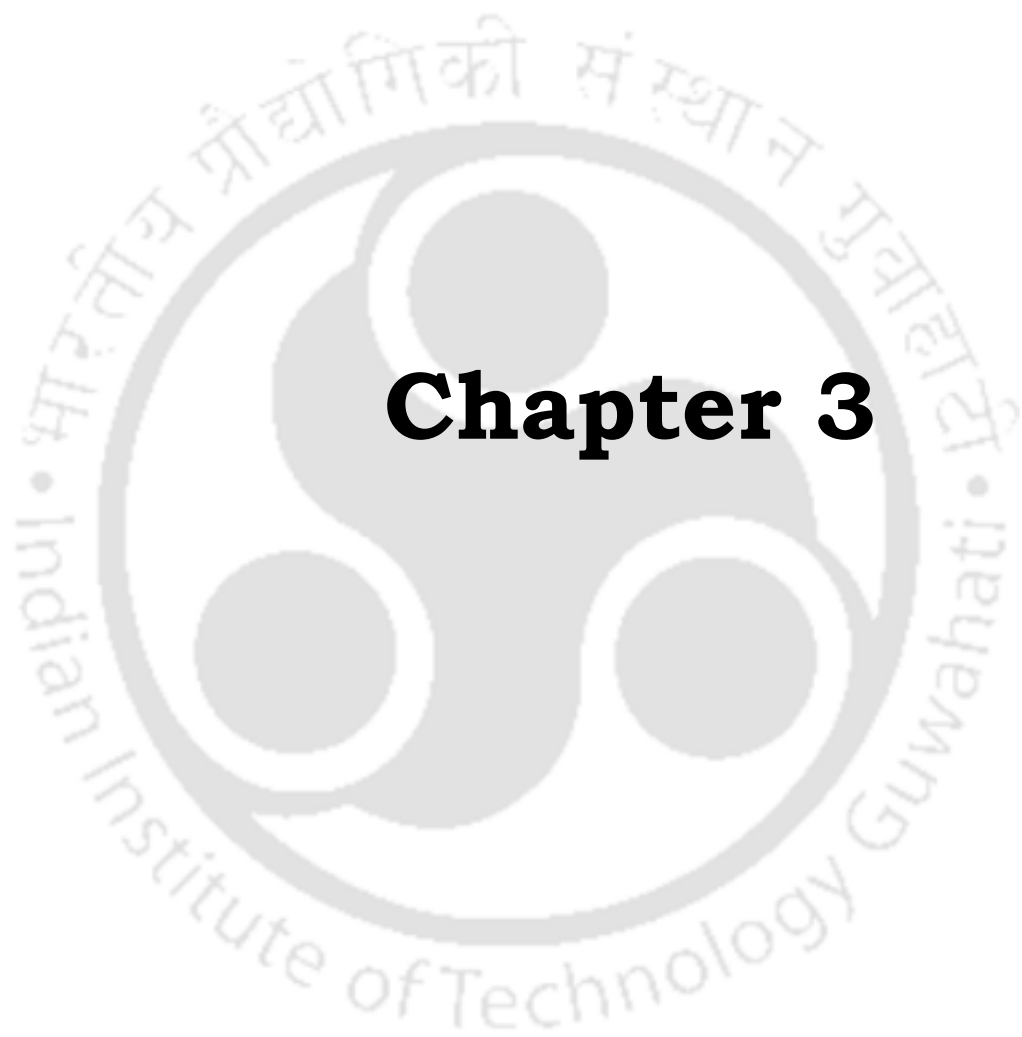
It is imperative to understand the interplay of user related factors and information systems effectiveness. Most of the studies on these variables are confined to data from developed countries (Lucas, 1978; Khalil & Elkordy, 2001). Such findings would contribute little to the understanding of the user related factors that are associated with IS in the developing countries. Thus, these factors are left largely unexplored in the IS literature of the developing nations. There is a need to broaden the research on IS success by empirically investigating the relationship between user related variables and IS success especially in the context of the developing countries. This study is a step forward in this direction.

2.12. Concluding Remarks

It is evident that IS researchers and practitioners have paid due attention to the assessment of IS success. However, even after several decades of research, assessment of information systems success has remained a challenging and critical issue for researchers. Further, literature review clearly showed that the concept of IS success is ill-defined and lacks consensus. Therefore, researchers are still trying to identify the constructs which can measure IS success in a comprehensive manner (Rai et al., 2002).

The literature substantiates that though considerable amount of research has been conducted on IS success models yet very little research seems to address the conceptualization and measurement of banking information systems especially in the context of developing countries such as India. Moreover, whether traditional IS success models can be extended to the assessment of the banking IS success needs further attention. Based on DeLone and McLean's model of IS success, this study addresses the potential research issues and gaps identified in the literature review. Literature review reveals that the assessment of information system cannot be done in isolation, but the whole mechanism requires an integrated approach that evaluates IS from various views and contexts. Therefore, it is evident that mere investment in technology without the consideration of the human and organizational factors may not necessarily improve performance of the organization. This study will attempt to provide insights into these gaps in literature.





Chapter 3



Chapter 3

Gap Analysis, Research Questions, Research Model and Hypotheses

3.1. Introduction

Literature review revealed various pertinent issues surrounding IS research and helped in identifying the theoretical basis, research model and research gaps for this study. This chapter will discuss rationale behind this study, proposed research model, research questions and hypotheses.

3.2. Gap Analysis of Research Literature

The extensive literature survey revealed several issues and gaps in the literature which became the foundation for the conceptualization of research questions and theoretical model of this study.

Banks are one of the largest user of IS and invest billions in the IS infrastructure. IS initiatives are a costly investment and failure or under utilization of IS may have large repercussions. Therefore, assessment of the benefits of ISs needs an extensive consideration for a number of factors that can determine the success or failure of these systems. However, it became evident that there are not much published or systematic data available regarding the assessment of banking information systems especially in the context of the Indian banking sector. Many banks carry out ad hoc surveys of IS performance individually on an irregular basis. However, such surveys have been routine surveys and largely non-scientific and their

results and implications are not available for publication. Therefore, this study can make a significant contribution in this direction by making an empirical investigation of banking information system success and by proposing a multidimensional model of IS success.

On the basis of several studies reviewed, it emerges out that banking information systems in India have not attained its true potential. Existing measurement approaches to assess IS success in financial sector has primarily utilized monetary indicators like return on investments, total cost and other cost- benefit analysis methods. Though there is little documented research on banking information systems success measurement considering non-monetary measures and intervening variables. Further, none of the studies we reviewed took a comprehensive and integrated approach to measure IS success. It is rather surprising to note that despite decades of research and radical advancement in technology, there are still several organizational and managerial issues related to banking information systems success that have not been properly addressed. As literature suggests that the banking information systems are dynamic in nature, which are affected by its environment and by various people who use it. The present research would try to identify these factors. IS success is measured in the present research by focusing on whether the system is able to satisfy the needs of individual end-users. However, these systems are also goal driven. So, the present study also tried to measure IS success by focusing on whether the system is able to achieve the goals of the organization. Additionally, to study the holistic view of the system success, the present study also measured success by focusing on the combine effect of individual impact and organizational impact as net benefits.

It is evident from the literature review that there is a lack of consensus among researchers concerning the measures for IS success (Garrity & Sanders, 1998; Seddon et al., 1999). It has been observed that most of the researches have largely focused on the technical aspects of the information system effectiveness, while limited attention has been paid to the organizational and socio-behavioral aspect of information systems' success. So, it was clear that IS success cannot be measured in isolation with just technical variables; it can be measured properly from a multidimensional perspective incorporating organizational and user-related variables. In this connection, DeLone and Mclean (1992) posited that "Researchers should systematically combine individual measures from the IS success categories to create a comprehensive measurement instrument. The selection of success measures should also consider the contingency variables, such as the independent variables being researched; the organizational strategy, structure, size, and environment of the organization being studied; the technology being employed; and the task and individual characteristics of the system under investigation" (p. 88). This quote motivated and provided the primary rationale for this study.

Several researchers were of the view that for measuring IS success researcher's should capture both technological and human factors (Garrity & Sanders, 1998; Wu & Wang, 2006). Kanellis, Lycett, and Paul (1998) stated that IS success is a perspective that emerges from the social and technical interplay within organizations. IS and contextual factors are so intertwined that it is difficult to identify their respective individual contribution to success. Furthermore, IS researchers in early 90's had predicted that a greater emphasis would be on the relationship between IS related processes and the human factors in the future.

An effective banking information system requires an appropriate mix of both social and technical elements (Davenport, DeLong, & Beers, 1998). Literature review made it clear that DeLone and McLean model is widely used and researched model of IS success. However, the dimensions of DeLone and McLean model seem to encompass only the technical aspect of IS success and overlook other important dimensions such as organizational, individual, and other context specific variables. As mentioned before, DeLone and McLean did not consider their model as definitive and complete and suggested that during the selection of success measures, contingency variables related to organization, environment, and personal characteristics should also be considered. Moreover, literature review indicated that leadership, organizational culture, top management support, managerial IT expertise, computer self-efficacy, job level, and length of job are some of the key variables that might affect IS success. However, despite existing theories providing clues and possible explanation into the influence that these contextual and individual variables exerts, no research to date has systematically been able to demonstrate how they interacts with the success of banking information system. To the best of our knowledge, there are no studies in Indian settings that have incorporated these contingency factors with the DeLone and Mclean model. Moreover, there are lack of proper models especially in the context of the developing countries such as India, relating technical, contextual factors and individual's characteristics in a single model. Therefore, the present study will extend D&M model by including contextual variables, and individual characteristics in addition to the system variables to study multidimensional nature of IS success at the post implementation stage in the banking context.

Literature survey reveals that to gain a holistic view of the IS success and its impact on individual and organization, it is imperative to measure individual impact

and organizational impact separately as well as their joint affect. Urbach et al. (2009) observed that most of the empirical papers evaluate IS success using individual impact dimension which is a micro view (Grover et al., 1996). Very limited studies have considered both individual and organizational impact dimensions to gain a comprehensive picture of IS success. The present study moved a little further and evaluated IS success with three outcomes, that is, individual impact, organizational impact, and net benefits. This will give insights into micro, macro as well as the combine holistic view in terms of net benefits of IS success. This will be a unique aspect of this research study.

3.3. Research Questions

In order to address the gaps in the literature, the following research questions were formulated:

1. What are the perceptions of employees regarding success of banking information system?
2. How private and public sector banks differ regarding the factors affecting IS success?
3. To what extent causal pathways proposed by DeLone and McLean model are valid in Indian banking context? How can DeLone and McLean's model be extended to understand multidimensional aspects of IS success?
4. What organizational, managerial, individual variables exert their influence on IS success in Indian banks, in addition to factors proposed by DeLone and McLean model?
5. What are the key future challenges of banking information systems in the context of developing countries such as India?

3.4. Conceptual Framework

A conceptual framework for this study has been developed based on the literature review. This framework/model will help to study relationship amongst various variables and thereby answer identified research questions as mentioned earlier in this chapter. This model extended the D&M model by including organizational, managerial, and individual characteristics factors apart from quality variables of D&M model. Thus this model is an extension of DeLone and McLean IS success model (1992, 2003) to measure post implementation success of banking information systems from the end users' (bank employee) perspective. The present study attempted to explore the impact of some contextual variables, individual characteristics, and system related factors on user satisfaction and IS success outcomes. As shown in figure 3.1, leadership, organizational culture, top management support, managerial IT expertise, computer self-efficacy, job level and length of job are some of the key variables believed to affect the effectiveness of the information systems. Hence these variables are taken as *independent variables* along with three quality dimensions of D&M model, that is, system quality, information quality, and service quality. Individual impact, organizational impact and net benefits were conceptualized as *dependent variables*. Demographic variables such as age, education, salary and gender of the user were used as *control variables*. User satisfaction has been conceptualized as the mediating variable between the independent and dependent variables. Detailed plan of the variables of the research model includes:

1. Independent variables:

(a) *Organizational variables* – Leadership style, Top management support, Organizational culture, and Managerial IT expertise

(b) *System related variables* – System quality, Information quality, and Service quality

(c) *Individual variables* – Computer self-efficacy, Job level, and Length of job

2. Mediating variable:

(a) User satisfaction

3. Dependent variables:

(a) *IS Success outcomes* - Individual impact, Organizational impact, Net benefits

This research model will be helpful to find out the relative impact of the predictor variables over criterion variables. Moreover, this model will also help to investigate whether the impact of predictor variables on dependent variables will be mediated by user satisfaction. This model is built on the premise that system related variables (system quality, information quality and service quality); organizational variables (leadership style, top management support, organizational culture, and managerial IT expertise) and individual variables (computer self-efficacy, job level, and length of job) will influence user satisfaction. Further, user satisfaction in turn influences individual impact, organizational impact, and net benefits.

This model extended the D&M model in banking context and made minor modifications in the existing D&M model. Few minor modifications include:

1. In a mandatory environment, the user must use the system regardless of whether they are intended to use it or not. In such mandatory setting, intention to use and “use” are not appropriate construct. In the banking context, using information systems for routine banking activities is mandatory for the employees. Therefore, no matter how dissatisfied (or satisfied) employees may be with the information system, they are required to use the system. Brown, Massey, Montoyo-Weiss, and Burkman

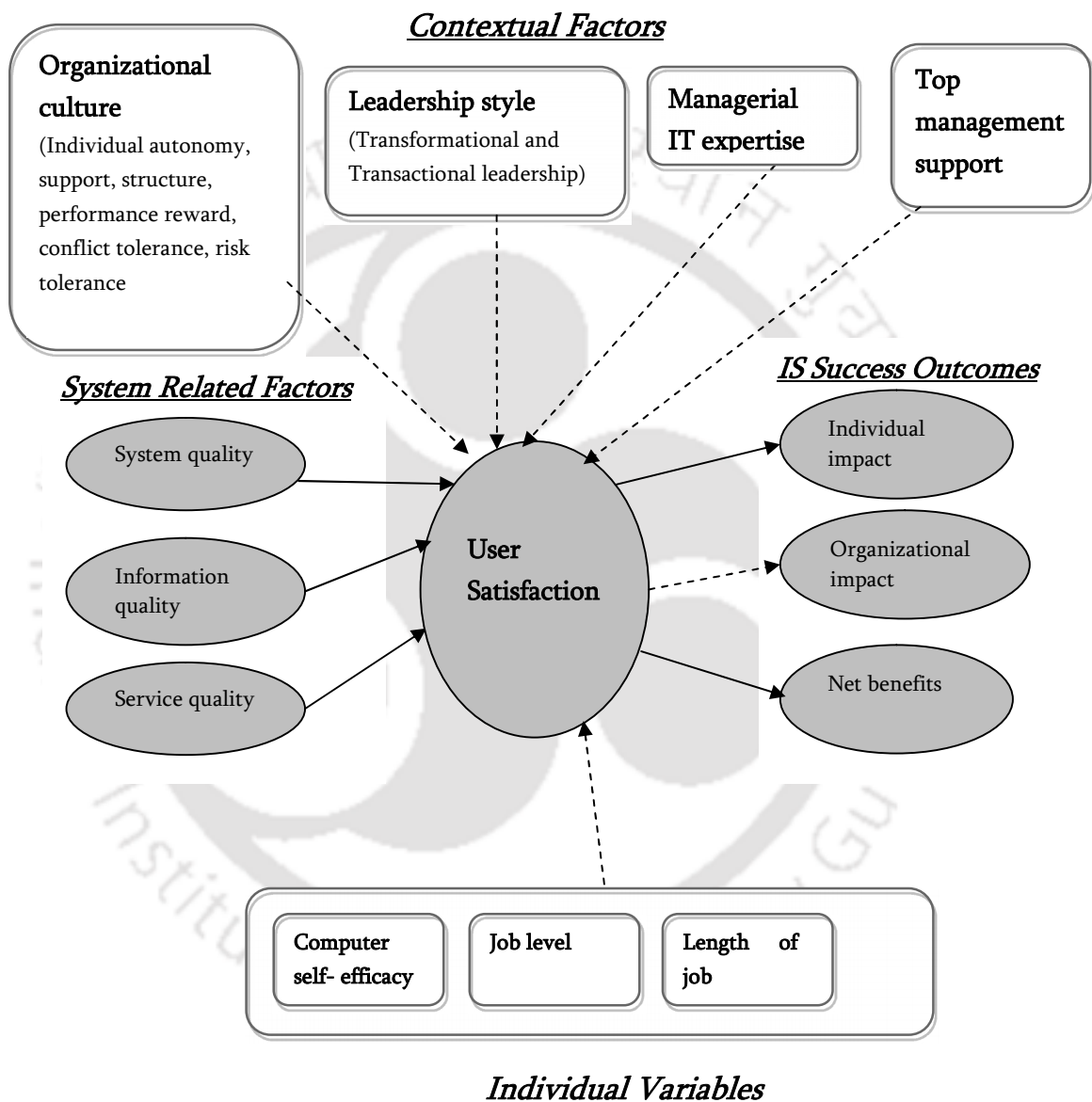
(2002) stated that in a mandatory setting, user attitude towards the system and not its usage, better represents satisfaction with the system. Therefore, the present research model included user satisfaction as the key construct and did not include system usage or intention to use dimensions.

2. In the updated D&M model of IS success (DeLone & McLean, 2003) there is a path from user satisfaction to net benefits and another path from net benefits to user satisfaction. This feedback link from net benefit to user satisfaction is excluded in the present model in order to avoid complexity. Similar practice has been adopted by several other researchers like Petter and McLean (2009), Urbach et al. (2009), Wang and Liao (2008). Recently, Khayun et al. (2012) employed the DeLone & McLean IS success model (2003) for evaluating the success of e-excise systems in Thailand by excluding the feedback loop to avoid model complexities.

3. This model extended the D&M model by including many new variables. It is clear from the literature review that variables like user satisfaction, individual impact and organizational impact will be influenced by a range of organizational and managerial and individual difference factors. Thus, organizational culture, leadership, support from the top management, managerial IT expertise, computer self-efficacy, job level, and length of job will directly influence the overall satisfaction level of users and will also exert their influence on individual and organization separately and jointly. Therefore, these variables were added in the model apart from the system related variables of D&M model in order to understand the multidimensional nature of IS success.

4. One of the unique aspects of this research model is that it conceptualized outcome measures in terms of individual impact, organizational impact, and the combined effect of both the individual and organizational impacts as net benefits. In

this connection, DeLone and McLean (2003) contend that it is the researcher's responsibility to define clearly and carefully the stakeholders and context in which benefits are to be measured.



Keys:

Oval boxes and solid lines indicate the IS success model (DeLone and McLean, 1992; 2003).

Rectangular boxes indicate the proposed extension of the D&M IS success model.

Dotted lines indicate the proposed extended path from four contextual variables and three individual variables to user satisfaction; and user satisfaction to organizational impact.

Note that only the mediation paths are shown, and the main effects of predictor variables on criterion variables are not shown because showing all these paths would render the diagram's interpretation less clear.

Figure 3.1: Proposed Research Framework for Banking IS Success (BIS)

3.5. Research Hypotheses

A set of hypotheses were developed from the research model and were empirically tested. These hypotheses are discussed below:

1. Relationship between systems related variables and user satisfaction

Many researchers have acknowledged the importance of quality variables (information quality, system quality, and service quality) in influencing user satisfaction (Freeze, Alshare, Lane, & Wen, 2010; Rai et al., 2002; Seddon & Kiew, 1994; Wang, 2008; Wang & Liao, 2008). The hypothesized relationship between systems related variables and user satisfaction are based on the theoretical and empirical work of DeLone and McLean (1992, 2003). They stated that system quality, information quality and service quality separately and jointly affect user satisfaction. Rai et al. (2002) found that all paths coefficients among IS success dimensions of the D&M model were significant.

(a) Information quality and user satisfaction

Information quality refers to the quality of the output produced by the banking information system in the form of reports and on-screen information. The desired characteristics of the information quality for effective banking information system are content, accuracy, clarity, currency, timeliness, relevance, understandability and precision. Providing complete and correct information of customer's account is the basic goal of a banking information system. Clarity and understandability of the relevant content is extremely important in this context.

Theory of Reasoned Action (Ajzen & Fishbein, 1980) proposed that beliefs about the objects are linked to attitude towards the object. Wixom and Todd (2005)

categorized constructs related to system and information as object based beliefs and user satisfaction as attitude. It suggests that if a user is satisfied with the quality of the information he receives from the system, he is more likely to be satisfied with the system and would perceive that the system will enhance his performance.

There is strong support in the literature regarding the relationship between information quality and user satisfaction (Iivari, 2005; Igbaria & Tan, 1997; Wixom & Todd, 2005; Wu & Wang, 2006). Several researchers like Almutairi and Subramanian, 2005; McGill et al., 2003; Petter and McLean, 2009; Rai et al., 2002; Seddon and Kiew, 1996; Seddon and Yip, 1992 found a consistent relationship between these dimensions at the individual level of analysis. Hussein (2009) examined the success of Egyptian banking information system, and found a significant relationship between information quality and user satisfaction. Thus, the following hypothesis is proposed:

H1a: Information quality will be positively related to user satisfaction.

(b) System quality and user satisfaction

System quality refers to the extent of individual's perception regarding system's performance. High quality banking information system comprises of characteristics like ease of use, ease of learning, user requirements, user friendliness, functionality, flexibility, sophistication, and customization.

DeLone and McLean (2003) stated that high quality system will be associated with greater user satisfaction and positive net benefits and vice versa. A slow, difficult and complex system would waste time and energy of the users. Consequently, it would have detrimental effect on the user satisfaction towards the system. User

satisfaction is a key dimension for the system to be considered successful in the mandatory context (Iivari, 2005).

At the individual level of analysis, there is strong empirical support for the system quality and user satisfaction in the context of different types of IS like management support systems (Gelderman, 2002), knowledge management system (Kulkarni, Ravindran, & Freeze, 2006; Wu & Wang, 2006), website system (Palmer, 2002). Perceived ease of use also has a significant relationship with user satisfaction. Many researchers reported a strong positive relationship between system quality and user satisfaction (Hussein, 2009; Igabaria & Tan, 1997; McGill et al., 2003; Rai et al., 2002; Seddon & Kiew, 1996; Wixom & Todd, 2005). Petter and McLean (2009) found a significant positive relationship between system quality and user satisfaction in a meta-analysis. Therefore, following hypothesis is proposed:

H1b: System quality will be positively related to user satisfaction.

(c) Service quality and user satisfaction

Service quality refers to attitude or perception of users regarding the level of services given by the IS department in terms of proper assistance and consultation, explanation to the problem, and future suggestions.

Literature reveals a mixed support for the relationship between service quality and user satisfaction. Use of multiple methods to measure service quality may be one of the reasons for inconsistent findings (Petter et al., 2008). Support and services provided by the IS department and the relationship between IS function and its users, has an impact on user satisfaction. However, good understanding between the IS team and users during implementation phase do not result in increased satisfaction of the related system. Choe (1996) found no significant relationship between training and

education provided by the IS department and user satisfaction. Petter and McLean (2009) examined through meta-analysis that the hypothesized relationship between service quality and user satisfaction found to be non-significant. However, Kettinger and Lee (1994) reported a significant positive relationship between service quality and user satisfaction when SERVQUAL instrument is used to measure service quality. The above findings suggest the sensitivity of the construct (Petter et al., 2008) towards the way it is measured. The present study proposes the proposition that:

H1c: Service quality will be positively related to user satisfaction.

2. Relationship of user satisfaction with three IS success outcome variables

(a) User satisfaction and individual impact

User satisfaction has been considered as an important factor to IS success because end users' satisfaction towards an IS plays a vital role in the efficient utilization of the system. Some studies have found a strong support for the relationship between user satisfaction and individual impact (Iivari, 2005; Seddon & Kiew, 1994; Igbaria & Tan, 1997). User satisfaction has been found to have positive impact on the end users' job (Guimaraes & Igabaria, 1997; Doll & Torkzadeh, 1989), performance (McGill et al., 2003), productivity and effectiveness (Rai et al., 2002), and job satisfaction. Etezadi- Amoli and Farhoomand (1996) reported that six factors (ease of use, functionality, and documentation, quality of output, support, and security) of end user computing satisfaction explained 50% variance in end user performance. They also found that satisfaction with the quality of output and functionality of the system emerged as most significant predictors.

Moreover, Iivari (2005) in the context of mandatory information systems found that the user satisfaction is a strong predictor of individual impact. However, it

was found that user satisfaction is weakly related to decision-making performance (Yuthas & Young, 1998). DeLone and McLean (1992) proposed that user satisfaction will directly affect individual impact (performance). Higher user satisfaction may imply a better appreciation of a system. When a system satisfies the users, it is perceived to be useful and has a higher impact on the user's performance and his or her effectiveness. Therefore, this study expected that user satisfaction would have a significant positive effect on individual performance, leading to the following hypothesis:

H2a: User satisfaction will be positively related to individual impact.

(b) User satisfaction and organizational impact

Very few empirical studies addressed the relationship between user satisfaction and organizational impact. DeLone and McLean (1992) identified only three studies that studied relationship of user information satisfaction (in terms of system quality, information quality and/or user satisfaction) and IS effectiveness in terms of organizational impact. Among these three studies only Miller and Doyle (1987) analyzes the relationship between user satisfaction and organizational impact. Gelderman (1998) investigated the association between user satisfaction and organizational impact and found that satisfaction is correlated to performance based on profitability and revenues. The present study assumes that high levels of user satisfaction would lead to an improved organizational performance. However, the empirical support for this assumed relationship is very limited. So, it is hypothesized:

H2b: User satisfaction will be positively related to organizational impact.

c) User satisfaction and net benefits

Several empirical findings are suggestive of strong association and causal link between user satisfaction and net benefits (Guimaraes & Igarria, 1997; Igarria & Tan, 1997; Iivari, 2005; McGill et al., 2003; Rai et al., 2002; Torkzadeh & Doll, 1999; Yuthas & Young 1998; Yoon & Guimaraes, 1995). Wang (2008) found user satisfaction to be a significant determinant of Intention to use (net benefit operationalized as intention to use) in the e-commerce context. Petter and McLean (2009) examined through meta-analysis that the hypothesized relationship between user satisfaction and net benefits at the individual level was found to be significant. Further, the assumed positive relationship between the user satisfaction and net benefits may vary depending on the conceptualization and operational definition of net benefits. However, for the present study it is hypothesized:

H2c: User satisfaction will be positively related to net benefits.

3. Relationship of leadership style with user satisfaction and IS success outcome variables

Burns (1978), and Bass (1985) noted that transformational leadership style motivates and appeals to follower's ideals and values to do more. Such a leader tries to inspire, set directions and vision for the subordinates' to put extra efforts and perform beyond expectations. He encourages followers to participate and take initiatives. The leader adopts a mechanism for influencing IS-related outcomes. The mechanism includes leader's strategic and tactical actions, role modeling, creating intellectual stimulation, support for user's individual needs, formulation of strong vision and dispensing contingent rewards.

Bennett (2009) examined the leadership style of IT managers and found that of all the three leadership styles (transformational, transactional and passive/avoidant), transformational leadership was the strongest predictor of extra effort, effectiveness, and satisfaction with the manager. He found that transformational leadership is associated with the will to succeed, effort and productivity. The findings are consistent with many other studies (Avolio & Bass, 2004; Avolio, Bass, & Jung, 1999; Judge & Piccolo, 2004; Lowe et al., 1996). Hussein et al. (2005) examined the success of information systems in Malaysian public sector and found that management style as the significant predictor of IS success. Studies by Lu and Wang (1997), and Igarria and Nachman (1990) found that leadership correlates significantly and positively with user satisfaction. Rezaei et al. (2009) found that leadership significantly correlated with MIS success factors. In many contexts, transactional leader also improves the efficiency of the followers (Bass & Avolio, 1990). Transactional leader emphasizes existing values and usually focuses on increasing efficiency through routine practices. However, there have been few studies that have investigated the contribution of leadership in evaluating success of information systems in the banking context. The present study proposed that leadership style (transformational leadership and transactional leadership) is associated with user satisfaction and IS outcomes. The following two hypotheses are:

H3a: Leadership styles (transformational leadership and transactional leadership) will significantly predict user satisfaction

H3b: Leadership styles (transformational leadership and transactional leadership) will significantly predict IS success outcomes (individual impact, organizational impact, and net benefits).

4. Relationship of organizational culture with user satisfaction and IS success outcome variables

Culture is a complex pattern of commonly held and shared beliefs, values, and assumptions that influences employee's perceptions and behaviour (Dewett & Jones, 2001; Ke & Wei, 2008). Culture of the organizations exerts a strong influence on how its members will accept and utilize the IS resources. Over last several decades, a large number of studies have been proposing that organization culture as an important factor in the success or failure of information systems adoption (Jackson, 2011). Davison and Martinsons (2003) observed a growing trend of addressing the organizational cultural issue in several studies. One reason for this trend may be that, many IS initiatives fail or are under performing due to misfit between culture and the IS, or the failure of the manager to understand culture and its influence on IS.

Organizational culture may have many dimensions such as autonomy, support, tolerance for conflicts and risk, individual responsibility, recognition for outstanding performance and emphasis on rules and regulations and so on may influence effective utilization of banking IS. A supportive culture plays an important role in organizations like banks where smooth operations among different functional units are essential. A supportive culture give a feeling to its employees that they are valued and so to reciprocate the same to their organization they too are encouraged towards the better usage of IS. Moreover, a supportive culture may promote employees' willingness to accept individual responsibility and responsibility for their mistakes (Ke & Wei, 2008).

Culture of tolerance for risk allows its members to experiment with new ideas and test its feasibility and effectiveness. Such a culture encourages its employees to be innovative, take their own decision in response to demand of the situation and be

responsible for their decisions (Ke & Wei, 2008). Culture with high tolerance for risk will help organization to maximally utilize IS with more innovative ideas.

Culture of autonomy and participative decision making encourages employees to express and present their ideas freely. Consequently, such culture will increase commitment and satisfaction. Additionally, even for a mandatory information system, a dissatisfied user may mentally reject the system and under utilize or sabotage the system (Markus, 1983). This results in reduced effectiveness of the system and even reduced efficiency of the user also. Organization that allows its employees to share ideas and problems with the supervisors signals its employees that they are not forced users. Organization that nurtures the culture of recognition for outstanding performance, make their employees more loyal and committed. This help the employee's to satisfy their higher order needs of self actualization and builds positive attitude towards the system. Therefore, it is proposed that:

H4a: Organizational culture (individual autonomy, support, structure, performance reward, individual responsibility, risk tolerance, and conflict tolerance) will significantly predict user satisfaction.

H4b: Organizational culture (individual autonomy, support, structure, performance reward, individual responsibility, risk tolerance, and conflict tolerance) will significantly predict three IS success outcome variables (individual impact, organizational impact, and net benefits).

5. Relationship of system related factors with user satisfaction and IS success outcome variables

Information system related factors (system quality, information quality, and service quality) play a vital role in the outcome measures such as user satisfaction,

individual impact, organizational impact and net benefits. Many studies reported significant association between the system related factors and user satisfaction. In the context of a mandatory information system use, Iivari (2005) found that perceived system quality and perceived information quality were significant predictors of user satisfaction with the system. Several instruments (Bailey & Pearson, 1983; Doll & Torkzadeh, 1988; Ives et al., 1983) have been developed to measure user satisfaction in terms of attributes such as system quality and information quality. These instruments have used as an independent measure of overall user satisfaction to test the predictive validity of the measure (Iivari, 2005). These studies have consistently reported significant correlation between user satisfaction (system quality and information quality) and the overall satisfaction with the system. Seddon and Kiew (1994) found that information quality and system quality are significant determinants of overall satisfaction. Similar results were reported by Rai et al. (2002). Studies in the marketing discipline also suggests that perceived system quality, perceived information quality and perceived service quality are antecedents of overall satisfaction (Spreng, Mackenzie, & Olshavsky, 1996).

There is moderate support in IS literature for the impact of information quality on individual performance (Petter et al., 2008). DeLone and Mclean (1992) identified three studies that found a significant association between information quality and individual impact. Hussein (2009) found a positive relationship between these two variables in the Egyptian banking sample. The relationship between system quality and individual impact has moderate support in the literature. Some studies have shown a positive association (Etezadi-Amoli & Farhoomand, 1996; Ifiando, 2007; Seddon & Kiew, 1994). However, few studies have found no relationship between them (Goodhue & Thompson, 1995). Literature reveals that the relationship between

service quality and individual impact has received moderate support in IS studies at the individual level of analysis (Petter et al., 2008). Kettinger and Lee (1994) observed that service quality focus on users needs and help them to reach the organizational objectives.

Literature shows ample evidence that the three quality dimension leads to improved organizational performance in terms of process improvement, productivity and profitability (DeLone & McLean, 1992; Seddon, 1997; Rai et al., 2002; Seddon & Kiew, 1994). Teo and Wong (1998) investigated the direct relationship between system quality and organizational impact, and information quality and organizational impact. Kettinger and Lee (1994) identified service quality as an important variable that affects positive IS outcomes.

Prior studies observed that perceived quality as a direct antecedent of user satisfaction, which in turn is a direct driver of Intention to reuse (conceptually close to the notion of net benefits) in the e-commerce systems context (Teas & Agarwal, 2000; Wang, 2008). In an empirical study in e-commerce domain, Wang (2008) found that out of three quality constructs service quality had the strongest total effect on intention to use (net benefits). Therefore, the present study conceptualized as:

H5a: System related factors (system quality, information quality, and service quality) will significantly predict user satisfaction.

H5b: System related factors (system quality, information quality, and service quality) will significantly predict three IS success outcomes (individual impact, organizational impact, and net benefits).

6. Relationship of individual variables with user satisfaction and IS success outcome variables

The importance of individual characteristics in influencing the success of information system has been emphasized by many researchers in the early stage of research such as Lucas (1978), and Zmud (1979). Individual's efficacy to use the computer plays a significant role in affecting end users attitude towards the system. Higher computer self efficacy increases the likelihood of IS success. Research findings on the influence of computer self-efficacy on IS success are mixed. Igbaria and Nachman (1990) reported that users with computer background are likely to be more confident in their ability to use the system and are more satisfied with the system. Users' with high level of computer self-efficacy are more comfortable with the system. These users finish their task quickly and try to discover new uses. This leads to increased satisfaction and enhanced performance of the individual. Further, they reported that at the organizational level computer self-efficacy was not found correlated with end user satisfaction.

User attitude and behaviour towards IS is expected to vary with users' work experience. Length of job is measured as the total number of years an individual is in job. Mixed findings are found in several studies. For example, Schewe (1976), and Lucas (1978) found that users possessing longer tenure in the job display a more positive attitude towards the system. However, Hussein (2009) studied length of job in the context of Egyptian banking system and found that there is no relationship between tenure and individual's satisfaction with the IS. Khalil and Elkordy (1997) found that work experience have an insignificant relationship with overall satisfaction and system use.

Job level determines the individuals responsibility and decision-making power, which determines his informational needs (Lucas, 1982). Hussein (2009) found a positive relationship between organizational level of employees and user satisfaction. This finding is consistent with the findings of Lucas (1982), and Khalil and Elkordy (1997). They suggested that users' at higher managerial levels are more satisfied with the system. However, several other studies reported no correlation between job level and user satisfaction (Igbaria, 1992). In the context of the present study, following hypotheses are proposed:

H6a: Individual variables (computer self-efficacy, length of job, and job level) will significantly predict user satisfaction.

H6b: Individual variables (length of job, job level, and computer self efficacy) will significantly predict three IS success outcomes (individual impact, organizational impact, and net benefits).

7. Relationship of top management support with user satisfaction and IS success outcome variables

Top management's strong support, participation, commitment, and knowledge play a crucial role in making IT successful. It is conceptualized as the involvement of the senior executives and top level management in terms of allocation of resources, their awareness, vision and understanding of the strategic potential of IT.

Several studies reported that top down management support is a key predictor of IS success in an organization (Ang et al., 2001; Grover et al., 1996; Hussein et al., 2005; Jarvenpaa & Ives, 1991; Thong et al., 1996). Top management support is essential to reduce users' negative attitudes and for overcoming the resistances of employees (Yoon, Guimaraes, & O'Neal, 1995). Guimaraes and Igbaria (1997)

identified top management support as an important factor affecting user satisfaction, use and IS impacts in their study of client/ server systems. Yoon and Guimaraes (1995) suggested that top management support is essential for providing the necessary resources for effective use of IS. Senior executive's support is also essential in fostering users' interest towards IS. It helps in enhancing his satisfaction with IS. Symbolic actions of support by senior managers also contribute to successful IS implementation (Sharma & Yetton 2003). Indeed, management's positive attitude towards IS functions have been found to be a likely indicator of IS acceptance. Thus, visible support and total commitment from top management encourages positive user attitude towards information systems. Consequently high levels of top management support may results in higher user satisfaction of information systems and promote their successful utilization. Therefore, it is assumed that top-management support will have significant influence on IS success.

H7a: Top management support will significantly predict user satisfaction.

H7b: Top management support will significantly predict three IS success outcomes (individual impact, organizational impact, and net benefits).

8. Relationship of managerial IT expertise with user satisfaction and IS success outcome variables

Managerial IT expertise refers to managers' experience and knowledge in information technology (Rezaei et al., 2009). This includes his experience in technology, awareness in IT advancements, interest and understanding about latest technology (Jarvenpaa & Ives, 1991). Jaravenpaa and Ives (1991) found that managers with appropriate knowledge and understanding about the system are more productive, proactive and have favourable attitude towards IT in comparison to

managers with little or no knowledge of the technology. Lack of experience and knowledge regarding the system brings indifference towards the system which may affect the users' attitude and performance too.

In Banks, managers and senior executives by their guidance, knowledge and understanding ensure that the subordinates use the systems in the best possible manner. Hussein et al. (2005) indicated the managerial IT expertise is positively related to IS success dimensions and the results of the study found that managers who understands the importance of IT will work towards the success of IS in his organization. Their findings are consistent with the findings of Ang et al., 2001; Boynton et al., 1994; and Rezaei et al., 2009. The present study, therefore, proposes that managerial IT expertise influences IS success dimensions and develop the following hypothesis:

H8a: Managerial IT expertise will significantly predict user satisfaction.

H8b: Managerial IT expertise will significantly predict three IS success outcomes (individual impact, organizational impact, and net benefits).

9. Mediating effect of user satisfaction on the relationship between leadership and IS success outcome variables

Transformation leader inspires the values and ideals of followers and inspire them to perform beyond expectation. Transformational leadership enhances IS success by instilling pride, confidence, trust and commitment in the users. Tarafdar and Vaidya (2006) investigated the influence of leadership in the adoption of e-commerce technologies. Cho et al. (2011) examined the positive impacts of transformational leadership on IS success in banking organizations. Their results supported the hypothesized relationship. Leader's vision is a continuous

psychological support for the follower (Ke & Wei, 2008). Senior executives or managers by expressing their vision clearly and explaining the rationale for various IS related activities can provide them with relevant information needed for completing the task. This increases the followers' sense of importance and value of task and thus develops a feeling of commitment. Such a leader stimulates follower's to look beyond their own interest and focus towards organizational goals. Transformational leader by role modeling appeals to the value system of the follower and thus fosters an atmosphere conducive to effective IS utilization. Several studies have tested positive association of transformational leadership with organizational commitment, organizational citizenship behaviour, follower's motivation, individual and organizational level outcomes and leader effectiveness (Cho et al., 2011; Judge & Piccolo, 2004).

Transactional leader, on the other hand, focus on contractual relationship between leader and his subordinates in terms of expected performance in exchange of certain rewards (Thite, 2000). The cost-benefit relationship between them results only in expected outcomes or an average performance. Contingent reward is though a characteristic of a transactional leader is an essential trait for a successful leader because it influences followers through positive reinforcement. The leader by clarifying task and associated rewards (Thite, 2000) to the followers ensures appreciation for good work, recommendation for pay increase and promotion. This works as an extrinsic motivation to work with more commitment, dedication and vigor. The present study therefore assumes that user satisfaction will have a mediating effect on the relationship between leadership and IS outcomes. Hence the present study proposes:

H9: User satisfaction will mediate the relationship between leadership styles (transformational leadership and transactional leadership) and IS success outcome variables (individual impact, organizational impact, and net benefits).

10. Mediating effect of user satisfaction on the relationship between organizational culture and IS success outcome variables

Several researches have proved that culture influences behaviour, thinking, perception and action of the employees. Culture creates certain values and beliefs that influence the way employee accomplish their duties and guide their decisions and behaviours (Schein, 1985). Symbolic meanings imposed by other members are also instrumental in building the perception towards the system. Gregory et al. (2009) investigated the mediating relation of employee attitude with culture and effectiveness. The results suggest that employee attitude was the significant mediator, and group culture emerges as a significant predictor of effectiveness. They stated that culture directly affects employee's morale, commitment and job satisfaction and then these intermediate factors affects organizational effectiveness. These findings are consistent with Siehl and Martin (1990), and Denison (1990).

Researchers have observed that organizational culture have a significant positive impact on organizational effectiveness as well as on the performance of individuals. It affects an individual's participation, involvement and commitment (Zamanou & Glaser, 1994). Culture of support and cohesiveness enhances motivation and commitment of the members. It develops a sense of belonging to a group. Group dynamics play a critical role in shaping the values that are tightly held by the members. It helps employees to focus towards common goals and objectives, reduction of conflicts, and commitment towards organizational mission and vision.

Siehl and Martin (1990) suggested that culture influences employee's attitude which in turn impacts organizational effectiveness.

In literature many have studied the role of organizational culture in various organizational settings (Denison, 1990; Denison & Mishra, 1995), yet there is scant empirical literature to support this hypothesis. The present study fill the void by exploring employee attitude as a mechanism through which culture influences IS performance. The above discussion provided significant evidence to propose hypothesis:

H10: User satisfaction will mediate the relationship between organizational culture (individual autonomy, support, conflict tolerance, structure, risk tolerance, performance reward and individual responsibility) and IS success outcome variables (individual impact, organizational impact, and net benefits).

11. Mediating effect of user satisfaction on the relationship between systems related factors and IS success outcome variables

The Hypothesis 11 proposes that the three quality facets indirectly impact IS success outcomes, through user satisfaction. Mediating relationship is hypothesized by Freeze et al. (2010) in the context of mandatory e-learning information systems. The authors suggested that high system quality and information quality of e-learning system are necessary for high levels of user satisfaction and ultimately its leads to strong e-learning system success. A system that user's perceive as user friendly, and easy to use is more likely to enhance his/her satisfaction. Similarly, a good information quality represents more accurate, valuable, useful, timely and relevant information. If the output is inaccurate, value less, and irrelevant it would have

detrimental effects on the attitude and satisfaction of the user. Igbaria, Guimaraes, and Davis (1995) examined perceived ease of use and perceived usefulness and found that if users perceive the system as easy, it may contribute to his overall job performance. Seddon and Kiew (1994) tested the indirect relationship between information quality and individual impact and organizational impact. Almutairi and Subramanian (2005) found a significant indirect association between information quality and individual impact but found no association between information quality and organizational impact in the context of Kuwaiti private sector.

Early theorist suggested that satisfied employees are more productive than dissatisfied ones (Gregory et al., 2009). Early in 1961, Likert suggested that a satisfied employee will willingly perform wholeheartedly to their potential. This increased individual productivity will result in increased organizational outcomes. Social exchange theory (Organ, 1977) explains the relationship between employee's attitude and organizational effectiveness. Theory states that employees feel grateful if they are satisfied and therefore, reciprocate by behaving in a manner that helps the organization increase its effectiveness. Hence the present study proposes the following hypothesis:

H11: User satisfaction will mediate the relationship between system related variables (system quality, information quality, and service quality) and IS success outcome variables (individual impact, organizational impact, and net benefits).

12. Mediating effects of user satisfaction on the relationship of individual variables with IS success outcome variables

It is proposed that user satisfaction will mediate the relationship between the individual variables (computer self efficacy, length of job, and job level and outcome variables (individual impact, organizational impact, and net benefits).

Computer self efficacy could be an effective predictor of satisfaction and other outcomes of IS success. Individuals having high self efficacy are more energetic, have their own learning style and are confident about their own capabilities. When the individuals with high computer self-efficacy face any problem in performing the task, they adopt a different outlook and strategies to solve the problem. On the other hand, individuals with low self-efficacy lacks confidence in their own capabilities, though they accept the system but do not utilize it fully or do not question if they have any problems. Lazer, Jones, Hackley, and Shneiderman (2006) found that lack of computer knowledge can cause deep frustration with the systems. Users with low computer self-efficacy will feel discomfort in using even the user friendly system also. They feel burdened and take longer time to finish even the simple task and put more efforts and time for doing the same amount of work which individual with high computer self-efficacy could do it with lesser time and efforts. This undermines their satisfaction with the system as well as their performance. Therefore, the individuals with high computer self-efficacy have better performance record than individuals with low computer self-efficacy.

Compeau and Higgins (1995) observed that individuals who have prior experience with computers will be able to use such systems for their own development and betterment and thus even for their organization. The individuals who are at ease with the computers and have no fear of it will show more confidence in

using it. Torkzadeh and Lee (2003) indicated that end user computer skills can increase user involvement, satisfaction, commitment and acceptance of IT systems. On similar lines, the present research assumes that users with a good knowledge of computers would be useful in ensuring effectiveness of IS.

In banking context, managers do not generally interact directly with the system therefore they evaluate the system objectively (Senn, 1982) in terms of speed, accuracy and cost reduction. So they seem to be more satisfied with the system. On the other hand, at the medium level, managers interact directly with such systems and therefore they evaluate it subjectively. So they seem to be less satisfied with the system. So, it is hypothesized:

H12: User satisfaction will mediate the relationship between individual variables (computer self efficacy, length of job, and job level) and IS success outcome variables (individual impact, organizational impact, and net benefits).

13. Mediating effect of user satisfaction on the relationship between top management support and IS success outcome variables

Top management support and direct participation in IS activities not only indicates the importance of information technology to the management but it also ensures their cooperation and support to the information system. Simultaneously, it communicates a positive signal to the end-users and ensures greater commitment and involvement from them. It is an established fact that only satisfied users will be committed towards effective utilization of system. Lack of user satisfaction undermines the overall success of the IS. Theoretically, Fishbein and Ajzen (1975) discussed that organizational support is an important factor which influences an individual's perception and attitudes towards IS. Lack of support from management is

considered as a barrier to effective IS usage (Guimaraes & Igbaria, 1997; Sharma & Yetton, 2003). Users who are encouraged by management are more motivated to explore the system. In comparison with employees who received less support, these employees have greater satisfaction and greater belief in helpfulness of the systems functions. Eisenberger, Huntington, Hutchison, and Sowa (1986) stated that perceived organizational support is linked to positive employee behaviour and feelings.

Thus, it can be hypothesized that when senior executives lend their support in form of resources, knowledge, vision and symbolic actions to support information technology, they tend to foster a greater use of information systems within that organization. Under these circumstances, staff is more willing and satisfied. As individual outcomes improve, the performance of the whole organization would increase. Therefore, it is hypothesized that:

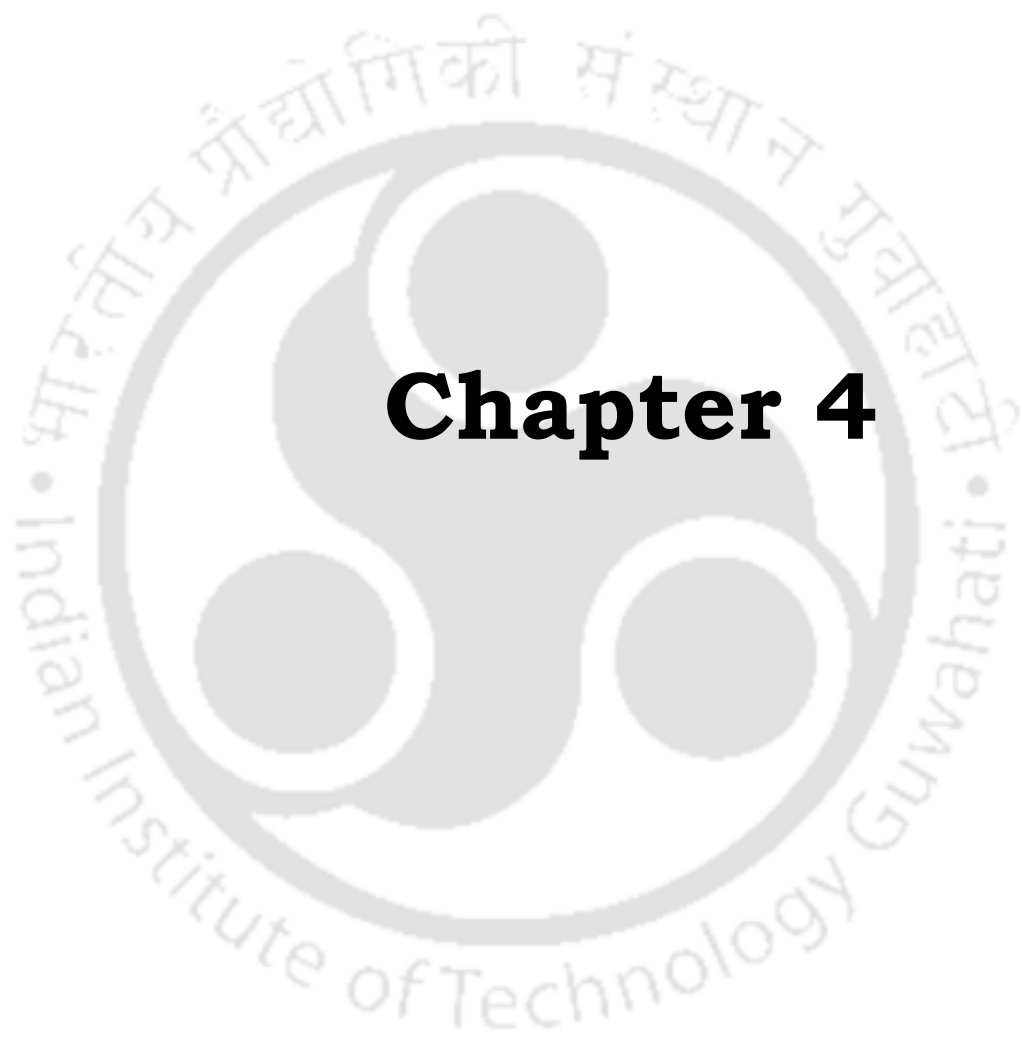
H13: User satisfaction will mediate the relationship between top management support and IS success outcome variables (individual impact, organizational impact, and net benefits).

14. Mediating effect of user satisfaction on the relationship between managerial IT expertise and IS success outcome variables

When a manager or senior executive possess technological knowledge, he/she easily understands and accepts new ideas. In the banking environment, one reason for the under utilization of core banking system is lack of managerial IT expertise. Many managers lack confidence due to this knowledge barrier and thus hesitate in giving any suggestion or guidance to users. Several banks, particularly the small public banks delay the adoption of advance technology until they have immense pressure from external forces.

Lee and Kim (2007) empirically investigated the influence of managerial IT knowledge on implementation of internet based information systems. Lee and Kim (2007) stated that organization with less IT expertise has less technical knowledge and potential to experiment with new ideas. There is sufficient empirical evidence to support the proposition that managers having technical expertise are more inclined towards the better and effective utilization of IS. They lend their full support to the users in case of problems and difficulties in IS related activities. This helps in reducing their annoyance at the time of difficulties and enhances their trust and satisfaction with the system. Therefore, it is hypothesized that:

H14: User satisfaction will mediate the relationship between managerial IT expertise and outcome variables (individual impact, organizational impact, and net benefits).



Chapter 4



Chapter 4

Research Methodology

4.1. Introduction

In order to address research questions, a mixed method approach was adopted. *Mixed research* methods refer to combining both qualitative and quantitative research methods within a single study (Howe, 1988; Teddlie & Tashakkori, 2003). Teddlie and Tashakkori (2003) described mixed methods as the "third methodological movement" (following quantitatively and qualitatively oriented approaches). Creswell, Plano Clark, Gutmann, and Hanson (2003) defined a mixed methods study as "*a mixed methods study involves the collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research*" (Creswell et al., 2003, p. 212).

Over time, the use of mixed methods research is commonly accepted in the social science research community (Tashakkori & Teddlie, 1998). In IS research, several authors have equally recognized that qualitative and quantitative researches are not mutually exclusive (Howe, 1988), and that both can be combined. Both quantitative and qualitative methods have their own strengths and weaknesses. Quantitative research focuses on the objective, context-free inquiry and generalization of results from large samples. Quantitative research provides precise quantifiable research data, useful for testing and validating already constructed theories and large numbers of people can be studied with generalizable results. Qualitative research on the other hand focuses on the small numbers of cases that are studied to get rich

subjective data of personal meanings and experiences embedded in contexts. It is exploratory in nature and useful for studying new and complex phenomena.

Mixed method research helps to combine the strengths of both quantitative and qualitative methods. For example, quantitative research typically focuses on confirmatory research based on a large sample. The use of a subsequent qualitative study could provide more in-depth insight into the results of the quantitative study. The use of multiple methods is considered to be a form of “methodological triangulation” in which the validity of the findings can be strengthened by using multiple perspectives to investigate a phenomenon. The use of mixed research methods can lead to richer and more reliable results. It helps in answering broader research questions, provide stronger evidences with the help of convergence and corroboration of findings, and more complete knowledge to inform theory and practice (Creswell et al., 2003). It is indeed concerned with combining multiple research methods in a single study in order to investigate phenomena which cannot be fully accessed by only using one of the involved methods. The goal of mixed method is not to replace qualitative or quantitative research, but to combine the strengths of both methods and compensate their weaknesses in one study (Creswell et al., 2003).

Mixed method designs may include either sequential or concurrent nature of data collection. Sequential designs include quantitative and qualitative data collection and analysis sequentially. Here one method is generally dominant. In concurrent designs, both quantitative and qualitative approaches are used simultaneously. Here equal or unequal priority is given to two methods depending on the need.

The present study uses a sequential mixed method design to address the research questions. For the convenience of the readers the research questions of the present study are reproduced here: (1) What are the perceptions of employees

regarding success of banking information system? (2) How private and public sector banks differ regarding the factors affecting IS success? (3) To what extent causal pathways proposed by DeLone and McLean model are valid in Indian banking context? How can DeLone and McLean's model be extended to understand multidimensional aspects of IS success? (4) What organizational, managerial, individual variables exert their influence on IS success in Indian banks, in addition to factors proposed by DeLone and McLean model? (5) What are the key future challenges of banking information systems in the context of developing countries such as India? Research questions 1-4 were addressed by a quantitative study and research question 5 is addressed by a qualitative study.

This study was conducted in three phases. *In the first phase*, a pilot study on 50 bank employees was conducted for the adaptation and refinement of the various measures used for this study. *In the second phase*, a quantitative study (study 1) was conducted on 302 bank employees to test the 14 hypotheses proposed based on the pathways of the conceptual model of the study. *In the third phase*, a qualitative study (study 2) on 50 branch managers and other senior executives was conducted to understand the key future challenges associated with banking information systems.

Following sections discusses pre-testing of questionnaires, the sample, data collection procedure and the measure used in the quantitative study (study 1).

4.2. Pretest of Quantitative Questionnaires (Phase 1)

All the questionnaires used for the present study were pre-tested on a small sample of 50 bank employees (sample included branch managers, middle level managers and other employees) to check the ease of understanding and appropriateness of the questions. The booklet of questionnaires starts with

demographic information followed by three sections. *Section 1* comprises IS success measures, top management support, and computer self efficacy measures, *section 2* comprises measures of organizational culture, and *section 3* comprises measures of leadership, and managerial IT expertise (see Appendix A for questionnaires). Participants were satisfied with the content, structure, and language of the questionnaire to a large extent. However, they suggested few changes to be incorporated. Some specific suggestions included:

1. Changing the scaling of the questionnaire from seven points to five points as it will reduce confusions.
2. Questions related to personal information should not be the part of questionnaire (such as name) as it violates confidentiality.
3. Some participants also asked to change the wording of few statements used in the questionnaire as they perceived them as difficult to understand.

Based on the above feedback, few changes were made in the questionnaire such as name of the respondents and banks were removed, difficult wordings in some items were rephrased to make them easier to understand and all 7 point scales are converted to 5 point scales by removing two bipolar statement i.e. “somewhat disagree” and “somewhat agree”.

4.3. Method (Study 1)

4.3.1. Sample

The sample for the study 1 (*phase 2*) comprised of 302 bank employees from various banks located in five major cities of India, such as: Delhi, Dehradun, Guwahati, Lucknow, and Mumbai. The data was collected from 14 banks (public = 8

and private = 6), which represented broad cross section of Indian banks. Out of which, 211 employees are from public banks (161 males and 50 females), and 91 employees (62 males and 29 females) from private banks, all having minimum 2 years of experience of using the Core banking information systems. Permission for data collection from foreign banks could not be obtained as they refused to provide the data, saying that it is against their policy. The sample of 302 respondents comprised of 73.6% of male and 26.1% of female employees. The mean age of the participants was 38.47 years ($SD = 11.58$) ($M_{\text{males}} = 40.12$, $SD = 11.36$; $M_{\text{females}} = 33.81$, $SD = 10.97$). In order to gain the perception of end-users, the sample included diverse range of bank employees such as clerk, front desk executives and middle managers as they were found to be the primary users of the banking information systems. Moreover, branch managers and senior level managers were also invited to participate, so as to get the perception of senior executives also. The qualification level of the employees ranged from post graduation (54.1%) to under graduation (3.6%) and around 49.5% respondents have work experience ranging from 2 months-10 years. 25.4% have work experience of 21 to 30 years. This indicates that respondents have sufficient background in terms of being able to judge the effectiveness of the system. Among the total 302 respondents, 37.6% of them are at assistant manager level and 27.4% were in the post of clerk. Detailed descriptive statistics relating to the respondents characteristics are shown in Table 4.1.

Table 4.1: Characteristics of the Respondents (N=302)

Characteristics	Number	Percentage
Gender		
Male	223	73.6
Female	79	26.1
Age		
<30	123	40.6
31-40	45	14.9
41-50	63	20.8
>51	71	23.4
<i>Total Mean age = 38.47; SD= 11.58</i>		
<i>Male (Mean = 40.12; SD= 11.36)</i>		<i>Female (Mean = 33.81; SD= 10.97)</i>
Education		
Undergraduate	11	3.6
Graduate	127	41.9
Postgraduate	164	54.1
Job Level		
Clerk	83	27.4
Officers	53	17.5
Assistant Manger	114	37.6
Branch Manager	43	14.2
Senior Managers/cluster Head	9	3
Length of Job		
<10 years	150	49.5
11-20 years	35	11.6
21-30 years	77	25.4
31-40 years	39	12.9
> 41	1	.3
Bank Type		
Public	211	69.6
<i>Male= 161; Female= 50</i>		
Private	91	30
<i>Male= 62; Female= 29</i>		

4.3.2 Procedure

Survey for the present research was carried out in banks located in five major cities of India (Delhi, Dehradun, Guwahati, Lucknow, and Mumbai). Banks were first identified from various websites. Then, the senior most authority of the particular bank's branch was approached and the purpose of the present study was briefed to them. Many banks provided consent for data collection while some banks suggested taking permission from their respective HR department regarding the data collection. So, for many banks permission for data collection was taken from their HR department. While, informed consent was also obtained from all participants and thus the participation was completely voluntary. Furthermore, the participants were assured confidentiality of the data before distributing the questionnaire. Participating branches were promised that they will get results summary of the survey if they wish to know. As shown in table 4.2 the data was collected from 14 banks (public = 8 and private = 6), which represented broad cross section of Indian banks. A booklet containing all the questionnaires of the present study were distributed to the participants and collected after their completion (usually 1 to 2 weeks time period was given to them). All the questionnaires were self-administered. A total of 335 filled questionnaires were received. However, after closely scrutinizing the questionnaires, only 302 questionnaires could be used for the analysis. Remaining 33 questionnaires were incomplete and lacked necessary information. Appendix C shows the profiles of the banks from which data were collected. For maintaining anonymity, actual name of the banks were not disclosed.

Table 4.2: Distribution of Sample (N = 302) on the Basis of Bank Type

Bank Type	Number of Participants
Public Sector (8 Banks)	N = 211
Bank –A	57
Bank –B	54
Bank –C	16
Bank –D	22
Bank –E	7
Bank –F	18
Bank –G	19
Bank –H	18
Private Sector (6 Banks)	N= 91
Bank –I	18
Bank –J	22
Bank –K	12
Bank –L	21
Bank –M	9
Bank –N	9
Total 14 Banks	302

4.3.3. Measures

All the items used in the study were borrowed from the original source and modified to fit in the banking context. A summary of the measures employed in the

study is presented in Table 4.3. Detailed descriptions of each questionnaire used for the present study are discussed below:

Table 4.3: Summary of Measures Employed in the Study

Section	Measures	No of items	Scale
	Personal information data		
I	IS success	39	5 point
	Top management support	4	5 point
	Computer self efficacy	4	5 point
II	Organizational culture	31	5 point
III	Leadership style	41	5 Point
	Managerial IT expertise	4	5 point

4.3.3.1. Leadership Style

The Multifactor Leadership Questionnaire (MLQ) is an instrument developed by Avolio and Bass (1995) to measure leadership style. The MLQ has undergone several revisions in the recent past since 1985 and there has been large body of research done in various countries and cultures. The current MLQ (Form 5X) contains 45 items. Out of these 45 items, 36 items measures nine components (four items in each component) of leadership. The rest of the nine items assess three leadership outcomes: *extra effort*, *effectiveness*, and *satisfaction*. The nine components comprised of five factors of transformational leadership, three factors of transactional leadership and one non leadership component (*laissez faire*). Five factors of transformational leadership include: *idealized influence (attributed)* refers to

charisma, being confident and powerful and followers identification with the leader; *idealized influence (behavior)* refers to charismatic actions focused on values and missions; *inspirational motivation* allows leaders to share positive vision of the future and communicates high level of expectations and talks optimistically with enthusiasm; *intellectual stimulation* refers to leaders who challenge old ways of doing things and stimulate users to use creative problem solving skills; and *individualized consideration* refers to coaching followers and listening to their concerns and needs. Leaders with individualized consideration focus on their follower's individual strengths, abilities, skills and help them to achieve their higher order needs.

On the other hand, transactional leadership has three factors: *contingent reward* refers to an interaction between leader and follower that works on an exchange basis; *management by exception (active)* allows leaders to monitor performance and take timely action if the performance deviates, and leaders enforce rules to avoid mistakes; *management by exception (passive)* refers to the behavior when leader wait until the problem become serious. They wait to take corrective action till the problem is brought to their attention.

MLQ also includes a non leadership component known as *laissez faire*. It refers to total absence/ or avoidance of leadership. It is most inactive type of leadership style. However, the present study used 20 items for measuring transformational leadership and 12 items for measuring transactional leadership style and 9 items to measure outcomes, making it total of 41 items. MLQ consists of two forms, a rater form, to be filled by the subordinates, and a leader form to be filled by the leader. The present study used only the rater form to measure the subordinate's perception of their leader's behaviour.

MLQ questionnaire is a five point rating scale ranging from 0 (not at all) to 4 (frequently, if not always) for rating the frequency of observed leader behavior. In this study rating from 1 (not at all) to 5 (frequently, if not always) is used to measure the frequency of behavior to maintain uniformity of rating points with other scales used for this study. Similar procedure is followed by Jung, Wu, and Chaw (2008) who used this instrument to measure leadership style of CEO's.

The focus of the present study is only on transformational and transactional leadership styles dimensions. Therefore, the five behavioral components of transformational leadership were combined to get the score for transformational leadership style. Similarly, the three behavioral components of the transactional leadership style were combined together to get the scores for transactional leadership styles. Moreover, non-leadership factor (*laissez faire*) dimension was not included in the present study as it was not incorporated in the hypotheses. MLQ has been found to be a valid and reliable measure of leadership. Several empirical studies (Bass, Avolio, Jung, & Berson, 2003; Den Hartog, Van Muijen, & Koopman, 1997) have reported high reliability and validity of these factors. Antonakis et al. (2003), and Barge and Schlueter (1991) also supported the current MLQ-5X as being a valid and reliable instrument. Lowe et al. (1996) reviewed the MLQ dimensions and found strong reliability and validity.

4.3.3.2. Organizational Culture

A 53 item Organizational culture scale developed by Parida et al. (1990) was used to measure organizational culture. It aims to measure the degree of favorableness for culture of the organization as perceived by the members belonging to that organization. Original scale comprises two dimensions: *observable culture* (35 items)

and *inferable culture* (18 items). Observable culture is the culture that is visible from outside, it is what one can see in employees behavior in their way of doing things and visible in their communications. On the other hand, inferable culture is the culture consisting core values or underlying assumptions or beliefs and values that shape and guide behavior of the organizational members. The present study focuses only on the observable dimensions of organizational culture of Parida et al. (1990) in the context of IS success. People can very easily report about observable dimensions of organizational culture as they are more perceptible. On the other hand, inferable cultural dimensions include inner values, beliefs, norms of the organizational members that are embedded at the deepest level. Such dimensions are difficult to measure. In this connection, Schein (1985) pointed out that to get to the deepest level of culture is quite difficult and takes a lot of patience. It is difficult to decipher the underlying assumptions and the unobservable core of the culture through cross-sectional studies. Schein (1985) stated that artifacts and surface manifestations are easily observable through formal documents and even through survey responses. However, underlying assumptions need more probing through longitudinal studies.

Thus, the present study used only 31 items out of 35 items of observable culture that were found to be suitable in the context of banks (see Appendix A). These items measures six characteristics: *individual autonomy* (degree of independence and opportunity for exercising initiatives); *structure* (the degree to which rules, regulations and standard practices are used to control individual employee behaviour); *support* (the degree of warmth and support provided by managers); *risk tolerance* (the degree to which employees are encouraged to be innovative and risk-seeking); *performance reward* (the degree to which performances are rewarded); *conflict tolerance* (the degree to which conflict is present in peer and workgroups

relationships as well as the willingness to truth worthy and open about internal differences). The questionnaire is a five-point Likert type scale with categories ranging from 1 (very low) to 5 (very high). The scale reported a satisfactory test-retest reliability coefficient of .73 (Parida et al., 1990).

4.3.3.3. IS Success Measures

In order to empirically analyze DeLone and McLean's model (2003), all the variables in the DeLone and McLean model were operationalized by adopting items from various sources. Sources of these items are discussed below:

(a) **Information Quality** was measured using the End User Computing Satisfaction (EUCS) instrument developed by Doll and Torkzadeh (1988). The EUCS instrument measure comprises of ten items about *information quality* dimension and two items about *ease of use*. It has four factors related to information quality: *Information content, accuracy, format, and timeliness*. The fifth factor "ease of use" is a component of "system quality" (Seddon & Kiew, 1994). We have followed the recommendation of Seddon and Kiew (1994) to eliminate the ease of use related items from the information quality dimension. Thus, the present study used only ten items related to content, accuracy, format and timeliness (see Appendix A). The questionnaire uses five point Likert- type scale ranging from strongly disagree (1) to strongly agree (5). The test-retest reliability of the instrument was found to be satisfactory over time (Torkzadeh & Doll, 1991). The Cronbach's alpha reliability of this scale was found to be .92 (Doll & Torkzadeh, 1988). The instrument was regarded as comprehensive and it has been validated through several confirmatory analyses and construct validity tests (Chen, Soliman, Mao & Frolick, 2000; McHaney & Cronan, 1998; Xiao & Dasgupta, 2002).

(b) ***System Quality*** was measured using the seven items from the IS-Impact measurement instrument of Gable et al. (2008) and one item from the EUCS instrument of Doll and Torkzadeh (1988).

IS-Impact measure of Gable et al. (2008) is a 42 item questionnaire measuring five constructs: individual impact, organizational impact, system quality, information quality. This survey instrument also included two criterion measures of overall success. In the present study, only 7 items of system quality dimension out of 15 items that are relevant in the context of banking were used. The questionnaire uses five point Likert- type scale ranging from strongly disagree (1) to strongly agree (5) to measure system characteristics like quality of documentation, functionality, sophistication, user requirements, efficiency, flexibility, customization, ease of use and ease of learning, access and so on. The Cronbach's alpha value was reported to be .92 (Sedera & Gable, 2004). One item from the End User Computing Satisfaction (EUCS) instrument of Doll and Torkzadeh (1988) was additionally used to measure the user friendliness of the system.

(c) ***Service Quality*** was measured using five items from the scale developed by Wang, Wang, and Shee (2007) to measure E-learning System Success (ELSS). Original scale measures six dimensions of updated DeLone and McLean (2003) model using 34 items on a 7-point Likert type scale. Moreover, it measures service quality dimension with five items from the e-learner perspective. The present study adapted these five items in the banking context. The ELSS instrument showed good reliability and validity across studies and reported Cronbach's alpha score of .88 (Wang, Wang, & Shee, 2007).

(d) **Individual Impact** was measured by the six items of the perceived usefulness scale developed by Davis (1989). Perceived usefulness is operationalized as the degree to which the employee feels that by using a particular system would increase his job performance and productivity. Items of this scale reflects individual impact (Rai et al., 2002), that is, the impact of the system on users performance. This scale covers all important aspects of individual impact. Consequently, many other researchers used this scale to measure individual impact (Iivari, 2005). Originally, the scale asked the participants to rate the extent to which they agree with each statement on a seven point Likert type scale. However, for the present study, we have adapted this scale by converting it into five point rating scale (Strongly disagree to strongly agree). Similar adaptation of this scale was done by Seddon and Kiew (1994). Cronbach's alpha reliability of this scale was reported to be .98 (Davis, 1989; Seddon & Kiew, 1994). This scale exhibited high convergent, discriminant, and factorial validity (Davis, 1989).

(e) **Organizational Impact** was measured by using the organizational impact dimension of IS-Impact Measurement scale of Gable et al. (2008) and one additional item "overall, the system is linked to all delivery channels of the bank" was included in the questionnaire on the basis of empirical literature. IS-Impact Measure is a 42 item questionnaire measuring five constructs: individual impact, organizational impact, system quality, information quality. Additionally, it includes two criterion measures of overall success. Originally the scale consists of eight items in the *organizational impact* dimension. It refers to the extent to which an information system has promoted improvement in organizational results and capabilities. However, the present study used only four items from IS Impact scale, that are

relevant in the context of banks which measures the overall productivity, change in business process and positioning of the organization. The questionnaire uses five point Likert- type scale ranging from strongly disagree (1) to strongly agree (5) The Cronbach's alpha reliability of this scale was reported to be .92 (Gable et al., 2008). Furthermore, the instrument was found to have a consistent factor structure and a strong content validity (Gable et al., 2008).

(f) **User Satisfaction** was measured using Departmental Accounting System (DAS) Evaluation Questionnaire (Seddon & Kiew, 1994). The scale consists of 32 items to measure six dimensions: *system quality, information quality, overall satisfaction, perceived usefulness, importance of the system and usage of the system*. The present study used the four items of the *overall satisfaction* dimension. However, for the present study, the rating of this scale is changed from 7 points to five points for the convenience of the participants. Cronbach's alpha reliability of this scale was reported to be .92 (Seddon & Kiew, 1994). Additionally, one item was used from IS-Impact measurement questionnaire from Gable et al. (2008).

(g) **Net Benefits** construct was introduced in the updated DeLone and McLean model (2003). In their updated model, DeLone and McLean combined individual impact and organizational impact into a single variable named "net benefits" (Prybutok et al., 2008; Chien & Tsaur, 2007). There is plethora of methods to measure net benefits at both the individual and organizational level of analysis and it has been operationally defined in many ways: some researchers use the term "IS effectiveness" to subsume "individual impact" and "organizational impact" or "net benefits" (Urbach et al., 2009). Prybutok et al. (2008) measured net benefit with items incorporating

individual impact, organizational impact and satisfaction. In the context of this study, net benefits is operationally defined as the perceived benefits gained by the individuals as well as by the organization. In this study net benefits is calculated as the sum total of individual impact score and organizational impact score. This study tries to explore the impact of various factors on individual, organization and even the combine effect of individual impact and organizational impact. This approach will give a holistic view of the benefits.

4.3.3.4. Top Management Support

Top management support was measured by using the four items adopted from Lee and Kim (2007). The scale was empirically tested by them on Internet based information system in Korean companies. The scale measures the extent of top management support for information system on a seven point Likert type scale. Convergent and divergent validity of this scale was found to be satisfactory and Cronbach's alpha reliability of was found to be .84 (Lee & Kim, 2007). However, as already reported, considering the suggestions of respondents during pilot study, the scale is converted to five point Likert type scale by removing "somewhat disagree" and "somewhat agree" anchor points.

4.3.3.5. Managerial IT Expertise

Managerial IT expertise was measured by using the four items adopted from Lee and Kim (2007). They empirically tested the scale on IS professionals in the context of Internet based information systems. The scale measures the extent of awareness and level of knowledge of IS professionals related to information system, on a seven point Likert type scale. However, as already reported, considering the

suggestions of respondents during pilot study, the scale is converted to five point Likert type scale by removing “somewhat disagree” and “somewhat agree” anchor points. Author’s have reported a good construct validity of this scale and the Cronbach’s alpha reliability was reported to be .89 (Lee & Kim, 2007).

4.3.3.6. Computer Self-efficacy

The self-efficacy is the belief that one has the capacity to achieve a particular goal or task. Computer self-efficacy is the self-assessment of a person's ability to use computers and its applications to complete important tasks. However, for the present study, computer self efficacy is defined specifically in the context of the information systems used by banking employees. Therefore, it is operationalized as an individual employee’s ability and confidence in the systematic usage of the overall information system and its related components to complete important tasks. Computer self efficacy was assessed by using 4 items taken from the Computer self efficacy scale developed by Marakas, Johnson, and Clay (2004). The original scale has ten items. In the present study items were modified to fit in the context of bank employees. All the items were rated on a five point Likert scale ranging from 1 (“strongly disagree”) to 5 (“strongly agree”). Several studies used the scale in multiple contexts and reported high discriminant and convergent validity (Johnson, 2005; Cho et al., 2011). Cho et al. (2011) used the sample in the banking context and reported Cronbach’s alpha reliability above .86.

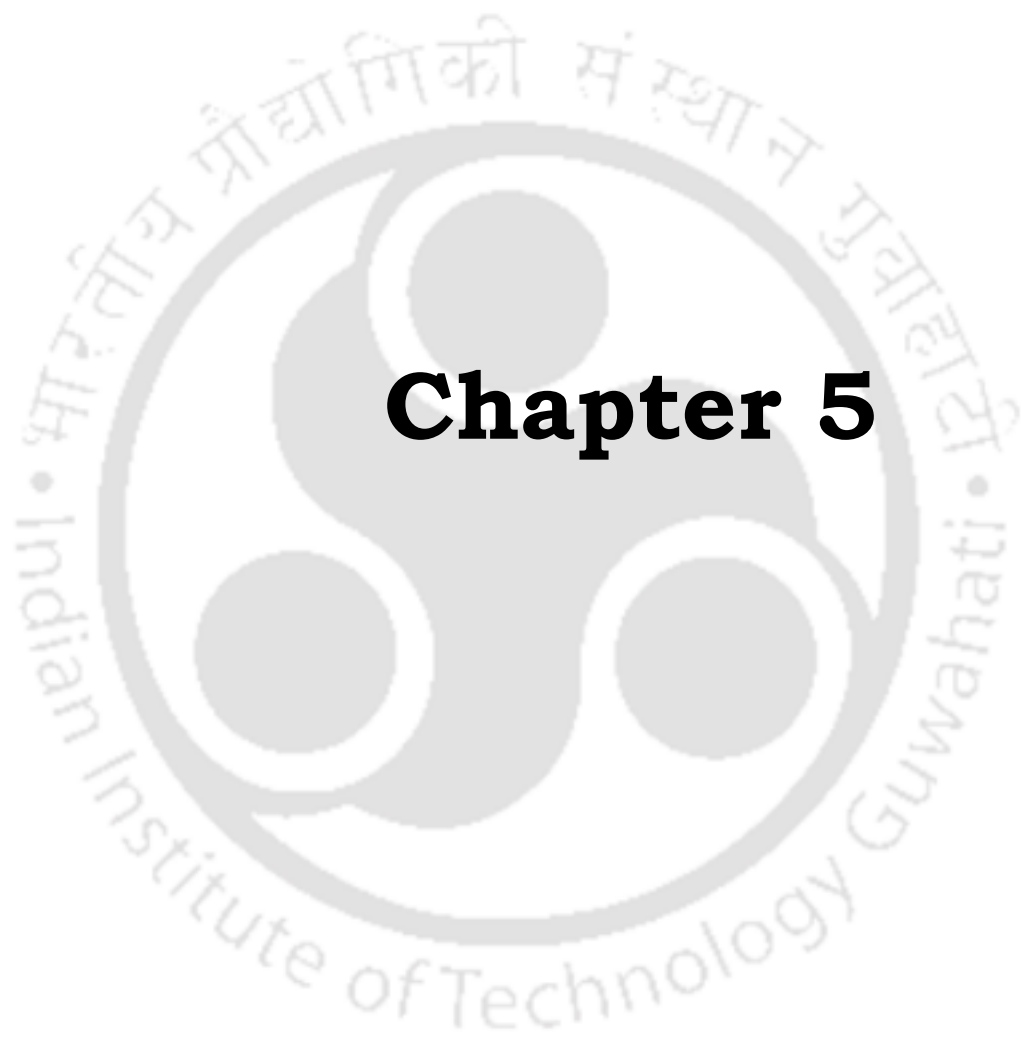
4.3.3.7. Job Level and Length of Job

Job level and length of job were measured using a single item for each variable in the demographic section of the questionnaire booklet. Items were worded

as: “designation” and “total work experience in years” to measure job level and length of job respectively.







Chapter 5



Chapter 5

Results of the Quantitative Investigation

5.1. Overview of Statistical Analysis

Various statistical tests were conducted to analyze quantitative data of the present study. Following are the summary of statistical tests:

1. Data of all the variables were tested for the assumptions of normality, linearity, multicollinearity, and outliers before starting the analysis.
2. Factor analyses were conducted to test the factorial structure of the scales.
3. Independent sample t- test, were conducted to compare the difference between public and private sector banks on factors affecting IS success.
4. Cronbach's Alphas were calculated for all questionnaires used in the present study to test their reliability.
5. Pearson correlation coefficients were calculated to quantify the strength of the linear relationships among variables.
6. Regression analysis was conducted to investigate possible predictors of criterion variables.
7. Mediation analysis was carried out using Baron and Kenny (1986) steps to examine the mediating effect of the mediator (user satisfaction) on the relationship between independent and dependent variables.

5.2. Assumption Testing

All the variables of this study were tested for the assumption of normality, linearity, multicollinearity, and outliers. All parametric tests assume an approximate normal distribution of variables. Distributions of all variables were found to be

normal on inspection of histogram. Leech, Barrett, and Morgan (2005) have suggested a rule of thumb for testing normality. According to them normality is violated if the skewness and /or kurtosis measure is more than 2.5 times its standard error. However, a problem with this method is that the standard error depends on the sample size. So, for large sample most variables would be non-normal according to the above rule. However, a simple guideline is that if the skewness is less than plus or minus one ($\leq \pm 1.0$), the variable is, at least approximately normal. According to this guideline all variables of this study were found to be approximately normally distributed. Values of skewness and kurtosis of all variables are given in table 5.1.

Linear relationship among variables was tested by examining scatter plots and correlation coefficients. No non-linear relationships among variables were found. No multicollinearity problem was found among variables as most of the correlation coefficients were of moderate degree. Case wise analysis was done to identify outliers. No outliers were found outside 3 standard deviations.

5.3. Univariate Analysis of Variables

All the variables of the present study were analyzed for descriptive statistics such as mean, SD, range, skewness, and kurtosis. The data was approximately normal as per the general rule, as the skewness and kurtosis were less than (± 1.0). Since the data of all variables were within the acceptable range of skewness and kurtosis, therefore, no transformations in the scores were done. Descriptive statistics of all variables are given in table 5.1.

Table 5.1: Mean, SD, Skewness, and Kurtosis of all Variables (N = 302)

Variables	Range	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Organizational Factors							
Top Management Support	12	8.00	20	16.195	2.352	-.767	.782
Transformational	80	20	100	3.510 [#]	.788	-.565	-.072
Transactional	45	15	60	3.004 [#]	.573	.184	.292
Managerial Expertise	16	4	20	15.113	3.500	.176	.414
Conflict Tolerance	12	3	15	9.854	2.366	.005	.105
Structure	6	4	100	7.642	1.301	-.407	.332
Risk Tolerance	22	8	30	19.685	3.974	-.425	-.140
Support & Participation	29	14	43	30.281	6.049	-.228	-.189
IS Success Factors							
Individual Impact	17	13	30	25.023	2.916	-.465	.847
Information Quality	24	16	40	31.970	4.179	-.476	.208
Ease to use	11	4	15	11.821	2.181	-.124	.611
System Quality	19	11	30	22.079	3.767	-.601	.361
Service Quality	20	5	25	17.464	4.018	-.845	.279
Organizational Impact	12	8	20	16.311	2.015	-.608	.981
User Satisfaction	18	7	25	20.003	2.735	-.998	.417
Individual Factors							
Computer-self-Efficacy	12	8	20	15.152	2.879	-.602	-.016
Job Level	4	1	5	2.476	1.125	.093	-.914
Length of Job	4	1	5	2.03	1.142	.531	-.213

[#]: The Mean values of MLQ dimensions are calculated on their average scores.

5.3.1. Leadership Style

Leadership style was measured by using Multifactor Leadership Questionnaire (MLQ). It offers a full range of assessment of leadership behaviours (Bass and Avolio, 2004). The MLQ consists of 45 items which measures nine factors: five factors of transformational leadership, three of transactional leadership, and one non-leadership factor, and three outcome factors (Avolio & Bass, 1995). The present study included only transformational and transactional leadership dimensions of MLQ and three outcome measures, that is out of total 45 items only 41 items are considered.

Transformational leadership was measured using 20 items which includes leader's visionary, inspirational, supportive, and charismatic attributes as sub-factors. Transactional leadership was measured using 12 items which includes contingent reward, management by exception (active) and management by exception (passive) as sub-factors. Present study retained the original factor structure of MLQ as several empirical studies consistently showed its factorial validity. Only the Rater form (subordinates perception of leader behaviour and effectiveness) of MLQ was used in this study. Table 5.2 shows the Cronbach's Alpha value, mean, SD, and range of scores for both transformational leadership and transactional leadership dimensions for the present sample. As shown in Table 5.2, Cronbach's Alpha coefficients of transformational leadership, transactional leadership, and total scale are .95, .67, and .93 respectively. Total possible scores of the items for transformational leadership and transactional leadership ranged from 20-100 and 12-60 respectively. Total scores for the present sample of transformational leadership and transactional leadership ranged from 20-100 and 15-60 respectively. The mean value of the transformational leadership dimension is 3.510 (SD = .788) and transactional leadership is 3 (SD = .573).

The scores of both the dimensions of MLQ (transformational leadership and transactional leadership) were obtained by calculating average scores for the items on the scale (by summing up the items which belong to each factor and dividing by the number of items that make up the factor).

Table 5.2: Cronbach's Alpha Reliability, Mean, SD and Range of MLQ Dimensions

Dimensions	Cronbach's Alpha Reliability	Mean	SD	Number of Items	Possible Range	Present Range
Transformational	.95	3.510	.788	20	20-100	20-100
Transactional	.67	3	.573	12	12-60	15-60
Total Scale	.93					

5.3.2. Organizational Culture

The questionnaire developed by Parida et al. (1990) was used to measure organizational culture. The factor analysis of the items was carried out using the principal component with varimax rotations method. Only those items with loadings of 0.40 and above were considered for factors (table 5.3). The present study focused on six dimensions of observable culture measured using 31 items. They are support, conflict tolerance, structure, risk tolerance, performance reward, and individual autonomy. In the present sample, 11 items were removed because of their low factor loadings. Remaining 20 items formed four factors which are described below:

Factor 1 comprised of nine items associated with the degree of independence in thoughts and actions, opportunity to participate in setting goals, and the different ways in which managers provided warmth and support to their subordinates. This is a new factor and named as *Support and Participation*.

Factor 2 included six items that showed the different ways through which employees are encouraged to be aggressive, innovative and risk-seeking. Therefore it is named as *Risk Tolerance*.

Factor 3 comprised of three items which indicated the degree of conflict present in relationships between peers and work groups as well as the tendency to hide ones feelings. Therefore, this factor is named as *Conflict Tolerance*

Factor 4 consisted of two items which indicated the degree to which rules and strict guidelines are used to control the employees. Therefore it is named as *Structure*.

Details of the factor loadings, Eigen values, and percentage of variance are shown in table 5.3. It is clear from the table that the total variance explained by all the factors of organizational culture measure is 60.51% out of which *support and participation*, *risk tolerance*, *conflict tolerance* and *structure* contributed to 29.51%, 12.10%, 10.23%, and 8.67% respectively. Table 5.4 shows Cronbach's Alpha value, mean, SD and range of scores for the four dimensions of organizational culture questionnaire. It is clear that the Cronbach's Alpha values of four dimensions include .60 (structure), conflict tolerance (.72), risk tolerance (.79) and support & participation (.89) respectively. The reliability of the whole scale is .89. So, all the Alpha values are in the acceptable range of reliability.

Table 5.3: Factor Loadings of Organizational Culture Measure

Items In my organization....	Factor 1 Support and Participation	Factor 2 Risk Tolerance	Factor 3 Conflict Tolerance	Factor 4 Structure
the opportunity to participate in the determination of procedures is:	.70			
the opportunity for independent thinking and action in my job is:	.77			
opportunity to participate in setting goals is	.58			
peoples concern for others problem	.70			
the spirit of help and cooperation	.69			
discussion of our personal problems with our supervisor	.75			
the encouragement to discuss about bank affairs is	.62			
the assistance from my superior to solve the problem is	.71			
the consideration of my superior to my feelings is	.58			
the freedom to challenge the traditional ways of doing things is		.67		
opportunity for taking initiative in my organization is		.69		
encouragement to be innovative is		.69		
encouragement to solve problems on our own is		.65		
chances of taking risk by organizations		.73		
encouragement to take risk		.74		
inter departmental difference			.77	
the friction among superiors and subordinates is			.80	
the tendency to hide feelings from each other is			.78	
emphasis on rules & regulations is				.82
there are strict guidelines and rigid rules for conducting the work are				.79
Total variance explained 60.51%				
Eigen values	5.90	2.42	2.05	1.73
Percentage of variance	29.51	12.10	10.23	8.67
Cumulative percentage	29.51	41.61	51.84	60.51

11 items of organizational culture have been excluded during analysis because of their low factor loadings.

Table 5.4: Cronbach's Alpha Reliability, Mean, SD and Range of Organizational Culture Dimensions

Dimensions	Cronbach's Alpha Reliability	Mean	SD	Number of Items	Possible Range	Present Range
Support and Participation	.89	30.281	6.049	9	9-45	14-43
Risk Tolerance	.79	19.685	3.974	6	6-30	8-30
Conflict Tolerance	.72	9.854	2.366	3	3-15	3-15
Structure	.60	7.642	1.301	2	2-10	4-10
Total Scale	.89					

5.3.3. Top Management Support

Top management support was measured by using the four items adopted from Lee and Kim (2007). This questionnaire has 4 items. Table 5.5 shows Cronbach's Alpha value, Mean, SD and range of scores. Cronbach's alpha value of top management support in the present sample is .86. Mean and SD of top management support are 16.195 and 2.352 respectively. This is a uni-dimensional scale. Therefore, factor analysis was not conducted for this scale.

Table 5.5: Cronbach's Alpha, Mean, SD and Range of Top Management Support

Dimensions	Reliability	Mean	SD	Number of Items	Possible Range	Present Range
Top Management Support	.86	16.195	2.352	4	4-20	8-20

5.3.4. Managerial IT Expertise

Managerial IT expertise was measured by using the four items adopted from Lee and Kim (2007). Table 5.6 shows Cronbach's Alpha value, Mean, SD and range of scores. Mean and SD of this questionnaire are 15.11 and 3.50 respectively.

Cronbach's alpha value of managerial IT expertise in the present sample is .89. This is a uni-dimensional scale. Therefore, factor analysis was not conducted for this scale.

Table 5.6: Cronbach's Alpha, Mean, SD and Range of Managerial IT Expertise

Dimensions		Cronbach's Alpha Reliability	Mean	SD	Number of Items	Possible Range	Present Range
Managerial Expertise	IT	.89	15.113	3.500	4	4-20	4-20

5.3.5. IS Success Factors

IS success factors of DeLone and McLean's model (1992, 2003) (Information quality, system quality, service quality, user satisfaction, individual impact, and organizational impact) were measured using several questionnaires developed and validated by different researchers. Details are as follows:

(a) *Individual Impact* was measured by six items adopted from the perceived usefulness scale developed by Davis (1989)

(b) *Information Quality* was measured by ten items adapted from End User Computing Satisfaction scale developed by Doll & Torkzadeh (1988).

(c) *System Quality* was measured using the seven items from the IS-Impact measurement instrument of Gable et al. (2008) and one item from the EUCS instrument of Doll & Torkzadeh (1988).

(d) *Service Quality* is measured by the five items adopted from the e-learning system success scale developed by Wang et al. (2007)

(e) *Organizational Impact* was measured by using four items from the organizational impact dimension of IS-Impact measurement scale of Gable et al. (2008) and one additional item "overall, the system is linked to all delivery channels of the bank" was included in the questionnaire based on the literature review.

(f) *User satisfaction* was measured by four items adopted from Departmental Accounting System Evaluation questionnaire (Seddon & Kiew, 1994). Furthermore, one additional item was included from the IS- Impact measurement questionnaire from Gable et al. (2008).

The factor analysis was conducted on all the 39 items gathered from various sources using the principal component with varimax rotations. Only those items with loadings of .40 and above were considered for factors analysis (table 5.7). Inspection of the items suggested that there are seven factors with total variance of 61.78%. Details of the factor loadings, Eigen values, and percentage of variance are shown in table 5.7.

Factor 1 comprised of eight items measuring relevance, clarity, currency, timeliness, accuracy of the information or output generated by the system. Therefore, it is termed as *Information Quality*.

Factor 2 comprised of five items concerned with the overall support delivered by the service provider, regardless of whether it is provided by the it department or the vendor. Therefore, it is termed as *Service Quality*.

Factor 3 included six items that examined the effect of information systems on the user's performance like increase in productivity, performance, efficiency etc of the users. Thus, it was termed as *Individual Impact*.

Factor 4 consisted of five items that examined the successful interaction between the information systems and its users. Hence, it is termed as *User Satisfaction*.

Factor 5 comprised of six items that measured the performance of the information systems from a technical or design perspective. Therefore, it is labeled as *System Quality*.

Factor 6 consisted of four items that examined the influence of information system on overall organizations performance. So, it is labeled as *Organizational Impact*.

Factor 7 turned out be a new factor, which consisted of three items indicating the extent to which system is easy to use, learn and user friendly to its users. Therefore, it is labeled as *Ease to Use*.

All the factors retained most of the original items of questionnaires used. However, a new factor, that is, *ease to use* (factor 7) emerged during the analysis. In addition, an item “Overall, the system is linked to all delivery channels of the bank” originally listed under organizational impact was clubbed with system quality (factor 5). Final questionnaire after factor analysis consisted 37 items. Further, table 5.8 shows descriptive statistics of IS success dimensions. Mean value of the dimensions were 31.97 (SD = 4.18) for information quality, 22.08 (SD = 3.77) for system quality, 17.46 (SD = 4.02) for service quality, 25.02 (SD = 2.92) for individual impact, 16.31 (SD = 2.01) for organizational impact, 11.82 (SD = 2.18) for ease to use and 20 (SD = 2.74) for user satisfaction.

Table 5.7: Factor loadings of IS Success Measure

Item no	Items	Factors*						
		1	2	3	4	5	6	7
7.	The information provided by this system is clear.	.62						
8.	The information from system is accurate.	.73						
9.	This system provides sufficient information.	.70						
10.	This system provides up-to-date information.	.72						
11.	I get the needed information from the system in time.	.66						
12.	This system provides the exact information I need.	.70						
13.	The system generates reports that seem to be just about exactly what I need.	.69						
14.	The information provided by this system meets my work needs.	.53						
23.	The IT department provides a proper on-line assistance.		.66					
24.	The system developers interact extensively with the users.		.67					
25.	The IT department staff is easily available for consultation.		.77					
26.	The IT department responds in a cooperative manner on your suggestions for future improvement in the system.		.80					
27.	The IT department provides satisfactory support.		.83					
1.	This system improves my performance.			.78				
2.	This system has enhanced my effectiveness.			.77				
3.	This system has increased my productivity.			.70				
4.	This system makes it easier to do my job.			.70				
5.	This system enables me to complete my work more quickly.			.60				
6.	Overall, I find system useful to my job.			.59				
33.	Overall, this system is able to meet the needs of my work.				.55			
34.	Overall, this system is efficient and is giving value for money.				.67			
35.	Overall, this system is satisfactory in its performance.				.75			
36.	Overall, this system is user friendly and enjoyable to use.				.68			
37.	Overall, the system is effective in its working.				.57			

18.	This system meets Banks overall requirements.					.48		
19.	This system includes necessary features and functions.					.53		
20.	This system responds quickly.					.63		
21.	This system requires minimum number of fields and screens to complete a given work.					.58		
22.	This system can be easily modified, corrected or improved by its users.					.72		
28.	Overall, the system is linked to all delivery channels of the bank.					.44		
29.	The system has resulted in an increased capacity.						.46	
30.	The system implementation has resulted in better positioning.						.72	
31.	The system implementation has resulted in improved business.						.67	
32.	Overall, the impact of system on our Bank has been positive.						.62	
15.	This system easy to use.							.76
16.	This system easy to learn.							.81
17.	This system user friendly.							.55
	Total variance explained 61.78%							
	Eigen values (rotated sums of squared loadings)	4.99	3.89	3.89	2.82	2.52	2.42	2.34
	Percentage of variance	13.47	10.53	10.50	7.62	6.81	6.54	6.31
	Cumulative percentage of variance	13.47	24	34.50	42.12	48.93	55.47	61.78

2 items of information quality were excluded because of their low factor loadings.

* Factor 1 = Information Quality, Factor 2 = Service Quality, Factor 3 = Individual Impact, Factor 4 = Satisfaction, Factor 5 = System Quality, Factor 6 = Organizational Impact, Factor 7 = Ease to use

The Cronbach's alpha coefficients of IS success dimensions for the present sample are shown in table 5.9. The alpha coefficients for the dimension were .86, .89, .80, .78, .87, .81, and .87 for individual impact, information quality, ease to use, system quality, service quality, organizational impact, and user satisfaction respectively. The Cronbach's alpha coefficient of the whole IS success questionnaire was found to be .95. Therefore, Alpha values indicates high reliability of IS dimensions.

Table 5.8: Mean, SD and Range of IS Success Dimensions

Dimensions	Mean	SD	Number of Items	Possible Range	Present Range
Information Quality	31.97	4.18	8	8-40	16-40
System Quality	22.08	3.77	6	6-30	11-30
Service quality	17.46	4.02	5	5-25	5-25
Individual Impact	25.02	2.92	6	6-30	13-30
Organizational Impact	16.31	2.01	4	4-20	8-20
Ease to use	11.82	2.18	3	3-15	4-15
User Satisfaction	20	2.74	5	5-25	7-25

Table 5.9: Cronbach's Alpha values of IS Success Dimension

Dimensions	Cronbach's Alpha Reliability
Individual Impact	.86
Information Quality	.89
Ease to Use	.80
System Quality	.78
Service Quality	.87
Organizational Impact	.81
User Satisfaction	.87
Total Scale	.95

5.3.6. Individual Factors

5.3.6.1. Computer Self Efficacy

Computer self efficacy was measured by 4 items adopted from Computer self efficacy scale developed by Marakas et.al. (2004). Factor analysis was not conducted for this questionnaire as it is a uni-dimensional questionnaire. As shown in the table

5.10, mean and SD of computer self efficacy was 15.15 and 2.88 respectively. Cronbach's Alpha value of this scale was .85.

Table 5.10: Cronbach's Alpha, Mean, SD and Range of Computer Self - Efficacy

Dimensions		Cronbach's Alpha Reliability	Mean	SD	Number of Items	Possible Range	Present Range
Computer Efficacy	Self	.85	15.13	2.88	4	4-20	8-20

5.3.6.2. Job Level

A single item measure was used to measure job level. As shown in that table 5.11, mean and SD of the job level are 2.47 and 1.12 respectively. Total possible scores of the items ranged from 1-5.

Table 5.11: Descriptive Statistics of Job Level

Dimensions	Mean	SD	Number of Item	Possible Range	Present Range
Job Level	2.48	1.13	1	1-5	1-5

5.3.6.3. Length of Job

A single item was used to measure length of job. As shown in the table 5.12, mean and SD of the length of job are 2.03 and 1.14 respectively. Total possible scores of the items ranged from 1-5.

Table 5.12: Descriptive Statistics of Length of Job

Dimensions	Mean	SD	Number of Item	Possible Range	Present Range
Length of Job	2.03	1.14	1	1-5	1-5

5.4. Perception of Employees Regarding Success of Banking Information Systems.

Perception of employees regarding the success of banking information systems was calculated in terms of IS success factors such as information quality, system quality, ease to use, service quality, individual impact, organizational impact, and user satisfaction. Perception of employees was analyzed by calculating the mean value of IS success factors on a scale of 1 to 5 indicating their level of agreement. The level of agreement was scaled as follows:

Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
1	2	3	4	5

The mean value of the level of agreement for each factor was calculated by dividing the mean scores of IS success factor with the number of items used to measure that dimension. In order to interpret the perception of employees, cut-offs were decided. If the mean value of a factor is less than or equal to 2.49, then the level of agreement with the statements measuring that factor is considered to be low. If the mean value ranges between 2.5 and 3.49, then the level of agreement with the statements measuring that factor is considered as medium. Moreover, if the mean value of a factor ranges between 3.5 and 4.49, then the level of agreement with the statements measuring that factor is considered high. Finally, if the mean value of a factor is more than or equal to 4.5, then the level of agreement with the statements measuring that factor is considered very high. The results shows that mean value of information quality is 4; system quality is 3.68; ease to use is 3.94; service quality is 3.49; individual impact is 4.17; organizational impact is 4.18; and user satisfaction is 4. In other words, information quality, system quality, ease to use, individual impact,

organizational impact and user satisfaction falls under the category of high level of agreement. However, the perception regarding the service quality emerged as medium.

5.5. Group Difference (Bank type) Analysis of all Variables

Student's t-test for independent groups was conducted to find the significant differences between public and private banks for all the main study variables. Table 5.13 provides the details of the t-tests:

(a) *Leadership Style*: A significant difference was observed on the transactional leadership style ($t = -2.24$, $p = .026$) with private banks scoring higher than public banks. No significant difference was observed for transformational leadership style.

(b) *Organizational Culture*: There was a significant difference in conflict tolerance dimension of organizational culture ($t = 3.28$, $p = .001$) with public banks scoring higher than private banks. No significant difference was observed on structure, risk tolerance, and support and participation.

(c) *Top Management Support*: No significant difference between public and private banks was observed on top management support.

(d) *Managerial IT Expertise*: No significant difference between public and private banks was also observed on managerial IT expertise.

(e) *System Related Factors*: No significant difference between public and private banks was observed on system related factors.

(f) *Individual Factors*: The private banks scored significantly higher on computer self-efficacy ($t = -2.53$, $p = .012$) as compared to the public banks.

Table 5.13: Results of Bank Type Differences Analysis for Study Variables

	1 Public Bank		2 Private Bank		t	P	Results
Variables	Mean	SD	Mean	SD			
Organizational Factors							
Top Management Support	16.30	2.42	15.95	2.18	1.215	.225	Not significant
Transformational	3.53	.79	3.47	.78	.536	.592	Not significant
Transactional	2.95	.58	3.11	.55	-2.24	.026	Significant
Managerial Expertise	15.11	3.50	15.12	3.51	-.027	.978	Not significant
Conflict Tolerance	10.14	2.41	9.19	2.11	3.28	.001	Significant
Structure	7.64	1.35	7.66	1.19	-.15	.882	Not significant
Risk Tolerance	19.43	4.02	20.27	3.82	-1.70	.091	Not significant
Support & Participation	29.87	6.33	31.23	5.24	-1.80	.073	Not significant
IS Success Factors							
Individual Impact	25.33	2.90	24.31	2.84	2.83	.081	Not Significant
Information Quality	32.19	4.22	31.46	4.06	1.39	.165	Not significant
Ease to Use	11.85	2.34	11.76	1.78	.37	.715	Not significant
System Quality	22.14	3.58	21.93	4.18	.44	.660	Not significant
Service Quality	17.42	4.15	17.56	3.71	-.28	.784	Not significant
Organizational Impact	16.47	2.03	15.93	1.95	2.18	.132	Not Significant
User Satisfaction	20.13	2.69	19.70	2.83	1.25	.211	Not significant
Individual Factors							
Computer self-Efficacy	14.90	2.98	15.75	2.54	-2.53	.012	Significant

5.6. Bivariate Relationship Analysis

5.6.1. Relationships among the Main Study Variables

Test of association among the main study variables were conducted using Pearson product moment correlation. Table 5.14, presents the bivariate associations for the main study variables. A detailed master correlation table showing relationship among all variables of the present study is shown in the Appendix D

Table 5.14: Correlation Matrix

Variables	User Satisfaction	Individual Impact	Organizational Impact	Net benefits
Transformational	.208**	.257**	.243**	.285**
Transactional	.125*	.145*	.161**	.172**
Conflict Tolerance	.176**	.227**	.185**	.238**
Structure	.314**	.252**	.380**	.345**
Risk Tolerance	.317**	.212**	.269**	.267**
Support and Participation	.385**	.338**	.357**	.392**
Top Management Support	.622**	.452**	.600**	.581**
Managerial IT Expertise	.234**	.311**	.259**	.328**
Information Quality	.571**	.555**	.524**	.615**
Ease to Use	.578**	.525**	.443**	.557**
System Quality	.603**	.470**	.492**	.543**
Service Quality	.467**	.273**	.557**	.441**
Computer Self Efficacy	.243**	.194**	.209**	.227**
Job Level	.098	.050	.063	.063
Length of Job	.058	.143*	.096	.140*

(*p<.05, **p<.01, ***p<.001)

It is evident from the table 5.14 that transformational leadership is significantly positively related to user satisfaction ($r = .208$, $p < .01$), individual impact

($r = .257, p < .01$), organizational impact ($r = .243, p < .01$), and net benefits ($r = .285, p < .01$). Similarly, transactional leadership is significantly positively related to user satisfaction ($r = .125, p < .05$), individual impact ($r = .145, p < .05$), organizational impact ($r = .161, p < .01$), and net benefits ($r = .172, p < .01$).

With regard to organizational culture, all the four dimensions of organizational culture, that is, conflict tolerance ($r = .176, p < .01$), structure ($r = .314, p < .01$), risk tolerance ($r = .317, p < .01$), and support and participation ($r = .385, p < .01$) were significantly positively correlated with user satisfaction. Similarly, conflict tolerance ($r = .227, p < .01$), structure ($r = .252, p < .01$), risk tolerance ($r = .212, p < .01$), and support and participation ($r = .338, p < .01$) were significantly positively correlated with individual impact. Further, conflict tolerance ($r = .185, p < .01$), structure ($r = .380, p < .01$), risk tolerance ($r = .269, p < .01$), and support and participation ($r = .357, p < .01$) were significantly positively correlated with organizational impact. Finally, net benefits was significantly positively associated with conflict tolerance ($r = .238, p < .01$), structure ($r = .345, p < .01$), risk tolerance ($r = .267, p < .01$), and support and participation ($r = .392, p < .01$).

Further, top management support had significant positive correlation with user satisfaction ($r = .622, p < .01$), individual impact ($r = .452, p < .01$), organizational impact ($r = .600, p < .01$), and net benefits ($r = .581, p < .01$).

Similarly, managerial IT expertise had significant positive correlation with user satisfaction ($r = .234, p < .01$), individual impact ($r = .311, p < .01$), organizational impact ($r = .259, p < .01$), and net benefits ($r = .328, p < .01$).

With regard to system related factors, information quality had significant positive correlation with user satisfaction ($r = .571, p < .01$), individual impact ($r = .555, p < .01$), organizational impact ($r = .524, p < .01$), and net benefits ($r = .615, p < .01$).

$p < .01$). Similarly, ease to use had significant positive correlation with user satisfaction ($r = .578, p < .01$), individual impact ($r = .525, p < .01$), organizational impact ($r = .443, p < .01$), and net benefits ($r = .557, p < .01$). Further, system quality had significant positive correlation with user satisfaction ($r = .603, p < .01$), individual impact ($r = .470, p < .01$), organizational impact ($r = .492, p < .01$), and net benefits ($r = .543, p < .01$). Finally, service quality had significant positive correlation with user satisfaction ($r = .467, p < .01$), individual impact ($r = .273, p < .01$), organizational impact ($r = .557, p < .01$), and net benefits ($r = .441, p < .01$).

With regard to individual factors, computer self efficacy was significantly positively related to user satisfaction ($r = .243, p < .01$), individual impact ($r = .194, p < .01$), organizational impact ($r = .207, p < .01$), and net benefits ($r = .227, p < .01$). However, job level was not significantly related to user satisfaction, individual impact, organizational impact, and net benefits. Further, the length of job was not significantly related to user satisfaction, and organizational impact but significantly positively related to individual impact ($r = .143, p < .05$), and net benefits ($r = .140, p < .05$ respectively).

5.6.2. Relationships among the Dimensions of DeLone and McLean's IS Success Factors

With regard to inter-correlations among the DeLone and McLean's IS success factors, table 5.15a shows that the information quality has significant positive correlation with system quality ($r = .563, p < .01$), service quality ($r = .426, p < .01$), user satisfaction ($r = .571, p < .01$), individual impact ($r = .555, p < .01$), organizational impact ($r = .524, p < .01$), and net benefits ($r = .615, p < .01$). Similarly, system quality has significant positive correlation with service quality ($r = .499, p < .01$), user

satisfaction ($r = .603, p < .01$), individual impact ($r = .470, p < .01$), organizational impact ($r = .492, p < .01$), and net benefits ($r = .543, p < .01$). Further, service quality has significant positive correlation with user satisfaction ($r = .467, p < .01$), individual impact ($r = .273, p < .01$), organizational impact ($r = .557, p < .01$), and net benefits ($r = .441, p < .01$). Individual impact had significant positive correlation with organizational impact ($r = .540, p < .01$), and with net benefits ($r = .921, p < .01$). Further, organizational impact had significant relationship with user satisfaction ($r = .759, p < .01$), and net benefits ($r = .826, p < .01$). Finally, user satisfaction had significant positive relationship with individual impact ($r = .610, p < .01$), organizational impact ($r = .759, p < .01$), and net benefits ($r = .761, p < .01$). Hence, the above discussion indicates that the *hypothesis 1 (H1a, H1b, H1c), and hypothesis 2 (H2a, H2b, H2c) are confirmed (table 5.15b)*.

Table: 5.15a: Correlation Matrix among the Dimensions of DeLone and McLean's IS Success Factors

	Individual Impact	Information Quality	System Quality	Service Quality	Organizational Impact	User Satisfaction	Net Benefits
Individual Impact	1						
Information Quality	.555**	1					
System Quality	.470**	.563**	1				
Service Quality	.273**	.426**	.499**	1			
Organizational Impact	.540**	.524**	.492**	.557**	1		
User Satisfaction	.610**	.571**	.603**	.467**	.759**	1	
Net Benefits	.921**	.615**	.543**	.441**	.826**	.761**	1

(* $p < .05$, ** $p < .01$, *** $p < .001$)

Table 5.15b: Hypotheses Related to the Relationship among the Dimensions of DeLone and McLean’s IS Success Factors

Hypotheses		Status
H1a	Information quality will be significantly and positively related to user satisfaction.	Supported
H1b	System quality will be significantly and positively related to user satisfaction.	Supported
H1c	Service quality will be significantly and positively related to user satisfaction.	Supported
H2a	User satisfaction will be significantly and positively related to individual impact.	Supported
H2b	User satisfaction will be significantly and positively related to organizational impact.	Supported
H2c	User satisfaction will be significantly and positively related to net benefits.	Supported

5.7. Multivariate Analysis

5.7.1. Main Effects Analysis

5.7.1.1. Main Effects of Leadership Styles on User Satisfaction, and IS Success Outcomes (individual impact, organizational impact, and net benefits)

Hypothesis 3 (H3a & H3b) proposes that the leadership styles (transformational leadership and transactional leadership) will significantly predict user satisfaction and three IS success outcomes that are individual impact, organizational impact, and net benefits. Statistical test of this hypothesis is described below:

(a) Leadership style predicting user satisfaction

The main effect of leadership styles (transformational leadership, and transactional leadership) were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control

their effect) and then transformational and transactional leadership scores were entered in the second step of regression analysis. User satisfaction is entered as the dependent variable. Results of this analysis are presented in table 5.16a. It is clear from the table that the model emerged significant and explained 7% of variance in user satisfaction ($R^2 = .070$, $F(6, 295) = 3.69$, $p = .001$). However, among the leadership styles, only transformational leadership emerged as the significant predictor ($\beta = .201$, $p = .001$), whereas, the beta value of transactional leadership did not turn out to be significant predictor ($\beta = .035$, $p = .594$) of user satisfaction after controlling the effects of all the demographic covariates.

Table 5.16a: Multiple Regression Analysis: Leadership with User Satisfaction

Independent Variables: Dimensions of Leadership Style (transformational and transactional)						
Covariates: Age, Gender, Salary, and Education				Dependent Variable: User Satisfaction		
Demographic covariates (age, gender, salary, education)			$R^2 = .022$		Adjusted $R^2 = .008$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.070	.051	3.692 <i>df(6,295)</i>	.001		
Transformational					.201	.001
Transactional					.035	.594

(b) Leadership style predicting individual impact

The main effect of leadership styles (transformational leadership and transactional leadership) were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then transformational and transactional leadership scores were entered in the second step of regression analysis. Individual impact is entered as the dependent variable. Results of this analysis are presented in table 5.16b. It is clear from the table that the model emerged significant and explained 10.3% of variance in

individual impact ($R^2 = .103$, $F(6, 295) = 5.62$, $p = .001$). However, among the leadership styles, only transformational leadership emerged as the significant predictor ($\beta = .251$, $p = .001$), whereas, the beta value of transactional leadership did not turn out to be significant predictor ($\beta = .028$, $p = .666$) of individual impact after controlling the effects of all the demographic covariates.

Table 5.16b: Multiple Regression Analysis: Leadership with Individual Impact

Independent Variables: Dimensions of Leadership Style (transformational and transactional)
Covariates: Age, Gender, Salary, and Education **Dependent Variable:** Individual Impact

Demographic covariates (age, gender, salary, education)		$R^2 = .033$		Adjusted $R^2 = .019$		
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.103	.084	5.620 <i>df(6,295)</i>	.001		
Transformational					.251	.001
Transactional					.028	.666

(c) Leadership style predicting organizational impact

The main effect of leadership styles (transformational leadership and transactional leadership) on organizational impact were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then transformational and transactional leadership scores were entered in the second step of regression analysis. Organizational impact was entered as the dependent variable. Results of this analysis are presented in table 5.16c. It is clear from the table that the model emerged significant and explained 8.7% of variance in organizational impact ($R^2 = .087$, $F(6, 295) = 4.71$, $p = .001$). However, among the leadership styles, only transformational leadership emerged as the significant predictor ($\beta = .221$, $p = .001$), whereas,

transactional leadership was not significant ($\beta = .062$, $p = .343$) predictor of organizational impact after controlling the effects of all the demographic covariates.

Table 5.16c: Multiple Regression Analysis: Leadership with Organizational Impact

Independent Variables: Dimensions of Leadership Style (transformational and transactional)						
Covariates: Age, Gender, Salary, and Education			Dependent Variable: Organizational Impact			
Demographic covariates (age, gender, salary, education)		R² = .022		Adjusted R² = .009		
Predictors	R ²	Adjusted R ²	F (Eqn)	Sig of F	B	Sig of β
	.087	.069	4.711 <i>df</i> (6,295)	.001		
Transformational					.221	.001
Transactional					.062	.343

(d) Leadership style predicting net benefits

The main effect of leadership styles (transformational leadership and transactional leadership) on net benefits were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then transformational and transactional leadership scores were entered in the second step of regression analysis. Net benefits were entered as the dependent variable. Results of this analysis are presented in table 5.16d. It is clear from the table that the model emerged significant and explained 12% of variance in net benefits ($R^2 = .120$, $F(6,295) = 6.701$, $p = .001$). However, among the leadership styles, only transformational leadership emerged as the significant predictor ($\beta = .271$, $p = .001$), whereas, transactional leadership was not significant ($\beta = .048$, $p = .459$) predictor of net benefits after controlling the effects of all the demographic covariates.

Table 5.16d: Multiple Regression Analysis: Leadership with Net Benefits**Independent Variables:** Dimensions of Leadership Style (transformational and transactional)**Covariates:** Age, Gender, Salary, and Education**Dependent Variable:** Net Benefits

Demographic covariates (age, gender, salary, education)		$R^2 = .033$		Adjusted $R^2 = .020$		
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.120	.102	6.701 <i>df</i> (6,295)	.001		
Transformational					.271	.001
Transactional					.048	.459

In short, among both the dimensions of leadership style, only transformational leadership emerged as the significant predictor of user satisfaction, individual impact, organizational impact and net benefits, when demographic variables were controlled. Therefore, hypothesis 3 (H3a & H3b) is partially accepted.

5.7.1.2. Main Effects of Organizational Culture on User Satisfaction, and IS Success Outcomes (individual impact, organizational impact, and net benefits)

Hypothesis 4 (H4a & H4b) proposes that organizational culture (conflict tolerance, support and participation, structure, and risk tolerance) will significantly predict user satisfaction, and three IS success outcomes that are, individual impact, organizational impact, and net benefits. Results of this hypothesis testing are shown below:

(a) Organizational culture predicting user satisfaction

The main effects of organizational culture (conflict tolerance, structure, risk tolerance, and support and participation) on user satisfaction were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four organizational culture variables were entered in the second step of regression analysis.

User satisfaction was entered as dependent variable. Results of this analysis are presented in table 5.17a. It is clear from the table that the model emerged significant and explained 23.7% of variance in user satisfaction ($R^2 = .237$, $F(8,293) = 11.405$, $p = .001$). However, among the organizational culture variables, only structure ($\beta = .199$, $p = .001$), and support and participation ($\beta = .275$, $p = .002$) dimension emerged as significant predictors of user satisfaction after controlling demographic covariates. However, risk tolerance ($\beta = .091$, $p = .271$), and conflict tolerance ($\beta = .072$, $p = .185$) were not significant predictors of user satisfaction.

(b) Organizational culture predicting individual impact

The main effects of organizational culture (conflict tolerance, structure, risk tolerance, and support and participation) on individual impact were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four organizational culture variables were entered in the second step of regression analysis. Individual impact was entered as dependent variable. Results of this analysis are presented in table 5.17b. It is clear from the table that the model emerged significant and explained 20.1% of variance in individual impact ($R^2 = .201$, $F(8,293) = 9.215$, $p = .001$). However, among the organizational culture variables, except risk tolerance ($\beta = .058$, $p = .488$), all three dimensions: conflict tolerance ($\beta = .117$, $p = .036$), structure ($\beta = .145$, $p = .009$), support and participation ($\beta = .343$, $p = .001$) emerged as significant predictors of individual impact after controlling demographic covariates.

Table 5.17a: Multiple Regression Analysis: Organizational Culture with User Satisfaction

Independent Variables: Dimensions of Organizational Culture (conflict tolerance, structure, risk tolerance and support and participation)

Covariates: Age, Gender, Salary, and Education

Dependent Variable: User Satisfaction

Demographic covariates (age, gender, salary, education)		$R^2 = .022$		Adjusted $R^2 = .008$		
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.237	.217	11.405 <i>df</i> (8,293)	.001		
Conflict Tolerance					.072	.185
Structure					.199	.001
Risk Tolerance					.091	.271
Support & Participation					.275	.002

(c) Organizational culture predicting organizational impact

The main effects of organizational culture (conflict tolerance, structure, risk tolerance, and support and participation) on organizational impact were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four organizational culture variables were entered in the second step of regression analysis. Organizational impact was entered as dependent variable. Results of this analysis are presented in table 5.17c. It is clear from the table that the model emerged significant and explained 24.5% of variance in organizational impact ($R^2 = .245$, $F(8,293) = 11.905$, $p = .001$). However, among the four organizational culture dimensions, only structure, and support and participation emerged as the significant predictors ($\beta = .287$, $p = .001$; $\beta = .252$, $p = .004$ respectively), of organizational impact. Whereas, the beta values of conflict tolerance ($\beta = .084$, $p = .120$), and risk tolerance were not

significant ($\beta = .031$, $p = .708$) after controlling the effects of all the demographic variables.

Table 5.17b: Multiple Regression Analysis: Organizational Culture with Individual Impact

Independent Variables: Dimensions of Organizational Culture (conflict tolerance, structure, risk tolerance and support and participation)

Covariates: Age, Gender, Salary, and Education

Dependent Variable: Individual Impact

Demographic covariates (age, gender, salary, education)		$R^2 = .033$		Adjusted $R^2 = .019$		
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.201	.179	9.215 <i>df</i> (8,293)	.001		
Conflict Tolerance					.117	.036
Structure					.145	.009
Risk Tolerance					.058	.488
Support & Participation					.343	.001

(d) Organizational culture predicting net benefits

The main effects of organizational culture (conflict tolerance, structure, risk tolerance, and support and participation) on net benefits were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four organizational culture variables were entered in the second step of regression analysis. Net benefits were entered as the dependent variable. Results of this analysis are presented in table 5.17d.

It is clear from the table that the model emerged significant and explained 27.1% of variance in net benefits ($R^2 = .271$, $F(8,293) = 13.618$, $p = .001$). However, among the four organizational culture dimensions, only conflict tolerance ($\beta = .117$, $p = .028$), structure ($\beta = .230$, $p = .001$), and support and participation ($\beta = .347$, $p = .001$)

emerged as significant predictors of net benefits. Risk tolerance ($\beta = .025$, $p = .756$) did not emerge as significant predictor of net benefits.

Table 5.17c: Multiple Regression Analysis: Organizational Culture with Organizational Impact

Independent Variables: Dimensions of Organizational Culture (conflict tolerance, structure, risk tolerance and support and participation)

Covariates: Age, Gender, Salary, and Education

Dependent Variable: Organizational Impact

Demographic covariates (age, gender, salary, education)		$R^2 = .022$		Adjusted $R^2 = .009$		
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.245	.225	11.905 <i>df</i> (8,293)	.001		
Conflict Tolerance					.084	.120
Structure					.287	.001
Risk Tolerance					.031	.708
Support & Participation					.252	.004

Table 5.17d: Multiple Regression Analysis: Organizational Culture with Net Benefits

Independent Variables: Dimensions of Organizational Culture (conflict tolerance, structure, risk tolerance and support and participation)

Covariates: Age, Gender, Salary, and Education

Dependent Variable: Net Benefits

Demographic covariates (age, gender, salary, education)		$R^2 = .033$		Adjusted $R^2 = .020$		
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.271	.251	13.618 <i>df</i> (8,293)	.001		
Conflict Tolerance					.117	.028
Structure					.230	.001
Risk Tolerance					.025	.756
Support & Participation					.347	.001

In short, among all the four dimensions of organizational culture, only structure, and support and participation emerged as the significant predictor of user satisfaction, individual impact, organizational impact and net benefits. On the other hand, conflict tolerance remained significant predictor of individual impact, and net benefits only when demographic variables were controlled. Therefore, it is clear from the above analysis that the *hypothesis 4 (H4a & H4b) is partially accepted*.

5.7.1.3. Main Effects of Top Management Support on User Satisfaction, and IS Success Outcomes (individual impact, organizational impact, and net benefits)

Hypothesis H7 (H7a & H7b) proposes that the top management support will significantly predict user satisfaction, and three IS success outcomes which are, individual impact, organizational impact, and net benefits. Statistical analysis is presented below:

(a) Top management support predicting user satisfaction

The main effect of top management support on user satisfaction was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then top management support was entered in the second step of regression analysis. User satisfaction was entered as the dependent variable. Results of this analysis are presented in table 5.18a. It is clear from the table that the top management support significantly predicted user satisfaction ($\beta = .618, p = .001$). The model emerged significant and explained 40.1% of variance in user satisfaction ($R^2 = .401, F(5,296) = 39.636, p = .001$).

(b) Top management support predicting individual impact

The main effect of top management support on individual impact was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then top management support was entered in the second step of regression analysis. Individual Impact was entered as the dependent variable. Results of this analysis are presented in table 5.18b. It is clear from the table that the top management support significantly predicted individual impact ($\beta = .443$, $p = .001$). The model emerged significant and explained 22.7% of variance in individual impact ($R^2 = .227$, $F(5,296) = 17.389$, $p = .001$).

Table 5.18a: Multiple Regression Analysis: Top Management Support with User Satisfaction

Independent Variables: Top Management Support						
Covariates: Age, Gender, Salary, and Education			Dependent Variable: User Satisfaction			
Demographic covariates (age, gender, salary, education)			$R^2 = .022$		Adjusted $R^2 = .008$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.401	.391	39.636 $df(5,296)$	.001		
Top Management Support					.618	.001

Table 5.18b: Multiple Regression Analysis: Top Management Support with Individual Impact

Independent Variables: Top Management Support						
Covariates: Age, Gender, Salary, and Education			Dependent Variable: Individual Impact			
Demographic covariates (age, gender, salary, education)			$R^2 = .033$		Adjusted $R^2 = .019$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.227	.214	17.389 $df(5,296)$	.001		
Top Management Support					.443	.001

(c) Top management support predicting organizational impact

The main effect of top management support on organizational impact was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then top management support was entered in the second step of regression analysis. Organizational impact was entered as the dependent variable. Results of this analysis are presented in table 5.18c. It is clear from the table that the top management support significantly predicted organizational impact ($\beta = .593, p = .001$). The model emerged significant and explained 37.1% of variance in organizational impact ($R^2 = .371, F(5,296) = 34.945, p = .001$).

Table 5.18c: Multiple Regression Analysis: Top Management Support with Organizational Impact

Independent Variables: Top Management Support						
Covariates: Age, Gender, Salary, and Education				Dependent Variable: Organizational Impact		
Demographic covariates (age, gender, salary, education)			R² = .022		Adjusted R² = .009	
Predictors	R ²	Adjusted R ²	F (Eqn)	Sig of F	B	Sig of β
	.371	.361	34.945	.001		
			df(5,296)			
Top Management Support					.593	.001

(d) Top management support predicting net benefits

The main effect of top management support on net benefits was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then top management support was entered in the second step of regression analysis. Net benefits were entered as the dependent variable. Results of this analysis are presented in table 5.18d. It is clear from the table that the top management support significantly predicted net benefits (β

= .572, $p = .001$) after controlling demographic covariates. The model emerged significant and explained 35.7% of variance in net benefits ($R^2 = .357$, $F(5,296) = 32.864$, $p = .001$).

Table 5.18d: Multiple Regression Analysis: Top Management Support with Net Benefits

Independent Variables: Top Management Support						
Covariates: Age, Gender, Salary, and Education			Dependent Variable: Net Benefits			
Demographic covariates (age, gender, salary, education)			$R^2 = .033$		Adjusted $R^2 = .020$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.357	.346	32.864 $d(5,296)$	.001		
Top Management Support					.572	.001

In short, top management support emerged as the significant predictor of user satisfaction, individual impact, organizational impact and net benefits, when demographic variables were controlled. *These findings, thus, supports the hypothesis 7 (H7a & H7b).*

5.7.1.4. Main Effects of Managerial IT Expertise on User Satisfaction, and IS Success Outcomes (individual impact, organizational impact, and net benefits)

Hypothesis 8 (H8a & H8b) proposes that managerial IT expertise will significantly predict user satisfaction and three IS success outcomes which are, individual impact, organizational impact, and net benefits. Details of this hypothesis testing are as follows:

(a) Managerial IT expertise predicting user satisfaction

The main effect of managerial IT expertise on user satisfaction was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and

education) were entered in the first step (to control their effect) and then managerial IT expertise was entered in the second step of regression analysis. User satisfaction was entered as the dependent variable. Results of this analysis are presented in table 5.19b. It is clear from the table that the managerial IT expertise significantly predicted user satisfaction ($\beta = .248$, $p = .001$) after controlling demographic covariates. The model emerged significant and explained 8.2% of variance in user satisfaction ($R^2 = .082$, $F(5,296) = 5.309$, $p = .001$).

Table 5.19a: Multiple Regression Analysis: Managerial IT Expertise with User Satisfaction

Independent Variables: Managerial IT Expertise						
Covariates: Age, Gender, Salary, and Education				Dependent Variable: User Satisfaction		
Demographic covariates (age, gender, salary, education)			$R^2 = .022$		Adjusted $R^2 = .008$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.082	.067	5.309 <i>df(5,296)</i>	.001		
Managerial IT Expertise					.248	.001

(b) Managerial IT expertise predicting individual impact

The main effect of managerial IT expertise on individual impact was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then managerial IT expertise was entered in the second step of regression analysis. Individual impact was entered as the dependent variable. Results of this analysis are presented in table 5.19b. It is clear from the table that the managerial IT expertise significantly predicted individual impact ($\beta = .320$, $p = .001$) after controlling demographic covariates. The model emerged significant and explained 11.3% of variance in individual impact ($R^2 = .113$, $F(5,296) = 9.114$, $p = .001$).

(c) Managerial IT expertise predicting organizational impact

The main effect of managerial IT expertise on organizational impact was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then managerial IT expertise was entered in the second step of regression analysis. Organizational Impact was entered as the dependent variable. Results of this analysis are presented in table 5.19c. It is clear from the table that the managerial IT expertise significantly predicted organizational impact ($\beta = .271$, $p = .001$) after controlling demographic covariates. The model emerged significant and explained 9.4% of variance in organizational impact ($R^2 = .094$, $F(5,296) = 6.170$, $p = .001$).

Table 5.19b: Multiple Regression Analysis: Managerial IT Expertise with Individual Impact

Independent Variables: Managerial IT Expertise						
Covariates: Age, Gender, Salary, and Education				Dependent Variable: Individual Impact		
Demographic covariates (age, gender, salary, education)			$R^2 = .033$		Adjusted $R^2 = .019$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.113	.119	9.114 <i>df(5,296)</i>	.001		
Managerial IT Expertise					.320	.001

Table 5.19c: Multiple Regression Analysis: Managerial IT Expertise with Organizational Impact

Independent Variables: Managerial IT Expertise						
Covariates: Age, Gender, Salary, and Education				Dependent Variable: Organizational Impact		
Demographic covariates (age, gender, salary, education)			$R^2 = .022$		Adjusted $R^2 = .009$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.094	.079	6.170 <i>df(5,296)</i>	.001		
Managerial IT Expertise					.271	.001

(d) Managerial IT expertise predicting net benefits

The main effect of managerial IT expertise on net benefits was tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then managerial IT expertise was entered in the second step of regression analysis. Net benefits were entered as the dependent variable. Results of this analysis are presented in table 5.19d. It is clear from the table that the managerial IT expertise significantly predicted net benefits $\beta = .340$, $p = .001$) after controlling demographic covariates. The model emerged significant and explained 14.7% of variance in net benefits ($R^2 = .147$, $F(5,296) = 10.171$, $p = .001$).

Table 5.19d: Multiple Regression Analysis: Managerial IT Expertise with Net Benefits

Independent Variables: Managerial IT Expertise						
Covariates: Age, Gender, Salary, and Education Dependent Variable: Net Benefits						
Demographic covariates (age, gender, salary, education)			$R^2 = .033$		Adjusted $R^2 = .020$	
Predictors	R^2	Adjusted R^2	F (Eqn)	Sig of F	B	Sig of β
	.147	.132	10.171	.001		
			<i>df(5,296)</i>			
Managerial IT Expertise					.340	.001

In short, managerial IT expertise emerged as the significant predictor of user satisfaction, individual impact, organizational impact and net benefits, when demographic variables were controlled. *Therefore, hypothesis 8 (H8a & H8b) is supported.*

5.7.1.5. Main Effects of System Related Factors on User Satisfaction, and IS Success Outcomes (individual impact, organizational impact, and net benefits)

Hypothesis 5 (H5a & H5b) proposes that the system related factors will significantly predict user satisfaction and three IS success outcomes (individual

impact, organizational impact, and net benefits). Details of this hypothesis testing are as follows:

(a) System related factors predicting user satisfaction

The main effects of system related factors (information quality, system quality, service quality, and ease to use) on user satisfaction were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four systems related variables were entered in the second step of regression analysis, while, user satisfaction was entered as dependent variable. Results of this analysis are presented in table 5.20a. It is clear from the table that the model emerged significant and explained 54.5% of variance in user satisfaction ($R^2 = 54.5$, $F(8, 293) = 43.835$, $p = .001$). It is clear from the table that all the four system related factors, that is, information quality ($\beta = .225$, $p = .001$), ease to use ($\beta = .280$, $p = .001$), system quality ($\beta = .272$, $p = .001$), and service quality ($\beta = .139$, $p = .004$) turn out to be significant predictors of user satisfaction.

(b) System related factors predicting individual impact

The main effects of system related factors (information quality, system quality, service quality, and ease to use) on individual impact were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four systems related variables were entered in the second step of regression analysis, while individual impact was entered as dependent variable. Results of this analysis are presented in table 5.20b. It is clear from the table that the model emerged significant and explained 43.4% of variance in individual impact ($R^2 = 43.4$, $F(8, 293) = 28.038$, $p < .001$). However, among the four system related factors, only information quality ($\beta = .339$, $p < .001$),

ease to use ($\beta = .308, p = .001$), system quality ($\beta = .149, p = .013$) turn out to be significant predictors of individual impact. Service quality ($\beta = .054, p = .304$) was not a significant predictors of individual impact.

Table 5.20a: Multiple Regression Analysis: System Related Factors with User Satisfaction

Independent Variables: Information Quality, Ease toUse, System Quality, and Service Quality

Dependent Variable: User Satisfaction

Covariates: Age, Gender, Salary, and Education

Demographic covariates (age, gender, salary, education)			R ² = .022		Adjusted R ² = .008	
Predictors	B	Sig of β	R ²	Adjusted R ²	F (Eqn)	Sig of F
			.545	.532	43.835 <i>df(8,293)</i>	.001
Information Quality	.225	.001				
Ease to Use	.280	.001				
System Quality	.272	.001				
Service Quality	.139	.004				

Table 5.20b: Multiple Regression Analysis: System Related Factors with Individual Impact

Independent Variables: Information Quality, Ease to Use, System Quality, and Service Quality

Dependent Variable: Individual Impact **Covariates:** Age, Gender, Salary, and Education

Demographic covariates (age, gender, salary, education)			R ² = .033		Adjusted R ² = .019	
Predictors	B	Sig of β	R ²	Adjusted R ²	F (Eqn)	Sig of F
			.434	.418	28.038 <i>df(8,293)</i>	.001
Information Quality	.339	.001				
Ease to Use	.308	.001				
System Quality	.149	.013				
Service Quality	.054	.304				

(c) System related factors predicting organizational impact

The main effects of system related factors (information quality, system quality, service quality, and ease to use) on organizational impact were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four system related variables were entered in the second step of regression analysis, while organizational impact was entered as dependent variable. Results of this analysis are presented in table 5.20c. It is clear from the table that the model emerged significant and explained 46.2% of variance in net benefits ($R^2 = .462$, $F(8, 293) = 31.460$, $p = .001$). Further, all the four system related variables, that is, information quality ($\beta = .245$, $p = .001$), ease to use ($\beta = .130$, $p = .015$), system quality ($\beta = .113$, $p = .052$), and service quality ($\beta = .355$, $p = .001$) emerged as significant predictors of organizational impact.

Table 5.20c: Multiple Regression Analysis: System Related Factors with Organizational Impact

Independent Variables: Information Quality, Ease to Use, System Quality, and Service Quality						
Dependent Variable: Organizational Impact			Covariates: Age, Sex, Salary, and Education			
Demographic covariates (age, gender, salary, education)			$R^2 = .022$		Adjusted $R^2 = .009$	
Predictors	B	Sig of β	R^2	Adjusted R^2	F (Eqn)	Sig of F
			.462	.447	31.460 <i>df(8,293)</i>	.001
Information Quality	.245	.001				
Ease to Use	.130	.015				
System Quality	.113	.052				
Service Quality	.355	.001				

(d) System related factors predicting net benefits

The main effects of system related factors (information quality, system quality, service quality, and ease to use) on net benefits were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the four systems related variables were entered in the second step of regression analysis, while net benefits were entered as dependent variable. Results of this analysis are presented in table 5.20d. It is clear from the table that the model emerged significant and explained 52.9% of variance in net benefits ($R^2 = .529$, $F(8, 293) = 41.075$, $p = .001$). Here also all the four system related factors, information quality ($\beta = .341$, $p = .001$), ease to use ($\beta = .267$, $p = .015$), system quality ($\beta = .152$, $p = .005$), and service quality ($\beta = .128$, $p = .008$) emerged as significant predictors of net benefits.

Table 5.20d: Multiple Regression Analysis: System Related Factors with Net Benefits

Independent Variables: Information Quality, Ease to Use, System Quality, and Service Quality						
Covariates: Age, Gender, Salary, and Education				Dependent Variable: Net Benefits		
Demographic covariates (age, gender, salary, education)			$R^2 = .033$	Adjusted $R^2 = .020$		
Predictors	B	Sig of β	R^2	Adjusted R^2	F (Eqn)	Sig of F
			.529	.516	41.075 <i>df(8,293)</i>	.001
Information Quality	.341	.001				
Ease to Use	.267	.001				
System Quality	.152	.005				
Service Quality	.128	.008				

In short, information quality, ease to use, system quality emerged as the significant predictor of user satisfaction, individual impact, organizational impact and

net benefits, while service quality dimension emerged as the significant predictor of only user satisfaction, organizational impact and net benefits, when demographic variables were controlled. *Hence, the above findings partially support the hypothesis 5 (H5a & H5b).*

5.7.1.6. Main Effects of Individual Factors on User Satisfaction, and IS Success Outcomes (individual impact, organizational impact, and net benefits)

Hypothesis 6 (H6a & H6b) proposes that individual factors will significantly predict user satisfaction and three IS success outcomes that are individual impact, organizational impact, and net benefits. Details of this hypothesis testing are as follows:

(a) Individual factors predicting user satisfaction

The main effects of individual factors (computer self efficacy, job level and length of job) on user satisfaction were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the three individual variables were entered in the second step of regression analysis, while user satisfaction was entered as dependent variable. Results of this analysis are presented in table 5.21a. It is clear from the table that the model emerged significant and explained 8.7% of variance in user satisfaction ($R^2 = .087$, $F(7, 294) = 4.001$, $p = .001$). However, among the three individual factors, only computer self efficacy ($\beta = .259$, $p = .001$) was a significant predictor of user satisfaction.

(b) Individual factors predicting individual impact

The main effects of individual factors (computer self efficacy, job level and length of job) on individual impact were tested using hierarchical regression analysis.

Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the three individual variables were entered in the second step of regression analysis, while individual impact was entered as dependent variable. Results of this analysis are presented in table 5.21b. It is clear from the table that the model emerged significant and explained 8.1% of variance in individual impact ($R^2 = .081$, $F(7, 294) = 3.725$, $p = .001$). However, among the three individual factors, only computer self efficacy ($\beta = .228$, $p = .001$) was a significant predictor of individual impact.

(c) Individual factors predicting organizational impact

The main effects of individual factors (computer self efficacy, job level and length of job) on organizational impact were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the three individual variables were entered in the second step of regression analysis, while organizational impact was entered as dependent variable. Results of this analysis are presented in table 5.21c. It is clear from the table that the model emerged significant and explained 7.7% of variance in individual impact ($R^2 = .077$, $F(7, 294) = 3.527$, $p = .001$). However, among the three individual factors, only computer self efficacy ($\beta = .241$, $p = .001$) was a significant predictor of organizational impact.

(d) Individual factors predicting net benefits

The main effects of individual factors (computer self efficacy, job level and length of job) on net benefits were tested using hierarchical regression analysis. Four covariates (age, gender, salary, and education) were entered in the first step (to control their effect) and then all the three individual variables were entered in the second step of

regression analysis, while, net benefits were entered as dependent variable. Results of this analysis are presented in table 5.21d. It is clear from the table that the model emerged significant and explained 9.8% of variance in individual impact ($R^2 = .098$, $F(7, 294) = 4.569$, $p = .001$). However, among the three individual factors, only computer self efficacy ($\beta = .265$, $p = .001$) was a significant predictor of net benefits.

Table 5.21a: Multiple Regression Analysis: Individual Factors with User Satisfaction

Independent Variables: Computer Self Efficacy, Job Level and Length of Job						
Dependent Variable: User Satisfaction Covariates: Age, Gender, Salary, and Education						
Demographic covariates (age, gender, salary, education)			$R^2 = .022$		Adjusted $R^2 = .008$	
Predictors	B	Sig of β	R^2	Adjusted R^2	F (Eqn)	Sig of F
			.087	.065	4.001 <i>df(7,294)</i>	.001
Computer Self Efficacy	.259	.001				
Job Level	.049	.453				
Length of Job	-.043	.712				

Table 5.21b: Multiple Regression Analysis: Individual Factors with Individual Impact

Independent Variables: Computer Self Efficacy, Job Level and Length of Job						
Dependent Variable: Individual Impact Covariates: Age, Gender, Salary, and Education						
Demographic covariates (age, gender, salary, education)			$R^2 = .033$		Adjusted $R^2 = .019$	
Predictors	B	Sig of β	R^2	Adjusted R^2	F (Eqn)	Sig of F
			.081	.060	3.727 <i>df(7,294)</i>	.001
Computer Self Efficacy	.228	.001				
Job Level	-.005	.942				
Length of Job	.056	.630				

Table 5.21c: Multiple Regression Analysis: Individual Factors with Organizational Impact**Independent Variables:** Computer Self Efficacy, Job Level and Length of Job**Dependent Variable:** Organizational Impact **Covariates:** Age, Gender, Salary, and Education

Demographic covariates (age, gender, salary, education)	R² = .022	Adjusted R² = .009
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Predictors	β	Sig of β	R ²	Adjusted R ²	F (Eqn)	Sig of F
			.077	.056	3.527	.001
					df(7,294)	
Computer Self Efficacy	.241	.001				
Job Level	.043	.509				
Length of Job	.006	.960				

Table 5.21d: Multiple Regression Analysis: Individual Factors with Net Benefits**Independent Variables:** Computer Self Efficacy, Job Level and Length of Job**Dependent Variable:** Net Benefits**Covariates:** Age, Gender, Salary, and Education

Demographic covariates (age, gender, salary, education)	R² = .033	Adjusted R² = .020
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Predictors	B	Sig of β	R ²	Adjusted R ²	F (Eqn)	Sig of F
			.098	.077	4.569	.001
					df(7,294)	
Computer Self Efficacy	.265	.001				
Job Level	.017	.795				
Length of Job	.041	.727				

In short, among the three individual factors, only computer self efficacy emerged as the significant predictor of user satisfaction, individual impact,

organizational impact and net benefits, when demographic variables were controlled. Therefore, hypothesis 6 (H6a & H6b) is partially supported.

5.7.1.7. Main Effects of User Satisfaction on IS Success Outcome Variables (individual impact, organizational impact, and net benefits)

Results of hypothesis 2 indicated that there is a significant positive correlation between the user satisfaction and three IS success outcome variables (individual impact, organizational impact, and net benefits). In this section, regression analysis will be conducted to test the extent to which user satisfaction will predict the three outcome variables.

(a) User satisfaction predicting individual impact

The main effect of user satisfaction on individual impact was tested using hierarchical regression analysis. Four covariates (age, gender, salary, education) were entered in the first step (to control their effect) and then user satisfaction was entered in the second step of regression analysis. Results of this analysis are presented in table 5.22a. It is clear from the table that the user satisfaction significantly predicted individual impact ($\beta = .600$, $p = .001$) after controlling demographic covariates.

Table 5.22a: Multiple Regression Analysis: User Satisfaction with Individual Impact

Independent Variables: User Satisfaction

Dependent Variable: Individual Impact **Covariates:** Age, Gender, Salary, and Education

Demographic covariates (age, gender, salary, education)			R ² = .033	Adjusted R ² = .019		
Predictors	B	Sig of β	R ²	Adjusted R ²	F (Eqn)	Sig of F
			.385	.374	37.013. <i>df(5,295)</i>	.001
User Satisfaction	.600	.001				

(b) User satisfaction predicting organizational impact

The main effect of user satisfaction on organizational impact was tested using hierarchical regression analysis. Four covariates (age, gender, salary, education) were entered in the first step (to control their effect) and then user satisfaction was entered in the second step of regression analysis. Results of this analysis are presented in table 5.22b. It is clear from the table that the user satisfaction significantly predicted individual impact ($\beta = .758, p = .001$) after controlling demographic covariates.

Table 5.22b: Multiple Regression Analysis: User Satisfaction with Organizational Impact

Independent Variables: User Satisfaction						
Dependent Variable: Organizational Impact			Covariates: Age, Gender, Salary, and Education			
Demographic covariates (age, gender, salary, education)			R² = .022		Adjusted R² = .009	
Predictors	B	Sig of β	R²	Adjusted R²	F (Eqn)	Sig of F
			.584	.576	82.948 <i>df(5,296)</i>	.001
User Satisfaction	.758	.001				

(c) User satisfaction predicting net benefits

The main effect of user satisfaction on net benefits was tested using hierarchical regression analysis. Four covariates (age, gender, salary, education) were entered in the first step (to control their effect) and then user satisfaction was entered in the second step of regression analysis. Results of this analysis are presented in table 5.22c. It is clear from the table that the user satisfaction significantly predicted net benefits ($\beta = .753, p = .001$) after controlling demographic covariates.

Table 5.22c: Multiple Regression Analysis: User Satisfaction with Net Benefits

Independent Variables: User Satisfaction						
Dependent Variable: Net Benefits			Covariates: Age, Gender, Salary, and Education			
Demographic covariates (age, gender, salary, education)			R² = .033		Adjusted R² = .020	
Predictors	B	Sig of β	R ²	Adjusted R ²	F (Eqn)	Sig of F
			.588	.581	84.426 <i>df(5,296)</i>	.001
User Satisfaction	.753	.001				

In short, user satisfaction emerged as the significant predictor of all the three outcome variables (individual impact, organizational impact and net benefits, when demographic variables were controlled. *Above findings, lends support to the hypothesis 2 (H2a, H2b, H2c).*

5.7.2. Mediation Regression Analysis

To test the hypotheses that user satisfaction will mediate the relationship of leadership styles, organizational culture, top management support, managerial IT expertise, system related factors, and individual factors with three outcome variables (individual impact, organizational impact, and net benefits), Baron and Kenny's (1986) analytic approach for testing mediation was followed. According to this approach, four conditions must be met to test mediation effect:

(1) A significant relationship must exist between the independent variable and the dependent variable to test for path c (Figure 5.1).

(2) There must be a significant relationship between the independent variable and the mediating variable to test for path a.

(3) The mediator must be significantly associated with the dependant variable so, to test for path b.

(4) When the mediator is controlled, the previously significant relationship between the independent and dependant variables is zero (in case of full mediation) and is reduced (in case of partial mediation). This will test for path c'. In other words, if the regression between dependant variable and independent variable plus mediator is zero then, it is case of full mediation and if the values are significantly reduced then, it is a case of partial mediation.

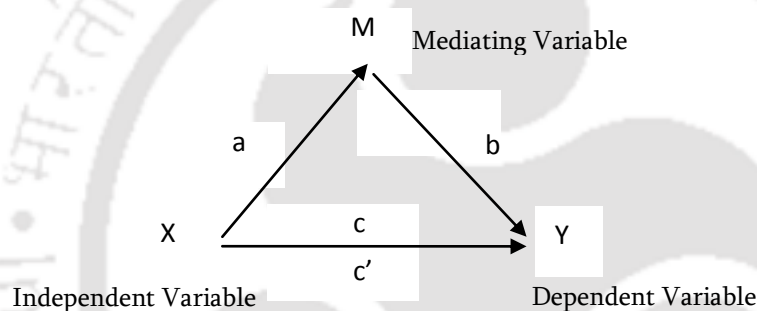


Figure 5.1: Paths for Mediation Analysis (Source: Baron and Kenny's, 1986)

In order to study the mediating effect of user satisfaction on the relationship between independent variables (leadership style, organizational culture, top management support, managerial IT expertise, system related factors, and individual factors) and three outcome variables (individual impact, organizational impact, and net benefits), the following method was adopted to meet the Baron and Kenny's criteria of mediation analysis:

(1) According to step 1, there must be a significant relationship between independent and dependent variable. Multiple regression analysis was conducted considering all the dimension of each independent variable as predictors and taking individual impact, organizational impact and net benefits, each, one by one as

dependent variables, and controlling the demographic covariates (age, gender, salary and education) in each case.

(2) Step 2 indicates that there must be a significant relationship between the mediator and the independent variables. Beta values were computed by taking user satisfaction as dependent variable and taking all dimensions of each independent variable as predictors after controlling the demographic variables.

(3) The step 3 states that the mediator must be significantly associated with the dependent variable. For the third step of mediation analysis, user satisfaction is considered as the predictor after controlling for demographic covariates, and individual impact, organizational impact and net benefits are considered individually one by one as dependant variables.

(4) According to step 4, the regression between (beta value) dependant variable and independent variable plus mediator is zero then, it is case of full mediation and if there is a significant reduction in beta value then, it is a case of partial mediation. Thus, the beta values are computed for the relationship of independent variables with the outcomes after controlling the demographic covariates and user satisfaction. After this the beta values obtained in the first step are compared with the beta values obtained in the fourth step. Finally, the Sobel's test for significance of mediation was carried out to test the significance of partial mediation. The present study followed the above four steps for all the mediation analysis.

5.7.2.1. Mediating Effect of User Satisfaction between the Leadership Styles (Transformational and Transactional) and the Three IS Success Outcome Variables (individual impact, organizational impact, and net benefits)

Hypothesis 9 proposes that the user satisfaction will mediate the relationship between leadership styles (transformational and transactional) and IS success outcome variables (individual impact, organizational impact and net benefits). To investigate this hypothesis, the conditions set forth by Baron and Kenny (1986) was followed.

Step 1- Table 5.16b, 5.16c, 5.16d clearly indicates that the transformational leadership significantly predicted individual impact ($\beta = .251, p = .001$), organizational impact ($\beta = .221, p = .001$), and net benefits ($\beta = .271, p = .001$), after controlling all the demographic covariates. Therefore, transformational leadership style met the first step of mediation analysis. However, transactional leadership did not predict any of the three IS success outcomes. Hence, it was not considered for mediation analysis.

Step 2- Next a regression is performed to predict user satisfaction (mediating variable) from leadership. Table 5.16a indicated that the transformational leadership significantly predicted user satisfaction ($\beta = .201, p = .001$) after controlling demographic covariates. Here again, transactional leadership did not predict user satisfaction. Therefore, only transformational leadership was considered for mediation analysis.

Step 3- For the third step of meditational analysis it was necessary to show a significant relationship between mediator and outcome. Table 5.22, illustrated that user satisfaction significantly predicted, all IS success outcome variables, that is, individual impact ($\beta = .600, p = .001$), organizational impact ($\beta = .758, p = .001$), and net benefits ($\beta = .753, p = .001$), after controlling demographic covariates.

Figure 5.2a, 5.2b, and 5.2c indicates the beta values and the pathways of the first three steps of the mediation analysis of user satisfaction between leadership styles and outcome variables. It is evident that among both the leadership style variables, only transformational leadership met the first three criteria's of meditational analysis for all the three IS success outcomes (individual impact, organizational impact, and net benefits)

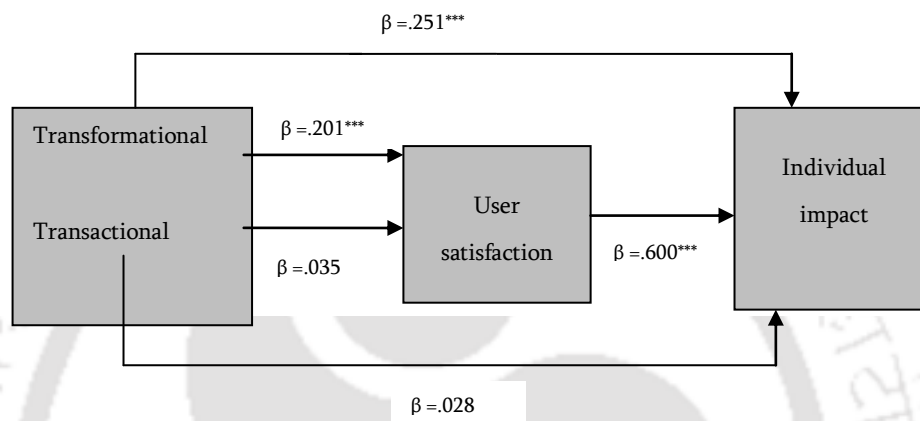


Figure 5.2a: First Three Steps of Mediation Analysis between Leadership Style and Individual Impact

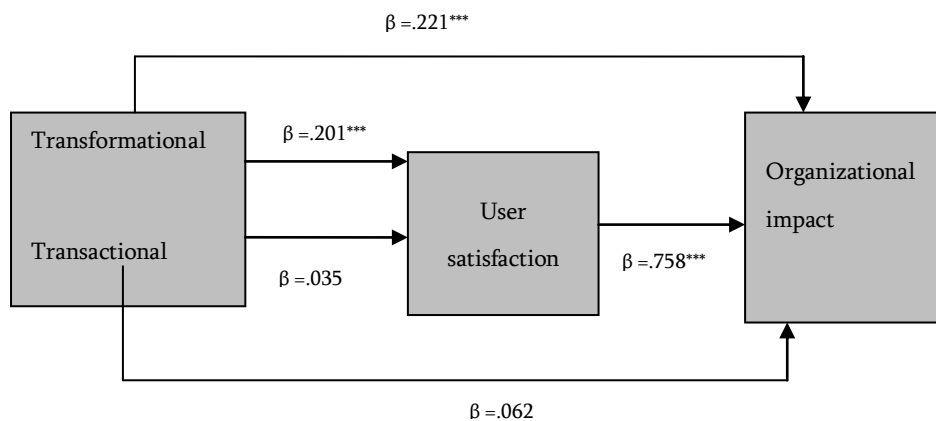


Figure 5.2b: First Three Steps of Mediation Analysis between Leadership Style and Organizational Impact

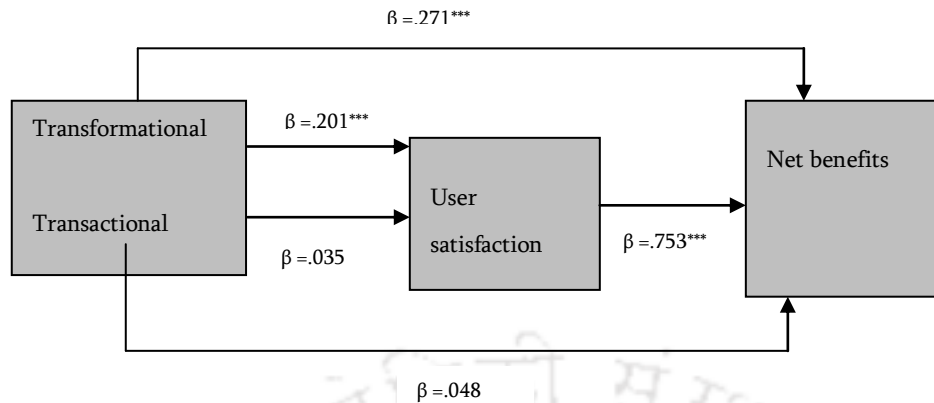


Figure 5.2c: First Three Steps of Mediation Analysis between Leadership Style and Net Benefits

Step 4- The final step of mediation regression analysis is shown in Table 5.23. It is evident from the table that the main effect of transformational leadership remained significant after controlling the demographic covariates and user satisfaction. However, there was a reduction in the β values of transformational leadership style with outcome variables from the first step to the fourth step. The β value for the relationship of transformational leadership (a) with individual impact reduced from .251 ($p = .001$) in the first step to .137 ($p < .01$) in the fourth step, (b) with organizational impact it reduced from .221 ($p = .001$) to .072 ($p < .001$), (c) with net benefits it reduced from .271 ($p = .001$) to .125 ($p < .001$). This regression analysis also provided estimates of unstandardized coefficient for association between mediator and dependent variable labeled as 'b' and its standard error 'Sb', required for Sobel test to test the significance of mediation.

It is clear from the Table 5.24, that the mediating effect of the user satisfaction between the transformational leadership and individual impact (Sobel $Z = 2.968$, $p = .002$), organizational impact (Sobel $Z = 3.023$, $p = .002$), and net benefits (Sobel $Z = 3.023$, $p = .003$) turned out to be significant (as indicated by Sobel test).

Therefore, it can be concluded that the user satisfaction partially mediated the relationship between transformational leadership and individual impact, organizational impact and net benefits. The effect of independent variable on dependent variable did not turn zero after statistically controlling the mediator variable, so this is a case of partial mediation according to Baron and Kenny's analytical approach (1986). *Therefore, hypothesis H9 is partially accepted.*

Table 5.23: Mediation Regression Analysis (Simultaneous Method): Leadership Styles

Independent Variables: Leadership: transformational leadership, transactional leadership

Outcomes: Individual Impact, Organizational Impact and Net Benefits

Mediator Variable: User Satisfaction **Covariates:** Age, Gender, Salary, and Education

Mediating effect of user satisfaction between leadership style and individual impact

	Step 1 IV: Transfo and Transac DV: IndImp (same as Table 5.16b)	Step 2 IV: Transfo and Transac DV: UserSat (same as Table 5.16a)	Step 3 IV: UserSat DV: IndImp	Step 4 IV: Transfo and Transac DV: IndImp Cont: UserSat
R ²	.103	.070	.385	.403
Adj R ²	.084	.051	.374	.389
F	5.620***	3.692***	37.013***	60.990***
β for Transfo	.251***	.201**		.137**
β for Transac	.028	.035		.008
β for UserSat			.600***	.569***

Table continued on next page...

*continued.....***Mediating effect of user satisfaction between leadership style and organizational impact**

	Step 1 IV: Transfo and Transac DV: OrgImp (same as Table 5.16b)	Step 2 IV: Transfo and Transac DV: UserSat	Step 3 IV: UserSat DV: OrgImp	Step 4 IV: Transfo and Transac DV: OrgImp Cont: UserSat
R ²	.087	.070	.584	.592
Adj R ²	.069	.051	.576	.582
F	4.711***	3.692***	82.948**	60.990***
β for Transfo	.221***	.201**		.072**
β for Transac	.062	.035		.036
β for UserSat			.758**	.737***

Mediating effect of user satisfaction between transformational leadership and net benefits

	Step 1 IV: Transfo and Transac DV: NetBen (same as Table 5.16c)	Step 2 IV: Transfo and Transac DV: UserSat	Step 3 IV: UserSat DV: NetBen	Step 4 IV: Transfo and Transac DV: NetBen Cont: UserSat
R ²	.120	.070	.581	.606
Adj R ²	.102	.051	.588	.596
F	6.701***	3.692***	84.426***	64.499***
β for Transfo	.271***	.201**		.125**
β for Transac [#]	.048	.035		.022
β for UserSat			.753***	.723***

*Transfo= transformational leadership; UserSat= user satisfaction; IndImp= individual impact; OrgImp= organizational impact; NetBen= net benefits

(*p<.05, **p<.01, ***p<.001)

This variable does not meet any criteria of mediation

Table 5.24: Sobel Test for User Satisfaction Mediating Leadership Styles**Mediator:** User Satisfaction**Independent Variable:** Leadership: transformational leadership

Dependent	Predictors	a	Sa	b	Sb	Sobel Z
Individual Impact	Transformational	.698	.228	.606	.050	2.968**
Organizational Impact	Transformational	.698	.228	.543	.028	3.023**
Net Benefits	Transformational	.698	.228	1.149	.060	3.023**

*variables those met first three criteria of mediation analysis are considered for Sobel test.

a = raw (unstandardized) regression coefficient for the association between independent variable and the mediator, Sa = standard error of a , b =raw coefficient for the association between the mediator and the dependent variable (when the independent variable is also a predictor of dependent variable), Sb = standard error of b .

(* $p < .05$, ** $p < .01$, *** $P < .001$)

5.7.2.2. Mediating Effect of User Satisfaction between the Organizational Culture Dimensions (conflict tolerance, structure, risk tolerance, and support and participation) and Three IS Success Outcome Variables (individual impact, organizational impact, and net benefits)

Hypothesis 10 proposes that user satisfaction will mediate the relationship between organizational culture dimensions (conflict tolerance, structure, risk tolerance, and support and participation) and IS success outcome variables (individual impact, organizational impact and net benefits). To investigate this hypothesis, the conditions set forth by Baron and Kenny (1986) was followed.

Step 1- Table 5.17b, indicated that conflict tolerance ($\beta = .117$, $p = .036$), structure ($\beta = .145$, $p = .009$), and support and participation ($\beta = .343$, $p = .001$), significantly predicted individual impact. As indicated by Table 5.17c, structure ($\beta = .287$, $p = .001$), and support and participation ($\beta = .252$, $p = .004$) significantly predicted organizational impact. However conflict tolerance did not predict

organizational impact significantly ($\beta = .084, p = .120$). Table 5.17d, revealed that conflict tolerance ($\beta = .117, p = .028$), structure ($\beta = .230, p = .001$), and support and participation ($\beta = .347, p = .001$) significantly predicted net benefits after controlling the demographic covariates. However, risk tolerance did not turn out to be a significant predictor of any of the three outcome variables. Thus, among four dimensions of organizational culture only conflict tolerance, structure, and support and participation met the step 1 criteria of predicting individual impact and net benefits. While, only structure, and support and participation met the step 1 criteria of predicting organizational impact.

Step 2- Table 5.17a indicated that structure ($\beta = .199, p = .001$), and support and participation ($\beta = .275, p = .002$) significantly predicted user satisfaction after controlling for demographic covariates. Therefore, only structure and support and participation met the criteria for second step of mediation analysis.

Step 3- For the third step of meditational analysis it was necessary to show significant relationship between mediator and outcome. Table 5.22, illustrated that user satisfaction significantly predicted all the three IS success outcome variables, that is, individual impact ($\beta = .600, p = .001$), organizational impact ($\beta = .758, p = .001$), and net benefits ($\beta = .753, p = .001$), after controlling the demographic covariates.

Figure 5.3a, 5.3b, and 5.3c indicates the beta values and the pathways of the first three steps of the mediation analysis of the user satisfaction between organizational culture and IS success outcome variables. Among all the dimensions of organizational culture, only two dimensions (structure, support and participation) met first three criteria's of meditational analysis for all the three IS success outcomes (individual impact, organizational impact and net benefits) and thus they are considered for further mediation analysis.

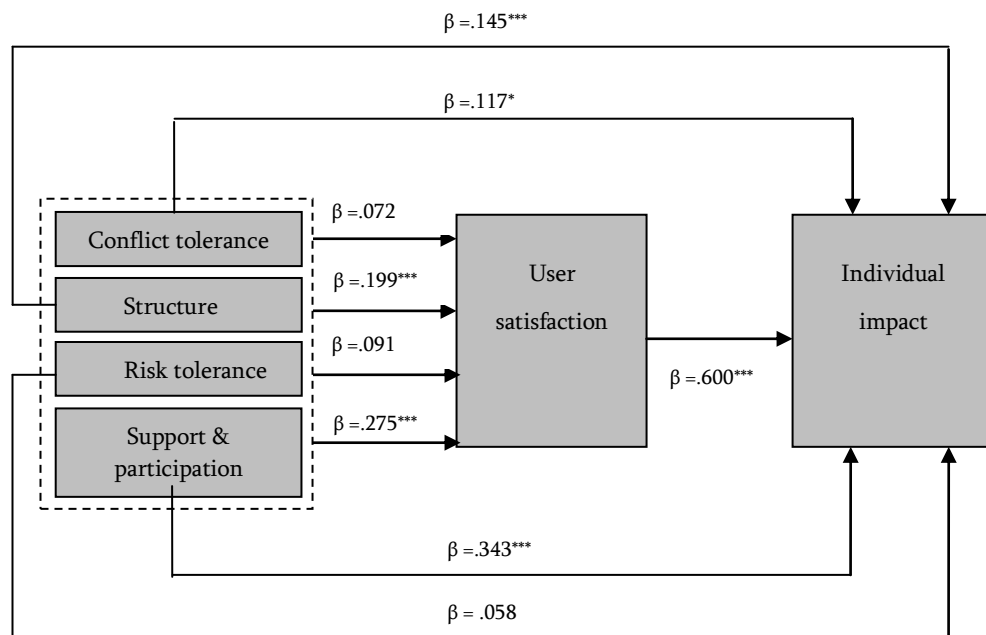


Figure 5.3a: First Three Steps of Mediation Analysis between Organizational Culture and Individual Impact

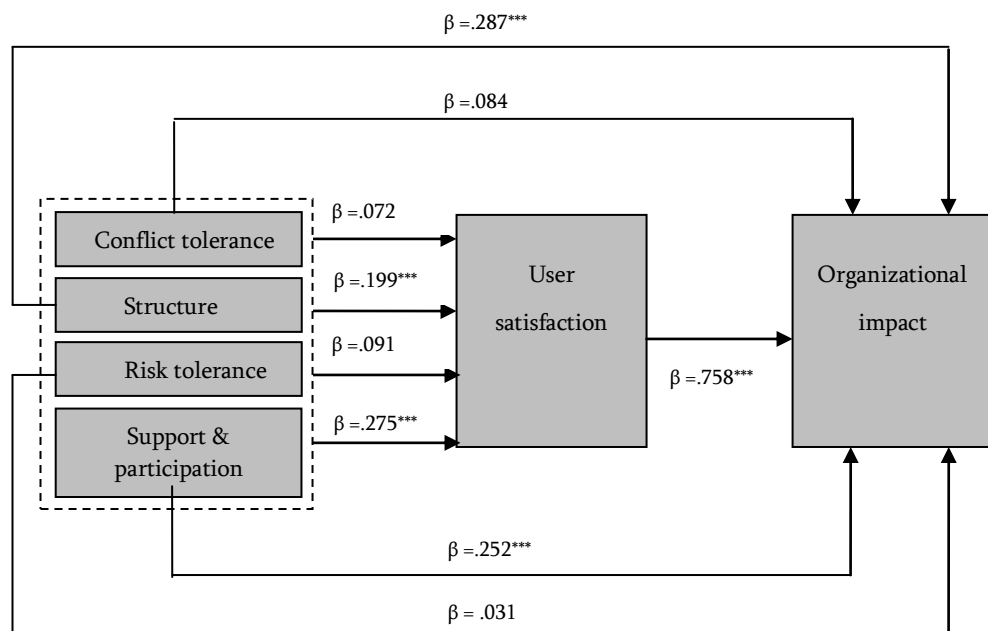


Figure 5.3b: First Three Steps of Mediation Analysis between Organizational Culture and Organizational Impact

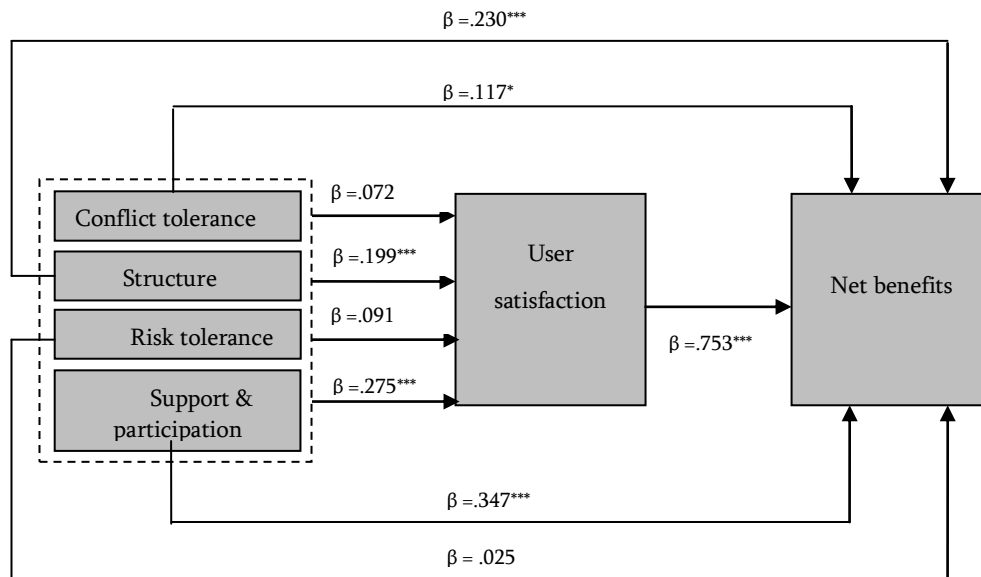


Figure 5.3c: First Three Steps of Mediation Analysis between Organizational Culture and Net Benefits

Step 4- The final step of meditational regression analysis is shown in Table 5.25. It is evident from the table that the main effect of structure, and support and participation remained significant after controlling the demographic covariates and user satisfaction. The β value for the relationship of structure (a) with individual impact reduced from .145 ($p = .009$) at the first step to .040 ($p = .417$) at the fourth step, (b) with organizational impact it reduced from .287 ($p = .001$) to .149 ($p < .001$), (c) with net benefits it reduced from .230 ($p = .001$) to .096 ($p < .01$). Furthermore, the β value for the relationship of support and participation (a) with individual impact reduced from .343 ($p = .001$) at the first step to .198 ($p < .01$) at the fourth step, (b) with organizational impact it reduced from .252 ($p = .004$) to .062 ($p = .327$), (c) with net benefits it reduced from .347 ($p = .001$) to .162 ($p < .01$). Results of Sobel test for significance of mediation (Table 5.26) proved that the mediating effect of user satisfaction was statistically significant. It is clear from the table that the mediating

effect of the user satisfaction between the structure and individual impact (Sobel $Z=3.459$, $p = .001$), organizational impact (Sobel $Z = 3.587$, $p = .003$), and net benefits (Sobel $Z = 3.585$, $p = .003$) turned out to be significant (as indicated by Sobel test). Therefore, it can be concluded that the user satisfaction fully mediated the relationship between structure and individual impact, while, partially mediated the relationship between structure and organizational impact and net benefits. Similarly, mediating effect of the user satisfaction between the support and participation and individual impact (Sobel $Z=3.037$, $p = .001$), organizational impact (Sobel $Z = 3.122$, $p = .003$), and net benefits (Sobel $Z = 3.120$, $p = .003$) turned out to be significant (as indicated by Sobel test). Therefore, it can be concluded that the user satisfaction partially mediated the relationship between support and participation and individual impact, and net benefits and fully mediated the relationship between support and participation and organizational impact.

In short, user satisfaction partially mediated the relationship between structure and organizational impact, and net benefits; support and participation and individual impact, and net benefits. While, user satisfaction fully mediated the relationship between structure and individual impact, and support and participation and organizational impact. However, conflict tolerance and risk tolerance did not meet the first three criteria's of mediational analysis, so they are not considered. *Thus, hypothesis 10 is partially accepted.*

Table 5.25: Mediation Regression Analysis (Simultaneous Method): Organizational culture

Independent Variable: Organizational Culture (Conflict Tolerance, Structure, Support and Participation, and Risk Tolerance)

Outcomes: Individual Impact, Organizational Impact and Net Benefits

Mediator Variable: User Satisfaction **Covariates:** Age, Gender, Salary, and Education

Mediating effect of user satisfaction between organizational culture and individual impact

	Step 1 IV: OC all dimensions DV: IndImp (same as Table 5.17a)	Step 2 IV: OC all dimensions DV: UserSat	Step 3 IV: UserSat DV: IndImp	Step 4 IV: OC all dimensions IV: Struc DV: IndImp Cont: UserSat
R ²	.201	.237	.385	.414
Adj R ²	.179	.217	.374	.396
F	9.215***	11.405***	37.013***	22.949***
β for ConTol [#]	.117*	.072		.079*
β for Struc	.145**	.199**		.040
β for RiskTol [#]	.058	.091		.106
β for SupPar	.343***	.275**		.198**
β for UserSat			.600***	.529***

Mediating effect of user satisfaction between organizational culture and organizational impact

	Step 1 IV: OC all dimensions DV: OrgImp (same as Table 5.17b)	Step 2 IV: OC all dimensions DV: UserSat	Step 3 IV: UserSat DV: OrgImp	Step 4 IV: OC all dimensions DV: OrgImp Cont: UserSat
R ²	.271	.116	.584	.609
Adj R ²	.225	.101	.576	.597
F	11.905***	7.766***	82.948**	50.537
β for ConTol [#]	.084	.072		-.034
β for Struc	.287***	.199**		.149***
β for RiskTol [#]	.031	.091		.032
β for SupPar	.252**	.275**		.062
β for UserSat			.758***	.691***

Table continued on next page...

*continued....***Mediating effect of user satisfaction between organizational culture and net benefits**

	Step 1 IV: OC all dimensions DV: NetBen (same as Table 5.17c)	Step 2 IV: OC all dimensions DV: UserSat	Step 3 IV: UserSat DV: NetBen	Step 4 IV: OC all dimensions DV: NetBen Cont: UserSat
R²	.271	.116	.581	.618
Adj R²	.251	.101	.588	.606
F	13.618***	7.766***	84.426***	52.503***
β for ConTol[#]	.117*	.072		.069
β for Struc	.230***	.199**		.096**
β for RiskTol[#]	.025	.091		.086
β for SupPar	.347***	.275**		.162**
β for UserSat			.753***	.675***

*OC= organizational culture; Struc= structure; ConTol= conflict tolerance; SupPar= support and participation; UserSat= user satisfaction; IndImp= individual impact; OrgImp= organizational impact; NetBen= net benefits

(*p<.05, **p<.01, ***p<.001)

These variables did not meet any criteria of mediation.

Table 5.26: Sobel Test for User Satisfaction Mediating Organizational Culture**Mediator:** User Satisfaction**Independent Variable:** Dimension of Organizational Culture

Dependent	Predictors	a	Sa	b	Sb	Sobel Z
Individual Impact	Structure	.419	.114	.564	.055	3.459***
	Support and Participation	.124	.039	.564	.055	3.037**
Organizational Impact	Structure	.419	.114	.509	.031	3.587***
	Support and Participation	.124	.039	.509	.031	3.122***
Net Benefits	Structure	.419	.114	1.073	.066	3.585***
	Support and Participation	.124	.039	1.073	.066	3.120***

*variables those met first three criteria of mediation analysis are considered for Sobel test.

a = raw (unstandardized) regression coefficient for the association between independent variable and the mediator, Sa = standard error of a , b =raw coefficient for the association between the mediator and the dependent variable (when the independent variable is also a predictor of dependent variable), Sb = standard error of b .

(* $p < .05$, ** $p < .01$, *** $p < .001$)

5.7.2.3. Mediating Effect of User Satisfaction between Top Management Support and Three IS Success Outcome Variables (individual impact, organizational impact, and net benefits)

Hypothesis 13 proposed that user satisfaction will mediate the relationship between top management support and three IS success outcome variables (individual impact, organizational impact and net benefits). To investigate this hypothesis, the conditions set forth by Baron and Kenny (1986) was followed.

Step 1- Table 5.18b, 5.18c, 5.18d indicates that top management support significantly predicted individual impact ($\beta = .443, p = .001$), organizational impact ($\beta = .593, p = .001$) and net benefits ($\beta = .572, p = .001$) after controlling the demographic covariates. Therefore, it meets the first criteria of mediation analysis.

Step 2- Table 5.18a indicated that the top management support significantly predicted user satisfaction ($\beta = .618, p < .001$) after controlling demographic covariates. Therefore, it meets second criteria of mediation analysis.

Step 3- For the third step of meditational analysis it was necessary to show a significant relationship between mediator and outcome. Table 5.22, illustrated that user satisfaction significantly predicted, individual impact ($\beta = .600, p < .001$), organizational impact ($\beta = .758, p < .001$), and net benefits ($\beta = .753, p < .001$), after controlling the demographic covariates.

Figure 5.4a, 5.4b, and 5.4c indicates the beta values and the pathways of the first three steps of the mediation analysis of user satisfaction between top management support and IS success outcome variables. It is evident that the top management support met first three criteria of mediation analysis.

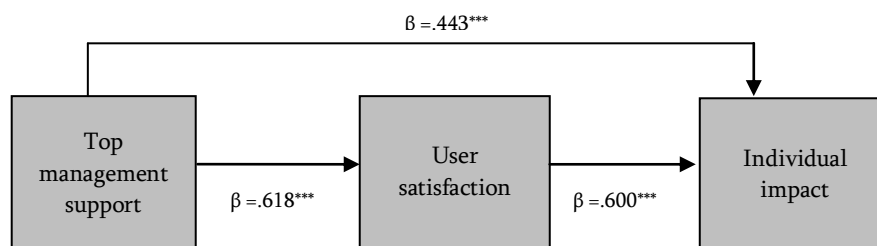


Figure 5.4a: First Three Steps of Mediation Analysis between Top Management Support and Individual Impact

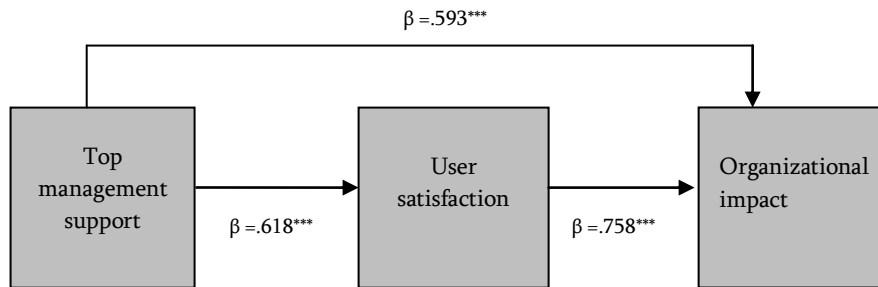


Figure 5.4b: First Three Steps of Mediation Analysis between Top Management Support and Organizational Impact

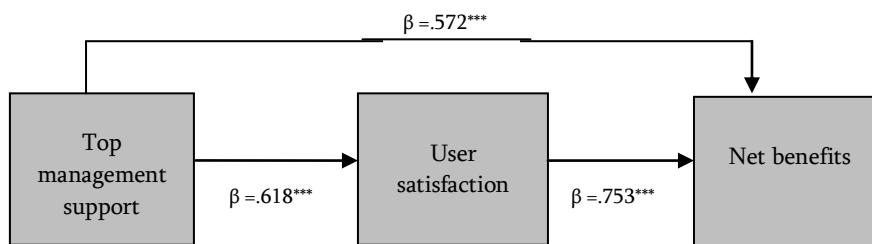


Figure 5.4c: First Three Steps of Mediation Analysis between Top Management Support and Net Benefits

Step 4- The final step of meditational regression analysis is shown in table 5.27. It is evident from the table that the main effect of top management support remained significant after controlling the demographic covariates and user satisfaction. However, there was a reduction in the β values of the top management support with outcome variables from the first step to the fourth step. The β value for the relationship of top management support (a) with individual impact reduced from .443 ($p = .001$) in the first step to .117 ($p < .001$) at the fourth step, (b) with

organizational impact, it reduced from .593 ($p = .001$) to .204 ($p < .001$), and (c) with net benefits, it reduced from .572 ($p = .001$) to .173 ($p < .001$).

It is clear from the table 5.28 that the user satisfaction partially mediated the relationship between the top management support and individual impact (Sobel $Z = 7.571$, ($p < .001$), organizational impact (Sobel $Z = 9.570$, ($p < .001$), and net benefits (Sobel $Z = 9.720$, ($p < .001$)). Thus, hypothesis 13 is fully supported.

Table 5.27: Mediation Regression Analysis: Top Management Support

Independent Variable: Top Management Support **Outcomes:** Individual Impact, Organizational Impact and Net Benefits **Mediator Variable:** User Satisfaction **Covariates:** Age, Gender, Salary, and Education

Mediating effect of user satisfaction between top management support and individual impact

	Step 1 IV: TopMan DV: IndImp (same as Table 5.18a)	Step 2 IV: TopMan DV: UserSat	Step 3 IV: UserSat DV: IndImp	Step 4 IV: TopMan DV: IndImp Cont: UserSat
R ²	.227	.401	.385	.393
Adj R ²	.214	.391	.374	.381
F	17.389***	39.636***	37.013***	31.838
β for TopMan	.443***	.618***		.117*
β for UserSat			.600***	.526***

Mediating effect of user satisfaction between top management support and organizational impact

	Step 1 IV: TopMan DV: OrgImp (same as Table 5.18b)	Step 2 IV: TopMan DV: UserSat	Step 3 IV: UserSat DV: OrgImp	Step 4 IV: TopMan DV: OrgImp Cont: UserSat
R ²	.371	.401	.584	.609
Adj R ²	.361	.391	.576	.601
F	34.945***	39.636***	82.948**	76.508***
β for Topman	.593***	.618***		.204***
β of UserSat			.758**	.630***

Table continued on next page....

*continued...***Mediating effect of user satisfaction between top management support and net benefits**

	Step 1 IV: TopMan DV: NetBen (same as Table 5.18c)	Step 2 IV: TopMan DV: UserSat	Step 3 IV: UserSat DV: NetBen	Step 4 IV: TopMan DV: NetBen Cont: UserSat
R ²	.357	.401	.581	.606
Adj R ²	.346	.391	.588	.598
F	32.864***	39.636***	84.426***	75.625***
β for TopMan	.572***	.618***		.173***
β for UserSat			.753***	.645***

*TopMan= top management support; UserSat= user satisfaction; IndImp= individual impact; OrgImp= organizational impact; NetBen= net benefits
 (*p<.05, **p<.01, ***p<.001)

Table 5.28 Sobel Test for user Satisfaction Mediating Top Management Support**Mediator:** User Satisfaction**Independent Variable:** Top Management Support

Dependent	Predictors	a	Sa	b	Sb	Sobel Z
Individual Impact	Top Management Support	.719	.052	.561	.062	7.571**
Organizational Impact	Top Management Support	.719	.052	.464	.035	9.570**
Net Benefits	Top Management Support	.719	.052	1.025	.075	9.720**

a= raw (unstandardized) regression coefficient for the association between independent variable and the mediator, *Sa*= standard error of *a*, *b*=raw coefficient for the association between the mediator and the dependent variable (when the independent variable is also a predictor of dependent variable), *Sb*= standard error of *b*.

(*p<.05, **p<.01, ***P<.001)

5.7.2.4. Mediating Effect of User Satisfaction between Managerial IT Expertise and Three IS Success Outcome Variables (individual impact, organizational impact, and net benefits)

Hypothesis 14 proposed that the user satisfaction will mediate the relationship between managerial IT expertise and IS success outcome variables (individual impact, organizational impact and net benefits). To investigate the hypothesis, the conditions set forth by Baron and Kenny (1986) was followed.

Step 1- Table 5.19b, 5.19c, 5.19d indicates that the managerial IT expertise significantly predicted individual impact ($\beta = .320, p = .001$), organizational impact ($\beta = .271, p = .001$) and net benefits ($\beta = .340, p = .001$) after controlling the demographic covariates. Thus, it meets first criteria of mediation analysis.

Step 2- Table 5.19a indicates that the managerial IT expertise significantly predicted user satisfaction ($\beta = .248, p = .001$) after controlling for demographic covariates. Therefore, it also meets second step of mediation analysis.

Step 3- For the third step of meditational analysis, it was necessary to show a significant relationship between mediator and outcome. Table 5.22, illustrated that user satisfaction significantly predicted, individual impact ($\beta = .600, p < .001$), organizational impact ($\beta = .758, p < .001$), and net benefits ($\beta = .753, p < .001$), after controlling the demographic covariates.

Figure 5.5a, 5.5b, and 5.5c shows pathways of first three steps of mediation analysis of user satisfaction between managerial IT expertise and three IS success outcome variables (individual impact, organizational impact and net benefits).

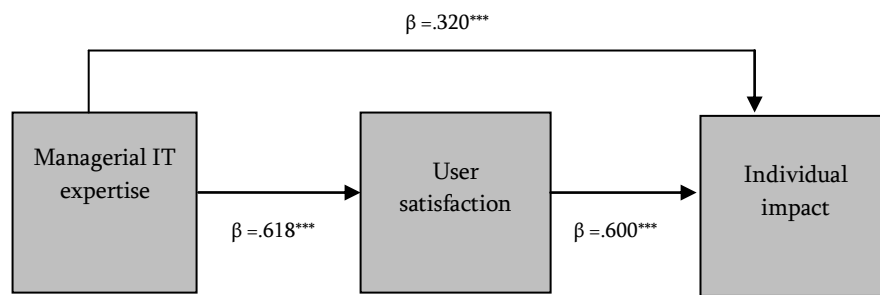


Figure 5.5a: First Three Steps of Mediation Analysis between Managerial IT Expertise and Individual Impact

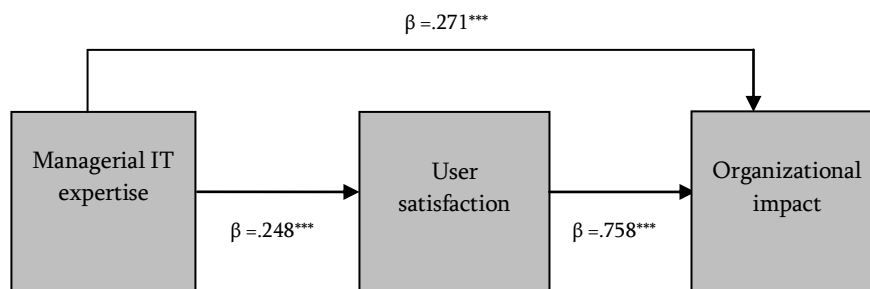


Figure 5.5b: First Three Steps of Mediation Analysis between Managerial IT Expertise and Organizational Impact

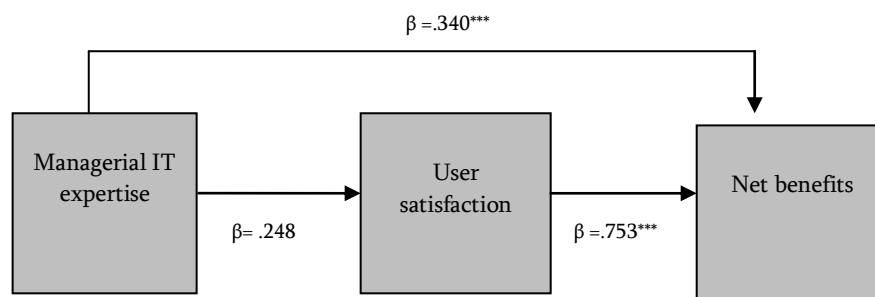


Figure 5.5c: First Three Steps of Mediation Analysis between Managerial IT Expertise and Net Benefits

Step 4- The final step of meditational regression analysis is shown in table 5.29. It is evident from the table that the main effect of managerial IT expertise remained significant after controlling the demographic covariates and user satisfaction. However, there was a reduction in the β values of the managerial IT expertise with outcome variables from the first step to the fourth step. The β value for the relationship of managerial IT expertise (a) with individual impact reduced from .320 ($p = .001$ in the first step to .182 ($p < .001$) at the fourth step, (b) with organizational impact it reduced from .271 ($p = .001$) to .089 ($p < .05$), and (c) with net benefits it reduced from .340 ($p = .001$) to .163 ($p < .001$). It is clear from the Table 5.30, that the mediating effect of the user satisfaction between the managerial IT expertise and individual impact (Sobel $Z = 4.291$, $p < .001$), organizational impact Sobel $Z = 4.131$, $p < .001$), and net benefits (Sobel $Z = 4.294$, $p < .001$) turned out to be significant (as indicated by Sobel test). Therefore, user satisfaction partially mediated the relationship between the managerial IT expertise and the three IS success outcome variables (individual impact, organizational impact, and net benefits). *Thus, hypothesis 14 is fully supported.*

**Table 5.29: Mediation Regression Analysis (Simultaneous Method):
Managerial IT Expertise**

Independent Variable: Managerial IT Expertise

Outcomes: Individual Impact, Organizational Impact and Net Benefits

Mediator Variable: User Satisfaction **Covariates:** Age, Gender, Salary, and Education

Mediating effect of user satisfaction between managerial IT expertise and individual impact

	Step 1 IV: ManExp DV: IndImp (same as Table 5.19a)	Step 2 IV: ManExp DV: UserSat	Step 3 IV: UserSat DV: IndImp	Step 4 IV: ManExp DV: IndImp Cont: UserSat
R ²	.133	.082	.385	.415
Adj R ²	.119	.067	.374	.401
F	9.114***	5.309***	37.013***	34.940***
β for ManExp	.320***	.248***		.182***
β for UserSat			.600***	.554***

Mediating effect of user satisfaction between managerial IT expertise and organizational impact

	Step 1 IV: ManExp DV: OrgImp (same as Table 5.19b)	Step 2 IV: ManExp DV: UserSat	Step 3 IV: UserSat DV: OrgImp	Step 4 IV: ManExp DV: OrgImp Cont: UserSat
R ²	.094	.082	.584	.591
Adj R ²	.079	.067	.576	.582
F	6.170***	5.309***	82.948**	70.989***
β for ManExp	.271***	.248***		.089*
β for UserSat			.758**	.735***

Table continued on next page....

*continued...***Mediating effect of user satisfaction between managerial IT expertise and net benefits**

	Step 1 IV: ManExp DV: NetBen (same as Table 5.19c)	Step 2 IV: ManExp DV: UserSat	Step 3 IV: UserSat DV: NetBen	Step 4 IV: ManExp DV: NetBen Cont: UserSat
R ²	.147	.082	.581	.612
Adj R ²	.132	.067	.588	.605
F	10.171***	5.309***	84.426***	77.710***
β for ManExp	.340***	.248***		.163***
β for UserSat			.753***	.712***

*ManExp= managerial IT expertise; UserSat= user satisfaction; IndImp= individual impact; OrgImp= organizational impact; NetBen= net benefits

(*p<.05, **p<.01, ***p<.001)

Table 5.30 Sobel Test for User Satisfaction Mediating Managerial IT Expertise

Mediator: User Satisfaction

Independent Variable: Managerial IT Expertise

Dependent	Predictors	a	Sa	b	Sb	Sobel Z
Individual Impact	Managerial IT Expertise	.194	.044	.591	.050	4.291***
Organizational Impact	Managerial IT Expertise	.194	.044	.542	.029	4.131***
Net Benefits	Managerial IT Expertise	.194	.044	1.133	.060	4.294***

a= raw (unstandardized) regression coefficient for the association between independent variable and the mediator, *Sa*= standard error of *a*, *b*=raw coefficient for the association between the mediator and the dependent variable (when the independent variable is also a predictor of dependent variable), *Sb*= standard error of *b*.

(*p<.05, **p<.01, ***P<.001)

5.7.2.5. Mediating Effect of User Satisfaction between IS Success Factors (Information quality, ease to use, system quality and service quality) and Three Outcome Variables (individual impact, organizational impact, and net benefits)

Hypothesis 11 proposed that user satisfaction will mediate the relationship between system related factors (information quality, ease to use, system quality and service quality) and IS success outcome variables (individual impact, organizational impact and net benefits). To investigate the hypothesis, the conditions set forth by Baron and Kenny (1986) was followed.

Step 1- Table 5.20b indicates that the information quality ($\beta = .339, p = .001$), ease to use ($\beta = .308, p = .001$), and system quality ($\beta = .149, p = .013$), significantly predicted individual impact. Similarly, Information quality ($\beta = .245, p = .001$), ease to use ($\beta = .130, p = .015$), system quality ($\beta = .113, p = .05$), and service quality ($\beta = .355, p = .001$), significantly predicted organizational impact (table 5.20c). Similarly, information quality ($\beta = .341, p = .001$), ease to use ($\beta = .267, p = .001$), system quality ($\beta = .152, p = .005$), and service quality ($\beta = .128, p = .008$), significantly predicted net benefits (table 5.20d). Thus, all the four system related factors met the first step of mediation analysis except service quality which did not turn out to be a significant predictor of individual impact.

Step 2- Table 5.20a, indicates that the information quality ($\beta = .225, p = .001$), ease to use ($\beta = .280, p = .001$), system quality ($\beta = .272, p = .001$), and service quality ($\beta = .139, p = .004$), significantly predicted user satisfaction after controlling for demographic covariates. So, all the system related factors met the second step of mediation analysis.

Step 3- For the third step of meditational analysis it was necessary to show a significant relationship between mediator and outcome. Table 5.22, illustrated that

user satisfaction significantly predicted, individual impact ($\beta = .600, p = .001$), organizational impact ($\beta = .758, p = .001$), and net benefits ($\beta = .753, p = .001$), after controlling the demographic covariates.

Figure 5.6a, 5.6b, and 5.6c indicates the beta values and the pathways of the first three steps of the mediation analysis of user satisfaction between system related factors and IS success outcome variables.

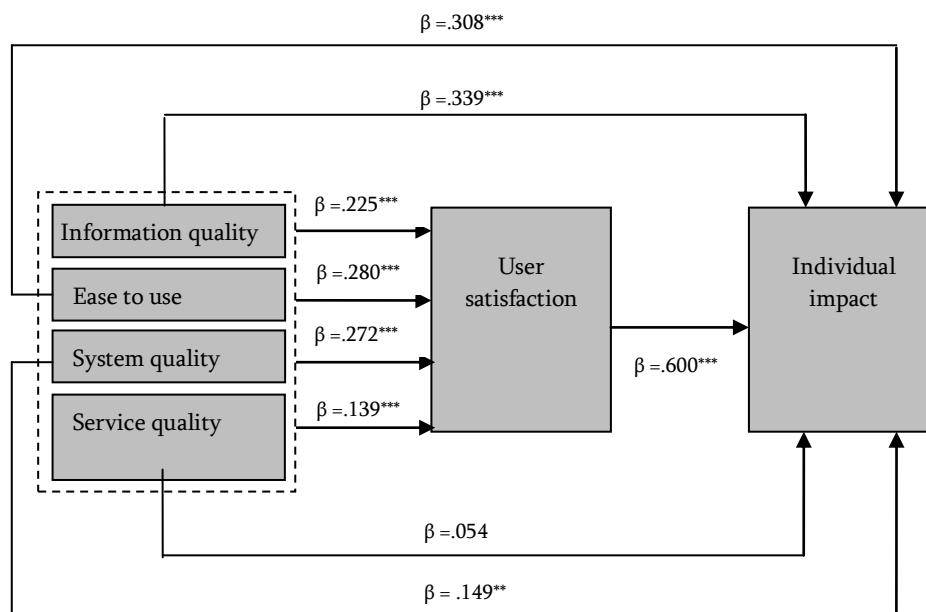


Figure 5.6a: First Three Steps of Mediation Analysis between System Related and Individual Impact

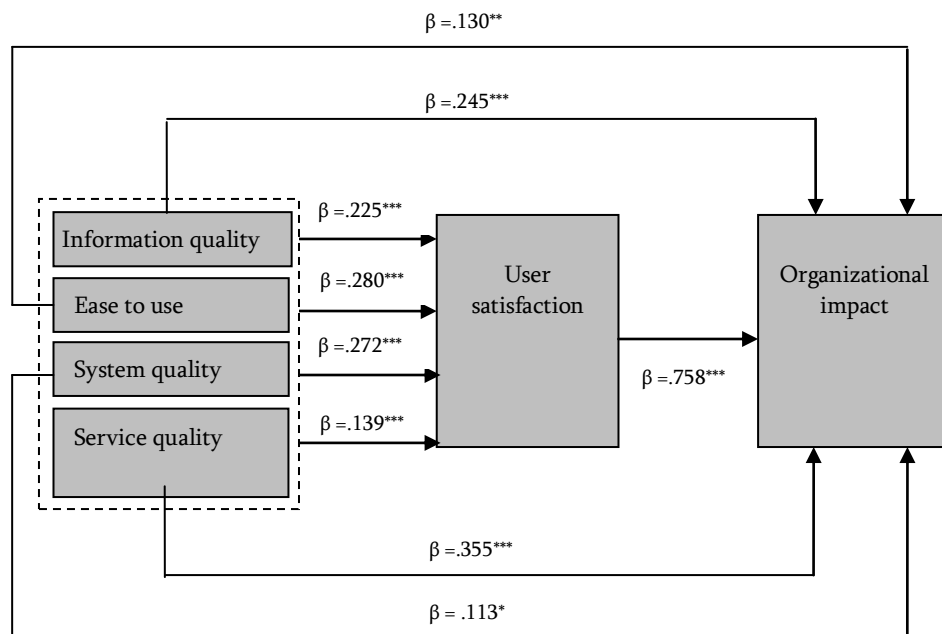


Figure 5.6b: First Three Steps of Mediation Analysis between System Related and Organizational Impact

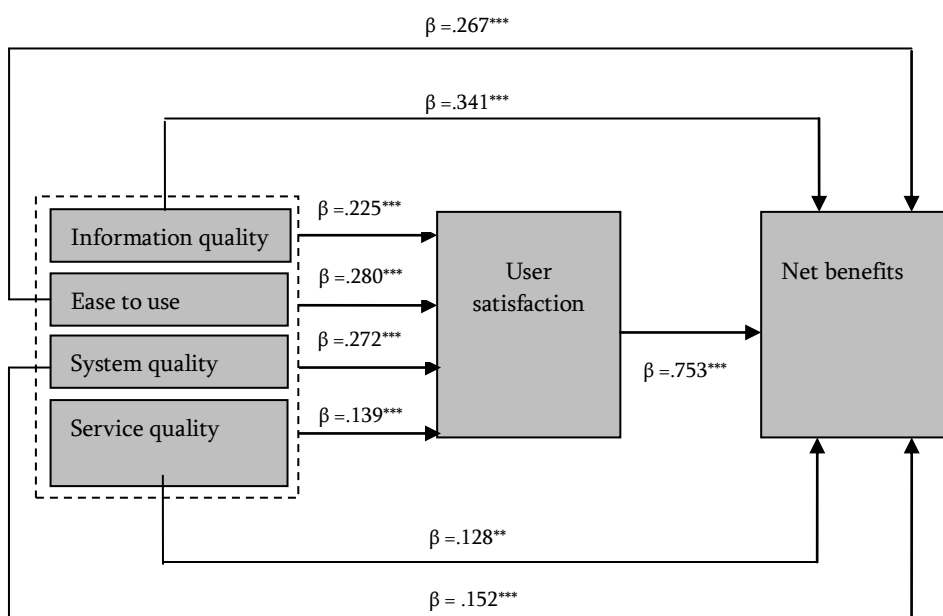


Fig.5.6c First Three Steps of Mediation Analysis between System Related and Net Benefits

Step 4- The final step of meditational regression analysis is shown in table 5.31. It is evident from the table that the main effect of information quality remained significant after controlling the demographic covariates and user satisfaction. The β values for the relationship of information quality with individual impact, organizational impact and net benefits reduced from the first step to the fourth step. The β value for the relationship of information quality (a) with individual impact reduced from .339, ($p = .001$) in the first step to .265, ($p < .001$) at the fourth step, (b) with organizational impact it reduced from .245, ($p = .001$), to .103, ($p < .001$), and (c) with net benefits it reduced from .341, ($p = .001$) to .225, ($p < .001$). It is clear from the table 5.32, that the mediating effect of the user satisfaction between the information quality and the individual impact (Sobel $Z = 3.394$, ($p < .001$), organizational impact (Sobel $Z = 4.187$, ($p < .001$), and net benefits (Sobel $Z = 4.067$, ($p < .001$) turned out to be significant (as indicated by Sobel test). Therefore, user satisfaction partially mediated the relationship between information quality and the three IS success outcome variables.

Similarly, the β value for the relationship of ease to use (a) with individual impact reduced from .308, ($p = .001$) in the first step to .216 ($p < .001$) at the fourth step, (b) with organizational impact it reduced from .130, ($p < .01$) to .047 ($p = .303$), and (c) with net benefits it reduced from .267, ($p = .001$) to .123, ($p < .01$). It is clear from the Table 5.32, that the mediating effect of the user satisfaction between the ease to use and the individual impact (Sobel $Z = 3.873$, ($p < .001$), organizational impact (Sobel $Z = 5.209$, ($p < .001$), and net benefits (Sobel $Z = 4.983$, ($p < .001$) turned out to be significant (as indicated by Sobel test). Therefore, user satisfaction partially mediated the relationship between the ease to use, and individual impact and net benefits, while fully mediates the relationship between organizational impacts.

Furthermore, the β value for the relationship of the system quality with all the outcome variables turn out non-significant after the addition of mediator. Specifically, the β value for the relationship of the system quality (a) with individual impact reduced from .149 ($p = .013$) in the first step to .059, ($p = .321$) at the fourth step, (b) with organizational impact it reduced from .113, ($p = .05$) to .059 ($p = .228$), and (c) with net benefits it reduced from .152, ($p = .005$) to .012, ($p = .807$). It is clear from the table 5.32, that the mediating effect of the user satisfaction between system quality and the individual impact (Sobel $Z = 3.646$, ($p < .001$), organizational impact (Sobel $Z = 4.691$, ($p < .001$), and net benefits (Sobel $Z = 4.523$, ($p < .001$) turned out to be significant (as indicated by Sobel test). Therefore, user satisfaction fully mediated the relationship between the system quality and all the three outcome variables.

Moreover, service quality did not meet the first criteria of mediation analysis for individual impact. Therefore, the fourth step of mediation analysis was not conducted with individual impact. However, service quality met first three criteria's of mediation analysis for both organization impact and net benefits. The β value for the relationship of service quality (a) with organizational impact reduced from .355 ($p = .001$) in the first step to .268 ($p < .001$) in the fourth step, (b) with net benefits it reduced from .128 ($p = .008$) to .057 ($p = .180$). It is clear from the Table 5.32, that the mediating effect of the user satisfaction between the service quality and the organizational impact (Sobel $Z = 2.885$, $p < .001$), and net benefits (Sobel $Z = 2.845$, $p < .001$), turned out to be significant (as indicated by Sobel test). Hence, the user satisfaction partially mediated the relationship between the service quality and organizational impact and fully mediated the relationship between the service quality and the net benefits.

In short, user satisfaction partially mediated the relationship between information quality and the three IS success outcome variables; ease to use, and individual impact and net benefits; service quality and organizational impact. While, it fully mediated the relationship between system quality and all the three IS success outcome variables; ease to use and organizational impact; service quality and the net benefits. However, service quality did not meet the first three criteria's with individual impact and hence not considered for mediation. *Therefore, it can be concluded that the hypothesis 11 is partially accepted.*

Table 5.31: Mediation Regression Analysis (Simultaneous Method): System Related Factors

Independent Variable: System Related Factors: Information Quality, Ease to Use, System Quality, and Service Quality

Outcomes: Individual Impact, Organizational Impact and Net benefits

Mediator Variable: User Satisfaction **Covariates:** Age, Sex, Salary, and Education

Mediating effect of user satisfaction between system related factors and individual impact

	Step 1 IV: all system related factors DV: IndImp (same as Table 5.20a)	Step 2 IV: all system related factors DV: UserSat	Step 3 IV: UserSat DV: IndImp	Step 4 IV: all system related factors DV: IndImp Cont: UserSat
R ²	.434	.545	.385	.483
Adj R ²	.418	.532	.374	.467
F	28.038***	43.835***	37.013***	30.299***
β for InfQua	.339***	.225**		.265***
β for EUse	.308***	.280***		.216***
β for SysQua	.149**	.272***		.059
β for SerQua	.054	.139**		.100*
β for UserSat			.600***	.329***

Table continued on next page....

*continued.....***Mediating effect of user satisfaction between system related factors and organizational impact**

	Step 1 IV: all system related factors DV: OrgImp (same as Table 5.20b)	Step 2 IV: all system related factors DV: UserSat	Step 3 IV: UserSat DV: OrgImp	Step 4 IV: all system related factors DV: OrgImp Cont: UserSat
R ²	.462	.545	.584	.644
Adj R ²	.447	.532	.576	.633
F	31.460***	43.835***	82.948**	58.723***
β for InfQ _{ua}	.245***	.225**		.103**
β for EUse	.130**	.280***		.047
β for SysQ _{ua}	.113*	.272***		.059
β for SerQ _{ua}	.355***	.139**		.268***
β for UserSat			.758**	.632***

Mediating effect of user satisfaction between system related factors and net benefits

	Step 1 IV: all system related factors DV: NetBen (same as Table 5.20c)	Step 2 IV: all system related factors DV: UserSat	Step 3 IV: UserSat DV: NetBen	Step 4 IV: all system related factors DV: NetBen Cont: UserSat
R ²	.529	.545	.581	.649
Adj R ²	.516	.532	.588	.638
F	41.075***	43.835***	84.426***	59.928***
β for InfQ _{ua}	.341***	.225**		.225***
β for EUse	.267***	.280***		.123**
β for SysQ _{ua}	.152**	.272***		.012
β for SerQ _{ua}	.128**	.139**		.057
β for UserSat			.753***	.514***

*InfQual= information quality; EUse= ease to use; SysQual= system quality; SerQual= service quality; UserSat= user satisfaction; IndImp= individual impact; OrgImp= organizational impact; NetBen= net benefits

(*p<.05, **p<.01, ***p<.001)

Table 5.32 Sobel Test for user Satisfaction Mediating System Related factors**Mediator:** User Satisfaction**Independent Variable:** System Related Factors

Dependent	Predictors	a	Sa	b	Sb	Sobel Z
Individual Impact	Information Quality	.147	.033	.351	.067	3.394***
	Ease to Use	.351	.061	.351	.067	3.873***
	System Quality	.198	.039	.351	.067	3.646***
Organizational Impact	Information Quality	.147	.033	.466	.038	4.187***
	Ease to Use	.351	.061	.466	.038	5.209***
	System Quality	.446	.033	.466	.038	4.691***
	Service Quality	.330	.034	.466	.038	2.885***
Net Benefits	Information Quality	.147	.033	.817	.082	4.067***
	Ease to Use	.739	.058	.817	.082	4.983***
	System Quality	.446	.033	.817	.082	4.523***
	Service Quality	.330	.034	.817	.082	2.845***

a = raw (unstandardized) regression coefficient for the association between independent variable and the mediator, Sa = standard error of a , b =raw coefficient for the association between the mediator and the dependent variable (when the independent variable is also a predictor of dependent variable), Sb = standard error of b .

(* $p < .05$, ** $p < .01$, *** $P < .001$)

5.7.2.6. Mediating Effect of User Satisfaction between the Individual Factors and Three IS Success Outcome Variables (individual impact, organizational impact, and net benefits)

Hypothesis 12 proposed that the user satisfaction will mediate the relationship between individual factors (computer self efficacy, job level, and length of job) and

all three outcomes variables (individual impact, organizational impact and net benefits). To investigate the hypothesis, the conditions set forth by Baron and Kenny (1986) was followed.

Step 1- It is evident from the Table 5.21b, 5.21c, and 5.21d that among the three individual factors only computer related self efficacy met the first step of mediation analysis after controlling the demographic covariates. Computer self efficacy ($\beta = .228, p = .001$) significantly predicted individual impact, organizational impact ($\beta = .241, p = .001$) as well as net benefits ($\beta = .265, p = .001$). However, job level and length of job, did not turn out to be significant predictors of individual impact, organizational impact, and net benefits. Thus, only computer self efficacy met the first criteria and was considered for further mediational analysis.

Step 2- Table 5.21a, indicates that the computer self-efficacy significantly predicted user satisfaction ($\beta = .259, p = .001$) after controlling for the demographic covariates. So, the second step for mediation analysis was also met by computer self efficacy.

Step 3- For the third step of mediational analysis it was necessary to show a significant relationship between mediator and outcome. Table 5.22, illustrated that user satisfaction significantly predicted, individual impact ($\beta = .600, p = .001$), organizational impact ($\beta = .758, p = .001$), and net benefits ($\beta = .753, p = .001$), after controlling the demographic covariates.

Figure 5.7a, 5.7b, and 5.7c indicates the beta values and the pathways of the first three steps of the mediation analysis of the user satisfaction between computer self efficacy and all the three outcomes (individual impact, organizational impact and net benefits).

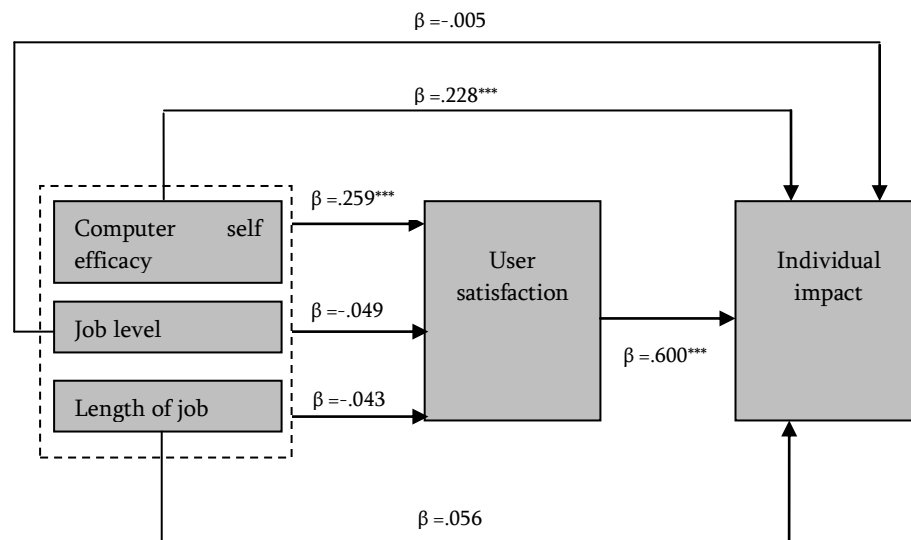


Figure 5.7a: First Three Steps of Mediation Analysis between Individual Factors and Individual Impact

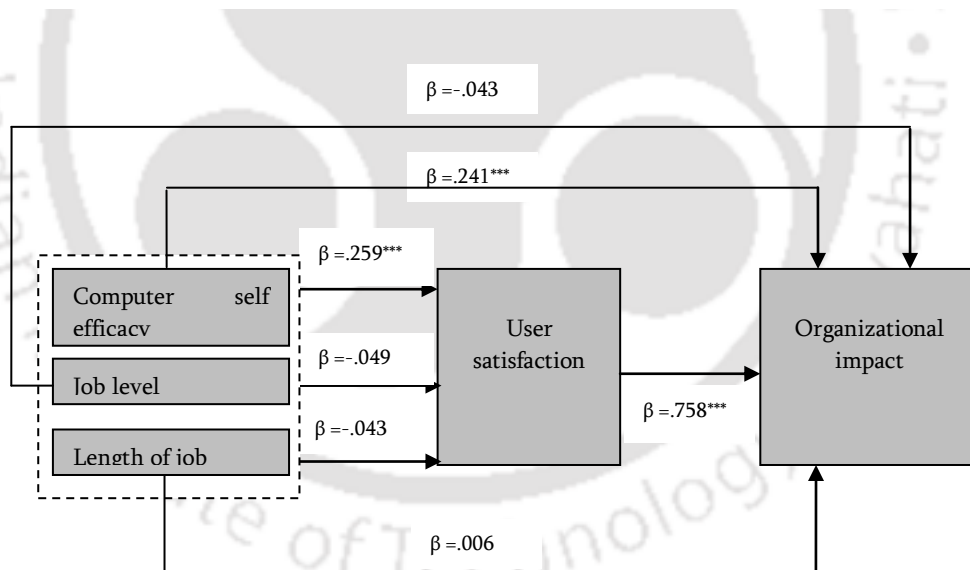


Figure 5.7b: First Three Steps of Mediation Analysis between Individual Factors and Organizational Impact

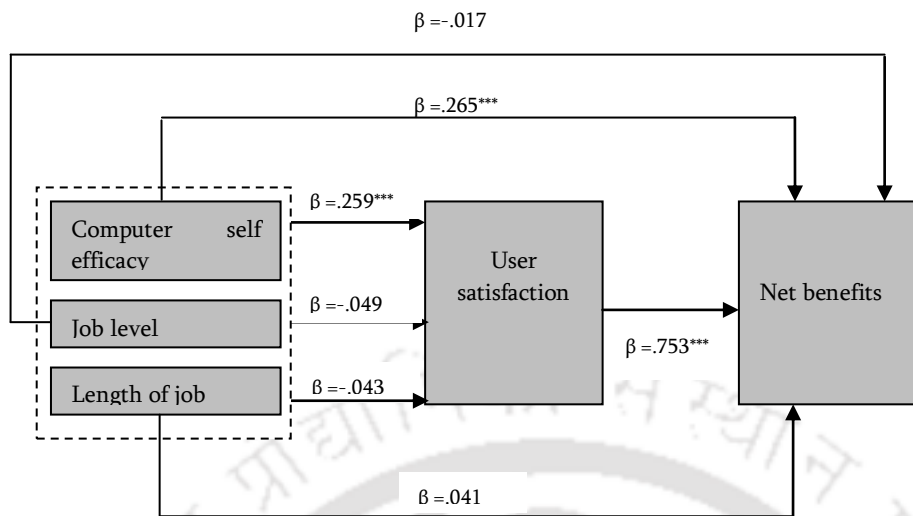


Figure 5.7c: First Three Steps of Mediation Analysis between Individual Factors and Net Benefits

Step 4- The final step of mediational regression analysis is shown in table 5.33. It is evident from the table that the main effect of computer self efficacy remained significant after controlling the demographic covariates and user satisfaction. The β value for the relationship of computer self efficacy (a) with individual impact reduced from .228 ($p = .001$) in the first step to .076, ($p = .114$) in the fourth step (b) with organizational impact, it reduced from .228 ($p = .001$) to .048 ($p = .233$) (c) with net benefits, it reduced from .265 ($p = .001$) to .074 ($p = .064$). It is clear from the Table 5.34, that the mediating effect of the user satisfaction between the computer self-efficacy and individual impact (Sobel $Z = 4.085$, $p < .001$), organizational impact (Sobel $Z = 4.353$, $p < .001$), and net benefits (Sobel $Z = 4.352$, $p < .001$), turned out to be significant (as indicated by Sobel test). So, it can be concluded that the user satisfaction fully mediated the relationship between the computer self-efficacy and all the three IS success outcome variables. *Therefore, the hypothesis 12 is partially accepted.*

Table 5.33: Mediational Regression Analysis (Simultaneous Method): Individual factors**Independent Variable:** Individual Factors: Computer Self Efficacy, Job Level, Length of Job**Outcomes:** Individual Impact, Organizational Impact and Net benefits**Mediator Variable:** User Satisfaction **Covariates:** Age, Gender, Salary, and Education**Mediating effect of user satisfaction between individual factors and individual impact**

	Step 1 IV: all individual factors DV: IndImp (same as Table 5.21a)	Step 2 IV: all individual factors DV: UserSat	Step 3 IV: UserSat DV: IndImp	Step 4 IV: all individual factors DV: IndImp Cont: UserSat
R ²	.081	.087	.385	.390
Adj R ²	.060	.065	.374	.377
F	3.727***	4.007***	37.013***	31.403***
β for CSE	.228***	.259***		.076
β for JLV [#]	-.005	.049		.076
β for LJB [#]	.056	-.043		.076
β for UserSat			.600***	.581***

Mediating effect of user satisfaction between individual factors and organizational impact

	Step 1 IV: all individual factors DV: OrgImp (same as Table 5.21b)	Step 2 IV: all individual factors DV: UserSat	Step 3 IV: UserSat DV: OrgImp	Step 4 IV: all individual factors DV: OrgImp Cont: UserSat
R ²	.077	.087	.584	.586
Adj R ²	.056	.065	.576	.575
F	3.527***	4.007***	82.948**	51.804***
β for CSE	.228***	.259***		.048
β for JLV [#]	.228***	.049		.007
β for LJB [#]	.241***	-.043		.038
β for UserSat			.758**	.746***

Table continued on next page....

*continued.....***Mediating effect of user satisfaction between individual factors and net benefits**

	Step 1 IV: all individual factors DV: NetBen (same as Table 5.21c)	Step 2 IV: all individual factors DV: UserSat	Step 3 IV: UserSat DV: NetBen	Step 4 IV: all individual factors DV: NetBen Cont: UserSat
R ²	.098	.087	.581	.594
Adj R ²	.077	.065	.588	.583
F	4.569***	4.007***	84.426***	53.606***
β for CSE	.265***	.259***		.074
β for JLV [#]	.017	.049		-.019
β for LJB [#]	.041	-.043		.072
β for UserSat			.753***	.737***

CSE= computer self efficacy; JLV= job level; LJB= length of job; IndImp= individual impact; OrgImp= organizational impact; UserSat= user satisfaction; NetBen= net benefits

(*p<.05, **p<.01, ***p<.001)

these variables does not meet any criteria of mediation

Table 5.34 Sobel Test for User satisfaction Mediating Computer Self Efficacy

Mediator: User Satisfaction

Independent Variable: Computer Self Efficacy

Dependent	Predictors	a	Sa	b	Sb	Sobel Z
Individual Impact	Computer Self Efficacy	.246	.055	.622	.051	4.085***
Organizational Impact	Computer Self Efficacy	.246	.055	.550	.029	4.353***
Net Benefits	Computer Self Efficacy	.246	.055	1.172	.062	4.352***

*variables those met first three criteria of mediation analysis are considered for Sobel test

a = raw (unstandardized) regression coefficient for the association between independent variable and the mediator, Sa = standard error of a , b =raw coefficient for the association between the mediator and the dependent variable (when the independent variable is also a predictor of dependent variable), Sb = standard error of b .

(*p<.05, **p<.01, ***P<.001)

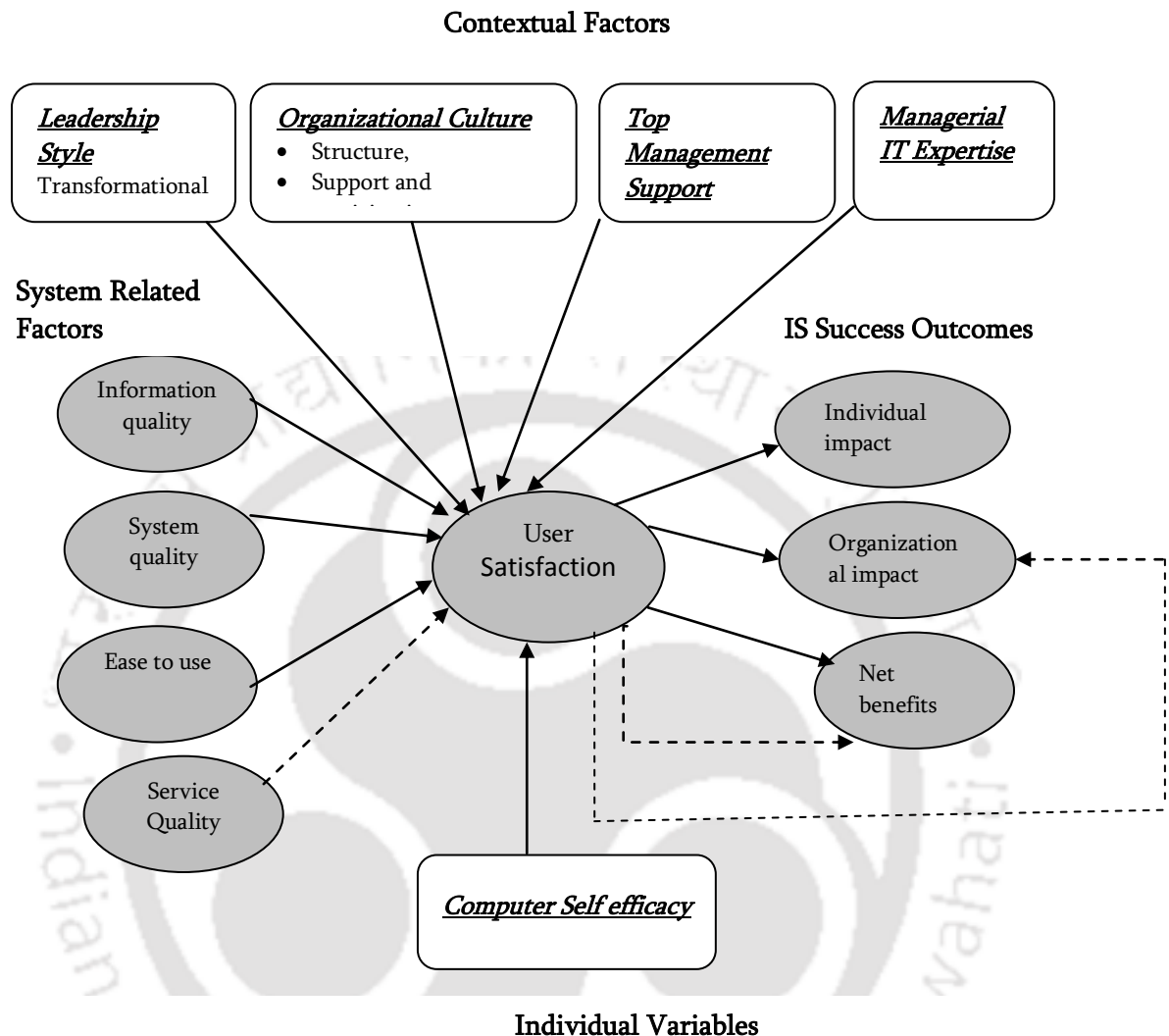
5.8. Concluding Remarks

This chapter presented the procedure and results of the quantitative study (study 1) conducted to test the hypothesis drawn from the conceptual model. It showed the procedure of testing the mediation analysis using the Baron and Kenny's analytical approach (1986). It is evident through hierarchical regression analysis that twelve additional significant pathways emerged out that was not originally the paths of DeLone and McLean model (1992, 2003). These additional pathways are from system quality to IS success outcomes; information quality to three IS success outcomes; service quality to two IS success outcomes (organizational impact, and net benefits); ease to use to three IS success outcomes and ease to use to user satisfaction. Thus, table 5.35 shows the summary of the results of hypotheses testing and figure 5.8 shows the revised conceptual model with the variables that significantly predicted user satisfaction and the three IS success outcomes.

Table 5.35: Summary of the Hypotheses Testing

	Hypothesis	Status
Hypothesis 1	System related factors will be positively related to user satisfaction.	
Hypothesis 1 a	Information quality will be significantly and positively related to user satisfaction.	Accepted
Hypothesis 1 b	System quality will be significantly and positively related to user satisfaction.	Accepted
Hypothesis 1 c	Service quality will be significantly and positively related to user satisfaction.	Accepted
Hypothesis 2	User satisfaction will be positively related to IS success outcomes.	
Hypothesis 2 a	User satisfaction will be significantly and positively related to individual impact.	Accepted
Hypothesis 2 b	User satisfaction will be significantly and positively related to organizational impact.	Accepted
Hypothesis 2 c	User satisfaction will be significantly and positively related to net benefits.	Accepted
Hypothesis 3 (H3a & H3b)	Leadership styles (transformational leadership and transactional leadership) will significantly predict user satisfaction, individual impact, organizational impact, and net benefits.	Partially accepted

Hypothesis 4 (H4a & H4b)	Organizational culture (risk tolerance, conflict tolerance, structure, and support) will significantly predict user satisfaction, individual impact, organizational impact, and net benefits.	Partially accepted
Hypothesis 5 (H5a & H5b)	System related factors (system quality, information quality, and service quality, and ease to use) will significantly predict user satisfaction, individual impact, organizational impact, and net benefits.	Partially accepted
Hypothesis 6 (H6a & H6b)	Individual variables (length of job, job level, and computer self efficacy) will significantly predict user satisfaction, individual impact, organizational impact, and net benefits.	Partially accepted
Hypothesis 7 (H7a & H7b)	Top management support will significantly predict user satisfaction, individual impact, organizational impact, and net benefits.	Accepted
Hypothesis 8 (H8a & H8b)	Managerial IT expertise will significantly predict user satisfaction, individual impact, organizational impact, and net benefits.	Accepted
Hypothesis 9	User satisfaction will mediate the relationship between leadership styles (transformational leadership and transactional leadership) and outcome variables (individual impact, organizational impact, and net benefits).	Partially accepted
Hypothesis 10	User satisfaction will mediate the relationship between organizational culture (conflict tolerance, structure, risk tolerance, and support) and outcome variables (individual impact, organizational impact, and net benefits).	Partially accepted
Hypothesis 11	User satisfaction will mediate the relationship between system related variables (system quality, information quality, service quality and ease to use) and outcome variables (individual impact, organizational impact, and net benefits).	Partially accepted
Hypothesis 12	User satisfaction will mediate the relationship between individual variables (length of job, job level, and computer self efficacy) and outcome variables.	Partially accepted
Hypothesis 13	User satisfaction will mediate the relationship between top management support and outcome variables (individual impact, organizational impact, and net benefits).	Accepted
Hypothesis 14	User satisfaction will mediate the relationship between managerial IT expertise and outcome variables (individual impact, organizational impact, and net benefits).	Accepted

**Keys:**

Oval boxes indicate the IS success model (DeLone and McLean, 1992; 2003) with one new dimension

Rectangular boxes indicate the extension of the D&M IS success model.

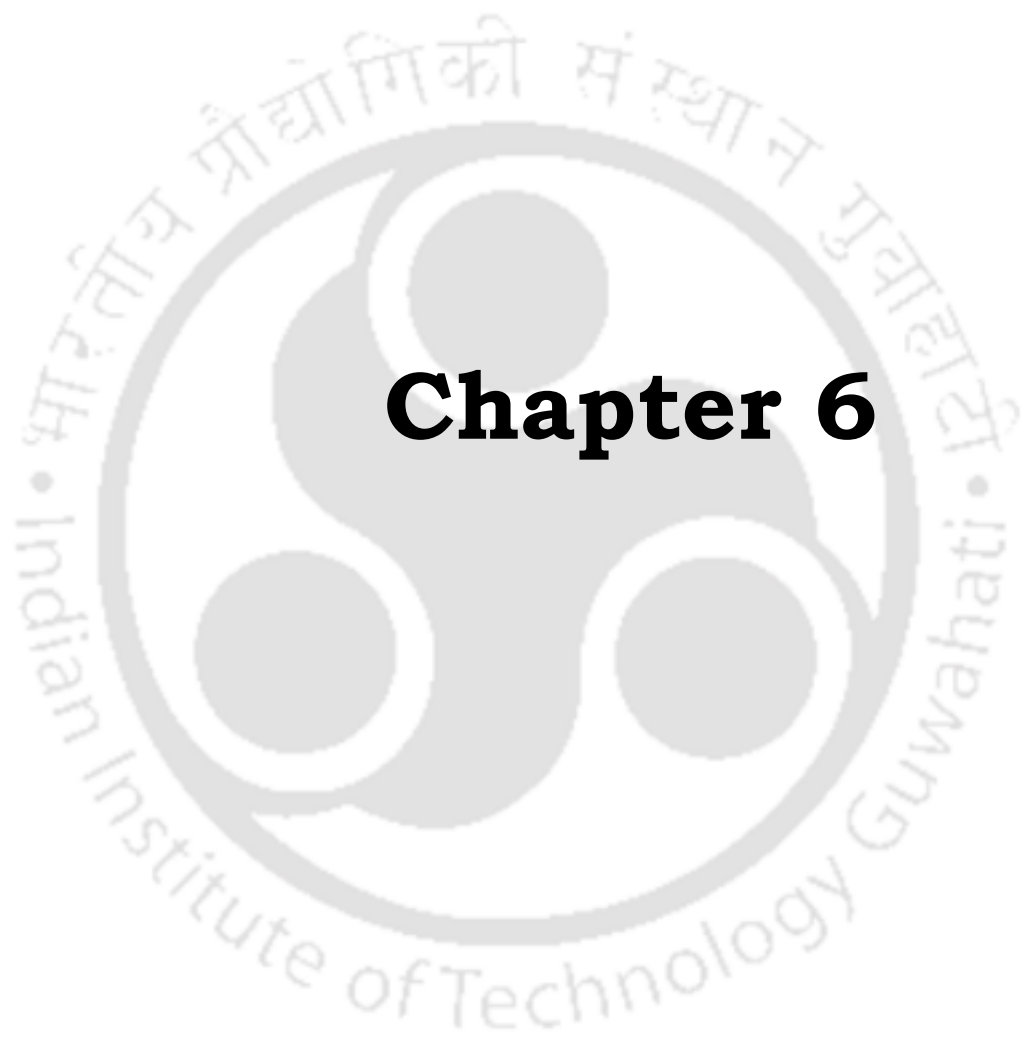
Solid lines indicate the pathways of the mediation analysis for all variables except service quality.

Dotted line indicate the mediation relationship of service quality with organizational impact and net benefits

Note that only the mediation paths are shown. The main effects of predictor variables on criterion variables are not shown because showing all these paths would render the diagram's interpretation less clear.

Figure 5.8: Revised Conceptual Model after Statistical Analysis





Chapter 6



Chapter 6

Quantitative Investigation: Discussion of the Findings

6.1. Introduction

Quantitative study was aimed at finding the answer of few research questions such as: (1) What are the perceptions of employees regarding success of banking information system? (2) How private and public sector banks differ regarding the factors affecting IS success? (3) To what extent causal pathways proposed by DeLone and McLean model are valid in Indian banking context? How can DeLone and McLean's model be extended to understand multi dimensional aspects of IS success? and (4) What organizational, managerial, and individual characteristics exert their influence on IS success in Indian banks, in addition to factors proposed by DeLone and McLean model? Several hypotheses were framed in reference to these questions. Following sections will discuss the findings of various research questions and hypothesis proposed for this study.

6.2. Discussion of the Findings

6.2.1. Perception of Employees Regarding Success of Banking Information Systems

Perception of employees regarding the success of banking information systems was calculated in terms of IS success factors such as information quality, system quality, ease to use, service quality, individual impact, organizational impact, and user satisfaction. Level of the agreement regarding these IS success factors were divided in terms of low, medium, high, and very high. The results shows that

employees had high level of agreement regarding information quality, system quality, ease to use, individual impact, organizational impact and user satisfaction. However, the perception regarding the service quality emerged as medium.

Results indicated that employees perception for banking IS is positive with regard to its features, functionality, output generated by the system, ease in using and learning the system, impact on individuals performance, impact on organization and users satisfaction for the system. However, the perception regarding service quality was not very positive (falls in the category of medium level of agreement). Moreover, analysis of the perception of employees indicates that none of the IS success dimensions came under the category of “very high” level of agreement. This implies that despite positive perception regarding IS success factors, there still exists areas for improvement and enhancing satisfaction level of employees. This finding is consistent with past literature on Indian banking (Chakrabarty, 2010; Khandelwal Committee Report, 2011).

6.2.2. Group Differences between Private and Public Sector Banks

Independent t-test was conducted to study the effect of type of bank (public and private sectors) on different variables of this study. Results indicated that there is a significant difference in the scores of transactional leadership ($t = -2.24$, $p = .026$), conflict tolerance dimension of organizational culture ($t = 3.28$, $p < .001$), and computer self-efficacy ($t = -2.53$, $p = .012$). Public banks scored significant higher score in conflict tolerance. On the other hand, private banks scored higher in transactional leadership, and computer-self efficacy. However, there was no significant difference in the scores of transformational leadership; structure, support and participation and risk tolerance dimensions of organizational culture; top

management support; managerial IT expertise; and system quality, information quality, service quality, individual impact, organizational impact and user satisfaction dimensions of system related factors between public and private banks. This implies that type of bank did not play a significant role on these factors.

Result indicated that the employees of private banks scored significantly higher in the dimension of the computer self-efficacy as compared to public banks. This could be due to the differences in the nature of workforce in the public and private sector banks. Private sector banks joined Indian banking sector relatively recently. Consequently, employees of the private banks are relatively young and possess basic computer knowledge and expertise while in public banks the majority of the employees are elderly and lacks computer expertise. Moreover, since inception, all private banks employees have been working with various IS applications. On the other hand, most of public bank employees (especially senior staff) have spent a large part of their career working manually. Therefore, adopting new technology was not easy and resistances from the employees were evident in the initial phase of IS adoption.

Results revealed that the higher authorities and managers of private banks exhibited higher transactional leadership behaviour as compared to public sector banks. As discussed earlier, transactional leaders seeks to motivate followers by appealing to their own self interests. Their main principle is to motivate the followers by the exchange process. It's a system of *quid pro quo* - reward/pay for effort. Transactional leaders focus on the accomplishment of task in exchange of desirable rewards like points, bonus, promotion, and increase in salary and so on. In a meta-analysis of 39 studies by Lowe et al. (1996) found more result oriented behavior among the manager's of the private sector as compared to public sector organizations.

Results also indicated that employees of the public sector banks scored significantly higher in the conflict tolerance dimension of the organizational culture. This could be again due to the differences in the work culture and mindset of workforce in the two sectors. Conflict tolerance dimension measures the degree of willingness to be honest and open-minded to resolve conflicts between supervisor and subordinates and amongst members of the work group (Kar & Tewari, 1999). Sinha (1980) in his prominent work on Indian work culture suggested that Indian subordinates depend excessively on their superiors with whom they want to develop a personalized relationship rather than contractual relationship. Indians feel comfortable in superior-subordinate relationship. They respect their subordinates. This is because in most of the public sector banks there has been a greater penetration of social habits and cultural values into the fabric of organization (Sinha, 1999). Therefore, a public sector employee cultivates a more familial relationships with other organizational members with whom they have spent several years. Thus, they try to maintain equilibrium in their relationship. Furthermore, in every organization there exists some interdepartmental differences and internal conflict, but due to familial relationship they take either preventive measure to avoid conflict or show more tolerance. Sinha (1999) observed that in Indian organizations, conflict and cooperation co-exists.

6.2.3. System Related Factors

Relationship of System Related Factors with User Satisfaction and IS Success Outcomes

The results of the study revealed that system related factors (information quality, system quality, ease to use, and service quality) had significant positive correlation with user satisfaction and IS success outcomes (individual impact,

organizational impact, and net benefits). This study found thirteen additional significant relationships that were not originally the paths of DeLone and McLean model (1992, 2003). These additional relationships are between system quality and IS success outcomes (individual impact, organizational impact, and net benefits); information quality and three IS success outcomes; service quality and three IS success outcomes; ease to use and three IS success outcomes and ease to use to user satisfaction. On further exploration of this relationship with hierarchical regression analysis (table 5.20a, 5.20b, 5.20c, and 5.20d) and after controlling the effects of demographic variables (like age, gender, salary and education) the result showed that information quality, system quality, and ease to use emerged as the significant predictors of user satisfaction, individual impact, organizational impact and net benefits. However, service quality emerged as a significant predictor of only user satisfaction, organizational impact and net benefits. Service quality did not predicted individual impact. Through hierarchical regression analysis this study also found twelve additional significant pathways that were not originally the paths of DeLone and McLean model (1992, 2003). These additional pathways are from system quality to three IS success outcomes (individual impact, organizational impact, and net benefits); information quality to three IS success outcomes; service quality to two IS success outcomes (organizational impact, and net benefits); ease to use to three IS success outcomes and ease to use to user satisfaction.

Various researches have shown that information quality and system quality are important factors for effective working of information systems in various contexts. The finding that system quality and information quality predicted user satisfaction is supported by the existing literature (e.g. Igbaria & Tan, 1997; McGill et al., 2003; Rai et al., 1992; Seddon, 1997; Seddon & Kiew, 1996; Seddon & Yip, 1992; Wixom &

Todd, 2005; Wu & Wang, 2006). Hussein (2009) and Iivari (2005) found support for the association between system quality and user satisfaction; and information quality and user satisfaction in the context of the financial sector. System quality (in terms of quality features and functionality, integration with various delivery channels, flexibility, quick response and access to information) and information quality (in terms of contents clarity, accuracy, relevance, easy to understand, easily interpretable, currency and usefulness to user) will directly influence users' satisfaction. A slow system with complicated menus and multiple windows to perform a single task would waste user's valuable time and would cause dissatisfaction to him. Moreover, findings suggest that user will have positive attitude towards the system whose output is accurate, concise and clear to understand, timely and relevant as per the requirement of the end user. The findings provide evidence regarding the multidimensional nature of system quality and informational quality.

An interesting finding that is worth mentioning here is that ease to use emerged out as a separate factor in the analysis which comprised of three measure like system is easy to use, easy to learn and is user friendly. Initially, in the present study, these three measures were components of system quality. However, after factor analysis, '*ease to use*' emerged as a new factor. In the context of banks the present study defines ease to use dimension as the extent to which a system enables users to achieve specified goals effectively and efficiently while promoting feelings of satisfaction (Lee, Kim, Rhee, & Trimi, 2006). A system that has simple layout and interfaces is relatively easy to learn. This type of system fosters steady learning and understanding. It helps users in acquiring new skills, knowledge, and techniques, which in turn raises his satisfaction level. The easier the system is, lesser the effort is

needed to operate it and thus more efforts one can allocate to other activities, which will contribute to overall high job performance.

Several studies (Chien & Tsaur, 2007; Kettinger & Lee, 1994; Khayun et al., 2012; Petter et al., 2008; Wang 2008) found mixed support for the association of service quality with user satisfaction and IS outcomes. Results of this study also revealed that service quality significantly predicted user satisfaction. This finding implies that higher the quality of support services which system provides, in terms of online help and assistance, interaction of IS staff with the users for their feedback, easy availability of IT staff for trouble shooting, cooperation of IT staff and, delivery of overall satisfactory services to user, higher will be the satisfaction attained with the system usage. In banking context, results of this study suggest that IT department fosters positive attitude (being cooperative) and good relationship with its users. However, results also found that service quality did not significantly predicted individual impact. The relationship between service quality and individual impact has received moderate support in the literature (Petter et al., 2008). This finding is consistent with the findings of Yoon and Guimaraes (1995) they found that developer's skill (service quality) were not significantly related to impacts on user's job (individual impact). The probable reason behind this finding may be that in banking context it is not possible for the system developers to interact extensively with the end users for software development. In banks, software's are developed by the core IT team that interacts directly with the CIO or top management team. Secondly, banks do not have IT cell in each and every branch. There may be few IT cells located at the regional office or circle office level. But most banks have 24 hrs help line desk and online support system. Few banks even have a pool of well qualified and experienced IT professionals contributing dedicatedly towards IT

initiatives and increasing the technological capabilities of the organization. Thus, though service quality is very essential for increasing the end users satisfaction but it is not directly related to individual's job performance, his effectiveness, and his overall productivity. On the other hand, the above reason justifies well the importance of high quality support for IT department for organizational efficiency.

Relationship between information quality and organizational impact can be considered as one of the key findings of this study. The association between the information quality and benefits at the organizational level (like organizational efficiency, sales, organizational reputation, cost reduction, business process) has shown mixed results in the past literature (Petter et al., 2008).

Several researchers found significant support for the positive relationship of individual impact with information quality and system quality (Rai et al., 2002; Seddon & Kiew, 1994; Wixom & Watson, 2001; Wixom & Todd, 2005). The result suggests that quality variables are closely related to end users' performance, who spend most of their time with systems. This implies the importance of two quality facets for improving the individual's performance and efficiency.

Similarly, positive association of net benefits with quality variables is supported by several empirical researches. For example, Prybutok et al. (2008) tested the direct relationship of net benefits with information quality, system quality, and service quality. They found significant positive correlations between these associations. Thus, strong support from past studies implies that these relationships hold true for banking context also.

Mediating Effect of User Satisfaction on the Relationship between System Related Factors and IS Success Outcomes

With respect to the mediating effect of user satisfaction on the relationship between system related factors and IS success outcomes (individual impact, organizational impact and net benefits), it was observed that user satisfaction partially mediated (table 5.31 and 5.32) the relationship between (a) information quality and all the three IS success outcomes, (b) ease to use and individual impact, and (c) service quality and organizational impact, (c) ease to use and net benefits. Moreover, user satisfaction fully mediated the relationship between (a) system quality and all three outcomes, and (b) service quality and net benefits, (c) ease to use and organizational impacts. However, user satisfaction did not mediate the relationship between service quality and individual impact. These findings infer that IS success factors (information quality, system quality, and ease to use) strongly enhances user satisfaction, which in turn enhances impacts on individual, organization and net benefits.

User satisfaction is the net feeling of satisfaction that results from aggregating all the benefits that a person receives from interaction with the system. Each user has certain aspiration or expectation for the benefits. To the extent a system meets or fails to meet these aspirations, the user is more or less satisfied. This positive satisfaction inspires employees to contribute more effort to their work which results in organizational effectiveness regardless of organizational context (Gregory et al., 2009). Freeze et al. (2010) in the context of mandatory IS use reported that high system quality, and high information quality are necessary for high levels of user satisfaction and ultimately leads to strong e-learning system success. Increased system quality, information quality, and service quality results in increased satisfaction,

which in turn is associated with increased IS success outcomes. A satisfied employee will perform his task whole heartedly and will be more productive as compare to his dissatisfied counterparts (Likert, 1961). This increased productivity results in enhanced IS outcomes.

Relationship of User Satisfaction with IS Success Outcomes

The result of correlation analysis revealed that user satisfaction is positively associated with all the three IS success outcomes (individual impact, organizational impact and net benefits). Further, hierarchical regression analysis (table 5.22a, 5.22b, 5.22c, and 5.22d) shows that the user satisfaction significantly predicts individual impact, and organizational impact. The additional path from user satisfaction to net benefits (i.e. combine effect of individual impact and organizational impact) also turned up to be significant. There is a strong support in the literature (Iivari, 2005; McGill & Klobas, 2005; Rai et al., 2002) regarding significant association between user satisfaction and individual impact. This finding implies that increased user satisfaction with banking information system results in increased positive effects on individual user's performance (McGill et al., 2003), productivity (Igbaria & Tan, 1997), effectiveness (Rai et al., 2002), and increased usefulness (Seddon & Kiew, 1994). A satisfied user will find that with the help of system he is able to do his routine job faster, easily with lesser efforts but with better results as compare to unsatisfied user. Hussein (2009) found strong support for this association in the context of Egyptian banks.

The association between user satisfaction and organizational impact was found to be significant. This finding implies that user satisfaction had a positive effect on organizational benefits. The present finding is consistent with findings of Gelderman

(1998), and Wu and Wang (2006). Early management theorists like Likert (1961) suggested that satisfied employees are more productive than dissatisfied employees. Ostroff (1992) found that employee satisfaction is positively related to organizational performance. Higher levels of user satisfaction with system would lead to higher impacts on organizations overall performance (Sabherwal, 1999), increased capacity (Sedera & Gable, 2004), better positioning of the bank, and improved business process (Gable et al., 2008). Even if an IS would objectively improve performance, end users are unlikely to use it or under utilize its potential benefits, if they do not perceive it easy, useful, or satisfactory.

This research found an additional relationship associated with user satisfaction and net benefits, which is conceptualized as the combine effect of individual impact and organizational impact. Some past studies also found association of user satisfaction with net benefits (Prybutok et al., 2008; Wu & Wang, 2006). livari (2005) found association between user satisfaction and system benefits in the context of financial and accounting systems. However, these studies operationally defined net benefits differently according to their research problem.

6.2.4. Leadership Style

Relationship of Leadership with User Satisfaction and IS Success Outcomes

The result of correlation analysis revealed that transformational leadership and transactional leadership have significant positive correlation with user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits). On further exploration of this relationship by using hierarchical regression (table 5.16a, 5.16b, 5.16c, 5.16d) only transformational leadership emerged as the significant predictor of user satisfaction, individual impact, organizational impact and

net benefits. Transactional leadership did not predict user satisfaction and any of the three IS success outcomes

A transformational leadership style focus on the intrinsic motivation of the employees which is concerned with the reinforcement and enjoyment related to the process of performing behaviour per se, and thus motivates the organizational members to think beyond themselves and work towards the organizational goal. Gardner and Avolio (1998) found that intrinsic motivation is an important driver of employees extra efforts to work hard and achieve better results. A transformational leader can enhance IS success by displaying leadership behaviours such as by articulating a clear IS vision, setting high standards for the work, expressing strong confidence in employees capabilities and abilities, showing sensitivity to individual's needs, challenging the follower's ability to excel, encouraging them to attain work related knowledge, and encouraging them to think out of box and solve problems with an innovative approach. This is likely to enhance individuals and organization's efficacy, effort and cohesion (Eom, 2006). By performing above set of behaviours, managers with the transformational leadership behaviour can play a crucial role in IS success (Cho et al., 2011). These findings are consistent with prior studies highlighting the influence of leadership on user satisfaction (Igbaria & Nachman, 1990), on MIS success factors (Rezaei et al., 2009) and influence of transformational leadership on IS success (Cho et. al., 2011).

Results showed that transactional leadership did not emerge as a significant predictor of user satisfaction, individual impact, organizational impact and net benefits. This could be due to the nature of transactional leadership. Transactional leadership values motivating employees through contractual agreement in the form of exchange of rewards for performance. A transactional leader watches followers

closely for mistakes and then takes corrective actions. This close watch and strict supervision may de-motivate the followers and may lead to only average performance. Moreover, a transactional leader focuses on extrinsic motivation by appealing to the current needs of subordinates, which results in expected outcomes and average performance. Several theoretical and empirical researchers found that contingent reward type of transactional leadership is associated with subordinates performance, satisfaction, and commitment (Bass, 1990; Yukl, 1989). However, there are strong evidences showing that transformational leadership is perhaps more strongly related than contingent reward leadership to subordinates performance, satisfaction and commitment (Avolio & Bass, 1988; Bass, 1985; Yukl, 1989). On the other hand, prior studies found that both management-by-exception-Passive and management-by-exception-Active typically have a negative relationship with various subordinate outcomes such as extra effort, organizational commitment, and managerial satisfaction and effectiveness outcomes (Bycio et al., 1995; Judge & Piccolo, 2004). In contrast to this, there is strong support of literature which indicates that transformational leadership is particularly effective in high technology context (Einstein & Humphreys, 2002; Shamir & Howell, 1999) and in situations that demands change (Bass, 1985). Humphreys (2001) observed that leaders who support information technology exhibited more transformational leadership behaviours than those who did not support.

Mediating Effect of User Satisfaction on the Relationship between Leadership and IS Success Outcomes

With respect to the mediating effect of user satisfaction on the relationship between leadership (transformational leadership and transactional leadership) and IS

success outcomes (individual impact, organizational impact and net benefits), it was observed that user satisfaction partially mediated the relationship between transformational leadership and IS success outcomes (table 5.23 and 5.24). However, user satisfaction did not mediate the relationship between transactional leadership and IS success outcomes.

The result shows that user satisfaction mediates the relationship between transformational leadership and IS outcomes. This result indicates that transformational leadership directly influence user satisfaction and this intermediate factor then directly impact IS success. Organizations where leaders demonstrate more of transformational leadership will boost the satisfaction level of users and will have enhanced IS outcomes in comparison to organizations where leaders practice only transactional leadership. This results also suggest that bank employees expect their managers (leaders) to create an atmosphere within the bank where they can think beyond conventional thinking, question traditional ways of doing things, can have a strong sense of purpose for doing things. Yukl (1994) observed that transformational leader brings major changes in the attitudes and assumptions of subordinates and builds commitment for the organization's mission, objectives and strategies. A transformational leader change his followers through his motivational, instrumental, and social interactions and individual bonding with followers (Eom, 2006). That may include providing autonomy, delegating more leadership roles to followers, encouraging them to actively take initiatives, building trust, and congenial relationship. Lowe et al. (1996) in a meta-analysis found that transformational leadership style helps followers to internalize the expectation of his leader and it is positively related to work-related outcomes such as satisfaction, commitment and performance.

6.2.5. Top Management Support

Relationship of Top Management Support with User Satisfaction and IS Success Outcomes

The result of correlation analysis revealed that top management support has significant positive correlation with user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits). Further, hierarchical regression analysis (table 5.18a, 5.18b, 5.18c, 5.18d) shows that the top management support predicts user satisfaction and all three IS success outcomes variables: individual impact, organizational impact and net benefits. This result is consistent with previous findings (Cho, 2007; Jarvenpaa & Ives, 1991; King & Teo, 1996; Sabherwal et al., 2006). Top management support is an important factor associated with the effectiveness of an information system (Cho, 2007). Guimaraes and Igarria (1997), and Mahmood et al. (2001) identified top management as an important factor affecting user satisfaction, use, and IS impacts. When managers dedicate a high level of resources to support information technology, they tend to foster a greater use of information systems within that organization. Top management's support in the allocation of IS resources, guidance in the form of clear IS vision, well-defined IS objective, and their knowledge for the strategic potential of IS are regarded as a significant predictor of IS performance. Top management support towards IS related activities conveys message to users that management give utmost priority to IS which helps in boosting their confidence and satisfaction for the specific IS and drives them to use IS optimally to its full potential. Absence of top management support is a critical barrier to IS success and organizations productivity (Sabherwal et al., 2006). Therefore, finding suggests that top management provides an environment conducive for effective utilization of banking information systems.

Mediating Effect of User Satisfaction on the Relationship between Top Management Support and IS Success Outcomes

With respect to the mediating effect of user satisfaction on the relationship between top management support and IS success outcomes (individual impact, organizational impact and net benefits), it was observed that user satisfaction partially mediated the relationship between top management support and IS success outcomes (table 5.27, and 5.28). This result indicates that top management support directly influence user satisfaction and this intermediate factor then directly impact IS success outcomes.

This finding suggest that top management support are considered important factor to ensure high quality system as it increase system success through increasing user satisfaction with the system. Aladwani (2002) investigated the impact of top management support on end-user satisfaction and highlighted its importance for successful implementation of systems in Kuwaiti public sector organizations. Top management's beliefs, knowledge and participation help in pooling of financial resources as well as saves time and efforts (Armstrong & Sambamurthy, 1999; Sabherwal et al., 2006). Top management support, guidance, commitment and participation are regarded as key indicators enabling the adoption and assimilation of advance technologies. Chatterjee et al. (2002) suggested that supportive ideas, beliefs and attitudes exert positive influence on the adoption of web based information systems.

6.2.6. Organizational Culture

Relationship of Organizational Culture with User Satisfaction and IS Success Outcomes

The result of correlation analysis revealed that all the four dimensions of organizational culture: conflict tolerance, structure, support and participation, and risk tolerance have significant positive association with user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits). Hierarchical regression analysis (table 5.17a, 5.17b, 5.17c, and 5.17d) shows that structure and support-participation dimension of organizational culture significantly predicts user satisfaction, individual impact, organizational impact and net benefits. On the other hand, conflict tolerance significantly predicted individual impact and net benefits. However, conflict tolerance dimension did not predicts user satisfaction and organizational impact, and risk tolerance did not predicted user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits).

Past several researchers have explored the relationship between specific culture domains and specific effectiveness measures (Cameron & Freeman, 1991; Denison, 1990; Denison & Mishra, 1995). Organizational culture influences every facet of the organization. The results reveal that structure, and support and participation dimensions of organizational culture is necessary for fostering environment conducive for increasing individual employees performance and organizations overall growth and productivity.

Supportive and participative culture plays a crucial role in effective absorption and utilization of CBS systems in banks. This type of culture is a significant determinant of user satisfaction. Banks with supportive organizational culture would facilitate the working of the information systems by leveraging it to its full potential.

In such a culture, employees in return put their maximum efforts for execution of organizational goals. In Indian settings, there is a significant emphasis on social and relational interactions in the organizations which results in a relationship-centered environment. Indian superiors extend warmth, affection, care and nurturance to their subordinates. Subordinates reciprocate by being loyal, committed and performing better.

The result reveals that structure is a strong predictor of user satisfaction, individual impact, organizational impact and net benefits. In the context of present study (Bank) this finding is well expected. Banking sector play a key role in the economic growth of any nation and there are several rules and regulations and also set of procedures which they have to strictly follow to safeguard the interest of various stakeholders. Such a culture would help banks to maintain efficiency, as organizational members follow rules and regulations and strictly follow the guidelines and procedures related to their work. This will improve their performance and it will have positive connotations for the organizations.

It has been observed that risk tolerance did not predict user satisfaction and IS success outcomes. Bank involves financial interest of millions, they do not have much scope to take risk and put interest of the public at stake. Moreover, Reserve bank of India keeps a close vigil on every activity of the banks. Furthermore, banks work under hierarchical and structured work culture and faces immense regulatory pressures. Consequently, risk taking culture is less evident in the banking sector. However, there are few exceptions of banks with flatter hierarchy and free flowing communication between management and subordinates.

Mediating Effect of User Satisfaction on the Relationship between Organizational Culture and IS Success Outcomes

With respect to the mediating effect of user satisfaction on the relationship between four dimensions of organizational culture and IS success outcomes (individual impact, organizational impact and net benefits), it was observed that (a) user satisfaction fully mediated the relationship between structure and individual impact, and partially mediated the relationship between structure and organizational impact, and structure and net benefits (table 5.25, and 5.26); (b) user satisfaction fully mediated the relationship between support and participation and organizational impact, and partially mediated the relationship between support and participation and individual impact, and support and participation and net benefits (table 5.25, and 5.26); (c) user satisfaction did not mediate the relationship of conflict tolerance with three IS success outcomes (individual impact, organizational impact and net benefits); (d) user satisfaction did not mediate the relationship of risk tolerance with three IS success outcomes (individual impact, organizational impact and net benefits).

This results indicate that some dimensions of organizational culture directly influence user satisfaction and this intermediate factor then directly impact IS success outcomes. Gregory et al. (2009) empirically examined employee attitude as a potential mediator of the relationship between organizational culture and effectiveness. The results of this study provide evidence that suggests that employee attitudes mediate the culture and firm effectiveness relationship. They found that group domain values such as cohesiveness, and empowerment, participatory decision-making create an environment that fosters employee satisfaction. The relationship between group domain and employee satisfaction is supported by the results of multiple empirical studies (Cameron & Freeman, 1991; Quinn & Spreitzer, 1991).

The increased satisfaction would in turn enhance performance and efficiency of the individual and would also exert positive impact on organizations performance and productivity.

6.2.7. Managerial IT Expertise

Relationship of Managerial IT Expertise with User Satisfaction and IS Success Outcomes

The result of correlation analysis revealed that managerial IT expertise has positive association with user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits). Hierarchical regression analysis (table 5.19a, 5.19b, 5.19c, and 5.19d) shows that managerial IT expertise significantly predicts user satisfaction, individual impact, organizational impact and net benefits. This finding is consistent with the findings of Hussein et al. (2005), Jaravenpaa and Ives (1991), Rezaei et al. (2009). Jaravenpaa and Ives (1991) found that managers with appropriate knowledge and understanding about the system are more productive, proactive in taking decisions, and have favourable attitude towards IT in comparison to managers with little or no knowledge of the technology. Managerial IT knowledge is found positively associated with IS success dimensions in several studies. Branch manager's experience and proficiency in the banking information system would be able to guide his subordinates and help them in troubleshooting of meager technical issues. In such case, subordinate do not have to wait for the support of IT team or network team. This would help saving the time of the employees and would also help organization from losing its valuable customers. Study by Hussein et al. (2005) indicated that managerial IT knowledge is significantly associated with IS success dimensions in the e-government context.

Mediating Effect of User Satisfaction on the Relationship between Managerial IT Expertise and IS Success Outcomes

With respect to the mediating effect of user satisfaction on the relationship of managerial IT expertise with three IS success outcomes (individual impact, organizational impact and net benefits), it was observed that user satisfaction partially mediates the relationship between managerial IT expertise and all three IS success outcomes (individual impact, organizational impact, and net benefits (table 5.29, and 5.30).

This result indicates that managerial IT expertise directly influence user satisfaction and this intermediate factor then directly impact IS success. The inference here is that where the manager has technological know-how, they are in better position to satisfy their employees and would encourage them to adequately assimilate information system in their work. Such a manager would also put all possible efforts to drive end user towards organizational efficiency and performance. Managers with technical expertise are more familiar with the ways computers operate, the extent to which (and how) a system provides relevant information for quick decision making purposes and the limitations of the information system. Thus, they are often able to satisfy individuals by taking quick decisions, timely guidance and by developing strategies and abilities for fast information processing. This enhances end users' satisfaction and their faith in the information system. This results in increased individual impact that in turn enhances organizational impact and net benefits.

6.2.8. Individual Variables

Relationship of Individual Variables with User Satisfaction and IS Success Outcomes

The result of correlation analysis revealed that computer self-efficacy have significant positive association with user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits). While length of job variable showed weak association with individual impact ($r = .143, p < .05$) and net benefits ($r = .140, p < .05$). On the other hand, job level variable did not show any association with user satisfaction and three IS success outcomes. Length of job showed no association with user satisfaction and organizational impact. Hierarchical regression analysis (table 5.21a, 5.21b, 5.21c, and 5.21d) shows that only computer self-efficacy significantly predicts user satisfaction, individual impact, organizational impact and net benefits. On the other hand, job level and length of job did not predict user satisfaction and any of the three IS success variables.

Result shows positive association of computer self-efficacy with user satisfaction; individual impact; organizational impact; and net benefits.. According to Compeau and Higgins (1995), computer self-efficacy refers to an individual's confidence in his ability to perform specific computer tasks. The result implies that individuals with higher computer self-efficacy are more confident in their interaction with computers and likely to utilize the system more efficiently. Higher computer self-efficacy results in higher individual impact because any user confident of his potentials will not get frustrated in the face of obstacles and engage in behaviours that increase performance outcomes (Bandura, 1997; Johnson, 2005). While past researchers observed that individuals with low level of computer self-efficacy are more likely to avoid computer tasks or give up more easily in the face of obstacles.

Many researchers have proved that high level of computer self-efficacy contributes towards a high degree of usage, user satisfaction and effectiveness of both individual and organization (Marakas et al., 1998; Compeau & Higgins, 1995).

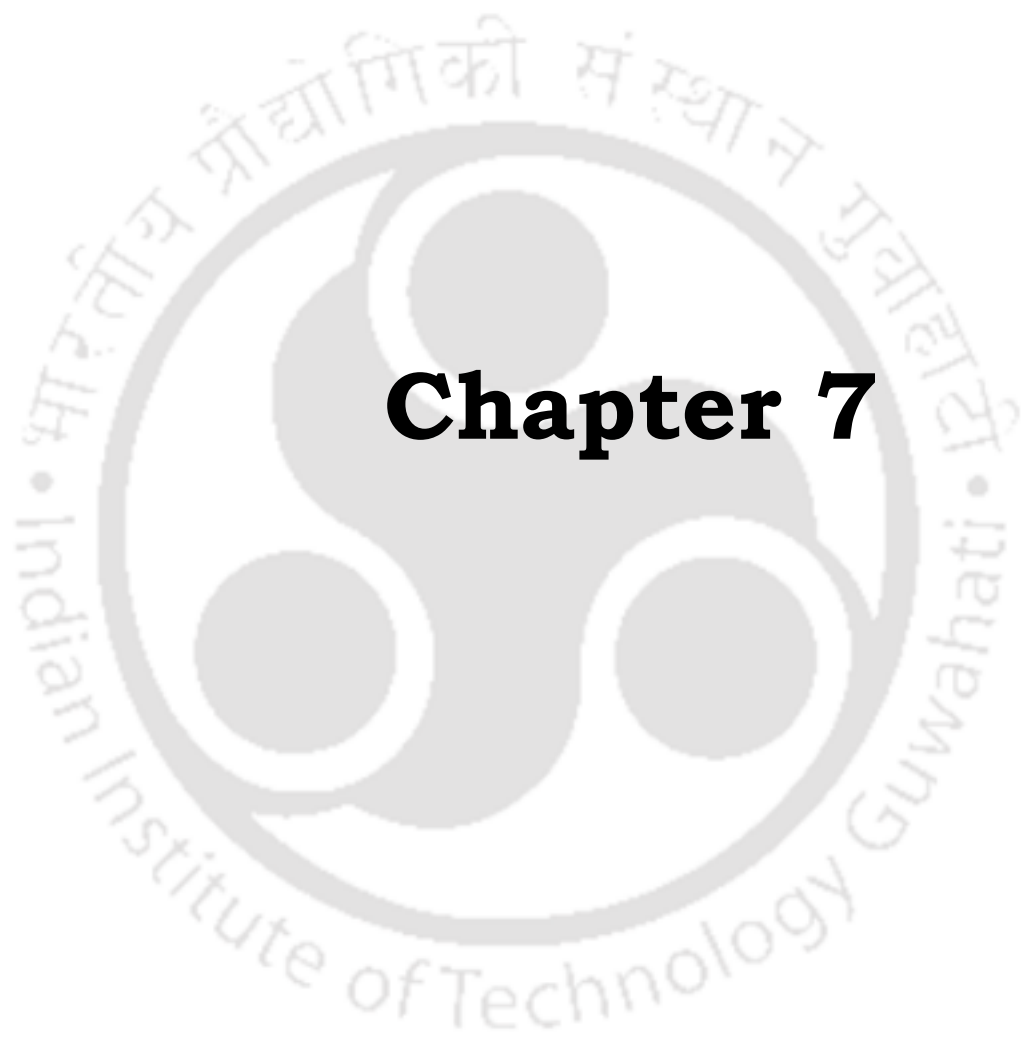
Result shows weak association of length of job variable with individual impact and net benefits and no association with user satisfaction and organizational impact. On the other hand, job level variable did not show any association with user satisfaction and three IS success outcomes. Further, in regression analysis both job level and length of job did not predict user satisfaction and any of the three IS success outcomes. There is mixed support in the literature for the association among length of job and IS success outcomes (Khalil & Elkordy, 1997; Lucas, 1978; Schewe, 1976). Hussein (2009) in the banking context found no relationship between tenure and user satisfaction. There is also mixed support in the literature for the association among job level and performance variables (Khalil & Elkordy, 1997; Lucas, 1982). Igbaria (1992) found no association between job level and IS usage. In the context of present study, the possible reason behind above findings is that employees with more number of years would have more hands on experience of using the system or would have more functional knowledge relevant to his job. In such a case, an employee would be able to perform better and efficiently than those who have gained less job related experience.

Mediating Effect of User Satisfaction on the Relationship between Individual Variables and IS Success Outcomes

With respect to the mediating effect of user satisfaction of the relationship of three individual variables dimensions with three IS success outcomes (individual impact, organizational impact and net benefits), it was observed that (a) user

satisfaction fully mediated the relationship between computer self-efficacy and individual impact, computer self-efficacy and organizational impact, and computer self-efficacy and net benefits (table 5.33, and 5.34); (b) user satisfaction did not mediate the relationship of job level with three IS success outcomes (individual impact, organizational impact and net benefits); (c) user satisfaction did not mediate the relationship of length of job with three IS success outcomes (individual impact, organizational impact and net benefits).

This result indicates that some individual characteristics such as computer self-efficacy directly influence user satisfaction and this intermediate factor then directly impact IS success. When users have high computer self-efficacy they feel more confident and satisfied with the system and believe that system is more useful to their task and in increasing their performance. Wu, Tsai, Chen, and Wu (2006) conducted a study in the context of online learning system. They found that there is significant relationship among computer self-efficacy, perceived usefulness (net benefits), confirmation, and satisfaction levels.



Chapter 7



Chapter 7

Key Future Challenges of Banking Information

Systems: A Qualitative Investigation

7.1. Introduction

In the phase 3 a qualitative study (study 2) was conducted to understand the subjective experiences and reflections of bank managers and other higher officials regarding the key future challenges of banking information systems' success. In the context of information system success research, qualitative research may help in understanding user's behavior with respect to the system, and the system's success and failures from the point of view of those involved with it (Kaplan & Shaw, 2004).

Indian banks have adopted and embraced IT to keep pace with the current competitive environment. It is one of the key determinants of growth and profitability of the banking sector. Banks are harnessing technology for offering innovative and cost efficient banking services. However, technology is a double-edged sword. Therefore, with the numerous benefits associated with banking information systems, there exist many challenges that impede technologies widespread adoption or use in the banks. It is imperative to address these challenges in order to understand banking IS. This chapter discusses study 2 which was specifically focused on this issue.

7.2. Overview of Qualitative Research

Denzin and Lincoln (2000) claim that qualitative research involves an *interpretive and naturalistic* approach: "This means that qualitative researchers study

things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them” (p. 3). Qualitative research is more suitable in context of exploratory research where focus is given on subjective experiences and contextual knowledge. There are several advantages of qualitative methods over the quantitative methods. Some of them are as follows:

1. Qualitative methods primarily use open ended questions that give opportunity to participants to respond in their own words, rather than forcing them to choose from fixed responses, as quantitative methods do. Open-ended questions have the ability to evoke rich responses that are meaningful and culturally salient to the participant.

2. Quantitative method does serve the purpose of objectivity and generalizability of results but the views and subjective experiences are lost somewhere in the quantitative data. On the other hand, qualitative method helps the researcher to gain insight into respondents’ inner subjective life, their attitudes, value systems, motivations, cultural beliefs and so on.

3. Qualitative methods helps to understand a given research problem from the perspectives of the local population it involves. Therefore, when used along with quantitative methods, qualitative research can help us to interpret and better understand the complex reality of a given situation and the implications of quantitative data.

4. Qualitative empirical data collected through the interview method provide rich insights for exploring, identifying, and understanding viewpoints, attitudes and influences of the participants (Healy & Perry, 2000).

5. Qualitative method gives power to interviewer, to exercise greater control over the interview situation by sometimes either changing the sequence of questions

or the language of questions without changing its intended meaning. It also allows researcher to clarify interviewee's doubts. The interviewer is not bounded by the rigid boundaries of pre-established questionnaire. He/she has the opportunity to elaborate on what is being asked, if the question is not understood, follow-up on unanticipated and valuable information with additional questions (Kaplan & Maxwell, 1994).

In the context of information system success research, qualitative research may help in understanding user's behavior with respect to the system, and the system's success and failures from the point of view of those involved with it (Kaplan & Shaw, 2004). Qualitative method will give more flexibility to the researcher to capture the detailed and rich understanding of IS success from the participant's cultural and contextual position.

7.3. Method (Study 2)

7.3.1. Sample

An interview schedule was used to conduct in-depth interviews of 50 senior officials from 14 banks located in 3 cities of India namely, Delhi, Guwahati, Lucknow. These banks also took part in the quantitative study. As shown in table 7.1, out of 50 respondents, 30 senior executives were from public banks (25 males and 5 females), and 20 senior executives were (15 males and 5 females) from private banks. The age of respondent ranged from 30 years to 50 years. The minimum education background of the respondents was Graduation. Moreover, only few are just graduates otherwise all officers had high educational background and holds professional degrees like M.B.A. and CAIIB (Certified Associate of Indian Institute of Bankers). Respondent's job level comprised of branch manager, senior manager, cluster head, chief manager and assistant general manager. Interviewees comprised of employees at

the managerial level who are involved in the decision making processes regarding the information systems at the branch or regional level. They were selected primarily because of their in-depth knowledge about IS and are most suitable for evaluating and reflecting views on the IS success and its future challenges. The work experience of all the respondents ranged from less than 10 years to 38 years. The analysis revealed that these banks have implemented FINACLE, BANCS 24, FINWARE, CROWN, FLEXCUBE, and i-flex information systems as CBS solutions. These branches have minimum four years of experience of using CBS systems.

Table 7.1: Characteristics of the Respondents (N=50)

Characteristics	
Bank Type:	
Public Bank	30
Private Bank	20
Gender:	
Male	40
Female	10
Age Range:	30-50 years
Job Experience:	< 10 years – 38 years
Educational Background :	Graduation and above
Job Level:	Branch Manager, Senior Manager, Chief Manager, Cluster/ Circle Head, and Assistant General Manger

7.3.2. Procedure

Data were collected through face to face interviews from senior bank executives. Before conducting the interview, a prior permission was obtained from the participants through telephonic conversation and emails. Then, at the scheduled time researcher visited the office of the executive and conducted the interview with the help of the interview schedule. The duration of the interview ranged from 45 minutes to 1 hour. After prior permission and assurance of strictest confidentiality, the

interviews were recorded with the help of a tape recorder. Interviews were conducted with the help of a semi- structure interview schedule (Appendix B). Open ended questions were asked to branch managers, and other senior executives regarding their experience with information system, resistance they faced from their employees, present trend and future challenges faced by their banks, and so on.

7.3.3. Data Analysis

Data were analyzed using thematic analysis. Thematic analysis is one of the most widely used qualitative data analysis process. It is a process oriented approach which involves searching through data to identify and code recurrent patterns and themes. Boyatzis (1998) defines a theme as a “pattern found in information that at minimum describes and organizes the possible observations and at maximum interprets aspects of the phenomenon” (p. 4). According to Braun and Clarke (2006) “thematic analysis is a qualitative analytic method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes the data set in (rich) detail. However, frequently it goes further than this, and interprets various aspects of the research topic”. (p. 79). Themes are patterns found in data sets that are important for the description of a phenomenon. Themes become the key categories for analysis. They further added that the thematic analysis is common to all forms of qualitative data analysis and does not require any detailed pre-existing theoretical knowledge or approaches as in grounded theory, discourse analysis, narrative analysis and so on. Thematic analysis is performed through the process of coding in six phases to create established and meaningful patterns. The analysis of the data includes following 6 steps (shown below in figure 7.1):

1. *Familiarizing with data:* Analysis starts with transcribing the data verbatim and noting down the initial notes while reading and re-reading data again and again.

2. *Generating initial codes:* This phase then involves generation of initial codes from the data. A code is “the most basic segment, or element, of the raw data or information that can be assessed in a meaningful way regarding the phenomenon” (Boyatzis, 1998, p. 63). Codes helps in identifying interesting features of the data in a systematic fashion across the entire data set and then collating data relevant to each code.

3. *Searching for themes:* This phase involves generating broader level of themes rather than codes. This step requires combining different codes into a potential theme. A thematic map using visual representation can be used for organizing themes. Then, relationships between different codes and themes can be further explored. In this process, some initial code becomes themes and others become sub themes and so on.

4. *Reviewing of themes:* Once a set of themes are identified, refinement or reviewing of these themes may be necessary. During this phase, analysis is done to check the validity of each theme in relation to the data. In this phase, possibility of combining some themes into each other or the possibility of breaking down a theme into separate themes are also explored. If the analysis seems incomplete, the researcher need to go back and find what is missing.

5. *Defining and naming the theme:* After a satisfactory thematic map is formed, the researcher needs to define and refine each theme. Here the focus of analysis is on identifying the essence of each theme and overall themes and to determine aspects of the data that captures each theme. For each individual theme, a detailed analysis is

done in terms of its importance and how it fits into the overall story in relation to the research questions. Further, the themes should not overlap much and further refinement of themes to identify sub-themes should be done.

6. *Report each theme*: This involves final analysis and writing reports. The report should be concise, coherent and logical account of the data within and across themes. Further, write-up should provide sufficient evidence of data to demonstrate the validity of a theme. While writing the reports of themes, clear examples and statements from the participants can be added to demonstrate the point. Report should go beyond the description of data by including analysis within the broader context of the research questions.

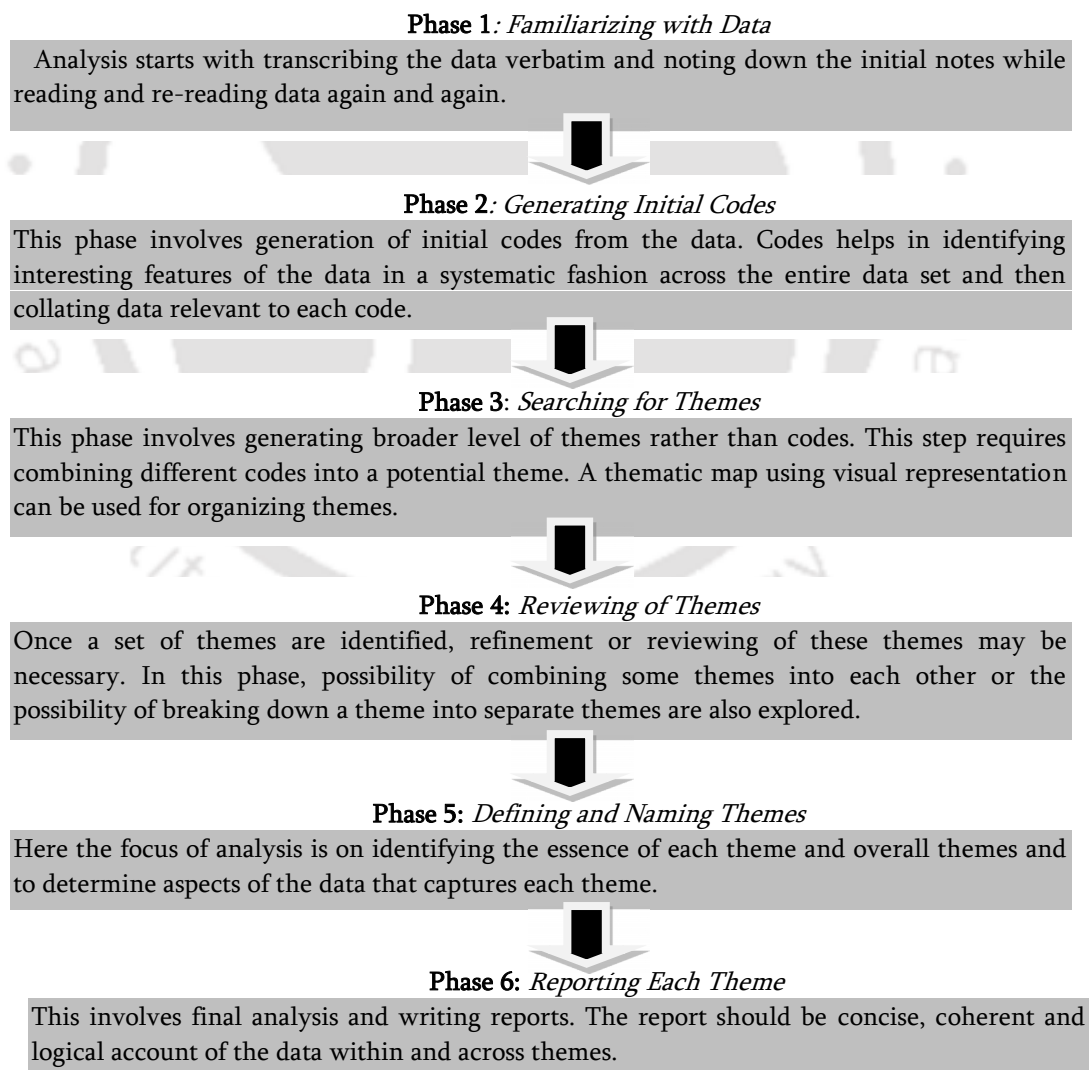


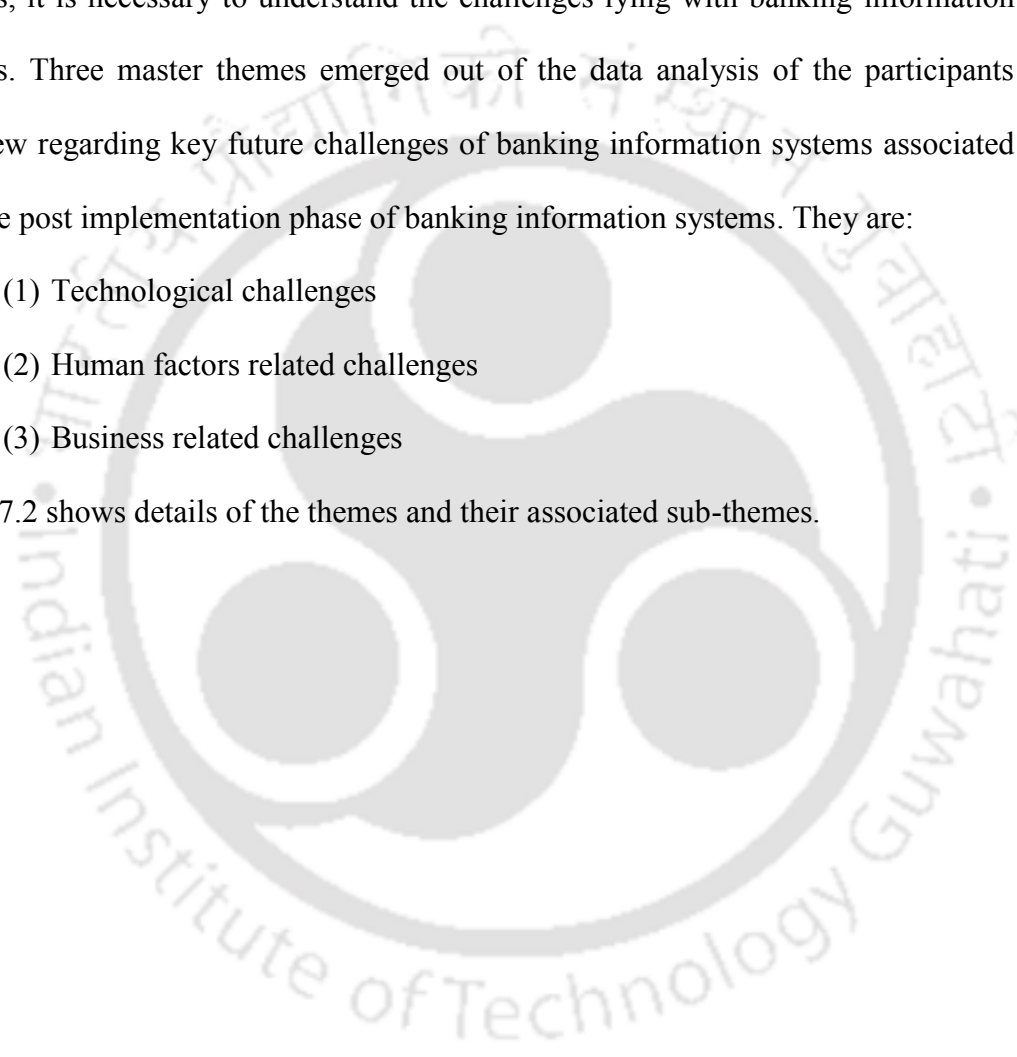
Figure 7.1: Phases of Thematic Analysis (Braun & Clarke, 2006)

7.4. Results of the Thematic Analysis

The role of IT has become so integrated and pervasive with banking sector that it is almost impossible to think of banking processes without an effective IT system. Existing dependence on technology has created various challenges for Indian banking information systems. In order to improve the working of information systems, it is necessary to understand the challenges lying with banking information systems. Three master themes emerged out of the data analysis of the participants interview regarding key future challenges of banking information systems associated with the post implementation phase of banking information systems. They are:

- (1) Technological challenges
- (2) Human factors related challenges
- (3) Business related challenges

Figure 7.2 shows details of the themes and their associated sub-themes.



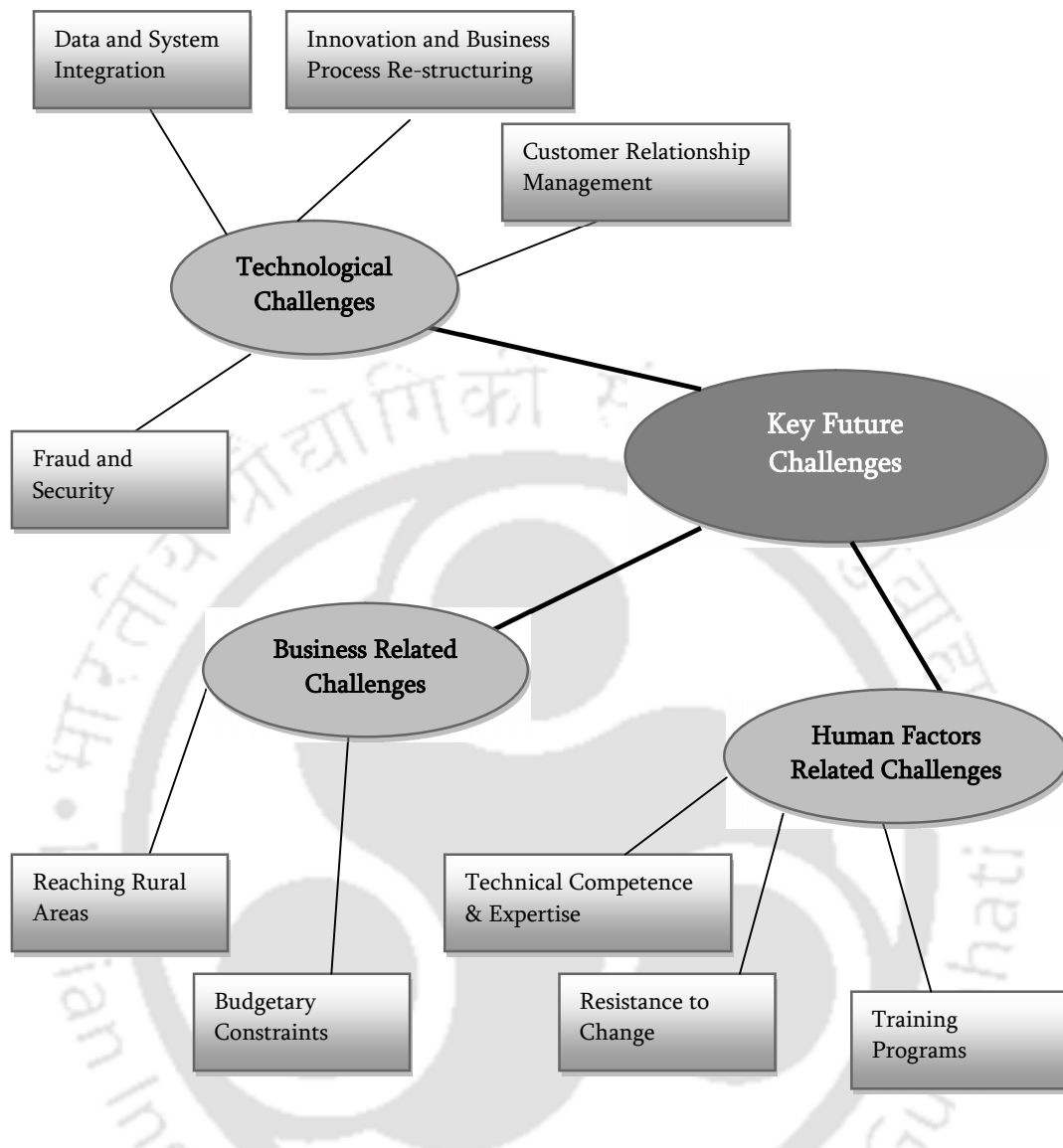


Figure 7.2: Final Thematic Map, Showing Main Themes and Their Sub-themes

7.4.1. Technological Challenges

Banking sector is highly dependent on the growth of information technology. Therefore, it is essential to study the key technological challenges faced by the banks. A close watch on these challenges will help in continuous improvement in IS effectiveness. This study attempted to understand some of the key technological challenges associated with the banking information systems from the end users. They are described below:

(a) Fraud and Data Security

The advancements in information and communication technology have revolutionized the banking industry. However, with this growing dependence of banking sector on technology, the demand for the secure, reliable and integrated network is becoming increasingly important. Confidentiality of the customer data has to be maintained by securing the customer data across the transaction life cycle. Despite heavy investment costs on procuring highly safe and reliable technologies, these technologies are not free from hackers and intruders. Thus, Banks and customers both view security threat as critically serious issue.

Security and reliability of the network was one of the main concerns of the participants of the interview. Most of the managers informed that banks have highly secure data management system with technical safeguards like encrypted data transfer, disaster recovery modules and mutual smart card authentication to ensure robust security in financial transactions, data recovery in case of accidents, and minimum number of instances of frauds. Almost all respondents rated security as the most important issue in modern banking. They reported that lack of trust in technology and cyber crime is one of the main inhibitors in the growth of the alternative delivery channels like mobile banking and e-banking. A large percentage of respondents expressed that perception of customers is also responsible in the security and trust in online banking. 40% managers revealed that a large section of public sector bank's customers include individuals in the age group of 40 and above, who seems to have aversion towards internet based banking transactions. On the other hand, list of private bank customers includes typically individuals from young generation. In this context, one manager stated:

“Lack of trust in technology, lack of integrity and lack of awareness discourages customers from using alternative online channels.”

This lack of trust by customers is not just based on unfounded evidences; there is some truth in it. Cases of identity theft, illegal transfer of customer's fund from their online account or through their credit card without their knowledge are very common. In this connection few excerpts from the interview are quoted below:

One manager quoted the perception of customers that *"though, consumers of have strong trust in their bank but weak confidence in its technology"*.

"I understand that security, data confidentiality and privacy are the major issues about the proper adoption of modern technologies and we keep track that our systems remain foolproof; still, we receive complaints regarding phishing, money laundering mail spoofing, and other fraudulent activities of online transaction".

"Definitely security and confidentiality are the key issues for the banking activities involving sensitive information. Some of the major frauds that bank have came across are: web spoofing, mail spoofing, hacking the computer or mobile, cloning, media tapping, poisoning the network structure etc."

"Yes, banks are very active against increased cyber crimes. Now, prevention mechanisms like public key infrastructure, digital authentication and encryption are adopted by several banks. It assures confidentiality, authenticity and integrity of information and increases the customer's confidence."

"I believe the big challenge to be faced by Indian banks is to avoid erosion of customer's confidence."

(b) Innovation and Business Process Re-structuring

To adapt and survive in this competitive technology intensive banking scenario, banks have no other option to reorient and innovate the business models of banking and enabling technology. Public sector banks have to change their business

processes and have to roll out new business models for launching new business lines (Khandelwal committee, 2010).

It has been observed from the reports of the participants that some banks are unable to utilize the IS to its full potential as they failed to reorient and restructure their resources by redesigning the branch network, reducing operational cost, replacing ageing and unskilled workforce with young and talented employees. In the restructured branch model, the banks has to adopt a one- stop- service which would enable them to offer all banking services to their customers under one umbrella. In connection to this, few excerpts from the interview are:

“.....most banks have yet to operationalize the provision of ‘one-stop service’ to customers.”

“Public banks are left with no options other than to reorient themselves. Public banks have to operate their core systems more efficiently in order to sustain and perform better. They have to reorient and redesign their operational strategies.”

“We are facing stiff competition from long-established government banks; management is planning to replace the old system with a robust core banking solution which would have the ability to handle large volumes of transactions in support of rapid growth across a range of products and channels.”

Though some banks have one-stop service in place, with a new job titles as single window operator.” apart from harnessing the technology, it also requires frontline staff to have integrated banking skills and multi-tasking abilities.

Banks should ensure a full proof migration mechanism from legacy system to new system to ensure complete data integration. For the smooth transition, new systems should be planned in such a way that the banking services should not be disturbed as well as it must be totally transparent to customers. Banks must give

priority to robust risk management systems, effective IT infrastructure, security issues, business continuity management.

It has been highlighted by the majority of the respondents that intensive technology adoption and implementation without the needed process changes and re-skilling and empowering of employees has the potential risk of increasing the cost of operations on one hand and chances of implementation failure on the other hand. A senior official commented:

“Core banking implementation is not enough, banks should review, business processes and work flows and thus focus on branch transformation.”

The respondents reported that new generation tech- savvy private banks have brought a paradigm shift in banking with customer centric approach. Only few public banks have realized the need to shift their focus from the product-centric banking to customer centric banking. Public sector banks still have to cover a long path by innovating new business models and adopting new strategies to enhance customer satisfaction through convenient and cost effective banking. One respondent stated:

“Our biggest challenge is to transform ourselves to a customer oriented bank, with improved technology for better services.”

(c) Customer Relationship Management

Another big challenge raised by almost all interviewees is to develop customer data repository that can support cross-selling and fast decision-making. Customers are more demanding and have high expectations with the new age banking and dynamic market. In such a situation, banks need to harness technology to create a data pool for better and effective decision-making. An Assistant General Manager stated that several banks are planning to focus more on client segmentation based on attitude, behavior and interest rather than demographic segmentation (such as age and gender). In order

to collect information and grouping information on the basis of attitudes, behavior, and interest bank needs highly advanced information technology, which is a challenge at present. In this connection, views of senior executives are:

“Our bank is focusing on modernizing its client segmentation techniques. It’s a challenge currently. Banks need to invest heavily on their infrastructure to upgrade their technology and analytical tools.”

“We are planning to adopt a ICT (information and communication technology) model in which data will be seamlessly transmitted from the host system to the recipient system without any human intervention. This will streamline more efficient, reliable and robust tool to encourage data management.

A manager mentioned that the biggest challenge is to manage customer data repository. Customer profiles can be used to generate their buying patterns and preferences. There is a need to turn immense raw data into meaningful information to produce business opportunities necessary for bank’s survival. Further, it is found that recent advances in information technologies has offered various ways of managing banks relationship within international banking standards; but, most banks are uncertain on how to adapt and restructure with these developments effectively

Most of the leading banks have realized the need to manage their intellectual pool through the knowledge management tools. Many participants emphasized the need for continuous flow of ideas from “grass root level to top level” and a sustained process of learning and sharing of experience and ideas across different functional units of the bank.

(d) Data and System Integration

There are two main types of integrations: data integration and system integration. Data integration means that data can be accessed from different types of

system deployed within the bank. System integration means ability to extend with new products and channels, and the ability to integrate with third-party applications.

Senior managers highlighted that one of the biggest challenge for nationalized banks is system integration, that is, to integrate various applications developed overtime on varied platforms to cater different banking services. Modern banking technology has made it possible to have one single banking solution to meet all banking needs. Respondents from few public sector banks highlighted that during core banking implementation some banks did not upgrade the technology and continued banking operations with legacy systems and its peripherals. Thus, these legacy systems have problems like obsolescence and inflexibility, difficulty to integrate multiple solutions.

Some banks reported problems of integration of varied information and data systems. It has been observed that banks showed concern regarding seamless integration of core banking solution with the legacy systems. Few respondents used the term *IS sophistication* for the purpose of describing integration. They mentioned that IS sophistication is a major determinant of IS success and defined it “*as the extent to which banks processes various business like payment systems, customer database systems, loan recovery systems, risk assessment systems, internet banking, and mobile banking systems and so on are integrated with CBS systems.*” It has been observed that the current extent of integration in some public banks is low. However, another respondent stated that:

“Our systems suffer from the problems of fragmented system modules that are difficult to integrate”

He informed that the CBS and loan software were not integrated, due to which it becomes difficult to relate the CBS data of a customer with the other proprietary

applications. One respondent highlighted the frequent problem faced by him and other employees of his bank due to lack of proper data migration from legacy systems to core banking solution. The comments of few of the respondents are:

“Indian banks are facing numerous technological challenges in creating an integrated channel infrastructure, mainly because management is burdening new channels onto ageing (legacy) systems that were not designed to work in real-time.”

“...various channels and surround solutions are integrated in such a manner that there is no lag, however, still lot of work is required for consistent and seamlessly integrated systems.”

Another respondent highlighted a very important issue in this regard:

“I must tell you that Reserve Bank of India (RBI) has asked some banks to shift from their existing CBS platform to an Oracle based platform as part of integrating data from various banks through an automated data flow system.”

Another challenge which participants highlighted is network failure and system downtime. The system downtime except needed for maintenance purposes, may be a reason of concern for the bank's IT department. Banks are critically dependent on technology and cannot tolerate system outages. One interviewee stated that *“there is a zero tolerance for the downtime.”* All respondents from Guwahati city stated that they have to face frequent *“no link”* or *“server down”* problems during the customer dealing time. The reason behind this is that they have to use the lease line provided by BSNL (which is the only source). Thus, the bank staff has to keep the customers waiting. A respondent from nationalized bank revealed that he has observed the reaction of the annoyed customers and overheard them saying:

“Manual days were better. Although, the work was slow but, we are able to get our work done”. Few other excerpts are:

“One of the major challenges for us is to make sure that we are up all the time, that is, minimize downtime. it is posing a lot of difficulties for the banks. However, sometimes it is difficult and unavoidable due to heavy traffic in the network.

Contrary to this, few large banks highlighted that they have adopted enterprise-wide data warehouse that resulted in system uptime by providing 24x7 data availability, scalability and reduced downtime.

Further, it was clear from the interviews that banks with seamless integration reported significantly higher efficiency with the core systems. Thus, system is effectively utilized when the surround-applications and other solutions are properly integrated with the main system. The CBS architecture, including hardware and software, must be properly integrated to eliminate redundancies and enhance efficiency.

7.4.2. Human Factors Related Challenges

Banking industry is heavily dependent upon information technology which needs qualified professionals for development, and support of the technology. Despite the programs performed by many banks to develop their local expertise in IT, there is still a real shortage of qualified personnel. The basic function of banking remained the same but technology has altered the way in which these services are offered to customers. With the customers expecting and demanding speed and efficiency, banks need to focus on personalized, cost effective and speedy services. Managers stated that even the customers using internet banking prefer speaking with someone before completing the transaction. Thus, human factor remains in the core of all technology initiatives.

So, instead of overcoming just the technological challenges, it is imperative that human factor related challenges should also be taken care of. Results of this study indicated many human factors related challenges associated with IS success in the banking sector of India. Detailed descriptions of these factors are as follows:

(a) *Technical Knowledge and Expertise of Employees*

Technical knowledge refers to basic computer knowledge and associated experience and skills possessed by employees. It includes wide gamut of employee's background, experience, awareness, and interest in IT/IS activities. Nelson (1990) stated that the acceptance of technology depends on the technology as well as on the level of expertise of the individual using the technology. One of the major future challenges for optimum utilization of banking information system success is lack of technical knowledge and expertise among end users' and managers.

Results of this study indicated that a large number of interviewees (48%) have expressed that their old (tenure wise) staff (clerical and managerial) do not have prior knowledge of computers and lacks proper knowledge for handling the information systems. About 20% of participants stated that prior technical knowledge is not required for handling information system as they have all the practical knowledge to deal with the necessary functions. The rest 32% informed that most of their staff members have prior technical knowledge and skills. This implies that around 70% respondents agreed upon lack of technical competence and skills issue.

The results indicated that lack of technical competence among employees was found to be a major barrier in the full utilization of IS and its success among Indian banks. In this context, a manager stated:

“the level of technical knowledge and skills among managers and end users will determine the level of inclination towards system usage”.

In general, it was observed that the majority of the clerical staff in banks lacks computer background especially those who joined bank in pre-reform period. On the other hand those who were recruited after technology reforms, have sufficient technical know how to operate computer. One of the senior managers reported that initially when CBS was launched, there was a strong resistance of employees especially from those who were not computer literate. Presently, due to mandatory computerization of almost every branch, all staff members learned basic applications that are required for their job. However, many participants revealed that several clerical end users, particularly elderly and who are close to retirement age, are using only the required features of the CBS system and are unwilling to learn any new features or applications. In this context one of the participant of a large branch reported:

“As yet, our branch is struggling with the day to day operational problems in information systems as some of our older employees and managers lack understanding of technical words and terminology.”

The findings of this study also indicate that apart from end user's technical background, branch manager's technical know-how of computer, technical expertise, and their interest in IT related activities also play a vital role in getting the efficient use of IS by their subordinates. In general, it was observed that managers with lack of computer background and technical skills also lack motivation to learn technical things and transmit it to their subordinates. One interviewee quoted the words of his Assistant General Manager:

“I don’t understand that why RBI want us to learn these new technologies; what it can do for me, even when computer was not there I am doing things according to my experiences and rules. I have no intentions to learn it now”.

Contrary to this, the results also found that some banks adopted an e- learning module for the managers so that they can educate themselves during breaks and free time. An officer stated:

“My previous branch manager was so cooperative and understanding that when he found that I am struggling with the IT Jargon, he took out time to help me out with IT complexities after office hours. I received the guidance from my seniors and so as I am a manager now, I will reciprocate the same”.

(b) Training Programs

Technology acts as a great enabler and provides huge opportunities for making banking more efficient and more inclusive. At the same time, it is also faceless, and this absence of a ‘human touch’ can be quite intimidating, if not threatening, to those just entering the banking network. Banks should, therefore, take extra care to ensure that the people are not driven away from banking because the technology interface is unfriendly. This requires training the banks’ frontline staff and managers as well as business correspondents on the human side of banking. Training improves better understanding of the employees which increases user satisfaction and work productivity.

Majority of interviewees (around 95%) agreed that rigorous training should be provided from time to time to staff members to ensure that they understand the functionality and complexities of the system and its effective usage. Respondents stated:

“The system can be made effective only if the employees are properly trained for how to use it, so I think training is very important”.

“...re-training is missing”

“...trainings are not systematically planned according to the situation”

One of the manager informed that his bank has made 50 hours of computer training compulsory for its officers. Majority of the participants stated that the core banking solutions installed in their bank have graphical user interface with interactive features and these menus are self explanatory and thus no extra training is needed. However, few others complained that their banks information system has DOS interface which is so interactive and user friendly. They have to remember each and every command. A senior manager informed that they have a system where apart from the induction training program, the new employees also get on-the- job training through other experienced staff members. One respondent stated that their organizations have established procedures for keeping staff up-to-date and informed about the changes in technology.

Few interviewees reported that in their bank there is no separate training for the clerical staff, the training programs are only for officers. Adding to this, a senior level manager stated that even if the training regarding computer and internet education is arranged by the training center, the not so tech savvy clerical or managerial staff doesn't take the training classes seriously. He further added:

“I feel that many staff members have to learn computer out of force as they do not have the internal motivation to learn it”.

Contrary to this, a branch manager stated that as all employees in his branch have computer background so they do not have any provision of giving them training on “How- To” of core banking systems. New incumbents learn it by themselves from

their peers. Further, she stated that training programs are organized for educating the staff regarding new modifications, new policies and banking practices. She pointed out that they also have e-learning modules in place so that each employee could learn by themselves. In short, it has been observed that the maximum number respondents both from private and public sectors banks strongly feels that regular training programs should be there and are in favour of the rigorous training programs associated with the core banking systems.

(c) *Resistance to Change*

Employees' attitude towards the IS may play a significant role in the success as well as failure of IS. The role of employees' attitude in IS use was also very evident in this study. Lack of proper training, competence and skills might results in resistance and indifferent attitude towards the IS in different ways. If the system is voluntary, users will avoid it; if the system is mandatory, resistance may take the form of increased errors, disruptions, and sabotage (Hussein, 2009). Employees attitude can be a strong enabler or a barrier towards IS utilization.

Respondents reported that resistance from the clerical staff is one of the biggest obstacles towards optimum utilization of CBS systems. A large number of mangers reported that elderly staff still resists the change from the legacy banking to computerized banking. Many employees feel that computerization has increased their workload and responsibilities. Few managers indicated that some old employees experience techno-phobia and a constant fear haunts their mind that due to lack of specialized expertise and limited understanding about computers they may make errors and can be under inquiry. One Manager stated the feelings of his employees regarding this:

“Some employees constantly believe that they may commit mistakes during transactions and this fear adversely affects their performance”

Lack of command over English language is which is used in information systems is also one of the reasons behind this phobia. Some comments from the participants in this direction are:

“Majority of our cashiers /tellers and older experienced staff are relatively comfortable and confident in the old manual system. They have more trust on pen and paper banking rather than computerized banking.” and

“Although many employees do not actively resist information technologies, but they believe that such technologies does not make much of a difference in their working”

Such resistances from the employees might act as a major barrier in the optimum utilization of IS. They think information technologies are essential for routine banking services and are unaware about its strategic importance for organization.

However, some participants reported that the employees with necessary expertise and knowledge perceive that IT has reduced their work load. Moreover, a Chief Manager informed that the bank selected and trained few employees having prior exposure of computers and then they are made responsible to train others in their respective branches. Another senior official (a leading bank) informed that:

“All union members are specially trained in CBS so that they can spread the message to each and everyone. This strategy worked as magic in driving away the fear of computers from the mind of staff members”

Analysis of the data also revealed that most of the private banks enjoy the benefit of younger and computer literate workforce. Thus, they are comfortable and

open to newer technologies and applications. However, the percentage of such employees is less in public banks. We can witness an amalgamation of two generation employees more often in public banks than in private banks. So, the usage of IS and its features beyond mandatory functions was less evident in these banks. Therefore, the nature of workforce and their attitude may play a vital role in the proper utilization of IS in banks.

Further, many participants revealed that they have witnessed resistance not only from the employees but from the customers as well. It was evident that a large percentage of the customer base of the public banks comes from rural and semi-urban areas. These customers lack exposure to computers and internets. Consequently, they are not very comfortable using e-banking and other alternative banking channels. For example, most of them use ATM only for withdrawing money, use internet banking only for viewing account statements and so on. While, the private bank's clientele is mostly urban-based, falling in the 20-40 age group, and has higher exposure to technology. In this connection, respondents informed that younger generation customers are reluctant to physically visit branch, they feel working over internet and mobile is more time saving and convenient as compare to physically visiting the branch. It has been observed that younger and well qualified customer has more access to smart phones, laptops and computers and prefers using various channels of information system. Contrary to this, older generation in the age group of 45 and above has a natural aversion towards adopting new technology. They prefer physically visiting to branch as compared to making online transactions using computers. One respondent from the public bank stated:

“We are not able to attract young customers; presently the percentage of young customers is very low. The young generation prefers private banks over public banks; they are ready to pay more for convenience and speed.”

Further, it was evident that in general, public banks are product-centric; they give priority to selling the product rather than building a long term relationship with customers. Some respondents informed that slowly in few banks this trend is changing, they have realized the importance of being customer-centric. One respondent stated that:

“today nationalized bank’s biggest challenge is to create demand, acquire young customers from private banks and retain them life-long”

To summarize, it is necessary that the banking sector understands that human factor is vitally important in making the IS successful. It is imperative to harness the potential available in the employees by creating a positive organizational culture; and developing skills, values and behaviours consistent with a high level of effectiveness. Apart from providing skills and knowledge, employees must be made aware of their potential and the difference they can make in realizing the vision of the organization. Power of recognition and appreciation can motivate employees to be flexible and more adaptive to keep pace with the changing times.

7.4.3. Business Related Challenges

Technology is an effective tool allowing banks to go beyond their traditional business and bridge the boundaries between customer and banking. Banks are involved in innovation in their business to minimize customer-services costs and simultaneously improve the quality of the customer experience. However, this study showed that banks are still facing many business related challenges. There are still

many avenues left for banks to achieve, particularly in the area of rural banking, reorienting the existing core banking systems, and other technological solutions. These challenges are discussed below:

(a) *Reaching Customers in Rural Areas*

According to a survey conducted by government of India in 2011, nearly 65% (112 million) of households in India does not have access to formal credit and borrow money from non-institutional sources like local money lenders, “mahajans” and so on. The lower the asset, class or income of the people, the higher is their degree of exclusion. As per the RBI guidelines, financial inclusion is one of the most crucial aspects in terms of growth and development. It is the process through which banks ensure that its services and financial products reaches to every section of the society even the weaker and lower income groups, at an affordable cost.

A large chunk of population still lacks access to even the basic banking services. An Assistant General Manager highlighted that only a very small percentage of the rural household has access to banking services. This is primarily because of the challenges in reaching remote areas. Similarly, private sector banks also did not stretch their presence in rural and remote India. Therefore, banks have ample opportunities to improve financial inclusion by improving and upgrading technology. Few excerpts in this connection are:

“We are focusing on leveraging mobile banking in rural areas to facilitate banking. we need to use IT infrastructure innovatively and creatively. Major challenge in front of bank is to provide continuous, safe, secure and reliable banking transactions to the untouched segment”.

“The banking industry is looking ahead at financial inclusion as a new opportunity as well as social responsibility for growth equity. However, at the same time, the road ahead is not very clear.”

Limited human resources, high transaction costs, lack of key resources, and IT knowledge and awareness is identified as the key obstacles in the financial inclusion initiatives. Respondents emphasized the need for adaptation of main stream technology for rural banking. However, few respondents from public banks reported innovative strategies in this direction. One of participants informed:

“We have adopted an ICT-based branchless banking solution that relies on business correspondents. This involves use of smart cards, hand held terminals, biometric devices and simple ICT tools like laptops, webcams and battery backup devices to provide for easy enrolment of new customers especially for the rural areas.”

The respondents from these banks informed that adopting the ICT based and branch-based business model proved that despite being a costly affair initially financial inclusion is a profitable and socially responsible business model.

(b) Budgetary Constraints

Lack of budget allocation for IT initiatives seems to be a major barrier in the expansion of IT applications for many banks. It is very clear that timely technological up-gradation is needed due to shorter life cycle of technological products and fast modernization of technology in the banking sector. 65% of the respondents informed that even though the financial position of the bank is sound, but the management has been allocating lesser funds for the IT initiatives. To expand and maintain the market share, banks need to invest more money in making their technology more robust and

flexible. A manager told that IT constitutes only 20% of the total expenditure of the bank. While other manager stated that though their bank had ample of funds allocated for IT, but bank have problems of strategic planning, poor alignment, and ineffective resource management. Similar reports were provided by some other assistant general managers also. As compared to technically advance private banks, public sector banks except few are somewhat laggards in using it as a strategic tool.

Few participants expressed their opinion that their bank is still struggling with its legacy systems and equipments that lacks scalability and flexibility and are not robust to capture the growing volume of transactions and large range of products and services.

On the other hand, managers from 35% of banks described that the bank knows the importance of allocating an appropriate amount of budget for the stable IT infrastructure as it is essential for future growth. Further, it was found that a lack of appropriate IT infrastructure is the main technical constraint in effective and efficient utilization of systems. Many banks have deficient technological infrastructure and using older version software with poor interoperability and functions. A manager commented: *“our infrastructure is not up to the mark to meet the growing volume of customers. It is old and not so robust.”*

Few banks are still using the system that does not have interactive menus and demands end-users to remember various commands and instructions. Some comments of the participants in this direction include:

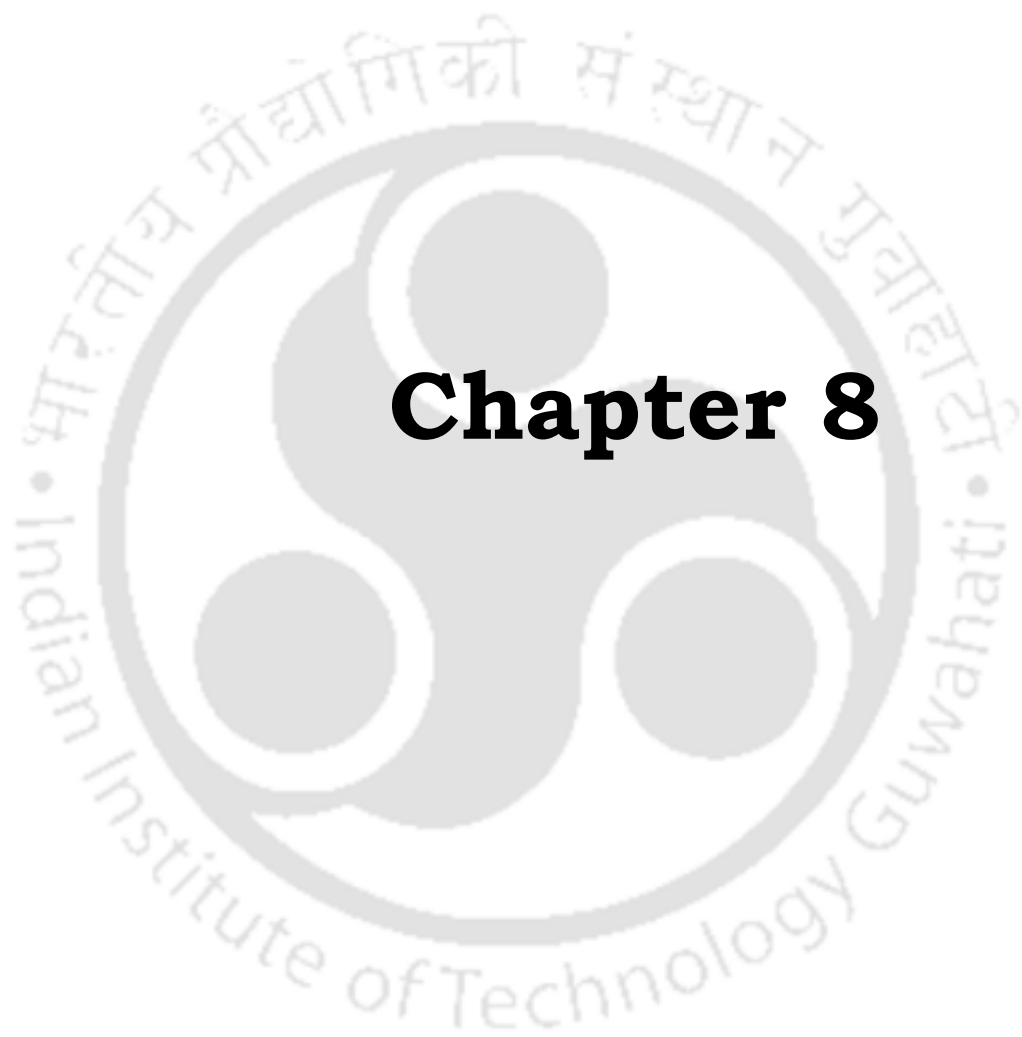
“World is moving fast in the race of technology, but we are still using age old system full of commands to memorize.....”

“...data migration has not yet completely over”

“....system does not support all the functional units of the bank”

The managers are of the view that IT obsolescence is high mainly as we do not have proper IT cell and vendor support. It is also noticed that due to internet banking and tele-banking proliferation, there is need that these new channels are integrated with the legacy systems. There are some banks which have implemented CBS just because of pressure from RBI's regulatory requirements. Their crucial processes are still not automated apart from mandatory functions and large amount of back office staff is still working manually on areas that have been automated long before. On the other hand, few banks appreciated their core banking solutions also. In this connection a senior executive informed that bank possesses a robust technical system that streamlines banking operations and optimizes the cost and maintains the relationship with the customer. Moreover, majority of participants pointed out the need for appropriate technology up gradation and adoption of new technologies like CRM solutions (customer relationship management), business intelligence, Web 2.0 technologies, knowledge management and collaboration techniques.





Chapter 8



Chapter 8

Qualitative Investigation: Discussion of the Findings

8.1. Introduction

Data of the qualitative study (study 2) was analyzed using the thematic analysis. Three master themes emerged out of the data analysis of the participant's interviews regarding key future challenges of banking information systems associated with the post implementation phase of banking information systems. The advancement in banking technology has created several new challenges for the bank. These challenges range from unskilled workforce, inefficient resources and infrastructure to customer resistance. These challenges were broadly categorized into: *technological challenges, human factors related challenges, and business related challenges.*

8.2. Technological Challenges

Technological challenges comprises of four sub themes: Fraud and security; Innovation and business restructuring; Data and system integration; and Customer relationship management. Fraud and security issues of the customer accounts in all channels is one the biggest challenges for the banks. This finding is consistent with findings of Lee and Turban (2001), who reported that perceived risk and lack of trust in technology have been frequently identified as key barriers in adopting online and mobile banking. Despite using modern techniques to curb cyber fraud, compliance of complex security standards are not yet sufficient. It is observed that attackers and hackers are increasingly becoming smart and banks need to respond proactively and

continuously. Banks cannot afford to compromise security issues. Apprehensions about the security of the banking transactions are keeping customers away from adopting full-fledged mobile banking and internet banking.

The effective implementation of banking IS requires re-engineering of business processes. However, several banks failed to adopt proper reengineering strategies due to increasing regulatory directives from Central Vigilance Commission (CVC) to computerize a required percentage of business within a stipulated deadline. This resulted in adoption of CBS without properly estimating the problems associated with CBS adoption. Thus, even after a decade, these banks are still facing various challenges such as lack of resources and adequate technology. Moreover, the staff (especially front line workforce) also lacks proper technical competence and skills which is resulting as a barrier in the optimum utilization of the IS. This finding is consistent with the observations made in the Khandelwal Committee Report (2010). Further, it was evident that banks especially the public sector banks have to adopt business process reengineering, redefine their business and HR (human resource) strategies to survive under the enhanced forces of competition. The main area in HR strategy is the re-skilling of workforce, both in technical and non-technical areas.

Data and system integration was found to be a key technological challenge for the banks. In this direction, Lee and Kim (2007) suggested that true potential of information system cannot be achieved until the information systems are fully integrated with the other information systems of the organization. They defined integration as the extent to which the data in the information system can be directly processed within the applications without human intervention. Thus, any new technology must be able to interface with all the system within the bank. Seamlessly

integrated systems eliminate problems associated with data redundancy and data conflict.

Network failure and system downtime was found to be another major technological challenge. The results indicated that banks as well as customers have a serious concern about the network failure and server down problem. It is found that system efficiency can be evaluated by monitoring the up-time of the system during the business hours and also after that. The system downtime apart for maintenance purposes may be a reason of concern for the IT cell. It becomes necessary for banks to mitigate the operational risks arising due to failure of technology and smooth conduct of the banking services. Persistent problem of network failure in banking services can cause heavy losses to bank as well as can tarnish bank's image. Contrary to this, it is also found that few large banks have adopted enterprise-wide data warehouse that resulted in system uptime by providing 24x7 data availability, scalability and reduced downtime.

Conducive technology for customer relationship management was reported as a major future challenge. Demographic and cultural shifts are changing the profile of the consumers. Today's customer has more purchasing power to spend on variety of products offered by various institutions. This increases the challenge for the banks to improve its efficiency, offer tailor made products to its customers and to deliver high levels of customer service. It was evident that as the demands and expectations of the customers are increasing, banks need to harness technology to create a data pool for better and effective decision-making. There is a need to turn immense raw data into meaningful information to produce business opportunities necessary for bank's survival.

8.3. Human Factors Related Challenges

A technology cannot work efficiently apart from the human elements involved in it. The human factor related theme comprise of three subthemes: technical knowledge and expertise of employees; training programs; and resistance to change.

It was very clear from the interviews that large number of senior employees (on the basis of age) lack prior exposure to computers and lacks technical competence and skills necessary for the optimum utilization of the IS. Past researches suggested that employees with good knowledge of computers or general IT skills are comfortable with the terminology and the language of the menus available in the system. Further, it was also found that the employees with formal computer background showed more involvement, commitment, acceptance, and satisfaction with the system. This result implies that individuals with prior computer knowledge have higher computer self-efficacy and they are more confident in their interaction with computers, and thus likely to utilize the system more efficiently. It was evident that over the years trained users are more confident, efficient and their productivity and accuracy of using the system is also higher. Employees having good understanding of the system and its features are willing to explore the computer over and above the routine tasks, are able to troubleshoot themselves for solve simple technical problems as compared to employees who do not have any formal computer background. Moreover, results also found that managers who are well informed about the IS and its potentials can induce his subordinates to make extensive use of IT. Therefore, lack of technical knowledge and skills among the employees seems to a major challenge for optimum utilization of the IS. Further, lack of training programs associated with various IS applications appears to be a key reason for the underutilization of IS and lesser involvement of employees with the information

system. This finding is also consistent with Khandelwal Committee Report (2010) which reported that there is huge shortage of skilled employees in the area of IT applications associated with banks. Davenport and Short (2003) noted that the lack of training and failure to understand the application appears to be responsible for IS problems and failures. Past findings also supports training for increasing the effectiveness and success of IS (Igbaria et al., 1995). The main purpose for an education and training program is not only to ensure that members are comfortable with the system, but also to increase their expertise and knowledge. Previous findings confirmed a positive correlation between banks' investment into training programs and their business performance (Beccalli, 2007). Past researches also indicated that the amount of time spent on the training and the quality of the training is positively associated with the user participation and satisfaction (Guimaraes, Staples, & Mckeen, 2003). Training improves knowledge, skills and attitudes which in turn increase confidence, motivation and job satisfaction (Fill & Mullins, 1990). In addition, employees' training is increasingly considered to be a prerequisite for the success of IS (Pritchard & Armistead, 1999).

Resistance to change also emerged as an important factor associated with human factor related challenges. It was evident from this study that lack of training, competence and skill is one of the main causes for employee's (especially elderly staff) resistance and indifference towards the optimum utilization of information systems. Further, it was found that some old employees experience techno-phobia and fears due to lack of specialized expertise and limited understanding about computers and information systems. Chan and Lu (2004) found that bank staff's resistance to technology is a common problem in the banking sector. Davis et al. (1989) argued that the introduction of new technology is bound to cause a disturbance within the

organizations and to the individuals. They further stated that successful adoption of new technology is influenced by the user's attitude. Thus, Davis et al (1989), and Tan and Teo (2000) suggested that users attitude can be a very powerful enabler or inhibitor for technology adoption. However, factors such as motivation, technical competence and capabilities, training and management support are some elements that reduce employee's resistance towards the system. It is clear from the literature review that all banking organizations are not equally ready to adopt core banking solutions. It has been reported that some large public sector banks adopted a proper change management program during Core banking solutions implementation phase to overcome the inherent resistance to change. Rabaa'i (2009) stated that a technical project supported by top management but without appropriate organizational readiness and adequate change management strategies in place is more likely to fail. On the other hand, an organizational change that is implemented with careful change management and cultural readiness is more likely to be successful. Thus, it is evident that technology is just an agent to bring changes; it is not a cure for all inefficiencies.

8.4. Business Related Challenges

Business related challenges comprised of two subthemes: reaching to rural areas; and budgetary constraints. Information technology is all pervasive in the Indian banks. Technology has reduced the scope of traditional or conventional banking with manual operations. With this growing dependence of banks on technology, it becomes imperative to address the budgetary constraints and resources allocation challenges with appropriate strategies. Moreover, the opportunities to enter new markets and unbanked areas are immense.

One of the major business related challenges includes reaching customers in rural areas. Rural and remote areas provide ample opportunities for the banks to expand their business. It was clear that despite vertical and horizontal expansion of banks, India is still a grossly under-banked nation (Khandelwal Committee Report, 2010). Khandelwal Committee Report on HR issues reported that 60% of the country's population (600 million people) still lacking access to formal banking system. So, RBI has mandated the banks to implement financial inclusion with rural areas with population over 2000. RBI issued guidelines for use of entities like NGOs and Self Help Groups to reach rural populations. Bank should utilize a confluence of simple technologies to extend benefits of formal credit to the unbanked poor masses in India. Thus, a major challenge for banks in coming years is to promote efficiency without neglecting financial inclusion. To meet this challenge, banks need to automate the delivery channels in the regional languages to enhance the reach of deliver channels to the rural population. Respondent also highlighted that lack of human touch associated with the technology driven non-branch channels is also one of the barriers for rural population. Touch screen smart phones, laptops, and automated answering machines might intimidate and create a techno-phobia among rural, technology illiterate customers. It is imperative for banks to ensure that systems are tailored to the needs of the different sections of society. Few large public sector banks adopted the ICT model which has been designed in a way to provide a flexible and differentiated service to the unbanked areas. It includes support for local language where transaction confirmation messages are voiced in the local language, and use of fingerprint helped in overcoming the barrier of illiteracy.

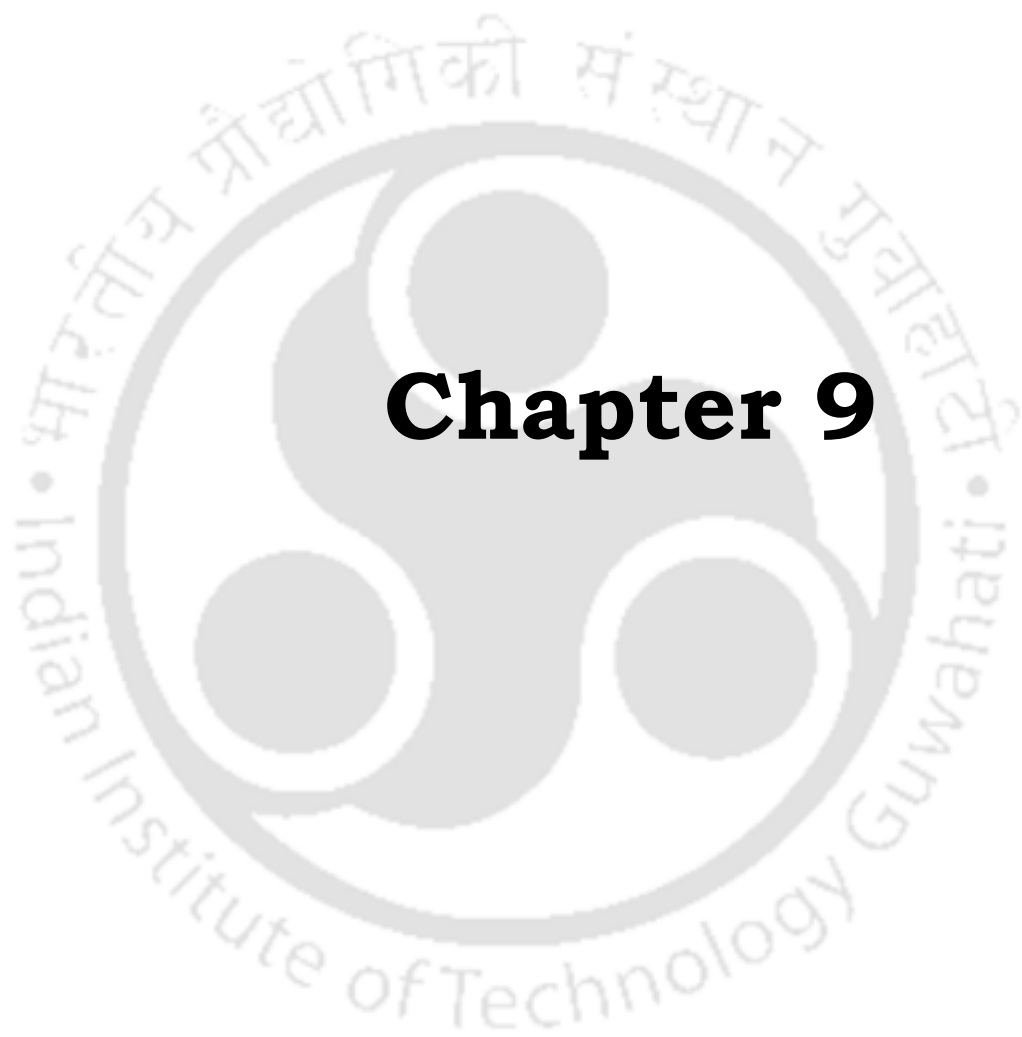
Furthermore, it is found that lack of budget allocation for IT initiatives and inadequate level of infrastructure emerged out as another major barrier and challenge.

This finding is consistent with the findings of Abukhzam and Lee (2010), who reported similar findings in context of Libyan banks. It is suggested by interviewees that with high rate of technology obsolescence, the banks should (a) strategically think to move from the past legacy systems towards a newer technology' (b) should adopt proper IT governance plans. It is evident that wide spread use of technology in banking requires that there should be effective IT governance considering best practices under different IT frameworks and standards. Regular problems of connectivity, data clean-up in the database, and delay in the back up and so on need regular management. An effective IT governance mechanism includes explicitly defined planning to align IS and business strategies, top management commitment towards IS growth, participative and collaborative decision making, and timely technological up-gradation. Consequently, this practice would result in effective control, better IS-business alignment, create allocation and operational efficiencies, and would improve overall IS performance. It is also found that banks need to upgrade and update their IT infrastructure to improve speed, quality and integrity of the system in order to increase business and profitability. The results suggests that banks can no longer remain idle on legacy applications; it is necessary that bank identifies technology gaps and develop IS plan that supports the bank's strategic goals. Therefore, it can be suggested that a robust IS infrastructure and better IS governance should be key areas of improvement for the banks.

In short, both public and private banks are required to address the above mentioned issues and challenges to stay in business and grow at a rapid pace. IT revolution has created both challenges and opportunities for the banks. This qualitative study confirms that in the use of information and communication technology, the private sector banks and few large public sector banks have taken lead

over other public banks. Further, majority of the employees in public banks lacks prior computer background especially those who joined banks in pre-reform period. On the other hand, those who joined after the technology reforms have relatively better computer literacy. Both public and private sector banks participants emphasize that management should consistently update its employees through proper training sessions to renew and expand the employee's technical skills and understanding. It is evident that resistance from the clerical staff (especially elderly staff) of the public sector bank is one of the biggest obstacles towards optimum utilization of CBS systems. On the other hand, most of the private banks enjoy the benefit of younger and computer literate workforce. Thus, they are comfortable and open to newer technologies and applications. Finally, it can be said that even the best technology and technical infrastructure would turn out to be detrimental without proficient end users'. Moreover, both public and private sector bank have taken lead in exploring the opportunities in the rural India. Both the sectors are investing heavily in technology to penetrate in rural areas.





Chapter 9



Chapter 9

Summary, Implications, Limitations and Future Directions

9.1. Introduction

This chapter presents the main conclusion of this study in the light of research objectives and research questions. The chapter is divided into four broad sections. The first section presents an overview and summarizes the main findings. The second section discusses the major contributions and implications of this study. The third section discusses the limitations of this study. Finally, the fourth section discusses the possible future directions and avenues of this study.

9.2. Summary

Banks make heavy expenditure in information systems in expectation to reap positive impacts to the organizational members and to the organization itself. Consequently, they are under increasing scrutiny and pressure to justify its value. However, in organizations, especially banks evaluation of IS success takes a back seat at the post-implementation stage due to lack of proper parameters and models for the assessment.

A comprehensive literature review revealed that the construct IS success had received enormous attention by researchers as they tried to conceptualize it using different models and frameworks. However, lack of consensus regarding the conceptualization and operationalization of IS success dimensions and measures still remains a major issue for researchers and practitioners (DeLone & McLean, 2003). Sabherwal et al. (2006) observed that despite considerable empirical research in

information systems success domain, findings on the interaction among various system related constructs and its determinants still remains inconsistent and inconclusive (Wang & Liao, 2008). The research in the IS field has been characterized as fragmented due to multiplicity of several constructs (DeLone & McLean, 1992; Rai et al., 2002) and ambiguity of concepts (Wang & Liao, 2008). As a result, throughout the world, evaluation of the information system (IS) success is still a key research area that deserves further probing (Wang & Liao, 2008). Irani (2008) argues that “the questions and problems that had been identified 15 years ago are still unanswered” (p. 88). Thus, it is concluded that researchers are still trying to identify the constructs which can best measure IS success in a comprehensive manner.

The present research is conducted in response to call for continuous challenges and test of IS success model in different contexts (DeLone & McLean, 2003; Rai et al., 2002; Wang & Liao, 2008). Based on the original and updated DeLone and McLean IS success model (1992, 2003), this research proposed and validated a comprehensive, multi-dimensional model of banking information systems success.

Moreover, measuring IS success in isolation without consideration of the contextual variables will not provide a holistic view of IS success. A comprehensive literature review revealed that limited research has attempted to examine the influence of conducive contextual factor on IS outcomes. Therefore, taking clues from the gaps in the literature of relevant contextual and individual variables, this research work explores the influence of contextual and individual variables on performance of end users and organization in the context of Indian banking. Contextual factors like leadership style, organizational culture, top management support and managerial IT expertise, and individual variables like computer self efficacy, job level, and length of

job are seen as essential for effective implementation of information systems in organizations. Therefore, the present study extended the DeLone and McLean IS success model by adding various contextual and individual variables with the technical factors. Thus, this study incorporated contextual variables like: leadership style, organizational culture, top management support, managerial IT expertise; and some individual factors like: computer self-efficacy, job level and length of job into D&M IS success model. This research has attempted to provide a consolidated view of IS success by adopting D&M IS success model. This study extended the D&M model by incorporating conducive contextual and individual variables into it and thus providing a multidimensional perspective to the D&M IS success model. This research explored the relationship of contextual, system related, and individual variables with user satisfaction and IS success outcomes by answering the following research questions:

1. What are the perceptions of employees regarding success of banking information system?
2. How private and public sector banks differ regarding the factors affecting IS success?
3. To what extent causal pathways proposed by DeLone and McLean model are valid in Indian banking context? How can DeLone and McLean's model be extended to understand multidimensional aspects of IS success?
4. What organizational, managerial, individual variables exert their influence on IS success in Indian banks, in addition to factors proposed by DeLone and McLean model?
5. What are the key future challenges of banking information systems in the context of developing countries such as India?

A conceptual model was developed to study relationship amongst various variables and thereby answer identified research questions (1- 4). Research question no. 5 was specifically addressed by a separate qualitative study. The research model of present study is an extension of D&M IS success model (1992, 2003) to measure post implementation success of banking information systems. Leadership (*transformational and transactional*), organizational culture (*support, structure, performance reward, conflict tolerance, risk tolerance, individual autonomy, and individual responsibility*), top management support, managerial IT expertise, computer self-efficacy, job level and length of job are some of the key variables believed to affect the effectiveness of the information systems. Hence these variables are taken as *independent variables* along with three quality dimensions of D&M model, that is, system quality, information quality, and service quality. Individual impact, organizational impact and net benefits were conceptualized as *dependent variables*. Demographic variables such as age, education, salary and gender of the user were used as *control variables*. User satisfaction has been conceptualized as the *mediating variable* between the independent and dependent variables. Detailed plan of the variables of the research model includes:

1. Independent variables:

(a) *Organizational variables* – Leadership style, Top management support, Organizational culture, and Managerial IT expertise

(b) *System related variables* – System quality, Information quality, and Service quality

(c) *Individual variables* – Computer self- efficacy, Job level, and Length of job

2. Mediating variable:

(a) User satisfaction

3. Dependent variables:

(a) *IS success outcomes* - Individual impact, Organizational impact, Net benefits

This theoretical model extended the D&M model by including organizational, and individual characteristics factors apart from quality variables of D&M model in order to understand the multidimensional nature of IS success. Another unique aspect of this research model is that IS success outcome measures are conceptualized in terms of individual impact, organizational impact, and the combined effect of both the individual and organizational impacts as *net benefits*. This model is built on the premise that system related variables (system quality, information quality and service quality); organizational variables (leadership style, top management support, organizational culture, and managerial IT expertise) and Individual variables (computer self- efficacy, job level, and length of job) will influence user satisfaction. This user satisfaction in turn influences individual impact, organizational impact, and net benefits.

Based on the research questions a set of 14 specific hypotheses were formulated based on the pathways proposed in the conceptual model to test the associations (H1-H2), direct effects (H3-H8) and mediating effects (H9-H14).

In order to address research questions, a mixed method approach was adopted. *Mixed research* methods refer to combining both qualitative and quantitative research methods within a single study (Howe, 1988; Teddlie & Tashakkori, 2003). Teddlie and Tashakkori (2003) described mixed methods as the "third methodological movement" (following quantitatively and qualitatively oriented approaches). Creswell et al. (2003) defined a mixed methods study as "A mixed methods study involves the

collection or analysis of both quantitative and/or qualitative data in a single study in which the data are collected concurrently or sequentially, are given a priority, and involve the integration of the data at one or more stages in the process of research” (Creswell et al., 2003, p. 212).

This study was conducted in three phases. *In the first phase*, a pilot study on 50 bank employees was conducted for the adaptation and refinement of the various measures used for this study. *In the second phase*, a quantitative study (study 1) was conducted on 302 bank employees to test the 14 hypotheses based on the pathways of the conceptual model of the study. *In the third phase*, a qualitative study (study 2) on 50 branch managers and other senior executives was conducted to understand the key future challenges associated with banking information systems.

In the **phase 1**, a pilot study was conducted on a small sample of 50 bank employees (sample included branch managers, middle level managers and other employees) to check the ease of understanding and appropriateness of the questions used in the questionnaires. All the questionnaires used for the present study were pre-tested. The booklet of questionnaires included demographic information followed by three sections. *Section 1* comprises IS success measures, top management support, and computer self efficacy measures; *section 2* comprises measures of organizational culture and *section 3* comprises measures of leadership, and managerial IT expertise. Participants were satisfied with the content, structure, and language of the questionnaire to a large extent. However, they suggested few changes to be incorporated. Thus, on the basis of the feedback of the participants few changes were made in the questionnaire which primarily involved rephrasing of some difficult words and sentences into easier ones.

In **phase 2**, quantitative study (study 1) was conducted with a sample size of 302 bank employees from various banks located in five major cities of India: Delhi, Dehradun, Guwahati, Lucknow, and Mumbai. Out of which, 211 employees were from public banks (161 males and 50 females), and 91 employees (62 males and 29 females) from private banks, all having minimum 2 years experience of using the Core Banking information system. A survey method was adopted for quantitative study. Further, **in phase 3**, a qualitative study (study 2) was conducted to explore key future challenges in banking information systems. In this study, in-depth interviews were conducted on 50 senior officials from 14 banks located in 3 cities of India namely, Delhi, Guwahati, Lucknow. Out of which, 30 senior officials are from public banks, and 20 senior officials are of private banks, all having minimum 10 years of banking experience. Interviewees comprised of employees at the managerial level such as branch manager, senior manager, cluster head, chief manager, zonal manager and assistant general manager.

Summary of Results of the Quantitative Study

Several statistical techniques were used to test the research hypotheses related to study 1. The key findings that emerged out are:

1. Perception of employees regarding the success of banking information systems was calculated in terms of IS success factors such as information quality, system quality, ease to use, service quality, individual impact, organizational impact, and user satisfaction. Perception of employees was analyzed by calculating their mean value of IS success factors on a scale of 1 to 5 indicating their level of agreement (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). In order to interpret the perception of employees, cut-offs were decided. Thus, level of the

agreement regarding these IS success factors were divided in terms of low, medium, high, and very high category. The results shows that employees had high level of agreement regarding information quality, system quality, ease to use, individual impact, organizational impact and user satisfaction. However, the perception regarding the service quality emerged as medium.

2. Significant differences were found between the public and private sector banks on the transactional leadership style, conflict tolerance dimension of organizational culture, and computer self-efficacy. This study found that the private sector banks scored higher in the dimension of transactional leadership and computer self efficacy as compared to public sector banks. While, public banks scored significantly higher in conflict tolerance dimension of organizational culture. However, there was no significant difference in the scores of transformational leadership; structure, support and participation and risk tolerance dimensions of organizational culture; top management support; managerial IT expertise; and system quality, information quality, service quality, individual impact, organizational impact and user satisfaction dimensions of system related factors between public and private banks. This implies that type of bank did not play a significant role on these factors.

3. A Principle component analysis with Varimax rotation was performed in order to obtain the factors of IS success measure and organizational culture. Apart from six original factors (system quality, information quality, service quality, user satisfaction, individual impact, and organizational impact), “*ease to use*” emerged as a new factor after the factor analysis. While, in the factor analysis of organizational culture dimensions, four factors emerged out (support and participation, structure, conflict tolerance, and risk tolerance).

4. There were positive significant correlation of transformational and transactional leadership style; top management support; conflict tolerance, support and participation, structure and risk tolerance dimensions of organizational culture; managerial IT expertise; system related factors (information quality, system quality, ease to use, and service quality), and computer self-efficacy with user satisfaction and all three IS success outcomes (individual impact, organizational impact and net benefits). On the other hand, length of job showed weak association with individual impact and net benefits. It shows no association with user satisfaction and organizational impact. However, job level did not show any association with user satisfaction and three IS success outcomes.

5. The result of correlation analysis revealed that user satisfaction have strong association with all the three IS success outcomes (individual impact, organizational impact and net benefits).

6. This study found significant relationship between the thirteen additional relationships that were not originally the part of DeLone and McLean model (1992, 2003). These additional relationships are the direct relationship between system quality and IS success outcomes (individual impact, organizational impact, and net benefits); information quality and three IS success outcomes; service quality and three IS success outcomes; ease to use and three IS success outcomes and ease to use and user satisfaction.

7. Hierarchical regression analysis found that the user satisfaction significantly predicts individual impact, and organizational impact. The additional path from user satisfaction to net benefits (i.e. combine effect of individual impact and organizational impact) also turned up to be significant. Moreover, transformational leadership style; structure and support-participation dimension of organizational culture; information

quality, system quality, and ease to use dimensions of system related factors; top management support, managerial IT expertise and computer self-efficacy emerged as the significant predictor of user satisfaction, individual impact, organizational impact and net benefits. On the other hand, conflict tolerance significantly predicted individual impact and net benefits. While, service quality emerged as a significant predictor of only user satisfaction, organizational impact and net benefits.

8. However, hierarchical regression analysis also found that transactional leadership style; risk tolerance dimension of organizational culture; job level and length of job individual variables did not predict user satisfaction and three IS success factors. Moreover, conflict tolerance dimension of organizational culture did not predict user satisfaction and organizational impact. Further, service quality did not predict individual impact.

9. Through hierarchical regression analysis this study also found twelve additional significant pathways that were not originally the paths of DeLone and McLean model (1992, 2003). These additional pathways are from system quality to IS success outcomes (individual impact, organizational impact, and net benefits); information quality to three IS success outcomes; service quality to two IS success outcomes (organizational impact, and net benefits); ease to use to three IS success outcomes and ease to use to user satisfaction.

10. The key findings from mediation analysis revealed that user satisfaction acts as a significant mediator in the relationship of transformational leadership style; structure, and support and participation dimensions of organizational culture, information quality, system quality, and ease to use dimensions of system related variables; top management support; managerial IT expertise, and computer self-efficacy with three IS success outcomes. While, user satisfaction mediated the

relationship of service quality with organizational impact and net benefits. However, it did not mediate the relationship with individual impact.

Summary of the Results of the Qualitative Study

The present study used thematic analysis for the analysis of qualitative data and followed Braun and Clarke (2006) guidelines. Thematic analysis is one of the most widely used qualitative data analysis process. It is a process oriented approach which involves searching through data to identify and code recurrent patterns and themes.

Three master themes emerged out of the data analysis of the interviews of the participant's regarding key future challenges associated with banking information systems in the post implementation stage. The advancement in banking technology has created several new challenges for the bank. These challenges were broadly categorized into: technological challenges, human factors related challenges, and business related challenges.

1. **Technological challenges** comprised of four sub themes: *Fraud and security*; *Innovation and business restructuring*; *Data and system integration*; and *Customer relationship management*. Almost all respondents rated security and fraud associated with online transaction as the most important issue in modern banking. They reported that lack of trust in technology and cyber-crime as one of the main inhibitors in the growth of the modern banking technology. It was found that despite using modern techniques to curb cyber fraud, security tools and standards are not yet sufficient. 40% managers revealed that a large section of public sector bank's customers include individuals in the age group of 40 and above, who seems to have

aversion towards internet based banking transactions. On the other hand, list of private bank customers typically includes individuals from young generation.

Moreover, It has been found that some banks are unable to utilize the IS to its full potential as they failed to reorient and restructure their resources by redesigning the branch network, reducing operational cost, replacing unskilled workforce with skilled employees. Respondents reported that effective implementation of banking IS requires proper re-engineering of business processes. However, in a hurry to meet the deadline regarding the regulatory directives from Central Vigilance Commission (CVC) to computerize a required percentage of banking business, several banks failed to adopt proper reengineering strategies. Moreover, the staff (especially front line workforce) also lacks proper technical competence and skills which is resulting as a barrier in the optimum utilization of the IS. This finding is consistent with the observations made in the Khandelwal Committee Report (2010). Even few respondents suggested that banks should ensure a full proof migration mechanism from legacy system to new system to ensure complete data integration.

Another big challenge raised by almost all participants is to develop customer data repository that can support cross-selling and fast decision-making. Customers are more demanding and have high expectations with the new age banking and dynamic market. In such a situation, banks need to harness technology to create a data pool for better and effective decision-making. It was found that some large banks are planning to focus more on client segmentation based on attitude, behavior and interest rather than demographic segmentation (such as age and gender). So, in order to collect information and grouping information on the basis of attitudes, behavior, and interest bank needs highly advanced information technology, which is a challenge at present.

Lack of proper system integration was also found to be a key challenge. System integration that is, to integrate together all IS applications that are developed and implemented overtime on various platforms for catering different banking services. With proper integration it is possible for banks to meet all banking needs of customer through single banking solution. Respondents from few public sector banks also highlighted that during core banking implementation some banks did not upgrade the technology and continued banking operations with legacy systems and its peripherals. Thus, these legacy systems have problems like obsolescence and inflexibility, difficulty to integrate with multiple solutions and so on.

2. **Human related challenges** included sub-themes such as *Lack of technical knowledge and expertise of employees; Training programs; and Resistance to change*. Results of this study indicated that a large number of interviewees have expressed that many employees especially their old (tenure wise) staff (clerical and managerial) does not have prior knowledge of computers and lacks proper knowledge for the effective use of the information systems. Moreover, it was found from the suggestions of majority of interviewees (around 95%) that rigorous training should be provided to staff members to ensure that they understand the functionality and complexities of the system and its effective usage. It was found that in few banks there is no separate training for the clerical staff, the training programs are only for officers. It was observed that employees' attitude and his interest towards systems, plays a significant role in the success as well as failure of IS. Lack of proper training, competence and skills might results in resistance and indifferent attitude towards the IS in various ways. It was found that many employees (especially elderly staff) still resists the change from the legacy banking to computerized banking because of the fear of

making errors and under-performance due to lack of expertise. Contrary to this it was also observed that employees with necessary expertise and knowledge perceive that IT has reduced their work load. Analysis of the data also revealed that most of the private banks enjoy the benefit of younger and computer literate workforce but, the percentage of such employees is less in public banks. An amalgamation of two generation of employees can be witnessed more often in public banks than in private banks. So, the usage of IS and its features beyond mandatory functions was less evident in these public banks.

Further, resistance from the customers also emerged as a key factor. A large percentage of the customer base of the public banks comes from rural and semi-urban areas. These customers lack exposure to computers and Internet. Resistance associated with online transactions is more evident among such customers. Contrarily, private bank's clientele is mostly urban-based, falling in the 20-40 age group, and has higher exposure to technology. It was also found that younger generation customers are reluctant to physically visit branch, they feel working over internet and mobile is more time saving and convenient as compare to physically visiting the branch.

3. This study showed that banks are still facing many **business related challenges**. It included sub-themes like, *Reaching to rural areas* and *Budgetary constraints*. There are still many avenues left for banks to achieve, particularly in the area of rural banking, reorienting the existing core banking systems, and other technological solutions. Result show that only a very small percentage of the rural household has access to banking services. This is primarily because of the factors such as limited human resources, high transaction costs, lack of key resources, limited access to remote rural locations and lack of IT knowledge and awareness. These

factors are the key obstacles in the financial inclusion initiatives. Similarly, private sector banks also did not stretch their presence in rural and remote India. Therefore, banks have ample opportunities to improve financial inclusion by improving and upgrading technology.

Further, budget constraints for IT initiatives seem to be a major barrier in the expansion of IT applications for many banks. 65% of the respondents informed that even though the financial position of the bank is sound, the management has been allocating lesser funds for the IT initiatives. It was also reported by few participants that their bank is still struggling with its legacy systems and equipment's that lacks scalability and flexibility and are not robust to capture the growing volume of transactions and large range of products and services. It was evident from the interviews that there are few banks which implemented CBS just because of pressure from RBI's regulatory requirements. Moreover, their crucial processes are still not automated apart from mandatory functions and large amount of back office staff is still working manually. On the other hand, results also revealed that few banks appreciated their core banking solutions also. Moreover, it was observed that majority of participants pointed out the need for appropriate technology up gradation and adoption of new technologies like CRM solutions (customer relationship management), business intelligence, Web 2.0 technologies, knowledge management and collaboration techniques.

In the light of the above qualitative findings, it is clear that there is a need for understanding the emerging challenges affecting Indian banking sector. Several banks are yet to make a desirable progress in implementing various technologies as well as in core banking transformation. Although, both public and private banks are trying hard to meet the challenges posed by the rapid changes that are sweeping the banking

sector, they still need to mitigate many challenges. Indian banking sector is facing future challenges in various domains particularly in the areas of technological up gradation and security threats; breaking employee resistances for newer technologies and creating skilled labour by proper training; innovations in the business to reach remote rural areas and working towards the financial inclusion and socially responsible business.

9.3. Research Contributions and Implications

The present research has several implications for successful core banking information systems. Findings of this study may be used by researchers as guiding pillar for future studies and by managers and strategists to structure their strategies so to optimally utilize their information systems and benefit their employees and businesses. The study findings will also be valuable for software designers and developers those who are involved with banking information system development. These implications are discussed below in detail:

Banks invest huge amount of money on IS and are one of the largest users of IS. However, most of the banks do not conduct regular and rigorous evaluations of their IT investments and returns. Major reason behind this is lack of proper scientific research in this area. Results of this study provide insights in this direction. Results of this study can be used for systematically evaluating success of banking information system with non-financial parameters. This study provides an empirical model and measurement instrument for evaluating IS success especially in the context of banking sector. This study presented a 7-factor, 39 item IS success instrument (information quality, system quality, service quality, ease to use, user satisfaction, individual impact, and organizational impact) with satisfactory psychometric properties for

measuring banking information systems success. This empirically validated instrument will be useful to researchers and practitioners for testing banking information system success especially with non-financial parameters.

This study extended DeLone and McLean's model (1992, 2003) of IS success in the context of banking sector. To the best of our knowledge, no other study adopted or extended this model in the context of Indian banking sector. Theoretical model of this study provides insights into the dynamics among multidimensional variables affecting IS success. The revised conceptual model after the statistical analysis reveals that IS success may be influenced by multidimensional factors such as organizational, managerial, system related, and individual characteristics of the end users. DeLone and McLean IS success model ignores contextual influences (Ifinedo, 2006) of IS success. DeLone and McLean (1992) acknowledge this limitation of their model. They recommended that for deeper understanding focus should not only be on system related factors but also on contextual variables that influence this success. The empirical finding of the present study supports the impact of various contextual and individual factors on IS success. Thus, this study adds to the literature especially on the role of contextual variables such as leadership style, organizational culture, top management support, managerial IT expertise, and individual characteristics variables on IS success. Specifically, present study found that transformational leadership style, some organizational cultural dimensions (such as active support and participation, structured work environment), managerial IT expertise, top management support and end users computer self efficacy are some of the contextual variables influencing IS success. Therefore, IS success does not depend only on the smooth technological functioning; rather it depends on the constant interaction of the technological, organizational and human factors. The theoretical framework of this study can enable

researchers and practitioners to identify various dimensions that exert influence on IS success at various levels and can investigate the causality between the success constructs and its determinants.

This study showed that the system related variables of DeLone and McLean IS success model and pathways affecting IS success outcome variables (individual impact, organizational impact and net benefits) holds true in the context of banking sector. Results indicated that the information system related dimensions such as information quality, system quality, service quality, and ease to use significantly influences user satisfaction and success outcome variables such as individual impact, organizational impact and net benefits. Moreover, very few past studies investigated the mediating effect of user satisfaction between system related quality dimensions and IS outcomes (individual impact, organizational impact and net benefits). The findings of this study bridged this gap and found that user satisfaction mediates the relationship between system related construct and IS success outcomes. Therefore, authorities should emphasize on enhancing IS quality dimensions by focusing on up-to-date hardware and software, integrated IS infrastructure, and user friendly systems. Moreover, the system should be well-designed, well-documented with concise and easy to understand outputs. Furthermore, it should be noted that banks should have a mechanism for continuous improvement of IS quality dimensions (Gorla, Somers & Wong, 2010).

Another contribution of this study which adds to the exiting literature of IS success, is evaluating IS success outcomes through individual impact and organizational impact individually as well as their joint effect as “Net benefits” in a single model. Literature survey reveals that to gain a holistic view of the IS success and its impact on individual and organization, it is imperative to measure individual

impact and organizational impact separately as well as their joint affect. Moreover, DeLone and McLean suggested that studies must include net benefits measure and such benefits must be measured on four levels: individual, group, organizational, and industry (DeLone & McLean, 2004). However, to the best of our knowledge, no prior research has identified the importance of studying individual impact and organizational impact singularly and jointly in a single model. Therefore, this study tried to bridge this gap.

Lack of research and literature on the post implementation success of information systems is one of the key drivers for this research. Systematic literature review revealed that most of the studies focused on the success of information systems at the implementation stage. However, only limited studies evaluated a post implementation information systems success. This study focused on the post implementation success of banking information systems. Therefore, this study contributes to the existing IS literature in this direction.

Results of the *qualitative study* (study 2) provided insights into some key future challenges of banking information systems. Reports of the participants revealed that banking information system has several future challenges which can be categorized into three broad categories: (a) *Technological challenges* comprises of four sub-themes: Fraud and security; Innovation and business restructuring; Data and system integration; and Customer relationship management (b) *Human factor related challenges* comprise of three sub-themes: Technical knowledge and expertise of employees; Training programs; and Resistance to change, and (c) *Business related challenges* comprised of two sub-themes: Reaching to rural areas; and Budgetary constraints. Results of this qualitative study is very significant as it reveals major barriers and future challenges of banking IS success in developing country settings.

Moreover, these findings will contribute to IS theory and practice. Firstly, findings of this study will provide insights into the understanding of banking IS and its performance. Secondly, results of this study re-validates some of the earlier research studies on IS challenges (Abukhzam & Lee, 2010; Chan & Lu, 2004; Davenport & Short, 2003; Khandelwal Committee Report, 2010; Lee & Turban, 2001; Lee & Kim, 2007; Tan & Teo, 2000). Third, this study articulates the experiences specific to Indian banks, throwing light on the key inhibitors and future challenges of banking information systems.

This qualitative study also contributes to IS practice. This study provides insight for the managers and authorities at the top management position. This would help them in formulating future strategies and policies associated with banking information systems. The findings also indicate that there is significant scope for human resource department in banks to frame policies related to training programs, implement adequate restructuring mechanism and change management programs and expanding business initiatives.

9.4. Limitations

Besides some major contributions of this study, there are few limitations of this study. However, some of these limitations might provide opportunities for further exploration. Few limitations related to this study are discussed below:

1. The sample of this study was limited to banking sector only. Only the bank employees using the IS were included in the study. Therefore, limited generalization can be drawn from this study for non-financial organizations. However, theoretical model of this study was based on strong theoretical and empirical literature.

Therefore, it is expected that results of this study will hold true in evaluation of different types of information systems.

2. The present study collected the data from public and private sector banks only. Present study did not include data from foreign banks. Moreover, the sample size of private banks was relatively small ($N = 91$). The reason behind this is that foreign banks and many private banks did not give permission for data collection citing as it as against their corporate policy to reveal the data of their branches.

3. Due to the constraints of time and resource, data were collected from banks located in few major cities of India only. Further, the sample size of the present study is limited to 302 for quantitative study and 50 for qualitative study.

4. The present study used cross-sectional survey method and used self reports for collecting data. Therefore, it is possible that some responses might be affected by the social desirability effect. Furthermore, other limitations of cross-sectional survey method may also be applicable for this study.

9.5. Directions for Future Research

This study is among few major attempts carried out to study the impact of various contextual, system related and individual characteristics variables on banking IS success. This study also provides new directions for future research associated with IS success and particularly banking information systems in India. Some of the possible future research directions are discussed below:

1. The DeLone and McLean model is extended by adding many contextual variables such as leadership, organizational culture, top management support, managerial IT experience, and individual characteristics such as computer self efficacy, job level and length of job. Future research may extend and analyze the

model with many other important variables. IS Literature suggests that organizational variables like organization size, organization structure, organizational maturity, business strategy do exert their influence on IS success. Influence of these variables can be studied in future research.

2. Future studies may replicate the study by including data from banking sector of other developing countries to test its validity across developing countries. Future studies with larger sample size will help in greater generalization of the findings.

3. The present study focused on private and public sector banks only. A comparative study of IS success factors among public, private and foreign banks can be investigated in a future study.

4. In this study, user satisfaction was identified as a mediator between the relationship of contextual, technical and individual variables with IS success outcomes. Other variables apart from user satisfaction need to be identified in future research that may act as a mediator or mechanism between the antecedent and outcome variables.

5. Future research may test the validity of the conceptual model of this study in the context of the other financial and non-financial organizations apart from banking sector.

6. Future research may examine the impact of inferable organizational culture (beliefs, norms and values) on IS success factors over a period of time. This would help in giving an idea about the influence prevailing beliefs and norms on the success of the information system.

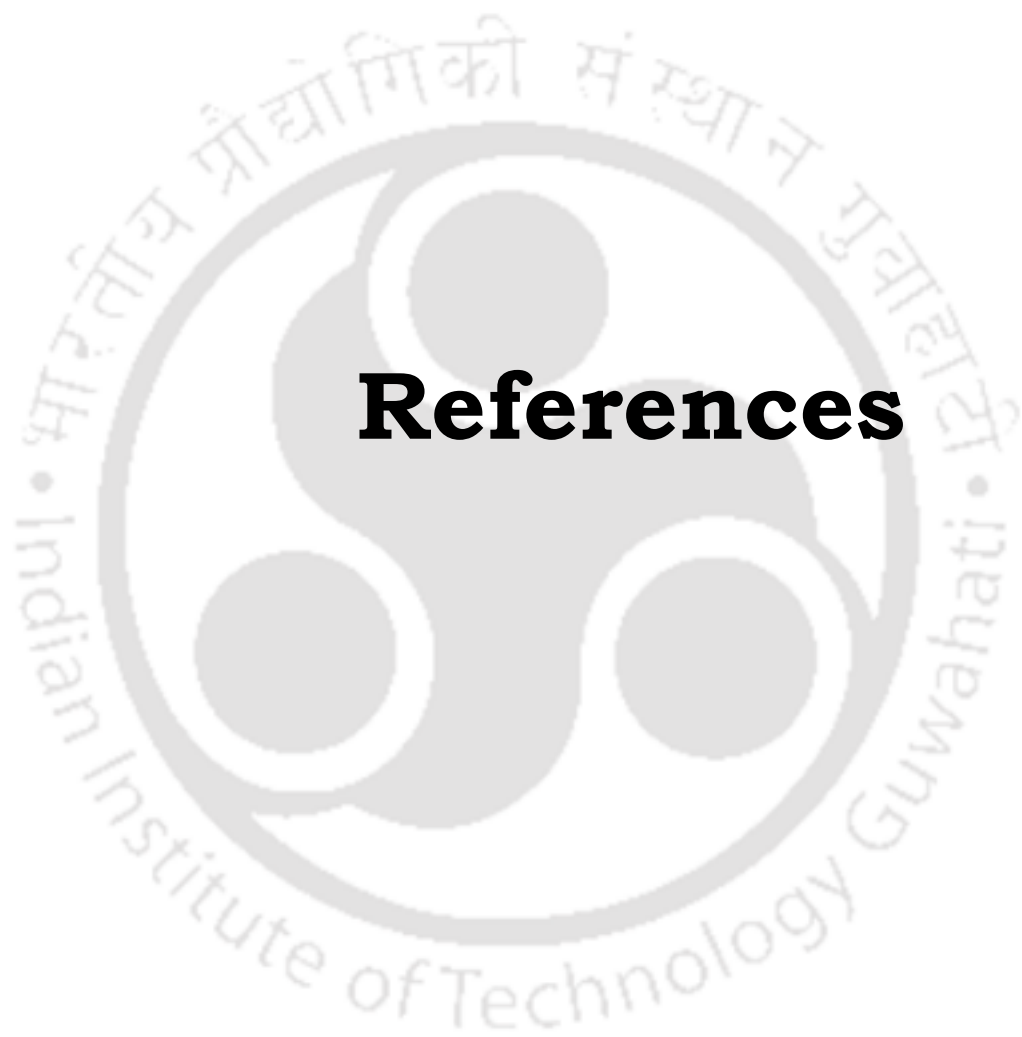
7. The study has been presented from the perspective of the individual end-users in banks. The future study may be conducted to evaluate the IS success from the customers perspective.

8. The present study conceptualized *Net Benefits* as a combine effect of individual and organizational impacts. Future researchers may operationally define net benefits with other parameters to cover workgroup impacts and societal impacts to get a deeper insight into IS success.

9. The present study has covered only the end-users of IS in banks. Future study may collect data from other respondents such as IS personnel's to examine the IS success.

10. The literature suggests that it takes a relatively long duration for information technology to produce tangible results. So, a longitudinal study should be conducted in order to evaluate the impact of various factors on IS success.





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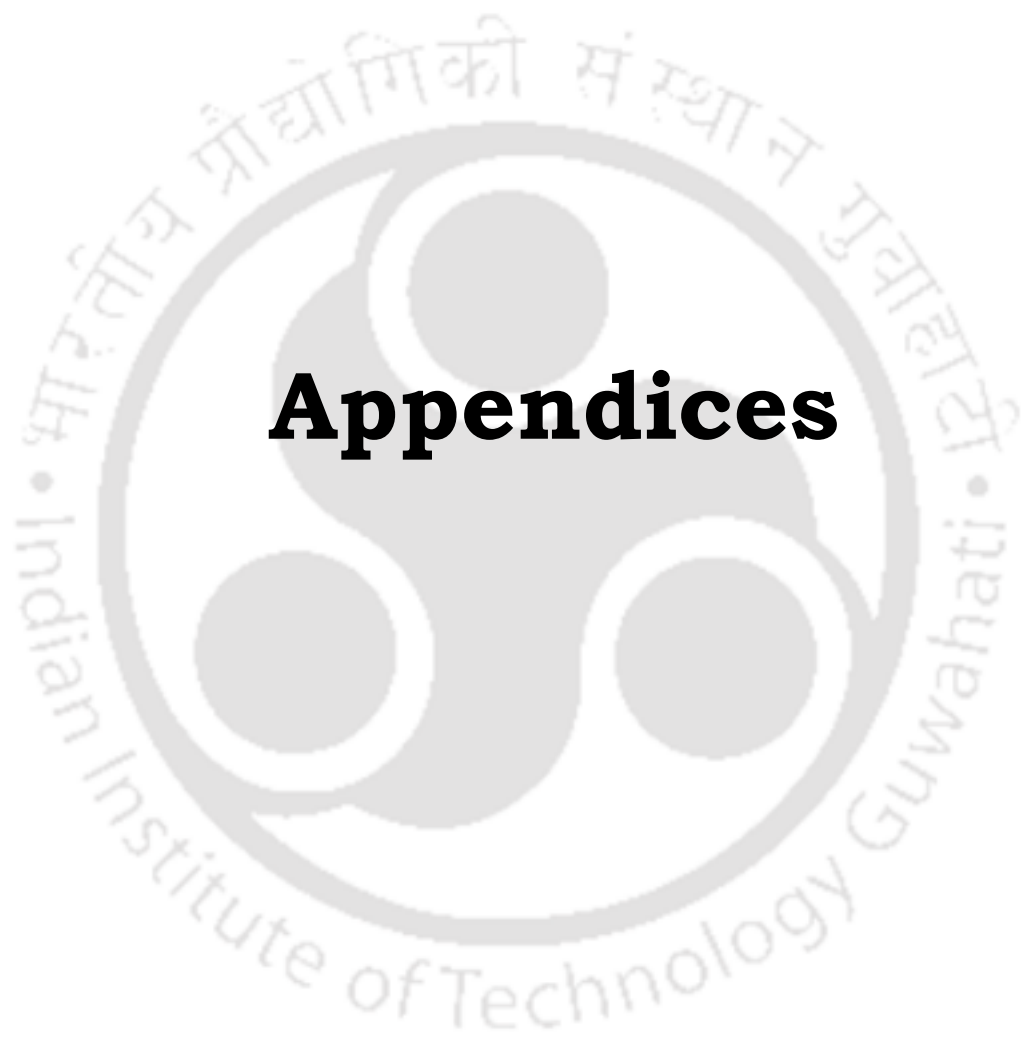
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Appendices



Appendix A (Questionnaires)

Indian Institute of Technology Guwahati
Department of Humanities & Social Sciences
Guwahati - 781 039

I am a Ph.D. student at the Department of Humanities & Social Sciences, IIT Guwahati, under the guidance of Dr. D. Hussain. This questionnaire is being administered as part of my Ph.D. study. The purpose of this survey is to **evaluate the effectiveness of the Information Systems (IS) or Information Technology (IT) deployed by your Bank.**

General Instructions for the Respondents

- Please answer the questionnaire **anonymously**. The information supplied by you will be confidential and will not be divulged to anyone except in an aggregated form.
- No question of personal nature is asked.
- Please complete the questionnaire *in one go for best results*. It will approximately take 15-20 minutes of your valuable time
- Data will be analyzed at an aggregate level and would be used for bona-fide research and academic purposes only.
- Please try as much as possible *to reflect the reality in your responses*.
- There is no right or wrong answer, your answer is the best answer.

As you would realize that without the help of the organization and its employees, it would not be possible for me to carry out this research work. Therefore, I would request you to kindly extend your cooperation and participate in this study.

Thank you very much for sparing your valuable time.

Sarika Kaushal
 Research Scholar,

Demographic Information

1. Age :(years)
2. Gender : *Male/ Female*
3. Designation :
4. Qualifications :
5. Tenure in the present job :(years)
6. Total work experience : (years)
7. Present monthly salary. Please indicate your choice by putting a tick mark [✓]

[] Below Rs. 20,000	[] Rs. 20,001-25,000
[] Rs. 25,001-30,000	[] Rs. 30,001-35,000
[] Rs. 35,001-40,000	[] Rs. 40,001 and above

Section I

- Name all IT systems deployed in your Bank (like FINACLE, Core Banking, ERP, CRM, HRIS, etc):
- When your branch become CBS: _____ (years)
- Please answer this section keeping in mind **only ONE Information system**. Please mention its name:
- Your total work experience for using this system: _____ (years)
- Your answers should relate to **your own experiences and thinking** regarding this IT system.
- **Encircle** your appropriate responses (for example 2)

IMPORTANT: Please note that where ever the term *IT or System* is used, it is intended to mean single Information System under consideration which has contributed most in your organizations growth

(a) Following descriptive statements tries to assess how useful you perceive the information system under consideration to be and how it has influenced your performance. This system...

	Strongly Disagree	Disagree	undecided	Agree	Strongly Agree
1. ...improves my job performance.	1	2	3	4	5
2. ...has enhanced my effectiveness in the	1	2	3	4	5
3. ...has increased my productivity.	1	2	3	4	5
4. ...makes it easier to do my job.	1	2	3	4	5
5. ...enables me to accomplish task	1	2	3	4	5
6. Overall, I find system useful to my	1	2	3	4	5

(b) Following statements tries to focus on the quality of the output in form of reports and on-screen generated by system under consideration.

7. The output presented is in a useful format.	1	2	3	4	5
8. I am satisfied with the accuracy of the system.	1	2	3	4	5
9. The information is clear.	1	2	3	4	5
10. The information from system is accurate.	1	2	3	4	5
11. The system provides sufficient information.	1	2	3	4	5
12. The system provides up-to-date information.	1	2	3	4	5
13. I get the needed information from the system in time.	1	2	3	4	5
14. The system provides the precise information I need.	1	2	3	4	5

	Strongly Disagree	Disagree	undecided	Agree	Strongly Agree
15. The system provide reports that seem to be just about exactly what I need.	1	2	3	4	5
16. The information provided by the system content meet my needs.	1	2	3	4	5
(c) Following statements are related to system's quality and are designed to capture your views about how system under consideration performs. The system					
17. ...is easy to use.	1	2	3	4	5
18. ...is easy to learn.	1	2	3	4	5
19. ...meets organizational requirements.	1	2	3	4	5
20. ...includes necessary features and functions.	1	2	3	4	5
21. ... responds quickly enough.	1	2	3	4	5
22. ...requires only the minimum number of fields and screens to achieve a task.	1	2	3	4	5
23. ...can be easily modified, corrected or improved.	1	2	3	4	5
24. The system is user friendly.	1	2	3	4	5
(d) Following statements are related to service quality of the system under consideration.					
25. The IT system provides a proper level of on-line assistance and explanation.	1	2	3	4	5
26. The IT system developers interact extensively with users during the development of the system.	1	2	3	4	5
27. The IT department staff is readily available for consultation.	1	2	3	4	5
28. The IT department responds in a cooperative manner to your suggestions for future improvement of the system.	1	2	3	4	5
29. The IT department provides satisfactory support to users.	1	2	3	4	5
(e) Following statements are related to judge the impact of the system at an organizational level.					
30. System has resulted in an increased capacity to manage a growing volume of transactions, customers.	1	2	3	4	5
31. System implementation has resulted in better positioning of the bank.	1	2	3	4	5
32.the impact of system on the organization has been positive.	1	2	3	4	5
33. Overall, the system is integrated to all delivery channels of the bank.	1	2	3	4	5
34. It has resulted in improved business processes.	1	2	3	4	5
(f) Following statements are related to assess the overall satisfaction you have with your system.					
35. Overall, the system is adequate to meet	1	2	3	4	5

the information processing needs of my job.					
36. Overall, the system enables bank to achieve greater operational efficiency.	1	2	3	4	5
37. Overall, the system is effective.	1	2	3	4	5
38. Overall, this system is enjoyable to use.	1	2	3	4	5
39. Overall, system is satisfactory.	1	2	3	4	5
(g) Following statements are designed to assess the top management support IT development receives.					
40. Management has allocated adequate financials and other resources for development and operation of IT.	1	2	3	4	5
41. Management is highly interested in using IT.	1	2	3	4	5
42. Management is aware of the benefits of the IT.	1	2	3	4	5
43. Management has a vision to project our Bank as a leader in the optimum use of IT capabilities.	1	2	3	4	5
(h) Following statements are designed to assess your confidence regarding the use of the system.					
41. I believe that I really have the ability to handle this IT system for doing my work.	1	2	3	4	5
42. I believe that I am an expert for using the IT system at my work.	1	2	3	4	5
43. I believe that I have the high system expertise to complete my work on time.	1	2	3	4	5
44. I am very confident of my skills and abilities to handle the IT systems.	1	2	3	4	5

Section II

The following statements are **designed to measure your feelings regarding certain aspects of your organisation**. Kindly examine each statement carefully and **encircle** the best possible choice (for example 2).

	In my organization...	Very Low	Low	Moderate	High	Very High
1	opportunity to participate in the determination of procedure is:	1	2	3	4	5
2	people's concern with others' problems is:	1	2	3	4	5
3	the spirit of help and cooperation is:	1	2	3	4	5
4	emphasis on rules and regulation is:	1	2	3	4	5
5	tendency of people to be cool and aloof towards each other is:	1	2	3	4	5

	In my organization...	Very Low	Low	Moderate	High	Very High
6	inter-departmental difference is:	1	2	3	4	5
7	opportunity for independent thought and action in my job is:	1	2	3	4	5
8	discussion of our personal problems with our superior is:	1	2	3	4	5
9	the strict supervision of employees is:	1	2	3	4	5
10	encouragement to discuss about company affairs is:	1	2	3	4	5
11	The opportunity for taking initiative in my organization is:	1	2	3	4	5
12	the assistance from my superior to solve the problems is:	1	2	3	4	5
13	the encouragement from my superior to be innovative is:	1	2	3	4	5
14	on outstanding performance chances of participation in making decisions is:	1	2	3	4	5
15	the tendency to hide feelings from each other is:	1	2	3	4	5
16	the friction among superiors and subordinates is:	1	2	3	4	5
17	the encouragement from superiors to solve the problems is:	1	2	3	4	5
18	the responsibility of what one does is:	1	2	3	4	5
19	on outstanding job performance the chances of receiving special rewards and recognition is:	1	2	3	4	5
20	the chances of taking risk by the organization are:	1	2	3	4	5
21	the guidelines and rigid rules for the conduct of work are:	1	2	3	4	5
22	changing the area of responsibility of employees is:	1	2	3	4	5
23	employees' hesitation to take responsibility is:	1	2	3	4	5
24	on outstanding job performance chances of higher pay is:	1	2	3	4	5
25	the encouragement from my superior to take risk is:	1	2	3	4	5
26	I get the opportunity to participate in setting goals is:	1	2	3	4	5
27	the consideration of my superior to my feelings is:	1	2	3	4	5
28	freedom to challenge the traditional ways of doing things is:	1	2	3	4	5
29	chances of getting support from superiors, when we do wrong:	1	2	3	4	5
30	on outstanding performance chances of receiving a promotion:	1	2	3	4	5
31	the delegation of responsibility to junior managers to make decision within their jurisdiction is:	1	2	3	4	5

Section III

Background Information of Your Immediate Boss

- This questionnaire is designed to judge how important the following *Leadership Behaviour* of YOUR IMMEDIATE BOSS is.
- PLEASE answer the following statements keeping in mind the behavior of YOUR IMMEDIATE BOSS.
- Your boss age : _____ years
- Your boss Gender : Male/Female
- Please answer *all items by encircling the appropriate one* for eg (2)
- **IRRELAVENT** or if you are unsure or do not know the answer, **LEAVE IT BLANK**

	The person I am rating ...	Not at all	Once in a while	Sometime	Fairly often	Frequently if not always
1.	provides me with assistance in exchange for my efforts.	1	2	3	4	5
2.	re-examines critical assumptions to question whether they are appropriate.	1	2	3	4	5
3.	fails to intervene until problems become serious.	1	2	3	4	5
4.	focuses attention on irregularities, mistakes, exceptions, and deviations from standards.	1	2	3	4	5
5.	talks to us about his/her most important values and beliefs.	1	2	3	4	5

MLQ is a copyright material so, researcher is permitted only to show sample items.

Following statements are related to judge the IT related expertise of your immediate boss

	Strongly Disagree	Disagree	undecided	Agree	Strongly Agree
1. He is well trained in the system implemented in our Bank.	1	2	3	4	5
2. He is aware of the advancement in the latest IT systems.	1	2	3	4	5
3. He has keen interest to learn the latest technology.	1	2	3	4	5
4. His understanding of advanced technology in IT is very good as compared to other employees.	1	2	3	4	5

Appendix B

Description of the Interview Schedule (N = 50)

Questions
1. Personal information: (a) Educational background, (b) Job level, (c) Tenure, (d) Job responsibility and nature of work.
2. Details about the information systems implemented in your bank.
3. IT revolution has created many challenges and opportunities for the banking sector. How do you look at these challenges and opportunities?
4. I would like to know more about various challenges and barriers you have encountered or witnessed after the implementation of IS in your branch.
5. Are you looking forward to any technological improvement associated with banking information systems?
6. Please comment on the security issues associated with online transactions.
7. Have you encountered any employee related resistances associated with banking information systems? How such resistance does influences BIS success?
8. Any other human factors related issues that may influence BIS success?
Please share your experience and thoughts on:
• How much importance bank give on training • Employees and managers attitude • Technical knowledge and skills of the employees • Managerial expertise

-
9. According to you, what are the future avenues of banking business associated with IS applications? Do you think that the constraints in the budget may hinder future expansion of IS applications in banks? Comment.
-



Appendix C

Profiles of the Organizations (N = 14)

1. Profile of Public Sector Banks (N = 8)

Bank A

This bank was nationalized in 1969 along with 13 other banks in India. It was one of the six public sector banks which had been chosen by the World Bank in the year 1995 for granting a loan of Rs. 72 crores under Financial Sector Development project. It is one of the few banks which have been given a loan by the World Bank for technological advancement and training. It is one of the most prestigious banks of India having a good market share. The bank has maintained a strong technological infrastructure with state-of-the-art IT innovations and solutions implemented at its branches and back-end. 100% branches of the bank have been fully computerized, and the bank has established its own network to ensure seamless connectivity and smooth workflow all the way through its banking process. The bank is serving country with employee base of over 10000 employees. It has revenue of over US\$ 750 million in 2012.

Bank B

It is a public sector bank with a century old history of its origin. In 1969, the Government of India nationalized this bank with 13 other Indian banks. The bank has gone through the various phases of its growth trajectory over hundred years of its

existence. After nationalization, the banks attained the status of a national level player in terms of geographical reach and clientele segments. Over the years, the bank has come up with several subsidiaries/sponsored institutions/joint ventures in India and abroad. In 2013, the bank has further expanded its domestic presence with more than 44000 employees serving in 4200 branches spread across all geographical segments. Keeping customer convenience at the forefront, the bank provides a wide array of alternative delivery channels. All the branches of this bank are live on core banking application. Bank has a strong pan India presence catering to all segments of an ever growing clientele base of approximately 5.15 crores. The bank has several branches in various countries. It is one of the largest public sector banks with approximately 4.7% share in the country's total deposits. The bank is planning to build an Enterprise Wide Data Warehouse with Business Intelligence Solution covering all the business areas of the bank to provide better access to information for decision support system, besides providing data for statutory reporting and MIS for the bank.

Bank C

This is more than 110 years old public sector bank. With more than 6000 branches, this bank is serving more than 80 million esteemed customers. The bank offers wide range of products and services and enjoys the trust of its customers and good brand image. To compete in this tech-savvy world, this bank has created niche for itself in the banking sector with the help of various technology enabled products and services which are providing convenient banking to all the customers including young techno savvy generation. Being one of the largest nationalized banks, it has a vast network of branches and ATMs. The bank is offering Internet banking to its

customers, which includes online bills payment of utility services; on line Railways/air ticket booking, e payment towards services like Excise Duty and service tax, and so on. It is also providing on line trading activity to its customers and demat accounts are also getting available to the customers. All the branches of the Bank are 100% on core banking platform, and are Real Time Gross Settlement (RTGS)/National Electronic Fund Transfer (NEFT) enabled. The bank has footprints in 10 countries. In 2012, the bank generated the total revenue of approximately more than US\$ 6 billion.

Bank D

This bank came into existence in early 1900. In 1969, the Government of India nationalized this bank with 13 other Indian banks. This bank is among the top five largest banks in India with total of approximately 39000 employees serving in 4500 branches including 1600 branches in rural India, and 800 branches in urban area. Apart from making presence in India, this public sector bank has strong hold in 24 countries. The bank offers a range of financial products and services including personal banking, corporate banking, international business, treasury banking and rural banking. It offers saving account, current account, card products, loan products, online banking, mobile banking, and ATM services. It implements core banking solutions in its domestic branches and provides for interbank remittances through RTGS and NEFT. In 2012, it has generated approximate revenue of around US\$ 5 billion.

Bank E

It is a more than a century old nationalized public sector bank. The bank has made a rapid growth over the years and blossomed into a mighty institution with a strong national presence and sizable international operations. It has around 39000 employee base, and 4300 branches, including more than 50 branches outside India. In business volume, the bank occupies a premier position among the nationalized banks. The bank offers a range of financial products and services including personal banking, corporate banking, international business, treasury banking and rural banking. It offers saving account, current account, card products, loan products, online banking, mobile banking, and ATM services. It implements core banking solutions in its domestic branches and provides for interbank remittances through RTGS and NEFT. In 2012, it has revenue of around US\$ 3 billion.

Bank F

This bank came into existence in early 1900. It is among top five largest and oldest Indian banks with a network of over 14000 branches of which more than 65% branches in rural and semi-urban areas. It is multinational bank based in India. It has hundreds of foreign offices covering more than 34 countries. The bank facilitates easy access to money through a wide network of thousands of ATMs. The bank has several regional hubs and zonal offices that are located at important cities throughout India. The bank offers full range of products and services to all its branches and customers, spreading economic growth to rural areas and providing financial inclusion. Thus, the bank serves the heterogeneous financial needs for the planned

economic development. In 2012, it had assets approximately around US\$300 billion and revenue of around US\$ 30 billion.

Bank G

This bank holds a very prominent place among the public sector banks on account of its network of over 4300 branches along with satellite branches at various centers throughout the length and breadth of the country. It has employee strength of around 34000 employees. During the past 100 years of history, the bank has weathered many storms and faced many challenges. The bank has successfully transformed every threat into business opportunities and excelled over its peers. A number of innovative and unique banking activities have been launched by the bank. The bank offers a host of Regular Banking Services to its customers, including personal banking services comprising of deposit, loan and investment services, priority and small and medium enterprises services, international banking services, corporate banking services and a host of other value added services. The bank has representative offices in 5 countries. It has generated revenue of over US\$ 2.5 billion, in 2012.

Bank H

This bank was established in early 1900. It is one of the 13 major banks which were nationalized in 1969. After nationalization, the bank expanded its branch network in a big way and actively participated in the developmental activities, particularly in the rural and semi-urban areas in conformity with the objectives of

nationalization. The bank has more than 1800 branches and offices and is having a total business of more than Rs 2 Lac crores. Presently, the bank is having a three-tier organizational set-up consisting of the Head office, regional offices and the branches. The bank has three full fledged overseas branches. The bank is 100% on core banking platform enabled with Electronic Fund Transfer System. The bank has the employee strength of more than 15000 employees.

2. Profile of Private Sector Banks (N = 6)

Bank I

This bank began its operations in 1994 after the Government of India allowed new private banks to be established. It is an Indian multinational bank and financial services company. It is among top 5 banks in India in terms of assets and market capitalization. This private sector bank offers a wide range of banking products and financial services to corporate and retail customers through a variety of delivery channels and through its specialized subsidiaries in the areas of investment banking, and non-banking services. The bank with its state-of-art technology for making banking simple and effortless is a trend setter in the use of banking technology in India. The bank has launched around 20 virtual banks across few major locations in India, which will serve as one-stop shops for all banking transactions. The bank has a multi-channel distribution strategy to provide 24x7 access to banking services. The bank has employee base of approximately 80000 employees, which serves the network of around 3000 branches. The bank has its presence in around 20 countries. In 2012, the bank has generated revenue of around US\$ 10 billion.

Bank J

This bank was one of the banks established by Reserve bank of India as part of the liberalization of the Indian banking industry. It is one of the new generation private sector banks. The bank has around 3000 branches in 25 states of India. All branches of the bank are linked on an online real-time basis. Since inception, this bank has a highly automated environment be it in terms of information technology or communication systems. All the branches of the bank have online connectivity with the other ensuring speedy funds transfer for the clients. At the same time, the bank's branch network and ATMs allow multi-branch access to retail clients. The bank makes use of its up-to-date technology along with market position and expertise to create a competitive advantage and build market share. In 2013, this bank's assets account is around Rs. 5 trillion with employee base of around 60000 employees, and a customer base of around 25 million customers. The bank has generated revenue of approximately US\$ 5.5 billion.

Bank K

This bank is a major Indian commercial bank in the private sector. It is the one of the largest banks in India in terms of capital base. It has around 1100 branches spread across 24 states in India. The bank has employee base of 8000 employees. In 2000, this bank implemented core banking solutions and offered Any Where Banking to its customers. The bank launched its international debit cards in the year 2004. The same year, it also provided Real Time Gross Settlement (RTGS) facility in all the branches.

Bank L

This bank began its operations in 1994 after the Government of India allowed new private banks to be established. Thus, this bank is among one of the major private sector banks under the category of new generation banks. It offers the entire spectrum of financial services to customer segments covering large corporate houses, agriculture and retail businesses. The bank has an extensive network of around 2000 branches and employee base of over 40000 employees. It is among top few public sector banks, which have largest number of ATMs. The bank has its presence in almost 10 countries. Even the bank has its presence in rural India with around 3 million accounts in over 5000 villages as part of its financial inclusion initiatives. It has total revenue of US\$ 3.5 billion in 2012.

Bank M

The bank came into operation after 1991 with the introduction of economic reforms and financial sector reforms and thus falls under the category of new private-sector banks. This bank is a major competitor in the business banking especially amongst smaller- and medium-sized clients. Business banking is centered primarily around cash handling, payment, direct banking, liabilities and investment, and trade services. The bank provides its customers with world class facilities. It has employee base of around 8000 employees serving a branch network of around 500 branches in around 400 cities. The biggest feature that differentiates this bank from other banks is its technological edge, corporate governance, knowledge bankers in its management team. This proves beneficial in profiting the valued customers of the bank. The bank

is well equipped with the modern day amenities like net banking, phone banking and mobile banking. The bank deals in corporate investment services. This bank has received numerous recognitions for its world class IT infrastructure and payment solutions. This bank has total assets of around US\$ 15 billion.

Bank N

This bank has competed in the banking/financial services and insurance markets for over 80 years. It got the license from Reserve bank of India to start nation-wide operation in 2002. This bank falls under the category of old private sector banks. This is a privately owned Indian multinational bank with retail, wholesale, and private banking platforms. It is among top ten largest private sector bank in India with assets around US\$10 billion and has a network of over 500 branches and 10000 employees which serving over two million customers. This bank markets an entire range of financial products and services organized under three strategic lines of business: retail, private and wholesale banking. The banks retail operation offers deposits, retail wealth management services, consumer loans, agricultural/rural banking and retail life insurance products. The banks' wholesale banking business provides corporate clients in India a range of commercial, transactional and electronic banking products. In 2012, it had revenue of around US\$ 700 billion.



Appendix D

Correlations between Main Study Variables (N=302)

Variables	Leadership style		Organizational culture				TopM	Man Exp
	Transfo	Transac	Con Tol	Struct	Risk Tol	Supp & part		
Transfo								
Transac	.519**							
ConTol	.108	-.150**						
Struct	.141*	.089	.059					
RiskTol	.479*	.383**	.079	.218**				
Supp & Part	.500**	.358**	.235**	.305**	.774**			
TopM	.234**	.136*	.130*	.418**	.260**	.377**		
ManExp	.595**	.385**	.137*	.257**	.362**	.493**	.307**	
InfoQual	.217**	.165**	.116*	.348**	.311**	.395**	.471**	.360**
Ease to use	.217**	.076	.127*	.195**	.314**	.375**	.408**	.232**
SysQual	.178**	.235**	.190**	.213**	.421**	.481**	.453**	.264**
ServQual	.290**	.203**	.166**	.302**	.381**	.478**	.428**	.342**
SysEff	.090	.085	-.059	.212**	.241**	.201**	.239**	.143*
UserSat	.208**	.125*	.176**	.314**	.317**	.385**	.622**	.234**
IndImp	.257**	.145*	.227**	.252**	.212**	.338**	.452**	.311**
OrgImp	.243**	.161**	.185**	.380**	.269**	.357**	.600**	.259**
NetBen	.285**	.172**	.238**	.345**	.267**	.392**	.581**	.328**
Joblevel								
Len_job								

Continued.....

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Variables	System related				Sys Eff	User Sat	Ind Imp	Org Imp	Net Ben
	Info Qual	Ease to use	Sys Qual	Serv Qual					
Transfo									
Transac									
ConTol									
Struct									
RiskTol									
Supp & Part									
TopM									
ManExp									
InfoQual									
Ease to use	.494**								
SysQual	.563**	.524**							
ServQual	.426**	.400**	.499**						
SysEff	.245**	.340**	.184**	.166**					
UserSat	.571**	.578**	.603**	.467**	.243**				
IndImp	.555**	.525**	.470**	.273**	.194**	.610**			
OrgImp	.524**	.443**	.492**	.557**	.209**	.759**	.540**		
NetBen	.615**	.557**	.543**	.441**	.227**	.761**	.921**	.826**	
Joblevel						.098	.050	.063	.063
Len_job						.058	.143*	.096	.140*

* = $p < .05$ ** = $p < .01$, Transformational leadership (Tranfo), Transactional leadership (Transac), Conflict tolerance (ConTol), structure (struct), Risk Tolerance (RiskTol), Support & participation (Supp & part), Top management support (TopM), Managerial expertise (ManExp), Information Quality (InfoQual), System quality (SysQual), Service quality (ServQual), System self efficacy (SysEff), User satisfaction (usersat), Individual impact (IndImp), Organizational impact (OrgImp), Net Benefits (NetBen)

About the Author

The author joined the Department of Humanities and Social Sciences, Indian Institute of Technology Guwahati, Assam, India, in August, 2007 as a Ph.D. scholar. Before joining IIT Guwahati, the author completed MBA in Marketing Management from University of Lucknow, Uttar Pradesh, India. The author has a good academic record with a CPI of 8.75 during Ph.D. coursework. The author received the Study and Travel Grants from Indian Council of Social Sciences Research (ICSSR) in the year 2011 for visiting various libraries in India pertaining to the research work and attending an International conference in Malaysia, respectively. She is a Fellow, of the prestigious Darshan Smiriti and Gandhi Samiti, Ministry of Culture, Government of India. She has a working experience of around three years in various organizations. The author published two research papers in peer reviewed international journals. She has also presented papers in national and international conferences and attended several workshops during Ph.D. research work.

Peer Reviewed Publications

- **Kaushal, S.** (2011). Effect of leadership and organizational culture on IT Effectiveness. *IEEE Xplore Digital Library*, 1-5.
- **Kaushal, S.** (2011). Determinants of IT effectiveness in Indian organizations. *Review of Knowledge Management*, 1(1), 73-83.

Paper Presented in International and National Conferences

- **Kaushal, S.** (2011). Effect of leadership and organizational culture on IT effectiveness. In *2nd International Conference on Research and Innovation in Information Systems*, November 23-24, Kuala Lumpur, Malaysia.

- **Kaushal, S.** (2011). Determinants of IT effectiveness in Indian organizations. In *1st National Conference on Knowledge Management*, May 29, 2011, New Delhi, India.

