ERP Implementation Challenges & Remedial Measures

(A Case Study at Pakistan Telecommunication Company Limited)

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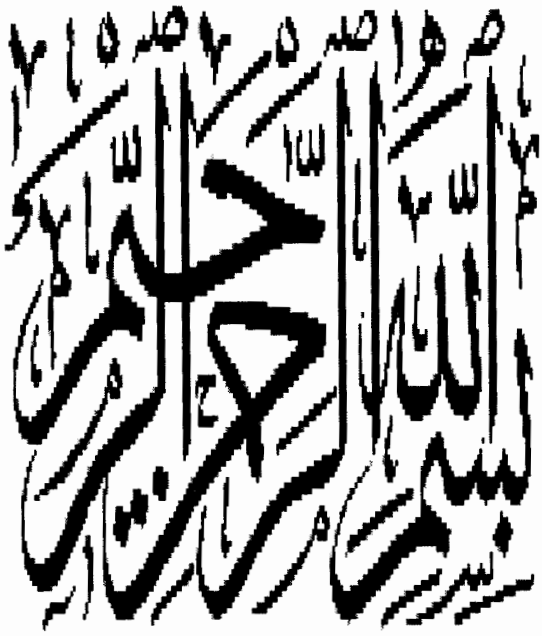
1- Production management
2- Management information systems.
3- Strategic planning



IN THE NAME OF ALLAH THE MOST MERCIFUL & THE MOST BENEFICENT

ERP Implementation Challenges & Remedial Measures

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A thesis submitted in partial fulfillment of the requirements for the Degree of Master of Philosophy/Science in Technology Management
at the Faculty of Management Sciences,
International Islamic University,
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(January, 2010)

FORWARDING SHEET

The thesis entitled "ERP Implementation Challenges & Remedial Measures" submitted by Abdul Zahid Khan in partial fulfillment of M.S degree in Management Sciences with specialization in Technology Management, has been completed under my guidance and supervision. I am satisfied with the quality of student's research work and allow him to submit this thesis for further process as per IIU rules & regulations.

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I hereby declare that this thesis, neither as a whole nor as a part thereof, has been copied out from any source. It is further declared that I have prepared this thesis entirely on the basis of my personal effort made under the sincere guidenance of my supervisor.

No portion of the work, presented in this thesis, has been submitted in support of any application for any degree or qualification of this or any other university or institute of learning.

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Dedicated to my Parents, Wife and Sweet Daughters

Ayesha & Manahil

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ACKNOWLEDGEMENTS

All praise and glory to Almighty ALLAH, who blessed me health, patience, knowledge and also enabled me to complete this work. I offer my humble gratitude from the core of my heart to the Holy Prophet, MUHAMMAD (Peace Be Upon Him) who is forever a source of knowledge and inspiration for the whole mankind.

I would like to express my deep and sincere gratitude to my supervisor, Dr. Rahat H. Bokhari, Director Computer Center, Quaid-i-Azam University Islamabad. He provided me sincere guidance and support throughout this research. I feel myself lucky enough that I worked under the supervision of such a genuine scholar. He is really committed and dedicated with his profession. He helped me a lot during the complex phases of this project.

I wish to express my warm and sincere thanks to Professor Amanullah Khan, who introduced me in the teaching profession and motivated a lot in the research work. I cannot forget his support and encouragement throughout my life.

I am grateful to Mr. Zafar Malik for his support during the proof reading of this project. He is always helpful for the students and takes keen interest in solving their problems. I appreciate the efforts of the Department of Higher Studies and Research in FMS for facilitating me at its best.

I extend my appreciation to all teachers for their kind contribution in my knowledge and expertise.

I would like to show my sincere appreciation to the management of FMS and International Islamic University; they helped and provided the necessary resources for this research project.

Special thanks to the top management of PTCL for providing the opportunity and necessary support during this research project. The support and cooperation of Mr. Naimat Ullah Toor (CFO), Mr. Niaz Malik (EVP), Mr. Basit (GM), Mr. Ahsan Mumtaz (Manager), and team leads is highly appreciated.

I am thankful to my family members, colleagues for their moral support and encouragement during the project. I also wish to thank the efforts of Mr. Zaheer Ansari in compilation of this thesis.

Abdul Zahid Khan

Abstract

The importance of Enterprise Resource Planning (ERP) systems has been exceedingly realized in the organizations of developed as well as in the developing countries of the world. The implementation of ERP system is a complex process and considerable efforts are required for its successful implementation. The cost of ERP implementation is high but the success rate is not encouraging. Efforts have been put in to explore issues/challenges affecting ERP implementation. However, the studies are mostly conducted in developed countries and little research is available with reference to developing countries like Pakistan. Recently, Pakistan Telecommunication Corporation (PTCL) invested more than two billion rupees to implement ERP system. The objective of this research is to explore the issues and challenges faced by the management during ERP implementation and document the respective remedial measures for its successful implementation. Formal and informal interviews of team leads and executives were conducted for the proceedings of this study.

The findings of our research explain that management support may lead to successful implementation of ERP in the organization. Lack of consideration of business process reengineering may impede the benefits of ERP adoption and possibly be problematic in future. Our research findings reflect that the strategy of the top management regarding extensive training of users, team empowerment, and arrangement of recreation activities, formal and informal meetings contributed a lot to overcome the issues of change management, communication gap between vendors and users and to extend the relationship among the stakeholders. The vendor's lack of relevant experience and understanding about organizational processes in telecom sector appeared as an impediment towards BPR and customization of ERP solution. Our research stresses that skills and relevant experience of vendor should be encouraged. Considerable efforts should be put in for managing change in order to realize the benefits of ERP implementation. The top management support was found helpful in reducing the ERP implementation issues. This research will be helpful for the management of public sector organizations in successful implementation of ERP in Pakistani environment.

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LIST OF ABBREVIATIONS

ERP : ENTERPRISE RESOURCE PLANNING

BPR : BUSINESS PROCESS REENGINEERING

FICO : FINANCIAL AND CONTROLLING

M& L: MATERIALS & LOGISTICS

HCM : HUMAN CAPITAL MANAGEMENT

NLM : NETWORK LIFE CYCLE MANAGEMENT

IS : INFORMATION SYSTEM

SAP : SYSTEM APPLICATION PRODUCTS

CRM : CLIENT RELATIONSHIP MANAGEMENT

VSS : VOLUNTEER SEPARATION SCHEME

PS : PROJECT SYSTEMS

PM : PLANT MAINTENANCE

MM : MATERIAL MANAGEMENT

ICT : INFORMATION & COMMUNICATION TECHNOLOGIES

IT : INFORMATION TECHNOLOGY

PTCL: PAKISTAN TELECOMMUNICATION COMPANY LIMITED

Chapter 1
Introduction

Chapter 1

Introduction

1.1 Introduction

The importance of Enterprise Resource Planning (ERP) is being exceedingly realized in the organizations. The objective of implementation of ERP in an organization is to reduce time and cost that consequently enhances the efficiency and effectiveness of the organization (Bradely, 2008). The ERP solutions are almost expensive and the implementation process may take one to two years approximately, however, it depends upon the modules to be implemented in the organization. It has been forecasted that the ERP market may reach US$ 1 trillion by 2010 (Hunter and Lipert, 2007). The successful implementation of ERP system in any organization always demands proper planning and management in all respects (Rajgopal, 2002). ERP systems integrate different business processes and have the potential to improve efficiency and effectiveness of the enterprise (Davenport, 1998; Somers and Nelson, 2004; Purnendu and Gunasekarn, 2003). However, it demands the business processes and organizational structures to be changed in order to take full advantage of Information Technology in organizations. The implementation of ERP systems in organizations is different from the implementation of traditional Information Systems (Rajgopal, 2002). ERP projects may fail after implementation and sometime even during implementation phase (Sumner, 2005). The time factor appeared as an important aspect in the ERP implementation process (Davenport, 1998; Ehie and Madsen, 2005).

The implementation of ERP in organizations is a challenging task (Ifinedo, 2008). Past research reflects that organizational approach is important to adopt ERP systems and gain its potential benefits (Bingi et al., 1999; Kumar et al., 2003). The adoption of ERP systems in public/private organizations in Pakistan is growing rapidly since last decade. Proper planning is considered to be imperative for successful ERP implementation. The objective of this study is to explore the potential challenges that management may face during the implementation of ERP systems and how such challenges may be addressed in a specific situation. This research may help in understanding the nature and gravity of the potential problems and their remedial measures carried out on the part of management during ERP implementation.

The past research addressed the issues and challenges in various contexts, however, there is lack of research regarding remedial measures that need to be addressed (Kumar et. al., 2003; Ngai et al., 2008). Moreover, the research concerning issues and challenges of ERP implementation has been conducted in advanced countries whereas little evidence exists with reference to the developing countries (Huang and Palvia, 2001).

Past research addressed various challenges such as change management, user resistance, top management support & commitment, user training, culture and conflict management that were faced by various organizations during ERP implementation (Bingi et al., 1999; Chen, 2001; Kumar et al., 2003, Somers and Nelson, 2004;Kwak &Lee, 2008).

The studies which addressed these issues were conducted in advanced countries. ERP system was implemented in Pakistan Telecommunication Company Limited (PTCL)

which provided us an opportunity to study the phenomena under research in this organization. The aim of this research was to explore various challenges and subsequent remedial measures taken by top management for successful implementation of ERP system in developing countries like Pakistan. PTCL deals in providing telecommunication services to the public/private sector in Pakistan.

1.2 Research Objectives

- To explore and understand the challenges faced by Public sector organization during ERP implementation
- To explore the strategy adopted by the management to cope with ERP implementation challenges
- To identify and document the experiences learnt during ERP implementation those may be adopted for successful implementation of ERP in future.
- To explore the efforts made by the management to manage the change during ERP implementation.

1.3 Research Questions

This research intends to address the following research questions:

Q1. What challenges are (if any) faced by the management regarding users reaction, business processes reengineering, and managing the potential change during ERP implementation?

Q2. How the challenges were addressed by the management for successful implementation of ERP system?

Q3. Was the top management supportive during implementation of ERP system?

Q.4 Up to what extent management faced user resistance towards ERP implementation in the organization?

1.4 Significance of Research

The past research reflects that various factors affect the implementation of ERP systems in organizations. Considering the importance of adoption of ERP solutions and respective challenges that organizations are facing need to be addressed in real context. The primary motive behind this research work is therefore to explore the implementation challenges of ERP and the corrective measures thereto. The findings may help higher management to be fully prepared during ERP implementation in the organizations.

The importance of addressing the phenomena under research is due to the failure of ERP systems in the organizations. The investigation may have implications for various aspects important for successful ERP implementation. The identification of various challenges and their remedial measures may contribute towards the exiting knowledge in this

domain. The research study may contribute towards acquiring the knowledge in depth as the research in ERP implementation has not been widely conducted in Pakistan. This research could address different ERP implementation challenges in public sector and the potential findings may have implications for the researchers and practitioners.

1.5 Scope of Research

The research will be limited to the study of ERP implementation challenges and their possible solutions faced by the higher management of PTCL in Pakistan.

Chapter 2
Literature Review

Chapter 2

Literature Review

2.1 ERP Definition

Enterprise Resource Planning (ERP) is defined as " Framework for organizing, defining and standardizing the business processes necessary to effectively plan and control the organization, so the organization can use its internal knowledge to seek external advantage"(Blackstone and Cox, 2005 cited in Jacob & Weston, 2007). A single database is used in the entire organization to integrate the functions of accounting, manufacturing, distribution and human resource (Al-Mashari et al., 2003).

2.2. History of ERP

Evolution of ERP may be traced back to the 1960's. In late 1960, the revolution in hardware and software lead to the applications like Material Resource Planning (MRP). The ERP began its life as Material Requirement Planning (MRP) that was required to manage for planning the raw material requirements. The main feature of MRP was demand and order management. MRP II evolved from MRP in 1975. It consists of elements like sales and operations planning and Financial interface (Sumner, 2005). The MRP systems were very much restricted to manufacturing process and did not address the other areas in the enterprise. The limitations of MRP II were realized that eventually lead to the introduction of ERP that deals with the business processes across the enterprise (Chung and Snyder, 2000). ERP emergence and revolution in the organization is also based on the concept of quality control introduced by quality gurus Deming, and Juran (Al-Mashari et al., 2003; Jacob & Weston., 2007).

2.3 Why ERP needed in the organization

ERP systems are designed and implemented to automate and integrate all the activities in a business processes. The processes are integrated and streamlined to get the competitive advantage and achieve the organizational efficiency and effectiveness (Davenport, 1998; Jacob & Weston, 2007). ERP systems may transform a company to be more efficient and effective by sharing data in real time (Ehie and Madsen, 2005; Kwak & Lee & , 2008).

2.4 ERP System Development Process

ERP design process encompasses planning, requirement analysis, design, detailed design, implementation, maintenance and continuous improvement phase (Sumner, 2005). A brief detail is follows as under:

2.4.1 Planning

ERP solution is expensive and proper attention must be given to the Planning phase. This phase consists of needs assessment, providing business justification for the acquisition of software. The business justification phase consists of tangible and intangible benefits of ERP like reduction in inventory, cost and cycle times and improvement in business processes.

2.4.2 Requirement Analysis

The requirement analysis phase specifies the business process to be supported by the ERP system and the benefits the company will achieve after implementing the best practices offered by the ERP vendor.

2.4.3 Design

During design phase two aspects such as customization versus reengineering are considered. In re-engineering the organization implement ERP system by re-engineering business processes according to the best practices advocated by the ERP solution. While in customization the ERP system is customized according to the requirements of the potential users of the system. The benefits of ERP could be achieved more through minimum customization and opting re-engineering approach. The past research has shown that the customization is more costly as compared to the re-engineering (Sumner, 2005).

2.4.4 Detailed Design

In this phase the models and processes are selected mostly based on best practices. The following steps may be considered to select the best practices: For the choice of best practices four steps are advocated.

- Selection of applicable business processes.
- Rejection of in-applicable processes.
- The decision regarding reengineering when some business processes are not matched with the system.
- The decision of customization when best practices seems to be unable to cover the certain processes

2.4.5 Implementation

The implementation phase consists of various activities such as identifying configuration issues data migration from old to the new system, building interfaces, implementing reporting system & security control, conducting pilot testing and trainings.

2.4.6 Maintenance and Continuous Improvement

In order to enhance the functionality of the system to accommodate the new requirements of the users surely there is a need for maintenance and continuous improvement. In this phase technical support is provided to enhance and upgrade functionality in the modules.

2.5 ERP Implementation Approaches

Past research advocated three approaches of ERP implementation: i) Big Bang, ii) Modular implementation, and iii) Process oriented implementation.

In "Big Bang" all the modules are implemented at the same time, however, this approach has not been appreciated due to its failure rate.

Modular approach stresses to implement one module at a time and considered most commonly used methodology. In this approach independent modules are installed and integration takes place at later stage of ERP implementation.

In Process oriented, one or few critical business processes are selected of few business units. It eventually ends up full implementation of ERP in the organization.

2.6 SAP Implementation Methodology ASAP

For the implementation of SAP solution, SAP introduced ERP implementation methodology called "ASAP". Gulledge and Simon (2005) explained the use and importance of ASAP methodology in detail. Brief descriptions of various phases of ASAP are discussed in the coming paragraphs.

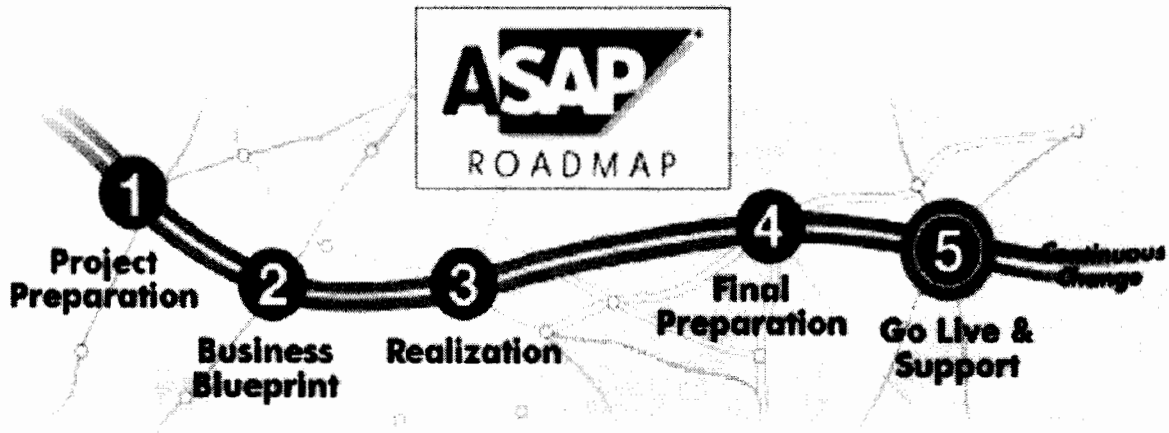

Fig.1 ASAP Implementation Phases adopted from Gulledge and Simon (2005)

Project Preparation: The organization of project is made in this phase. Project team and scope is decided. The team selected is trained on ASAP methodology.

Business Blueprint: This phase is very critical once the scope is decided and frozen then it is very difficult to add more changes in the approved scope. A list of Business requirements is documented in this phase. Business process Master List (BPML) is created to align the software with the business processes.

Realization: This phase attempts to configure more or less 80% of the business processes according to the organizational structure. The plan of data conversion is also chalked out in this phase.

Final preparation: This phase consists of various activities like final testing, data conversion and user training & acceptance. The go live and sign off is decided in this phase.

Go live and Support Continuous Change: During this phase the users are asked to provide feedback regarding functionality and environment of the system. The business processes are validated after getting feedback from the end user to ensure the business environment is fully supported and functional.

It has been observed in different research studies that ASAP methodology is significant and useful when process of similar nature are configured before and it is not significant in case of processes of unique nature (Sommers, 2004a cited in Gulledge and Simon, 2005).

2.7 ERP Implementation Life Cycle

Esteeves and Pastor (1999) emphasized the importance of Product, Process, People and Change Management dimensions in ERP implementation life cycle like ASAP discussed above. The implementation process must be based on these four dimensions. In Product phase the organization should understand the characteristics, properties and capabilities of the ERP system before implementation. The ERP solution must be according to the

needs and requirements of the organization. The objectives of ERP implementation must be achieved through this ERP product.

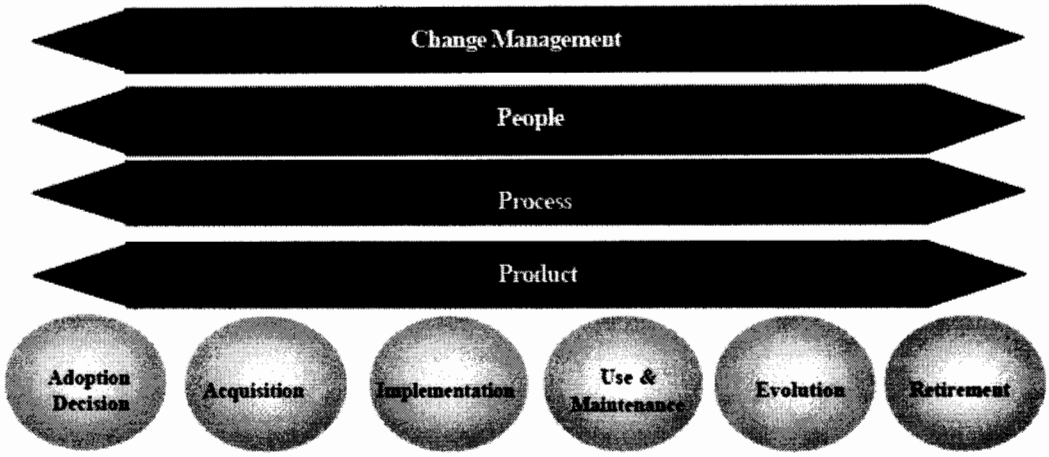

Fig.2 ERP life cycle framework adopted from Esteeves and Pastor (1999)

In Process phase the attention must be given to the reengineering of core business processes of the organization. The reengineering efforts will make the system efficient and effective.

The People dimension demands user training in order to reduce the resistance and attention must be given to improving culture of the organization.

Through change management the required results could be achieved in terms of user acceptance and motivation. Kumar et al., (2003) also stressed the importance of people, process and change management and considered these factors important for successful implementation of ERP in the organization.

2.8 ERP Implementation Issues and Challenges

The process of ERP implementation in the organization is very complex and challenging task and the organizations on adoption of ERP faced problems during implementation (Kumar et al., 2003). A lot of research has already been conducted in identifying the issues, challenges and Critical Success Factors (CSF) relating to ERP implementation. Different researchers have synthesized the past research to identify the critical success factors in implementing ERP (see Soja, 2006; Ngai et al., 2008). Burns et al., (1991) pointed out environmental and methodological factors those were critical for MRP implementation. Parr et al. (1999) identified and grouped the ten factors in different domains like: i) management, ii) personnel, iii) software, and, iv) project. The other researchers also classified the CSF in to strategic and tactical levels (Esteeves and Pastor, 2000). Different research studies identified top management support, clear objectives, project champion, ERP team work and composition, change management, culture and communication as important factors for ERP implementation (Nah et al., 2001; Somers and Nelson, 2001).

Motwani et al. (2005) proposed a comprehensive framework after reviewing past research relating to ERP implementation as under:

Pre-Implementation	Implementation	Post Implementation
• Clear understanding of strategic goals for ERP • Commitment by top management • Cultural and structural changes readiness	• Excellent Project Management • ERP Package selection that fits with business procedures • Open information and communication policy • Exhaustive analysis of current business processes • Importance of data accuracy • IT leveragability and Knowledge capability • Great implementation team • Focused performance measures • Appropriate celebration when project completed	• Post implementation Audit • Documentation and advertising ERP success • Correspondence success • Process Success • Interaction success • Expectation success • Benchmarking

Table1. ERP implementation framework adopted from Motwani et al. (2005)

The grouping of different factors in three phases will help the management in developing effective strategies for successful implementation of ERP in the organization.

Various studies have addressed the issues, challenges and critical success factor during ERP implementation. The common factors discussed in most of the studies are top management commitment, BPR, change management, project management, culture, conflict management, training, politics and team empowerment (see Davenport, 1998;

Bancroft et al., 1998; Somers and Nelson , 2001; Brown and Vessey, 2003;Kumar et al., 2003; Al-Mashari et al., 2003; Ehie and Madsen, 2005;Ifinedo, 2008;Francoise et al., 2009; Sammon and Adam, 2009). The common factors considered in most of the studies are top management commitment and support, Change management, Business Process Reengineering and user participation and training. We attempted to identify various factors from literature review as mentioned in Appendix A.

Our research questions are based on factors like top management commitment and support, Change management, Business Process Reengineering and user participation and training. These factors will be discussed in brief in the preceding paragraphs.

2.8.1 Top Management Commitment and Support

Past research emphasized the importance of top management commitment during ERP implementation in the (Xia et al., 2009; Bradeley, 2008; Sheu et al., 2008). Sarker & Lee (2002) stressed the involvement of top management in all the important phases of project. Bhatti (2005) mentioned support in the form of effective leadership and provision of necessary resources to the project. The top management must be responsible for monitoring huge projects like ERP. The interest of top management in the project will positively influence the users (Adwani, 2001). The strategic objectives of ERP project must be clear to the management and it must not be considered only as an automation activity (Davenport & Brooks, 2004; Somers & Nelson, 2004). The top management should make some efforts in conveying the benefits of ERP to the users in pre-implementation phase of ERP (Motwani et al, 2005). The team empowerment by the top

management also contributes in successful implementation of ERP in the organization (Yusuf et al., 2006; Sammon and Adam, 2009).

2.8.2 User Participation

The past research stressed the importance of user participation during ERP implementation (Amoako-Gyampah, 2007). Ifinedo (2008) stressed the importance of user participation in projects of ERP in order to get the benefit of their "local intelligence" in designing business processes and applications. The existing knowledge of users may be useful for ERP implementation team in understanding the deficiencies of existing business processes. The user support and help during requirement analysis and implementation phase of ERP implementation is mostly needed (Bhatti, 2005). Experienced and skillful staff should be included in the team to get maximum benefit of user participation in ERP implementation (Soja, 2006; Bingi et al., 1999). Amoako-Gyampah (2007) mentioned the importance of intrinsic involvement of user in order to increase the perceived usefulness of the system. The participation of user helps increasing motivation, user commitment and user acceptance of ERP in the organization (Jafri et al., 2006; Bradley, 2008).

2.8.3 Change Management

The success of ERP implementation is highly based on the efforts of top management regarding change in the organization (Edwards & Humphues, 2005). Pugh (2005) considered Change management as strategic issue and advocated the importance of this

factor for successful implementation of IS in the organization. Chafey & Wood (2005) explained the Lewin recommendations for the management of change as under:

The ***Unfreeze*** stage could be achieved by getting the organization ready for change by providing sufficient training, education and motivation to users.

The ***Move*** stage reflects the efforts of putting change into practice, the adoption phase.

The ***refreeze*** stage by making the change stick by accepting the system (see Chafey & Wood, 2005).

The unfreeze stage is considered most critical because efforts are made in recognizing the need and importance of change to users. It will automatically lead to the acceptance of change. Some factors like empowerment of stakeholders and full participation and communication among the users is considered important for formulating change strategy in the organization (Sarker & Lee, 2003, Sammon and Adam, 2009).

2.8.4 Business Process Reengineering (BPR)

In 1990's BPR was considered tactical focused than strategic i.e by emphasizing on cost reduction, company downsizing and operational efficiency rather than strategically focused. BPR concept is based on redesign of business processes to improve the quality, cost, service and speed to exploit more benefits of Information Technology (IT) in the organization (Sharma,2004). Subramoniam et al. (2009) emphasized the importance of BPR and IT by mentioning it through a recursive relationship between them. IT may not be restricted to clerical job but organizations are using it for strategic decision making. IT is considered as enabler for strategic decision making and BPR through IT is gaining popularity. The strategic role of IT in business and its importance in BPR and project success is well recognized in the research (Bosilj-Vuksic and Spremic, 2004).

Sumner (2005) considered globalization, deregulation and competition at global level as main reason for re-engineering of business processes. Evolution of concepts like e-business, Client Relationship Management (CRM) and supply change management demands for change in business processes (Subramoniam et al., 2009; Sumner, 2005).

2.8.4.1 Re-engineering choices

Sharma(2004) mentioned two main choices for re-engineering which are Technology enabled re-engineering and Clean slate re-engineering . In technology enabled re-engineering there is no change in software and it provides the design that best fits the software. Technology enabled is considered cost effective, simpler, more predictable and less risky. Best practices are followed in technology enabled re-engineering also called concurrent transformation. On the other hand, the clean slate re-engineering starts from scratch and software is made according to the requirements of the firm. It is costly and time consuming and lot of financial and personal resources are required in clean slate re-engineering.

2.8.4.2 Benefits of BPR

The case studies conducted in different companies like Ford Motors, IBM credit authorization, Xerox, Wal-Mart and HP are getting benefits of BPR in terms of cost reduction, better inventory management, improvement in response time, timely decision making and effective customer service (Sumner, 2005).

Koch (2001) emphasized the importance of integration of BPR and ERP and considered it as main challenge. The different research reports mentioned benefits of BPR and required a change in the process of organization.

2.8.4.3 BPR in ERP

The implementation process of ERP will be smooth and free from issues if the processes are streamlined before the start of implementation process (Subramoniam et al., 2009). Al-Mashari(2003) argues that organization can achieve ERP benefits only if there is a strong link between implementation approach and business process performance measures. The capability and professional aptitude in terms of change strategy development and deployment, enterprise-wide project management, BPR integration with IT and technical aspects is considered very important in terms of successful ERP implementation (Al-Mashari and Zairi, 2000). The organizations which ignored BPR faced lot of problems of integration etc. at the time of implementation of ERP Koch(2001).

Chapter 3

Research Methodology

Chapter 3

Research Methodology

3.1 Introduction

The concept of examining present and re-examining past is considered as one of the main reasons of research. Research is defined as "original investigation undertaken in order to gain knowledge" (HFFCE, 1998 cited in Dawson, 2005, pp.16). Sekaran (2002) mentioned research as an organized, systematic, objective and scientific inquiry or investigation to find the solutions to the problems. Sharma (2004) defined research as an application of scientific method for studying a problem. Kothari (2004) grouped the objectives of research as under:

Group-I deals with exploratory studies and the main purpose is to devise a problem for particular study or developing hypothesis from an operational point of view.

Group-II deals with descriptive research studies to reveal the characteristics of a particular individual, group or situation.

Group-III consists of diagnostic research studies that determine the frequency of occurrence of something are in the third group.

Group-IV includes the hypothesis testing research studies to test hypotheses of causal relationship.

Researchers mentioned research design as application of scientific method to study the particular problem or phenomena carried out systematically, objectively and logically to

get conclusions (Yin, 2003; Sekaran, 2002; Blalaock & Blalaock , 1982). The research design is conceptual structure regarding planning and carrying out a research study. It is an arrangement of different activities for the collection, measurement and analysis of data in order to obtain answers to the research questions. However, the research design should be based more or less on methodology (Kothari, 2004; Sharma, 2004). The research process, a systematic activity consisting of a sequence of steps effectively performed to understand and explore social or physical phenomena under research leading to development of body of knowledge (Blalaock & Blalaock, 1982; Sekaran, 2002).

3.2 Research Paradigms

The two main paradigms of research are quantitative and qualitative. The quantitative research is based on the measurement of quantity or amount whereas qualitative research is based on qualitative phenomena (Kothari, 2004). The qualitative studies are inductive whereas quantitative studies are deductive in nature. Theory is the outcome of research in inductive studies where as theory is tested in deductive studies (Cooper &Schindler, 2000; Bryman & Bell, 2003).

Terms such as "research approaches" and "research methods" are being used interchangeably in the research literature. However, the researchers made an attempt to distinguish between them. According to Galliers (1992) research approach is " a way of going about one's research, embodying a particular style and employing a different research methods to collect the data", whereas, research method provides simple ways to systemize observations (Weick, 1984). Kaplan(1964, pp.18) defined research

methodology is "the study- the description, the explanation, and the justification of methods and not the method themselves".

3.3 Case Study as a Research Method

In qualitative paradigm one of the research methods being used is a "Case Study". It examines phenomena in its natural settings, learn about the state of the art, and generate theories from practice. The case study method is not only the data collection method but it is a comprehensive research strategy along with its protocols ensures reliability and validity of the investigation (Tellis, 1997; Yin, 2003). It provides an opportunity for the researcher to examine in depth a single entity or a particular event in its context (Franz and Robey, 1984). When a holistic and in depth investigation is needed then case study method is considered more suitable (Tellis, 1997). Different key characteristics have been documented in the literature that might be considered to opt case study as a research method (see Benbasat et al., 1987).

According to (Baxter & Jack, 2008) the case study method is supposed to be more suitable when:

i) The research questions are based on "how" and "why" questions.

ii) One can not change the actions and behavior involved in research.

iii) The researcher focus on contextual conditions consider relevant for research.

iv) Boundaries are not clear between the phenomena and context.

The case study as qualitative research method has been widely used in Information System (IS) research (Orlikowski & Baroudi, 1991; Sheu et al., 2004). The case study research gained attention of IS researchers when they realized the need to address organizational issues in addition to technical ones. The reason for the popularity of case

study in IS research is due to change in focus of researchers, who began to address organizational issues in addition to the technical ones. Benbasat et al. (1987) mentioned three reasons to use case study research in IS:

- IS could be studied in natural setting
- Helps to answer "how" and "why" questions in order to understand the nature and complexity of processes.
- To research an area in which few previous studies exist. With the rapid pace of change in IS field, new topics emerge and demand for careful observation and research.

3.4 Types of Case Study

Various researchers mentioned case study research method as an effective tool. It may improve conceptual and descriptive understanding of the complex phenomena to be investigated (Yin, 1994; Stuart et al., 2002). Case studies may be i) explanatory, ii) descriptive and iii) exploratory, however, the situation reflects which type of case study would be most suitable for the phenomena under research (Yin, 2003).

Tellis (1997) mentioned that in an exploratory case study, the fieldwork and data collection may be undertaken prior to defining research questions; however, the framework of the study must be created prior to conducting a study. In an exploratory case study it is not necessary to give hypothesis or model in advance but the study itself may help in developing a well founded hypothesis or model for further investigations (Tellis, 1997; Sharma, 2004).

3.5. Case Study Research Design

Yin (2003) mentioned the following five components of case study research design:

1. **Study questions:** in terms of "who", "what", "Where", "how" and "why". The case strategy is considered suitable for "how" and "why" questions
2. **Study prepositions:** direct attention to something that should be examined within the scope of study. Some exploratory studies may exist without prepositions, however, such type of studies will have purpose and criteria for successful evaluation of these studies
3. **Unit of analysis:** the way the research questions are defined. It could be an individual, a community, an organization, state or civilization or specific project
4. **The logic:** linking data to prepositions
5. **The Criteria:** for interpreting

Defining "unit of analysis" is considered the most important part in case of single case design. Yin(2003) considered single cases as a common design for case studies and give five justifications for its appropriateness, i) a critical test of existing theory, ii) to represent a unique or extreme case, iii) a representative or typical case, iv)revelatory case, v) longitudinal case. The components mentioned at serial 4 and 5 concerning data analysis and report are the least well developed in case studies (Tellis, 1997). Case study design may be holistic (a single unit of analysis) or embedded (multiple units of analysis). Multiple case designs may be considered suitable for the research when the focus is on theory building or theory testing (Benbasat et al., 1987).

3.6 Quality of Research Design

Different tests such as i) Construct Validity, ii) Internal Validity, iii) External Validity and iv) Reliability are commonly used to establish the quality of research design (see Kider & Judd, 1986 cited in Yin, 2003)

Construct Validity: It is used at the time of data collection phase and during this phase there is a use of multiple sources of evidence. A chain of evidence, the sequence from observation to conclusion is established and finally the case study report is reviewed by the key informants.

Internal Validity: It is used only in explanatory cases for causal relationships. For this purpose pattern matching technique is used that links data to the prepositions.

External Validity: It is used in order to generalize the case study findings. For this purpose multiple embedded cases with multiple observations for each prediction are conducted.

Reliability: It is used to minimize the errors and biases in the study. The study is repeated in a sense that same data collection procedure is adopted by another researcher using the same documented methodology and further it has been verified that the results of the two studies are same.

3.7 Case Study Protocol

Case study protocol is considered to be the guide line for the researcher to ensure the reliability and proper conduct of case study. Yin (2003) has provided the following guidelines of case study protocol:

- **An Overview of Case Study Project**: Project objectives, case study issues and relevant readings about the topic being investigated
- **Field Procedures**: Site selection, access to data sources, schedule of data collection activities are part of this section
- **Case Study Questions**: Interview questions o to keep the researcher on track are part of this section
- **Guide line for the case study report:** The audience , outline and format of report are part of this section

Consideration of such protocols to conduct of case study may help in minimizing the problems during the study.

3.8 Conduct of Case Study

Data for case studies can be collected from multiple resources. It is well established fact that data collected from multiple resources will improve the reliability of case study research (Stake, 1995; Yin, 1994; 2003). Six sources of evidence clearly mentioning their strengths and weaknesses are shown in the table 2.

Sources of evidence

Source of Evidence	Strengths	Weaknesses
Documentation	• stable - repeated review • unobtrusive – not created as a result of case study • exact – contains exact names, references and details of an event • broad coverage - extended time span, many events and many settings	• retrievability - difficult • biased selectivity , if collection is incomplete • reporting bias - reflects author bias (unknown) • access - may be blocked deliberately
Archival Records	• Same as above • precise and quantitative	• Same as above • privacy might inhibit access
Interviews	• targeted - focuses on case study topic • insightful - provides perceived causal inferences	• bias due to poor questions • response bias • incomplete recollection • reflexivity - interviewee expresses what interviewer wants to hear
Direct Observation	• reality - covers events in real time • contextual - covers event context	• time-consuming • selectivity - might miss facts • reflexivity - observer's presence might cause change • cost – hours needed by human observers
Participant Observation	• Same as above • insightful into interpersonal behavior and motives	• Same as above • bias due to investigator's manipulation of events
Physical Artifacts	• insightful into cultural features • insightful into technical operations	• selectivity • availability

Table:2 Adapted from (Yin, 1994, pp. 80; 2003, pp.86) and reformatted.

3.9 Triangulation

Collecting data from multiple sources is considered triangulation. Four types of triangulation techniques are: i) data triangulation, ii) investigator triangulation, iii) theory triangulation and iv) methodical triangulation (Patton, 1987 cited in Yin, 2003). The research shows that the problems of construct validity could be solved through data triangulation ((Baxter and Jack, 2008). The case study is considered reliable when data collected from multiple sources of evidence (Yin, 2003). Convergence will increase the quality and reliability of research (Baxter and Jack, 2008). Convergence could be achieved through multiple sources of evidence in a single case study.

Convergence of Evidence (Single Study)

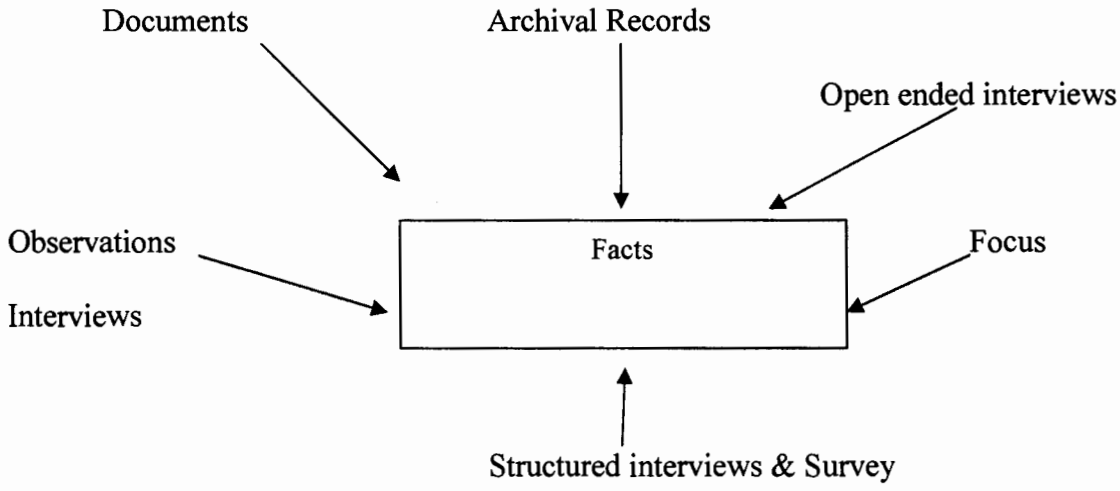

Figure3. Adapted from: (Yin, 2003, pp. 100)

Yin (2003) also mentioned that the chain of evidences such as case study report, case study database, citations to specific evidentiary resources in a case study database, case study protocol and case study questions may further improve the reliability of a case study.

3.10 Adoption of Case Study as Research Method for Current Research

Keeping in view the research questions already mentioned in chapter-1, the exploratory case study research was adopted as it seemed to be more suitable for this research. Although lot of research is conducted in the implementation issues and challenges but there is hardly any research conducted in the telecom sector, particularly in developing countries like Pakistan. The implementation of ERP is a contemporary phenomenon in its real life context and the boundaries between ERP implementation and its real life context are not clearly evident due to their interactions so the use of case research method is justified (Yin, 2003; Liang and Xue, 2004). Researchers mentioned that exploratory studies are suitable for the research of IT related projects (Benbasat et al., 1987; Tellis, 1997).

ERP System consisting of different modules i.e. Human Capital Management (HCM), Finance (FI), Material Management & Procurement (MM) and Project Systems (PS)) has been implemented in PTCL recently. This research attempted to explore the ERP implementation challenges and remedial measures taken on the part of management for successful implementation of the system. For our research we used a single case study along with its well defined protocols to maintain the quality of research conducted.

Formal and informal interviews of executives and staff involved in the ERP implementation process were conducted as a source of data collection. In addition, the available documentation concerning the implementation process was also consulted.

Prior to arranging formal interviews of the key persons and team leads of Human Capital Management (HCM), Finance (FI), Material Management & Procurement (MM) and

Project Systems (PS), necessary permissions from the higher management were sought and some informal meetings were conducted with the top management. The Non Disclosure Agreement (NDA) was signed between the two parties i.e. the Islamic University and PTCL.

The interviewees were aware of the NDA that was taken place between the university and PTCL. It helped the interviewee to be more motivated and cooperative during the interview process. The top management of PTCL deputed a person as coordinator, who coordinated in scheduling interviews with the team leads at their convenience. He also assisted us in getting access to the documents required relating ERP implementation process and also maintaining better rapports and with other personnel concerned. He also helped in arranging informal interviews with the staff officers of operational level. The cooperation from the staff of operational level was also appreciable. They added valuable information regarding various challenges at operational level that appeared to be very fruitful to this research. The interviews of team leads were semi structured and the main focus in the interview questions were the issues and challenges faced during ERP implementation and the steps they took to overcome these challenges. The prime areas covered during interview were concerned with change management, BPR, top management commitment and support and user related aspects such as user resistance, training etc.

These interviews were tape recorded, however, with the permission of interviewee. In addition, we also took notes and noted our observations during the interviews. These interviews were transcribed immediately that helped to document the contents of interview in a better way.

The triangulation approach helps to minimize the bias in the study (Yin, 2003). The data triangulation approach was used for this purpose. In order to strengthen our study we conducted interviews of General Manager (GM) ERP, Senior Managers(SM) ERP and Assistant Manager (AM) ERP and team leads in formal and informal ways. All formal interviews conducted were typed and get validated from the interviewee concerning its accuracy. In some cases the interviewee was approached more than once for the clarification of data collected about complex issues. The emails and phone calls also helped to gather relevant information in this regard. The challenges and issues explored were further validated with the operational level managers through informal interviews. The information collected was stored properly and backup was maintained accordingly.

Chapter 4

Case Study at PTCL

Chapter 4

Case study at PTCL

4.1 Introduction

Pakistan Telecommunication Company Limited (PTCL) is the largest telecommunication services provider in Pakistan consisting 30,000 employees and 5.7 million customers. PTCL is playing key role in providing infrastructure services to telecom companies and corporate customers in Pakistan. Ufone and Paknet are subsidiaries of PTCL and these are playing a vital role in achieving significant edge on its competitors in Pakistan. PTCL was privatized in April, 2006, and the Emirates Telecommunication Corporation (ETISALAT) took its management control. PTCL is now in the leading role for telecommunications industry in Pakistan.

4.2 Organizational Structure of PTCL

Geographically, PTCL is divided into different zones, such as Northern, Southern, Central and Western Zones for management purpose. PTCL headquarter is situated in Islamabad. Keeping in view various functions performed by PTCL, it may be divided into different domains such as HRD, Administration, Finance, Operations, Technical, Commercial, and Corporate Development. PTCL has done its best to provide the infrastructure to facilitate communications all over Pakistan along with the services needed by its potential customers.

4.3 Computerization in PTCL

Some of the core businesses processes were automated by the Information Systems Department. For example, HR application developed in Oracle, Payroll and Accounts were developed using Peachtree and Quick Books etc. However, these systems were not integrated thus causing data inconsistency and data redundancy. The problems faced by management were like to delayed consolidation of company reports, difficult access to the required information, non availability of costing models, non cohesive view of the data for decision making, non existence of proper reporting channels within the business units and non integration of business processes. Such issues were causing major difficulties in acquiring updated information needed for strategic policy making.

4.4 Adoption of ERP the turning point

Keeping in view the problems faced by the management due to inability of the existing computerized systems and other standalone customized applications to cope with information needs, the top management of PTCL decided to adopt ERP system. The consideration was that it might improve availability of updated reliable information as and when needed by the users concerned. The management decided to implement ERP solution, both in PTCL and its subsidiary Ufone. After preliminary study of the businesses processes, that need to be automated and subsequent selection of ERP vendor among those who submitted their bid, the management signed a contract with Siemens Pakistan in February 15, 2007 for implementation of proposed ERP system. There was two stage bidding, first pre-qualification on technical grounds and the other commercial bidding open. Both Oracle and SAP were benchmarked, however, the management

decided to go for SAP. The cost of project was estimated as 2 billion Rupees (Pak currency). The project was scheduled to be completed by November 2008. The details of different modules of potential ERP system are mentioned in the following paragraphs.

4.5 ERP System: Detail of Potential Modules

The proposed ERP solution was a huge project with high cost. The project was implemented in three phases (i.e. Phase-A1, Phase-A2 and finally Phase-B1). The scope of the project entailed ERP modules concerning various business processes such as Financials, Procurement, Material Management, Human Capital Management, Network Lifecycle Management/ Operations, Project System/Development and further integration of existing Billing and other legacy systems with ERP system. A brief introduction of modules mentioned above is given as under:

4.5.1 Financials and Controlling (FICO)

SAP ERP Financials provides a comprehensive financial management solution for the most complex businesses across a broad range of industries. It is the leading enterprise software solution for addressing critical financial functions, such as core accounting, financial and management reporting, working capital management, performance management and, through integration with SAP solutions for regulatory compliance. The scope of phase-A1 consists of implementation of Ledgers, Accounts Payables, Accounts Receivables, Cash & Bank, Cost Center Accounting and Profit Center Accounting. The scope of Phase-A2 consists of Assets Accounting, Bank Accounting (Advanced Level) and Cost Modeling (Activity Based Costing).

4.5.2 Materials and Logistics (M&L)

Materials Management encompasses management of inventory and purchasing process across the supply chain network. It can also facilitate the process of Supply Chain management. The module was capable to share information online with other relevant modules and providing latest information to its potential users for effective decision making. The scope of phase A1 consists of Centralized Procurement, Materials Master, Materials Issuance & Receipt, Inventory evaluations, Vendors Management and Purchase Order Management. The scope of phase-A2 encompasses Online Approvals (Workflow), Vendors Evaluation, Contract Management, Catalogue Management and Supplier Relationship Management (SRM).

4.5.3 Human Capital Management (HCM)

This module is expected to enhance organizational effectiveness by empowering employees to manage processes in a collaborative environment while having real-time access to information required for workforce decision-making. It may enable the organization to align employees, processes, and strategies for business success. The solution optimizes each employee's contribution by aligning employee skills, activities, and incentives with business objectives and the strategies to reach them. HCM may support cross functional information needs and regulatory requirements. The scope of activities in phase –A1 consists of Personnel Administration, Payroll, Time Management and Organization Design. The scope of activities in Phase-A2 consists of Personnel Development, Compensation Management, Training & Event Management and Employee Self Services.

4.5.4 Network Lifecycle Management

SAP Network Life Cycle Management module comprises of Project Systems (NLM-PS) and Plant Maintenance (NLM-PM). Detail is as follows:

4.5.4.1 NLM-PS (Project Systems)

It provides powerful project management & accounting functionalities for projects of any scale and scope, providing high level of integration between PS and other SAP application components, such as Logistics, Accounting, and Human Resources. The scope of activities of phase-A1 consists of Project Definition and structure, Work Breakdown Structure on the basis of PC-1 and Estimates, Project Execution (including Stores issuance, and external procurement) and Projects Closure. The scope of phase-A2 consists of Investment Planning & Management, Projects Planning & Scoping, Projects Execution, Managing Property Portfolios and Managing Contracts.

4.5.4.2 NLM-PM (Plant Maintenance)

It facilitates in planning, execution and reporting of Corrective maintenance, Preventive maintenance, Refurbishment maintenance, and Phase-in/Phase-out equipment processes, Inventory Management and Asset accounting across the network. The scope of Phase–A2 consists of Phase-in Equipments, Preventive Maintenance, Corrective Maintenance, Inspection, Phase-out Equipment, Asset Scrapping and Demand and Supply Planning.

4.6 Adoption of ERP Implementation methodology

In response to a question regarding which implementation methodology was adopted by your organization, one of the executives replied that it was a big challenge. The main objective was rapid and successful implementation of the system, hence a suitable methodology was a dire need of the time. The executive management and vendor agreed to adopt ASAP methodology; however, the implementation of different modules was kept parallel. The implementation of four modules in parallel appeared as problematic at the outset as quoted by one of the team members.

4.7 Interviews: (ERP Implementation and Potential Challenges)

Different challenges that were faced by the management during ERP implementation were in the areas like Business Process Reengineering (BPR), Change Management, Top Management Commitment and Support, Training, and Culture etc. In order to explore challenges regarding aspects mentioned above, when and how they occurred, we conducted formal interviews with team leads of the project and other executives of PTCL. Informal interviews of some of the team members were also conducted. Due to some sensitivity issues, the identity of each interviewee could not be disclosed, however, their comments/views are worth mentioning to explain this research effort.

The interview exercise for the undernoted reasons:

- To make ourselves familiarize with the PTCL and understand the process of ERP implementation in the organization
- To explore the issues and challenges faced during ERP implementation process and document the remedial measures, taken, if any, during implementation
- To validate the issues observed

The list of questions that guided the interview process was constructed around the main challenges of top management commitment, BPR, Change Management and Culture etc. the full text of which can be found in the Appendix B.

With respect to top management commitment and support some are enumerated here below:

- Do you think that top management provided necessary support during ERP implementation?
- Was the management supportive?
- Do you think the objectives and benefits of ERP were communicated to the employees prior to commencing the project?
- Do you think there was a consensus among the executives to support ERP implementation in the organization?
- How would you describe your experience of top management commitment and support?
- Do you think your management believes on team empowerment?

The questions pertinent to BPR included:

- Did you observe any change in the business processes of the organization?
- What was the main approach used in terms of BPR?
- Did ERP software get customized before implementation?
- Did the vendor support in customization of software?
- Did any conflict occur between vendor and management during BPR effort?
- Do you think the BPR exercise was successful and desired results were achieved?
- Any challenging situation faced during BPR and what are your comments?

The questions pertinent to change management included:

- Did the employees raise their voice against implementation of ERP?
- Did the employees avoid the use of the system?
- How did they react?
- What was the strategy of the management to tackle the resistance of employees?
- Do you think the organization considered the importance of change management?
- Did the employees take ownership of the system?
- Did the vendor ever make a complaint regarding the non cooperation of users?
- Up to what extent the management was successful in implementation of change in the organization?
- Do you think the users were eager to accept the change? Any critical situation faced during change management effort in the organization?

The questions concerning training, project completion & success and culture are mentioned in the detailed interview questions attached as Appendix B.

4.8 Research Results

Our findings regarding major aspects of our research interest such as BPR, Change management, top management commitment and support, training, and culture etc. are mentioned in the coming paragraphs. These findings are the result of our observations, study of project documentations available, informal discussions and formal interviews of executives and team leads. In response to questions that up to what extent the top management was committed to support the implementation process, the responses of some interviewees are documented as under:

4.8.1 Top Management Support

Top management commitment and support is a critical factor regarding ERP implementation. We explored in detail the phenomenon that up to what extent the top management played its role during the process of implementation. At the outset the top management was very enthusiastic and considered ERP solution dire need of the organization. Top management support was evident as their recommendations to adopt ERP solution were being commissioned. However, there was difference of opinion among the executives about selection of ERP solution provider. Some showed their preference for SAP whereas others were supporting solution from Oracle being cost effective. A senior executive remarked:

> *There was resistance from top management regarding implementation of ERP. Some members of the top management kept their opinion that why not to adopt*

> *ERP solution from Oracle (i.e. more cost effective) rather than SAP. Their speculation was that huge investment in this project might upset the budget of the company.*

The perception of management about the system return was not consistent among the executives. The executive who were managing activities relating to switching and transmission were least interested in the solution, however, the management dealing with Finance, HR etc. were more inclined towards adoption of ERP system. An executive said:

> *There was lack of top management support overall, however, support from CFO was appreciable and it was the main motivating factor for the team members that eventually contributed a lot towards successful implementation of ERP in our organization.*

As PTCL was in processes of privatization and new management was supposed to take the control within few weeks, the top management was expecting outcome of the project, at the earliest, to prove their efficiency. Nevertheless high expectations for some executives caused disappointment leading to lack of support from them. As one of project team lead made his comments mentioned below:

> *Although top management provided the moral support and encouragement at the outset of the project but it went on declining at the time of implementation. The readiness of management was questionable as the implementation of ERP was their first experience. The management was not aware of ERP implementation process so expected output in few weeks since its inception. They developed their perception that solution seem to be useless and disappointing.*

Regarding management support, another team lead commented:

> *Top management hardly visualized the whole picture of ERP system but just considered it as automation of existing work processes. The management did not realize the importance of this project on their part.*

Readiness for ERP is an important factor in the success of ERP implementation. The readiness means the objectives and goals should be clearly defined, benefits and importance of the system should be communicated to the users in advance for successful implementation. We observed the efforts that were made, varied from department to department. It is worth mentioning here that two departments namely the Finance and HR were more engaged in ERP implementation as compared to other departments. The motivation of Finance and HR departments was due to their awareness about ERP potential benefits and its threats. These were conveyed to the potential users by the top management prior to inception of ERP system in these departments. It was observed that management did not realize the need to get the potential users to be familiar about long run benefits of ERP at the outset of the project. This might be reason that less motivation was observed at organizational level. A few departmental chair persons made efforts to motivate their staff to take active part in implementation process. The contrasting views were articulated by executives from Finance and Project systems. A senior executive from department of Finance commented:

> *Top management conveyed the benefits and importance of the system to an extent they knew before the start of system.*

Another senior executive from department of Project Systems mentioned contrasting views given as under:

> *Prior to inception of ERP system we were not informed by the management about its objectives, benefits that might be achieved on its implementation but the vendors enlightened us about the potential benefit of the system. I have my opinion that a planned effort was not made on the part of top management at organizational level regarding realization of ERP benefits.*

Another member of operational staff told:

> *We were not invited by the executive management during decision making about adoption and implementation of ERP system in the organization. However we were conveyed later on that executive management had made a decision for adoption of an ERP system comprising of FICO, MM and HR in the organization.*

Not surprisingly, however, the views of different interviewees exhibited a bit contradictory perception about top management support and their strategy to motivate their operational staff towards adoption of ERP in the organization.

4.8.2 Business Process Reengineering (BPR)

It has already been mentioned in the literature review that organizations which adopted ERP systems considered BPR an essential need in order to achieve maximum efficiency and productivity. The implementation of ERP without BPR is considered a big challenge in even advance countries. The research has shown that the organization did not pay attention to BPR phenomena, faced lot of problems at the time of implementation and did not achieve the desired results.

The vendors of ERP system claimed that ERP solutions were using best practices; the organizations are required to reengineer their business processes. BPR is a critical factor for successful implementation of ERP as mentioned in the past research.

During our research study the interviewees were asked different questions, whether or not BPR was considered a critical factor during ERP implementation. The formal interviews along with informal discussions with the team members reflected that the organization did not pay attention to the BPR. Some of the management officers mentioned that PTCL was in the process of restructuring at the time of implementation of ERP, so little attention was paid to this aspect on organizational level at the outset of the project. Actual importance of BPR was realized later on. Accordingly, the department of BPR was established and an expert was hired to carry out business process reengineering activities in the organization. However, the expert hired resigned soon after joining the PTCL thus leaving BPR activities un-managed. It might be speculated as a drawback in ERP implementation. One view offered by the manager of NLM is as under:

> *We did not pay proper attention to BPR and consequently we faced a lot of problems. There was a specific wing responsible for BPR, but due to restructuring in the organization, the department was closed. BPR was discontinued and ERP was implemented without reengineering the existing business processes. Although an expert was hired to manage BPR activities but unfortunately he resigned and left this area unattended.*

During our study it was found that the existing business processes of PTCL were not documented properly, so this situation appeared as a major drawback for business processes to be reengineered. The vendor faced lot of problems in collecting required

information about business processes in the organization, although they were accompanied by the project team members of PTCL. One of the team members said:

> *Our processes were not documented such, spent lot of time in collecting relevant information about the processes and their documentation.*

Further, it is worth mentioning here that PTCL was operating in different regions of Pakistan. One of the big challenges for the management was to collect user requirements from different regions. The requirement gathering regarding business processes was carried out through meetings and interviews with the relevant persons leading to documentation of existing business processes. The whole process was narrated by the team lead of NLM as under:

> *We are operating in different regions. To collect undocumented data from different regions was a big challenge. We had interviewed the people who were involved in these activities and document the "As is" [existing process] processes. We also had workshops for business blue prints. The vendor proposed "To be" processes. In this regard we conducted the workshops inviting general managers, senior managers, engineers and all others involved in organizational processes. Consequently, we came up with the "To be"[process to be implemented] processes after getting feedback from the officials mentioned above and what the vendor proposed. The "To be" processes covered corrective maintenance, preventive maintenance, phase in and phase out.*

Another identical view from HR team lead was:

> *Business processes regarding HR were not documented properly. In this regard we initiated to document "As is" processes that took six months to be completed.*

> *Afterwards efforts were made to reengineer "AS is "processes leading to "To be" processes in coordination with the vendor. However the "To be" processes were finalized after discussion with owners of the processes. Later we went for realization and adapted the ASAP approach recommended by the vendor.*

Although efforts were made in streamlining and documenting the processes but there were certain departments where focus was not on end to end processes. The relevant persons were not included in the team responsible for process design and implementation. The problem of ownership of processes was also aroused due to due to this issue. The system was badly affected and desired results were not achieved. This problem was realized after the implementation of certain modules when certain activities were performed out side the SAP system. The due time required for re-engineering of certain processes was not given properly. The management wanted to see the out put on urgent basis by compromising certain processes. One of the executives of project systems mentioned:

> *The processes are not linked thoroughly and some activities are performed out side the system. The end to end process is not completed. There are some centralized and some decentralized procurement activities performed and still some portion is performed out side the SAP. For example, in case of procurement, we make purchase requisition from the system but release strategy at outside the system. Due to non availability of data some intermediate processes are carried out manually in order to take the final approval. In my opinion this problem appeared due to non involvement of the persons those were aware of end to end processes. The urgency factor [management desires that the system should be implemented at the earliest] also contributed a lot in this issue.*

Two other managers also gave similar comments:

> *Although the higher management formed a team consisting of officials from each department responsible for providing user requirements regarding businesses processes running in their respective departments but they were not well aware of end to end processes. I guess we did not convey system requirements properly to the vendors.*

> *The employees of department of Project system were demanding customization of PS module at major level to best fit with the old practices in use, however, the vendors were stressing that their PS module uses best practices so customization at major level was not recommendable. It appeared as a conflict between vendor and users. Later on the issue was solved by providing extensive training to the users leading to acceptance on the part of users.*

The second executive made his comments that:

> *Unfortunately, some intermediate processes were ignored as the members of the team who participated during ERP implementation did not possess the knowledge of end to end process.*

The comments mentioned above reflect that the users themselves were not very certain about the business processes running in their departments. Such limitations regarding knowledge of existing processes consequently affected the efficiency of BPR. The General Manager of ERP team said:

> *We have done business process simplification rather than business process reengineering. Some processes were modified and refined as suggested by the vendors.*

The Manager of Material Management commented:

> *We synchronized policies and processes in our department. We preferred to adopt best practices of SAP and changes were made accordingly in our existing business processes. Almost this change covered 95% of policies and 25 % of processes. Major reduction in cost is found on implementing new processes. A lot of benefits have been realized on adoption of such practices.*

One of the team lead said:

> *Minimum customization has been proposed by us. We do not have much knowledge about SAP and we adopted whatever the vendor suggested. In my opinion there should be preliminary training of users on SAP prior to ERP implementation. It may help at least to be familiar about best practices SAP is claiming. I feel it remained a drawback on our part.*

Most of the managers preferred to run the existing business processes in parallel with the ERP solution being implemented until their employees were familiar and learn its use properly. Consequently it might help to use the system at its best.

4.8.3 Change Management

Past research has shown that the change management is very much required for successful implementation of ERP. Organizational culture is important factor in order to

manage change and it is dependent on attitudes, values and beliefs of users in the organization. Different obstacles regarding managing change on the part of the top management were observed during our research study in PTCL.

In Pakistan, the bureaucratic culture largely prevails in public sector organizations and PTCL is no exception to that. The top management considers IS projects not as important as technical/technological projects related to transmission and communication. It has been observed that the top management and the other employees hardly know the benefits that may be obtained on implementation of ERP systems in the organization. The employees did not perceive use of IS as a valuable activity rather than a low level task. The attitude of the users was also considered a major problem.

One of the team leads commented:

> *Most of our employees are not computer literate and they did not even inspire to check their email accounts. The existing organizational culture is not supportive for adoption of ERP and other IT applications. The employees were at ease to use existing business processes and feel fear to adopt new ways of working due to lack of their skills in running IT application. They consider implementation of SAP as threat to their jobs. There exists resistance on the part of users to accept ERP system. I feel there is a dire need to change the mind set of the people for adoption of new technologies.*

In support of this another view offered by manager:

> *PTCL is hybrid of old and new people, realization is there but somehow they feel it [SAP] as burden. It is also operating in different geographical locations of Pakistan. To realize the importance of this system was a challenging task. To*

> *change the mindset of the people and to make them use this system is not an easy task.*

As mentioned by the manager of NLM that PTCL is operating in different geographical locations of Pakistan, the acceptance of the system in those regions as compare to head office was a big challenge. Moreover, the users with different educational background and culture in those regions offered resistance to ERP implementation. They felt it burden because they did not perceive it useful for them. They felt comfortable with the existing processes they were used to from several years. Resistance was observed at different levels. Another reason for resistance was transparency and loss of control. The top management even received threats from employees through different means. An executive expressed his feelings:

> *Certain group of employees threatened me through emails and telephone calls. They just want to stop ERP Implementation. I displayed the words of Allama Iqbal [The National Poet] at the entrance of my office "courage like tiger and will like eagle" and I mean it. I feel that they have the fear of transparency, loss of control and disclosure of their mal practices they perform. I have trust and faith on Almighty Allah, I never gave up.*

Different responses from the executives reflect that well planned and consistent effort was not made for motivating employees to use the ERP system. In order to cope with the situation; consultants were hired for this job but the efforts made remained ineffective. The results were not shown in short time. Change management is a gradual process and

needs some time. Top management used "authoritative approach" and forced the employees to use ERP system. One team lead said:

> *We were following top down approach. Authoritatively we are trying to make them use of this system.*

Similar comments were made by an executive from HR:

> *Regarding change management initially we hired some professionals for this task but they did not provide the desired results. The organization adopted top down approach in a sense that employees were forced to use the system and they had no other option.*

The Volunteer Separation Scheme (VSS), offered by the organization appeared as a cause of trained manpower turnover. Due to this scheme the management failed to retain the manpower that was initially trained to participate in ERP implementation. The employees who got training on SAP left the organization prior to implementation "phase-A1". It was one of the reasons of user resistance. It seems that proper attention was not given to retain trained manpower. A top management executive commented:

> *Some consultants were hired for this job [change management] and they are still working in PTCL. They were assigned the responsibility of VSS in addition to their prime responsibility. They did not adopt proper strategy for this task. In my opinion to offer VSS to trained manpower was a misstep. The turnover of trained manpower created lot of challenges for implementation of ERP in the organization. There is still a shortage of technical and trained staff.*

During the "Phase-A1" there was lot of resistance from newly inducted staff due to lack of training. Their perception was that it is too difficult to understand the SAP solution. They were not volunteered to use the system and considered it as disappointing.

The top management adopted a strategy to provide extensive training to the potential users in order to manage the change and overcome the resistance from users. There were more than thirty thousand employees of PTCL spread all over Pakistan. The management adopted "train the trainer" concept instead of conducting parallel training for thousands of employees. A few employees were trained after their selection from remote cities. Further, they were assigned the task to conduct training in their own premises.

Regarding training strategy the team lead from NLM said:

> *We used the train the trainer concept. Our focus was not to miss any geographical area like Gujranwala, Wazirabad and Sialkot etc. Three or four people were selected from these locations. We provided them end user training. They were asked to provide the training to their colleagues in their respective offices.*

Another executive from HR remarked:

> *In terms of user training we have planned aggressive strategy. More than 800 employees were trained, some of them left the job after getting training in SAP but we hired the new ones. Thirty thousand employees were in the process of leaving organization voluntarily (VSS). Before going to the go live stage [ERP Implementation] they left the organization. We faced the shortage of trained employees but we injected some fresh blood. The newly hired individuals were*

> *more committed than the old ones. Their approach towards technology was positive and helped the organization in achieving specific goals and objectives.*

On the contrary another team member showed his dissatisfaction about the training provided and stressed for more rigorous training to achieve maximum output. His comments were as under:

> *Only operational level training was provided to the employees and I feel it was not enough. In my opinion users should be aware of complete picture of ERP system so that they should not consider it as burden. Training must be provided after proper need assessment of employees.*

The problems faced by top management during Phase A1 were addressed in Phase A2 of this project. In Phase- A1the trainers were mostly from Siemens and some newly hired youngsters of PTCL. The trainers were not aware of business processes of PTCL. They faced difficulty in comparing the potential business processes with old prevailing practices. The users were aware of old processes and procedures but did not know much about SAP. The same was true for the trainers who knew functions of SAP but had limited knowledge about process and procedures practiced in PTCL. It appeared as communication barrier towards effective communication between both parties. To cope with this situation, the management adopted an effective strategy in Phase A2 of the project by assisting the trainers with experts of PTCL having knowledge of process and procedures of the organization. This assistance facilitated the trainers in comparing old practices prevailing in the organization with potential processes of SAP. Consequently, the problems and concerns of different users were addressed. The trust of employees and organizational culture thus improved a lot in this manner.

The manger of MM commented as under:

> *After facing problems in Phase A1 we grouped together the old and the young users together in Phase A2, so that they could understand the process as well system The old employees knew the processes very well and youngsters also started understanding the system. They helped each other and made this a successful strategy. The instructors were selected who understand the existing process as well SAP solution in detail. The instructors were also assisted by the experts from respective departments of PTCL. Now they were in a position to compare the old process with the new ones likely to be adopted. The ambiguities and concerns in the minds of the users were rectified and now they trust the system.*

In order to improve the relationship between the vendor and the project team members the management appreciated to arrange trips and sports activities. It might provide an opportunity for both parties to develop good rapport and effective communication between them. It helped the vendors to understand the existing business processes and to convey potential benefits of ERP to its potential users.

The manager of project management team said:

> *We made deliberate efforts to reduce the communication gap between the employees of the organization. For this purpose some trips and sports activities were arranged. The cricket matches were played between different departments and the members of ERP team. The benefits of ERP were conveyed in different discussions during the trips. The birthdays and other events were also celebrated*

> *together and all the employees became like family members. This strategy helped us a lot to manage the change needed for successful ERP implementation.*

During the informal discussions with executives and team members they pointed out that there was communication gap between departments involved in ERP implementation and ERP project team. This created a culture of non cooperation among the stakeholders which caused some problems regarding collection of data from various departments. To resolve this issue the management developed a strategy to conduct meetings of team leads and project leads on consecutive days. This strategy helped in reducing conflicts / issues between ERP team and individuals from departments involved. In case any issue emerged both parties did their best to reach some solution after mutual consensus. Secondly the team members were also asked to present their progress to the project manager on daily basis. In response every individual tried to complete his task in time. One of the executives said:

> *We scheduled to have meeting with members of development team as well as representatives from different departments on daily basis. Every participant was required to present the tasks assigned to him and the progress made on his part. It developed a culture of trust, collaboration and every one started to own his responsibility. If there existed any issue, the same was addressed on the spot. We started celebration of achievements that consequently encouraged the individuals. Everybody was interested in completing his task as early as possible because efforts being made by him were appreciated at CIO level.*

Some senior executives told that organizational culture was merely supportive for ERP system at the outset of the project. The privatization of PTCL and hiring of new IT

literate persons after VSS improved the culture of the organization. The newly hired manpower was more motivated towards adoption of Information Communication Technology. The manager Finance and manager of HR mentioned in their interviews that:

> *Organizational Culture is very important, however, it was not supportive in the beginning of ERP project. They have to change themselves especially after the privatization. I guess, the people have realized that they have to change themselves in order to survive. The induction of young blood in PTCL improved the current culture in organization. I expect that it would further improve with the passage of time but some patience must be shown on our part as well.*
>
> *As change management is concerned, our strategy to hire young blood from good universities might bring change and promote e-culture in the organization. The youngsters might have the potential to change the culture of our organization. They are more IT literate and accept technology quickly as compared to their senior colleagues.*

A similar view was shared by manager of MM:

> *In procurement department, a totally new team was constituted. Initially it was a small department but after SAP implementation we hired 60 more people. They were young and energetic and hardly any problems were faced regarding their resistance toward ERP implementation.*

Some of the top executives were of the opinion that ERP solution might be developed after observing business processes practiced in developed countries. Organizational culture, SOP's in developing countries like Pakistan may be different from developed

countries. The managers were of the point of view that vendors themselves possess very limited experience of ERP implementation in telecom sector. The problems occurred during ERP implementation in PTCL might be due to facts mentioned above. One of the managers said:

> *We have totally different scenarios, and our culture is different. Our work force planning is different than that of the other sectors. We can not implement the practices of Europe because their culture is different and their working style is different. If we adopt that system as it is, it will be very difficult for us to make that system successful. In my opinion if the cultural issues were addressed in advance and implementation strategy adopted according to the culture then the system could be more successful.*

The team leads from HR, Finance and NLM commented:

> *Vendor did not have experience of telecom sector. Initially they committed that they will bring experts from other countries but they did not bring even a single expert. This was may be due to security issues of Pakistan. There were some conflicts because of this and lot of time was spent in resolving these issues. The project delay was due to this problem. The vendor did not understand the telecom culture and not in a position to offer the best relevant practices. In my opinion the system could be implemented in one year rather than spending two years.*

> *The knowledge and experience of consultant in Telecom sector was insufficient. Vendor was facing resources crunch. Although vendor promised to hire services of foreign experts but did not bring any one. The fresh graduates hired by the vendor seemed to possess very little experience. We had to make them*

> *understand the basics of telecom activities. By the time learning curve achieved they left the organization. The turnover of employees hired by the vendor was very high. I feel, the consultant must possess good knowledge in the area concerned.*

Interesting comments from another member of PS are as under:

> *We don't know the SAP and they don't know PTCL's business processes. If we know the capabilities of the system [SAP] then we would have been in a better position to give them our requirements to get maximum benefit from the system.*

The past research has advocated **team empowerment** as an important factor to achieve projects success. We observed that top management delegated powers to the individuals concerned to take decisions concerning ERP implementation on their behalf. The project manager was advised to directly communicate with the president rather than his immediate boss. This structural change left a positive impact on ERP project. The Project Manager told:

> *I was fully empowered to report to the president directly. Every body was avoiding any non cooperation now because he knew that any bad report about his attitude might be brought to the notice of the president.*

HR executive in his interview remarked as under:

> *Team empowerment is critical, we were given empowerment and we did many things on behalf of top management. Our management supported us and empowered us.*

In an informal discussion, a member said:

In my opinion Change management effort should have been started from day one. ERP system ownership is at head quarter level but at regional level it is not available. The system would be accepted throughout PTCL, once the ownership realized at region level.

4.9 PTCL Experiences and Suggested Remedial measures

The challenges faced during ERP implementation by the top management of PTCL and the strategies they followed in certain issues has been discussed in preceding paragraphs. The remedial measures taken were quite effective; however, still a number of issues remained un-attended. In order to avoid these issues in future the executives and team leads suggested following remedial measures:

- *There must be a third party audit other than Siemens so that the technical flaws in the implementation could be identified. Vendor always freeze requirements and always argue on requirements provided to them. We have a limited knowledge to provide them sufficient requirements. There must be a competent authority that should validate the processes and ensure that these are the best practices according to our environment, culture etc.*

- *Availability of proper HR resources and trained staff must be retained in order to achieve the benefits of ERP implementation.*

- *Attention must be given to employee turn over as well as consultant turnover*

- *SOP's must be defined in order to avoid conflicts and issues in future*

- *There must be a single data source. Data is important not only in Oracle or SAP but even in Excel.*

- *Change management effort must be started from day 1.*

- *Vendor selection is important. Resources must be defined like CVs of not only the Project directors and team leads but those of the entire team and their relevant experience must be considered.*

Chapter 5

Research Findings and Conclusion

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5.1 Research Findings and Conclusions

This chapter reports the findings of our research regarding ERP implementation in PTCL. Keeping in view our research questions mentioned in chapter-1 we explored different aspects relating to top management support, business process reengineering and how change was managed during the process of implementation. Our study also encompasses the challenges faced by the top management and the respective remedial measure taken to cope with the situation. The research finding would be helpful for the researchers as well as practitioners to understand the phenomena of ERP implementation in the Telecommunication sectors particularly in developing countries like Pakistan. Keeping in view our research findings one may consider ERP implementation at PTCL as successful attempt despite that the project was not completed within the schedule.

The ERP system implemented in the PTCL consists of Financial and Controlling (FICO), Material & Logistics (M&L), Human Capital Management (HCM), Network Life Cycle Management Project Systems (NLM-PS), and Network Life Cycle Management Plant Maintenance (NLM-PM). The top management decided to implement all modules in parallel that seemed to be problematic. It is apparent that parallel implementation of such modules may need more resources and tremendous efforts to monitor and control the process as a whole. The "BIG BANG" approach adopted by the management as mentioned in the previous research may not be considered always successful. It might be

more risky as compared to the modular approach in which a single module is implemented at a time. Organizations usually prefer modular approach. Some researchers advocate that parallel implementation is only suitable in organizations of small size but not preferable in big organizations (Sumner, 2005). As PTCL was a big organization so the problems faced by the management during ERP implementation seemed to be due to the selection of Big Bang approach. The implementation of ERP in PTCL was a new experience for the management so the management might not completely foresee the potential problems which may arise on adoption of this approach. Our research findings reflect that user participation was symbolic during ERP initiation phase and the management hardly considered it an essential aspect at the out set of the project. However, user participation may not be ignored as stressed in the past research (Bingi et al., 1999). The user's knowledge and skills about existing processes and their suggestions to streamline the "To Be" processes may help to reduce potential challenges of ERP implementation. We found that lack of user participation appeared as one of the causes of lack of commitment, non cooperation with ERP team, resistance to adoption of new technology and ownership of the system. The users were not familiar with the potential benefits of the solution so they were found not to be motivated at the out set of project. The management hardly realized that lack of user participation could be problematic and adversely affect implementation process. It may be speculated that the problems might be reduced if the management would have realized the importance of user participation at the initiation of project.

In PTCL proper attention was not given to the selection of suitable representatives from different departments as to coordinate with the vendor. However, the representatives

selected lacked knowledge about the prevailing practices, standard operating procedures and various business processes (end to end processes) needed to be automated or to be reengineered. This problem impeded to get insight the integration of business processes within the organization. We observed during our study that the management did not pay any attention to get users, encouraged to participate during the implementation of ERP in Phase-A1. However, the management realized that user non participation might cause communication gap, lack of strong rapport and ownership of the system. Keeping in view the situation the management adopted a policy to arrange formal & informal meetings , sports activities and recreational trips on regular basis. It helped a lot in decreasing user resistance, improving user commitment, building their trust and realizing benefits of ERP solution.

The objectives and benefits of ERP implementation were not conveyed to users in pre-implementation phase of ERP. We have not seen any effort from top management in arranging pre- training sessions, seminars and conveying benefits of ERP at the user level. The organizational readiness is not seen in PTCL. From literature review it is evident that successful organizations are paying attention to this factor by conveying objectives and benefits of ERP in the pre implementation phase of project to their users (Motwani et al., 2005). Few departments like Finance and HR made some efforts in conveying benefits of ERP to the users in advance but efforts were not made at organizational level.

Although the top management provided support in terms of allocation of budget and resources, however, the interest of management observed to be declined with the passage of time. The same was also observed by the vendor. He commented in his interview:

Management was not persistent in terms of commitment and support to ERP Project. It is a drawback that may decline the motivation and commitment of users and may lead to non acceptance of the system. The past research advocated continuous support and participation in main activities of ERP implementation by the top management in order to achieve success in ERP(Francoise et al, 2009; Ngai et al., 2008; Sheua et al., 2009). The interviews from executives reflected that ERP project was not their top priority as compared to other projects related to transmission and switching. One executive commented during his interview:

> *Implementation of ERP is not considered as one of the core activities as is in the case of switching and transmission in PTCL. It is considered one of the automation efforts in the organization.*

The above comments also reflect that the top management did not visualize the true picture of ERP and considered it as an automation activity. ERP is just not an automation of the business processes (Bingi et al., 1999; Adwani, 2001; Kumar et al., 2003). The top management of PTCL due to lack of experience in ERP was not fully aware of the benefits of ERP at organizational level. They did not give enough time to the pre-implementation phase of project and showed lack of project preparation. Our research supports the findings of Sammon & Adam (2009), They emphasized the importance of proper preparation for ERP project in order to avoid problems of future. The problems faced by the management of PTCL are the results of non consideration of certain aspects advocated by Sammon & Adam. The lack of preparedness was seen on the part of top management of PTCL and it is one of the reasons of different issues faced at the time of implementation. Past research emphasized the importance of top management

commitment & support and considered it essential factor for the success of ERP implementation in the organization, however, it was perhaps ignored by the management of PTCL.

Our research also explored the challenges faced by the top management regarding BPR. The department established in order to deal with reengineering of the existing business processes was closed by the management. It reflects that due importance of BPR was not given to business process reengineering. Its consequences appeared in such a way that end to end processes were not integrated properly. Past research has shown the importance of BPR in successful implementation of ERP in the organization (Al-Mashari & Zairi, 1999). The best approach considered by most of the researcher is the concurrent implementation of BPR and ERP in the organization (Subramoniam et al., 2009). The BPR was not conceptualized and performed properly during phase A1 of the project. So some processes therefore not reengineered properly, causing a single business process to be completed by performing some of its sub tasks manually. This drawback was due to non consideration of business process reengineering on implementation of ERP. It may impede the benefits which may be gained on the adoption of ERP solution. In order to achieve maximum benefits from ERP solution implemented, such drawback need to be overcome. One of the project team members highlighted this issue and said:

> *We did not achieve the efficiency level that we were expecting because of problems of non-integration of processes. The information required from different modules is not through a single click.*

The management learned a lesson from such bitter experience during phase A1 and proper attention was given to BPR during implementation of NLM-PM module in phase A2 of the project. In this regard, the existing business processes were documented after developing consensus among the users from different regions of PTCL. The documentation of existing processes also helped the team of Siemens to understand the prevailing business processes in the department concerned. Consequently, it assisted in adopting best practices to run end-to-end processes smoothly. In our opinion, the step taken towards consideration of BPR during Phase A2 should have been at the outset of Phase A1. We found that there existed some problems during automation of processes due to non consideration of BPR and our findings support the past research which considered BPR as a critical factor for implementing ERP solution in the organization.

The top management of PTCL hardly visualized the importance of experience and expertise of vendor in telecom sector during the process of vendor selection. It caused lot of problems during different phases of ERP implementation. The users mostly relied on vendors suggestions irrespective of lack of their skills and relevant experience. Such act may not be favorable towards achieving successful implementation. Its negative impact appeared in terms of non customization of certain modules required by the users causing dissatisfaction among the users. The promises from the vendor to hire consultants from abroad did not mature, rather aggravated the problems. In this regard it is speculated that the PTCL may not achieve optimum benefits on implementation of ERP system. The comments of a team member:

> *We could have completed this project in less than a year if our consultant had an experience of Telco.*

These comments also reflect that there was some delay in project due to this factor. Past research recommends the experience of Vendor in the relevant field as pre requisite during its selection. However, it was not given due importance by the top management so it may affect ERP success in long run. We recommend that this aspect may not be ignored during ERP implementation.

Past research highlighted the importance of change management and it is considered as one of the critical factors for the success of ERP implementation in the organization as discussed in chapter 2. Our research explored the efforts made by the top management in order to administer the potential change due to adoption of ERP in the organization. The management was of the view that some efforts were made for change management process, however, our research findings reflect that the management did not give due importance to change management process at the out set of ERP implementation. Top management stressed that users must use ERP modules FICO and HCM instead of the legacy system which was already in place. It shows that users were not motivated and encouraged by the management, so they did not volunteer to use the system. The users started to use the system because they had no other option. The timely action taken by the management to compel the users to use the system though appeared successful at the early phase of implementation, however, it would have been more effective if the users were motivated through realizing the benefits of the new system. If the users realize the need and benefits of the system then there may be less resistance from them in long run. Later on, the management of PTCL made sincere efforts in terms of training, encouraging effective communication among stakeholders and improving culture of the organization. Effective communication among the staff is almost considered an essential aspect for

successful ERP implementation in the organizations (Nah et al., 2001; Sarker and Lee, 2003; Ngai et al., 2008). The management introduced R@bta magazine, encouraged celebration of cultural events, formal & informal meetings for improvement of good rapport and lessoning communication gap among the stakeholders. Past research considered user training as one of the success factor for ERP implementation in the organization (Ke & Wei, 2008). To arrange training for thousands of its employees is a hectic job for PTCL. The management adopted an approach to train the trainer concept. The training provided to the users further reduced the resistance level and improved the motivation of employees. The research work undertaken by us showed that training strategies adopted by the top management were successful and helped a lot during implementation process. The efforts made by the management regarding change management contributed towards implementation process. Our research findings are in accordance with the past research (see Adwani, 2001; Al-Mashari et al., 2003, Ngai et al., 2008).

We conclude that the success of ERP project at PTCL is due to the efforts of dedicated project management team selected by the top management and specially the executive responsible for the whole task. Our research supports the findings of Esteves & Pastor (2002) who had advocated Project champion is considered the main factor in the success of ERP implementation in organization.

The implementation process could have been more successful and more beneficial if the management has developed proper strategy at pre implementation phase, implementation

phase and post implementation phase as proposed in past research (see Motwani et al., 2005). The activities performed at the stages mention above appear to be deficient and their effect was observed in the form of delay in completion of the project.

5.2 Research Limitations

The current research is carried out in a single organization. However, further research is needed to generalize the findings of this research. Future research could be conducted in Acceptance of ERP, tangible and intangible benefits of ERP and role of knowledge management in ERP projects.

Reference

Al-Mashari M., Al-Mudimigh, A. and Zairi, M. (2003) Enterprise Resource Planning: A Taxonomy of Critical Factors, *European Journal of Operational Research*, 146, 2, 352-364.

Al-Mashari M. and Zairi, M. (2000) Information and Business Process Equality: The Case of SAP R/3 Implementation, *The Electronic Journal on Information Systems in developing Countries*, 2, 4, 1-15.

Aladwani, A. M. (2001) Change Management Strategies for Successful ERP Implementation, *Business Process Management Journal*, 7, 3, 266-75.

Ash, C. G. and Burn, J. M. (2003) A Strategic Framework for the Management of ERP Enabled E-Business Change, *European Journal of Operational Research*, 46, 2, 374–387.

Amoako-Gyampah, K. and Salam, A.F. (2004) An extension of technology acceptance model in an ERP implementation environment, *Information and Management*, 41, 6, 731-745.

Amoako-Gyampah (2007) Perceived usefulness, user involvement and behavioral intention: an empirical study of ERP implementation, *Computers in Human Behavior*, 23, 3, 1232-1248.

Bryman, A. and Bell, E. (2003) *Business Research Methods*. Oxford Press.

Bancroft, N., Seip, H. and Sprengel, A. (1998) *Implementing SAP R/3 – How to Introduce a Large System into a Large Organization*, second edition Manning Publications Co., USA.

Brown, C. V. and Vessey, I. (2003) Managing the Next Wave of Enterprise Systems: Leveraging Lessons from ERP, *MIS Quarterly Executive*, 2, 1, 65-77.

Blalock A.B. & Blalock H.M. (1982) *Introduction to Social Research*, Prentice-Hall, Inc., Englewood Cliffs, USA.

Bingi, P., Sharma, M.K. and Godla, J.K. (1999) Critical issues affecting an ERP implementation, *Information Systems Management*, 16, 3, 7–14.

Baxter, P. and Jack, S. (2008) Qualitative Case Study Methodology: Study Design and Implementation for Novice Researchers, *The Qualitative Report*, 13, 4, 544-559.

Binbasat,I., Goldstein, D.K. and Mead, M.(1987) The Case Research Strategy in Studies of Information System, *MIS Quarterly*, 11, 3, 369-386.

Bradley, J. (2008) Management Based Critical Success Factors in the Implementation of Enterprise Resource Planning Systems, *International Journal of Accounting Information Systems*, 9, 175–200.

Brown, W.(2004) ERP implementation planning and structure: A recipe for ERP success, *ACM.*

Bhatti, T. R. (2005) Critical Success Factors for the Implementation of Enterprise Resource Planning (ERP): Empirical Validation, *Proceedings of the second International Conference on Innovation in Information Technology, Zayed University, College of Business, Dubai, UAE*, 1-10.

Bosilj-Vuksic, V. and Spremic, M. (2004) ERP system Implementation and business Process Change: case study of a Pharmaceutical Company, *Journal of computing and Information Technology,* 30,5,54-71.

Burns, O.M., Turnipseed, D. and Riggs, W.E.(1991)Critical Success Factors in Manufacturing Resource Planning implementation, *International Journal of Operations and Production Management,* 11, 4, 5-19.

Cliffe, S. (1999) ERP Implementation, *Harvard Business Review*, 77, 1, 16-17.

Chen, I. J. (2001) Planning for ERP Systems: Analysis and Future Trend, *Business Process Management Journal*, 7, 5, 374-86.

Chaffey, W. and Wood, S. (2005) *Business Information Management*, Pearson Education, England.

Chung, S.H. and Synder, A.C.(2000) ERP adoption: a technological evolution approach, *International Journal of Agile Management Systems*, 2, 1, 24-32.

Cooper, D.R. and Schindler, P.S. (2000). Business Research Methods, 9th Edition, B.I. printers Rawalpindi.

Davenport, T. (1998) Putting the Enterprise into the Enterprise System, *Harvard Business Review* 76, 4, 121-131.

Davenport, T. H. (2000) The Future of Enterprise System-Enabled organizations, *Information Systems Frontiers,* 2, 2, 163-180.

David L. Olson, D. L., Chae, B. and Sheu, C. (2005) Issues In Multinational ERP Implementation, *International Journal Services and Operations Management*, 1, 1,7-21.

Dawson, C. W.(2005) *Projects in Computing and Information Systems: A Student's Guide*, Addison Wesley printed in Great Britain.

Ehie, I. C. and Madsen, M. (2005) Identifying Critical Issues in Enterprise Resource Planning (ERP) Implementation, *Computers in Industry,* 56, 6, 545–557.

Esteves, J.M., Pastor, A.J. (1999) An ERP Life-cycle-based Research Agenda, *First International workshop in Enterprise Management and Resource Planning: Methods, Tools and Architectures (EMRPS)* Venice, Italy.

Edwards, H.M. & Humphries, P.L. (2005) Change Management of People & Technology in an ERP Implementation, *Journal of cases on Information Technology*, 7, 4, 144-160.

Franz, C. R. and Robey, D. (1984) An Investigation of User-led system Design: Rational and Political Perspective, *Communications of the ACM*, 27, 12, 1202-1217.

Franciose, O., Bourgault, M. and Pellerin, R. (2009) ERP Implementation through critical success factors' management, *Business Process Management*, 15, 3, 371-394.

Gargeya,V.B., Brady,C. (2005) Success and Failure Factors of Adopting SAP in ERP System Implementation, *Business Process Management Journal*, 11, 5, 501-516.

Gallier, R.D. (1992) *Choosing Information System Research Approaches*, in Information System Research: Issues, Methods, and Practice Guidelines, *Blackwell Scientific, Oxford*, 2, 2, 144-162.

Gulledge T., Simon G. (2005) The Evolution of SAP Implementation Environments, *Industrial Management & Data Systems*, 105, 6, 714-736.

Hunter M. G. and Lippert SK. (2007) Critical Success Factors of ERP Implementation, *Paper presented at the Information Resources Management Conference Vancouver*, BC, Canada. *Information Systems Management*, 16, 3, 7-14.

Huang, Z. and Palvia, P. (2001) ERP Implementation Issues in Advanced and Developing Countries, *Business Process Management Journal,* 7, 3, 276-284.

Irani, Z., Keefe, R.O. and Paul, R. (2001) ERP Problems and Application integration issues: An empirical survey, 34th Hawaii International conference on system sciences.

Ifinedo, P. (2008) Impacts of Business Vision, top management support, and external expertise on ERP success, *Business Process Management*, 14, 4, 551-568.

Jacobs, R., Ted, F., C. and Weston Jr. (2007) Enterprise Resource Planning (ERP)-A Brief History, *Journal of Operations Management*, 25, 357–363.

Jafari, S. M., Osman, M.R., Yusuff, R.M. and Tang, S.H. (2006) ERP Systems Implementation In Malaysia: The Importance of Critical Success Factors, *International Journal of Engineering and Technology*, 3, 1, 125-131.

Kaplan, A. (1964) *The Conduct of Enquiry: Methodology for Behavioral Science*, Chandler Publishing Company, San Francisco, California, USA.

Ke, W. and Kee, K. (2008) Organizational Culture and Leadership in ERP Implementation, *Decision Support Systems*, 45, 208–218.

Kothari, C. R. (2004) *Research Methodology Methods and Techniques,* New Age publishers, New Delhi.

Kumar, V., Maheshwari, B. and Kumar, U. (2003) An Investigation of Critical Management Issues in ERP Implementation Empirical Evidence from Canadian Organizations, *Technovation* 23, 793–807.

Kwahk, K.Y. and LEE, J.(2008) The role of readiness for change in ERP implementation: Theoretical bases and empirical validation, *Information & Management*, 45, 474-481.

Koch, C. (2001) BPR and ERP: Realizing a vision of process with IT. *Business Process Management, 7, 3, 258-265.*

Liang, H. and Xue, Y. (2004) Coping With ERP-Related Contextual Issues in SMES: A Vendor's Perspective, *Journal of Strategic Information Systems*, 13, 399–415.

Lowe, A. and Locke, J. (2008) Enterprise Resource Planning and the Post bureaucratic organization, *Information Technology &People*, 21, 4, 375-400.

Mabert, V. A., Soni, A. and Venkataran, M. A. (2001) Enterprise Resource Planning: Common Myths Versus Evolving Reality, *Business Horizons, 69-76.*

Muscatello, J. R., Small, M. H., Injazz J. and Chen (2003) Implementing Enterprise Resource Planning (ERP) Systems in Small and Midsize Manufacturing Firms, *International Journal of Operations & Production Management,* 23, 850-871.

Mohammad, S. and Mclaren, T.S.(2009) Probing the Gaps between ERP education and ERP Implementation Success Factors. AIS Transactions on Enterprise Systems, 1, 8-14.

Mandal, P. and Gunasekaran, A. (2003) Issues in Implementing ERP: A Case Study, *European Journal of Operational Research,* 146, 274–283.

Manoj Sharma (2004) Research Methodology, *Anmol Publications Pvt Ltd.*

Motwani, J., Mirchandani, D., Madan, M., Gunasekran, A. (2002) Successful implementation of ERP projects: Evidence from two case studies, Int. Journal Production Economics, 75, 83-96.

Motwani, J., Subramanian, R., Gopalakrisna, P.(2005) Critical Factors for successful ERP implementation: Exploratory findings from four case studies, *Computers in Industry* 56, 529-544.

Nah, F., Lau, J. and Kuang, J. (2001) Critical Factors for Successful Implementation of Enterprise Systems, *Business Process Management Journal*, 7, 3, 285-296.

Nah, F.H., Lau, L.S. and Kuang, J. (2001) Critical factors for successful implementation of enterprise resource systems, *Business Process Management Journal*, 7, 3, 285-96.

Ngai, E. W. T., Law, C. C. H. and Wat, F. K. T. (2008) Examining The Critical Success Factors in the Adoption of ERP, *Computers in Industry*, 59, 6, 548-564.

Orlikowski, W. J. and Baroudi, J. J. (1991) Studying Information Technology in Organizations: Research Approaches and Assumptions, *Information Systems Research*, 2, 1, 1–28.

Olson, D.L., Chae, B. and Sheu, C. (2005) Issues in Multinational ERP implementation, *Int. Journal Services & operations Management*, 1, 1, 7-21.

Parr, A.N.,Shanks, G., and Darke,P.(1999) Identification of necessary factors for successful implementation of ERP systems in new Information Technologies in Organizational processes, Kluwer Academic Publishers, 99-119.

Pugh, L. (2005) *Change Management in Information Services,* Ashgate Publishing limited England.

Remus, U. (2007) Critical Success factors for implementing enterprise portals. A comparison with ERP implementation, *Business Process Management*, 13, 4, 538-552.

Rajagopal, P. (2002) An Innovation-Diffusion view of Implementation of Enterprise Resource Planning (ERP) Systems and Development of a Research Model, *Information & Management,* 40, 87–114.

Subramoniam, S., Tounsi,M., and Krishankutty, K.V. (2009) The Role of BPR in the implementation of ERP systems, *Business Process Management, 15,5, 653-668.*

Sarker, S. and Lee..A.S. (2000) Using a case study to test the role of three key social enablers in ERP implementation.

Sarker, S. and Lee, A.S. (2003) Using a Case Study to Test the Role of Three Key Social Enablers in ERP Implementation, *Information & Management*, 813–829.

Sammon, D. and Adam, F.(2009) Project preparedness and the emergence of implementation problems in ERP projects, *Information and Management, xxx, xxxx-xxx..*

Sekaran, U. (2002) *Research Methods for Business, John Willey.*

Soja, P. (2006) Success factors in ERP systems implementations, *Journal of Enterprise Information Management,* 19, 4, 418-433.

Stake, R. (1995) *The Art of Case Research, Sage Publications.*

Sternad, S. and Bobek, S. (2006) Factors which have Fatal Influence on ERP Implementation on Slovenian Organization, *Journal of information and organizational sciences*, 30, 2, 279-293.

Sheua, C., Chaea, B. and Yang, C. (2004) National Differences and ERP Implementation: Issues and Challenges, *Omega*, 32, 361 – 371.

Srivastava, M. (2009) Chinese Cultural Implications for ERP Implementation, *Journal of Technology Management & Innovation*, 4, 1.

Somers, M. and Nelson, K. (2001) The Impact of Critical Success Factors Across the Stages of Enterprise Resource Planning Implementations, *In Proceedings of the 34th Hawaii International Conference on System Sciences, 1-10.*

Somers, M.T. and Nelson, G.K. (2004) A taxonomy of players and activities across the ERP project life cycle, *Information and Management,* 41, 257-278.

Sumner, M. (2005) *Enterprise Resource Planning*, Pearson Education, Inc & Dorling Kindersley Publishing Inc.

Tellis, W. (1997). Introduction to Case Study, *The Qualitative Report*, 3 (2). Available: http://www.nova.edu/ssss/QR/QR3-2/tellis1.html

Weick, K.E.(1984) Theoretical Assumptions and Research Methodology Selection. Harward Business School Press, Boston, Massachusetts, 111-134.

Xia, Y., LOK, P. and Yang, S. (2009) The ERP Implementation of SME in China, IEEE, 978-1-4244-3662.

Yusuf, Y., Gunasekaran, A. and Wu, C. (2006) Implementation of Enterprise Resource Planning in China, *Technovation*, 26, 1324–1336.

Yin, R. K. (1994) *Case Study Research: Design and methods (2nd Ed.)* Beverly Hills, CA: Sage Publications, USA.

Yin, R. K. (2003) *Case Study Research: Design and Methods* (3rd ed.), Sage Publications, USA.

Appendix- A

ERP Implementation Issues and Challenges

Author	TOP Management vision/support	BPR	Integrationn	Selection consultants\employees	Training and Development	Infrastructure Development	PM	Quality Assurance	Ongoing Project Management	Culture / language	Politics	Regulatory legal requirements	Technical Manpower	Team Empowerment/ User participation	Communication	Change Management	Conflict Management
Bingi et al.(1999)	√	√	√	√	√									√			
Kumar et al.(2003)				√	√	√	√	√	√								
Sheu et al.(2004)	√									√	√	√	√				
Ehie and Madsen(2005)	√	√			√	√	√										√
Sarkera, Lee(2003)	√													√	√		
Weiling and Wei(2008)	√									√				√		√	
Ke and Wei (2008)	√				√	√				√			√	√		√	
Al-Mashari et al.(2003)				√	√		√	√		√					√		
Y. Yusuf et al.(2006)		√		√	√									√		√	
TR BHATTI(IIT-2005)	√	√	√	√	√	√	√								√	√	
Nah et al.(2001)	√	√			√		√	√		√					√	√	
Huang and Palvia (2001)	√	√	√			√						√					
Adwani (2001)	√				√			√							√	√	
Ngai et al.(2008)	√	√	√	√	√	√	√	√		√		√			√		
Irani et al.(2001)			√				√		√				√	√		√	

Author	TOP Management vision/support	BPR	Integrationn	Selection consultants\employees	Training and Development	Infrastructure Development	PM	Quality Assurance	Ongoing Project Management	Culture / language	Politics	Regulatory legal requirements	Technical Manpower	Team Empowerment/ User participation	Communication	Change Management	Conflict Management
Ash and Burn(2003)	√		√							√				√	√	√	
Mandal and Gunasekaran(2003)	√	√	√		√		√		√				√		√	√	
Joseph Bradley(2008)	√			√	√	√	√		√		√			√	√	√	√
Sternad and Bobek(2006)	√	√	√	√	√		√	√	√					√	√	√	√
Jafri et al.(2006)	√	√		√	√		√		√					√	√	√	√
Gargeya and Brady(2005)	√		√	√	√		√	√		√	√				√	√	
Olson et al.(2005)	√	√	√		√		√	√		√			√		√	√	
Sarker and Lee(2003)	√													√	√		
Xin(2005)	√	√					√		√					√	√		
Infinedo (2008)	√			√											√		
Francoise et al.,(2009)	√		√	√			√	√						√	√	√	
Sammon & Adam (2009)	√		√	√		√									√	√	

Author	TOP Management vision/support	BPR	Integrationn	Selection consultants\employees	Training and Development	Infrastructure Development	PM	Quality Assurance	Ongoing Project Management	Culture / language	Politics	.Regulatory legal requirements	Technical Manpower	Team Empowerment/ User participation	Communication	Change Management	Conflict Management
Remus (2007)	√	√	√	√	√		√			√					√	√	
Srivastava (2009)	√	√		√	√					√							
Lowe & Locke (2008)										√	√	√		√	√		√
Xia et al., (2009)	√				√		√			√				√	√	√	
Somers & Nelson(2004)	√	√		√	√		√	√							√	√	√
Amoako-Gymapah & Salam (2004)	√	√			√		√			√						√	
Amoako-Gymapah (2007)	√	√		√		√		√					√			√	
Chung & Synder (2000)	√	√		√	√				√					√	√	√	
Lee & Kwak (2008)	√	√								√					√	√	
Subramoniam et al., (2009)	√	√		√		√	√							√	√	√	
Brown (2004)	√	√		√	√									√		√	
Soja(2006)	√			√			√		√					√		√	
Mohamed, & Mclaren(2009)	√				√		√			√				√	√	√	√
Bosilj-Vuksic & Spremic(2004)		√	√		√										√	√	

Appendix B

INTERVIEW QUESTIONS

Q. Do you think that you faced some situation during ERP implementation as a challenging task if so, what was that?

Q. How do you scale its severity?

Q. What remedial measures have you taken to cope with such situation? Do you think that you successfully tackle the problem?

Q. Did the management ever communicate the reasons for adopting ERP systems to the employees?

Q. Did the management encourage employees participation for selection of ERP software?

Q. Do you think that top management provided necessary support during ERP implementation?

Q. Was the management supportive?

Q. Do you think the objectives and benefits of ERP were communicated to the employees prior to commencing the project?

Q. Do you think there was a consensus among the executives to support ERP implementation in the organization?

Q. How would you describe your experience of top management commitment and support?

Q. Do you think your management believes on team empowerment?

Q. Did the employees raise their voice against implementation of ERP?

Q. Did the employees avoid the use of the system?

Q. How did they react?

Q. What was the strategy of the management to tackle the resistance of employees?

Q. Do you think the organization considered the importance of change management?

Q. Did the employees take ownership of the system?

Q. Did the vendor ever make a complaint regarding the non cooperation of users?

Q. Up to what extent the management was successful in implementation of change in the organization?

Q. Do you think the users were eager to accept the change? Any critical situation faced during change management effort in the organization?

Q. Do you think that employees' unawareness about Information communication technologies (ICT) was one of the challenges for adoption of ERP systems?

Q. Did the project complete on time and within the budget? If no, were any specific reasons that you may comment on.

Q. Do you think that employees turnover increased during ERP implementation, if yes, what strategy was adopted by you in order to retain them?

Q. Did you observe any change in the business processes of the organization?

Q. What was the main approach used in terms of BPR?

Q. Did ERP software get customized before implementation?

Q. Did the vendor support in customization of software?

Q. Did any conflict occur between vendor and management during BPR effort?

Q. Do you think the BPR exercise was successful and desired results were achieved?

Q. Up to what extant your organization asked for customization of ERP software. Did any conflict occur between vendor and organization, if so, how was it tackled?

Q. Did the vendor encouraged customization of the ERP software? if not, what was the reaction of employees?

Q. Do you feel selection of ERP systems vendor was a critical task?

Q. Would you please comment on any major issue (political/cultural/organizational) that you feel to be addressed?