FACTORS INFLUENCING IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING IN THE MOBILE COMMUNICATIONS SECTOR IN KENYA

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RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS OF THE MASTER OF BUSINESS ADMINISTRATION, THE UNIVERSITY OF NAIROBI

NOVEMBER, 2014

DECLARATION

I declare that this research project is my original work and has never been submitted to any other University for assessment or award of a degree.

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This project has been submitted with my authority as the university supervisor.

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ACKNOWLEDGEMENTS

I thank the Lord Almighty for blessing me. I would not have completed my studies were it not for His favour. I would also like to thank my dear mother for her undying support without which I would not have reached this far in my education life. I could never thank you enough.

My sincere gratitude also goes to my lecturer who gave more than expected. Your guidance, availability and dedication was truly inspiring. I am also grateful for the support I received from my classmates. Thank you for the encouragement and support during the challenging times.

I also want to acknowledge the support I received from my friends. Your moral support and positive influence is much appreciated. May God bless you all.

ABSTRACT

Enterprise resource planning systems are business management software that allow an organization to use a system of integrated applications to manage the business and automate many functions. The basic goal of an ERP system is to provide one central repository for all information that is shared by all the departments to improve flow of data across the organization. Implementing an ERP system is an expensive and time consuming venture therefore companies need to comprehend the factors influencing the implementation of ERP systems to avoid wastage of company resources through ERP implementation failures. This study sought to examine factors influencing implementation of ERP systems in the mobile communications sector in Kenya. It was guided by two specific objectives: to establish the factors influencing implementation of ERP in the Mobile Communications Sector in Kenya and to find out the relationship between the identified factors and implementation of ERP in the Mobile Communications Sector in Kenya. The study employed a descriptive research design. Four factors that influence implementation of ERP systems were identified through factor analysis. These include: employee knowledge and skills, top management support, project team and organizational goals and objectives. Three out of the four variables were found to have strong positive relationships with ERP implementation. These include: employee knowledge and skills, top management support and project team. Organizational goals and objectives had moderate positive relationship with ERP implementation. An examination of the joint relationship established that the four variables jointly account for 74% of the variability in ERP implementation. The findings of this study can be useful to companies planning to implement ERP systems and to ERP consultants. Although the study focused on the mobile communications sector, the researcher did not consider whether the size of the firms had an effect on the ERP implementation process. Future studies could look at factors influencing ERP implementation based on the size of the firms. The scope could also be extended to include other East African countries. Additional studies could also focus on the level of adoption of ERP systems in Telecommunications Industry.

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LIST OF ACRONYMS/ABBREVIATIONS

ATO	-	Asset Turn Over
BPR	-	Business Process Reengineering
DOI	-	Diffusion of Information
ERP	-	Enterprise Resource Planning
IDT	-	Innovation Diffusion Theory
IT	-	Information Technology
MNOs	-	Mobile Network Operators
MRP	-	Material Requirements Planning
ROA	-	Return on Assets
ROI	-	Return on investment
SAP	-	Systems Applications Products
TAM	-	Technology Acceptance Model
TOE	-	Technology Organization Environment
SPSS	-	Statistical Package for Social Science

CHAPTER ONE:

INTRODUCTION

1.1 Background of the Study

In order to efficiently conduct business, the different functional areas within a company need to share data. In the past organizations often purchased departmental systems that focused on the specific needs of the individual departments within the organization. However, although departmental systems enabled departments to conduct their daily business activities efficiently and effectively, these systems were not helpful when people from one part of the firm needed information from another part of the firm (Valacich & Schneider, 2012). To address this challenge, organizations turned to Enterprise Resource Planning systems (ERP). Enterprise Resource Planning systems collect data from various key business processes in manufacturing and production, finance and accounting, sales and marketing and human resources and store the data in a single central data repository (Laudon & Laudon, 2009). This made it possible for information that was previously scattered in different systems to be shared across the organization.

ERP systems can help a company achieve competitive advantage. Enterprise systems provide value both by increasing operational efficiency and by providing firmwide information to help managers make better decisions (Laudon & Laudon, 2013). Some of the important attributes of ERP are its abilities to: automate and integrate an organization's business processes; produce and access information in real time environment and share common data and practices across the entire enterprise. Most organizations expect ERP systems to reduce their operating cost, increase process efficiency, improve customer responsiveness and provide information for decision making (Elgaral & Al-Serafi), 2011).

Implementing an ERP system is not a simple task and takes a lot of planning and consulting. ERP implementation takes a lot of effort, time and money and if these are not handled properly they can become the reasons why ERP is not implemented successfully (Kumar & Gupta, 2012). Some of the common reasons why ERP is not

successfully implemented include; coordination issues, budget issues, poor ERP selection, absence of consultant, unfriendly user interface and customization issues. On the other hand factors that lead to successful ERP deployment include: user participation and engagement, thorough system testing, documented system procedures, top management support and user training.

ERP implementation done right can translate into improved productivity, cost savings and profits. ERP implementation need not be a painful process that causes employee anxiety and leads to business disruption. This study therefore focused on the factors affecting ERP implementation with a focus on Mobile Network Operators in Kenya.

1.1.1 ERP Systems Implementation

ERP is a strategic tool that helps companies gain competitive advantage by integrating all business processes and optimizing available resources. This allows an enterprise to deliver value added products and services in the shortest time possible (Breakfield & Burkley, 2002). ERP replaces stand- alone applications by providing various modules based on a common database and similar application interfaces that service the entire enterprise rather than portions of it. Prior to the emergence of ERP, employees had to retrieve information from two or more separate computing systems making their job extremely difficult. Storing data in a single place and making it available to everyone within the organization empowers everyone in the organization to be aware of the current state of business and to perform their jobs better (Valacich & Schneider, 2012).

Many companies today have installed or are in the process of implementing packaged ERP systems to support their business activities. Moreover the market share for ERP vendors continues to grow indicating that more companies are embracing ERP. The top three ERP vendors in the world are SAP, Oracle and Sage. SAP had just over $6B in total ERP software revenue in 2012, leading the worldwide market with 24.6% market share. Oracle had $3.12B and Sage, $1.5B in software

revenues for 2012. Oracle's market share was 12.8%, and Sage, 6.3% (Forbes, 2013). Due to keen competition for control of the lucrative ERP market share, the vendors are continuously updating their products and adding new technology-based features.

There are two major ways of implementing ERP systems. Companies can implement the system at once or in phases. The type of implement shall depend on the organization structure, the culture and policies of the organization. In case of multinational companies that have different systems in the different units across the globes, the organization may prefer to implement the Enterprise system in phases. On the other hand, a global organization with common practices across the various countries may prefer to implement the entire system in one go. (Dembla, 1999).

There are many reasons for a company to go for ERP implementation. Some of these reasons include: simplified organization structure, consolidation of business operations, technical changes to the entire organization, real time data processing, improving economies of scale and cost saving. (Dembla, 1999). Other major reasons reported in the literature as drivers for ERP adoption are; pressure from the side of the competitors, business partner requirements for faster service, integration between functional units, organizational standardization across different locations and globalization of businesses. However, for each company the drivers for implementing ERP are different as well as their priority order, these are likely to be influenced by the organization's context.

1.1.2 Mobile Communications Sector in Kenya

The Telecommunications industry in Kenya has three Mobile Network Operators (MNOs):

Safaricom limited, Airtel Kenya Networks Limited and Telkom Kenya limited. Safaricom is the clear market leader in the mobile services. The industry has undergone massive transformation due to technological advancement and liberalization. Notable changes include partial privatization of Telkom Kenya Ltd in

December 2007 and diversement of the government's 25% stake in Safaricom limited through a public listing in May 2008. (PWC, 2014).

The Mobile Network Operators in Kenya face a number of challenges as the economic downturn, slow uptake of new services and intense competition increase pressures to cut costs and improve efficiency. The industry also faces rapid obsolescence due to constantly evolving technology. Price wars have characterized Kenya's mobile communications sector in recent years, following the market entry of new players. This has resulted in accelerated subscriber growth, but it has also presented challenges to the profitability of the operators, forcing them to streamline their operations and develop new revenue streams in an environment of falling average revenue in the voice market. Third generation (3G) mobile broadband services as well as mobile payment and banking services are delivering these additional revenues, but all service segments are highly competitive. (PWC, 2014).

1.1.3 ERP Application in the Mobile Communications Sector

The success of MNOs depends on efficient operational processes and investments in technologies that enhance internal efficiencies. Technology solutions adopted by businesses in the mobile communications sector should help to identify and explore new revenue opportunities and improve customer satisfaction through reliable delivery and accurate billing. ERP systems provide capabilities that support and enhance processes associated with producing and delivering telecommunications products and services.

ERP systems can enable MNOs better manage their assets. A clear view of all asset data across the company is necessary to support decision making. ERP systems provide greater visibility of working capital which helps streamline cash flows and optimize transactions with customers and vendors (Laudon & Laudon, 2013). In addition, ERP systems also assist MNOs to manage partners and dealers effectively. Forecasting and replenishment tools help create detailed plans for demand and supply and for distribution. MNOs face scrutiny of financial records, safety

precautions and labour law compliance. ERP systems enable management to show compliance through accurate and detailed records.

ERP systems also help improve procurement activities in a company by automating routine tasks such as requisitioning and purchase order management (Valacich & Schneider, 2012). ERP systems provide MNOs with human capital management capabilities that simplify and streamline workforce related processes such as leave management, performance appraisal and payroll processing. Moreover, collaboration folders application within ERP systems enables employees in MNOs to work on product design and development data in virtual teams with external partners and suppliers.

1.2 Statement of the Problem

Despite the promises and the continued popularity of ERP Systems, evidence is accumulating to demonstrate that obtaining benefits from an ERP is not as straightforward as those selling and promoting such systems would like us to believe (Boersma & Kingman, 2005). Many companies have experienced challenges in implementing ERP systems leading to wastage of time and money. It is therefore important for companies planning to implement ERP systems to understand the factors affecting implementation in order to minimize the risk of failure and to optimize their ERP implementation.

A study conducted by Nah and Delgado (2006) identified seven critical factors for ERP implementation. These factors are: business plan and vision, change management, ERP Team composition, management support, project management and system analysis. However this study was based on a developed country which is significantly different from a developing country like Kenya.

Parijat & Pranab (2009) found seven factors that are critical in implementation of IT projects: support from top management, goals and objectives, user knowledge, project champion, project team competency, improve work efficiency, scalability &

scope and ERP importance. Although this study was based on a developing country it did not focus on the mobile communications sector.

Aldammas & Al-Mudimigh (2005) classified eleven factors affecting ERP implementation. These factors are: ERP team work and composition, top management support, effective communication, project management, business plan and vision, project champion, appropriate business and legacy systems, business process reengineering and customization, change management program and culture, software development testing and trouble shooting and monitoring and evaluation. This study was also conducted in Saudi Arabia which is a far more developed country compared to Kenya.

A local research conducted by Nyagah (2006) asserts that teamwork and composition in the ERP implementer-vendor consultant partnership is a key factor influencing ERP implementation success. The researcher also found out that good communication and coordination between implementation partners is essential. However the researcher did not focus on a particular industry but based his study on the views of ERP consultants in Kenya.

Mbogori (2010) argues that finances is a major factor affecting implementation of ERP. Although the study focused on the mobile communications sector, it was a case study of a specific company and the findings cannot be generalized to the whole sector.

To the best of the researcher's knowledge, no study had been conducted in a developing country like Kenya on ERP implementation focusing on the mobile communications sector as a whole. This study therefore sought to bridge this knowledge gap by establishing the factors influencing ERP implementation in Mobile Communications sector in Kenya. The study addressed the following research question; what are the factors influencing ERP implementation in Kenya?

1.3 Research Objective

The research objectives of this study were to:

i. Establish the factors influencing implementation of ERP in the Mobile Communications Sector in Kenya
ii. Find out the relationship between the identified factors and implementation of ERP in the Mobile Communications Sector in Kenya

1.4 Value of the Study

Successful implementation of ERP systems is important to ensure that the resources invested are not wasted. Implementing an ERP system is an expensive and time consuming venture, companies therefore need to ensure that the implementation process is properly executed.

The findings from this study can be helpful to companies that want to implement ERP systems as it will give an in-depth insight on factors affecting ERP implementation especially in the in the Mobile Communications Sector in Kenya

In addition, the findings from this study can be useful to ERP functional consultants as they can use new knowledge acquired from this study to advise their clients on factors that affect the implementation process and thus avoid pitfalls that can lead to ERP project failures.

Academicians and researchers may also use the findings from this study as a source of reference when conducting their own research and as a basis for conducting further research. The study will also identified areas for further research.

CHAPTER TWO:
LITERATURE REVIEW

2.1 Introduction

This chapter presents the past studies as well as theories related to ERP. The purpose of the study was to examine factors influencing implementation of ERP in the Mobile Communications Sector in Kenya. The chapter is organized as follows. First it presents the concept of ERP Systems, followed by a review of literature on ERP implementation. This is followed by benefits of ERP implementation and finally challenges of ERP implementation.

2.2 ERP Systems

An Enterprise Resource Planning system is a packaged business software system that allows a company to: automate and integrate the majority of its business processes, share common data and practices across the entire enterprise and produce and access information in a real-time environment (Deloitte Consulting, 1998). This definition basically presents ERP as a piece of software.

Wallace & Kremzar (2001) on the other hand define ERP as an enterprise-wide set of management tools that balances demand and supply, containing the ability to link customers and suppliers into a complete supply chain, employing proven business processes for decision making and providing high degrees of cross functional integration among sales, marketing, manufacturing, operations, logistics, purchasing, finance and human resources thereby enabling people to run their business with high levels of customer service and productivity and simultaneously lower costs and inventories and providing the foundation for effective e-commerce. This definition emphasizes the integration, laid by ERP, between various organizational networks. From the above definitions it is clear that the purpose of ERP is to make easy the information flow between all business functions within the organization and to manage the organization's connections with its outside stakeholders.

The evolution of ERP systems closely followed the developments in the field of computer hardware and software systems. Material requirements planning (MRP) systems were developed in the 1970s which involved mainly planning the product or parts requirements according to the master production schedule. Following this route new software systems called manufacturing resources planning (MRP II) were introduced in the1980s with an emphasis on optimizing manufacturing processes by synchronizing the materials with production requirements. MRP II included areas such as shop floor and distribution management, project management, finance, human resource and engineering. ERP systems first appeared in the late 1980s and the beginning of the 1990s with the power of enterprise-wide inter-functional coordination and integration. Based on the technological foundations of MRP and MRP II, ERP systems integrate business providing accessibility and visibility across the enterprise. (Valacich & Schneider , 2012).

ERP systems enable firms to manage all their resources more effectively. They also aid in standardizing business processes and also increase the visibility of the business by providing real time financial and production information. The downside to ERP systems is that they are very expensive to implement, deployment takes a long time and once the ERP system is implemented it becomes a single vendor lock in for further upgrades or customizations.

2.3 Theoretical Foundations of ERP Implementation

A number of theories and models have been developed to explain technology adoption and implementation such as ERP. Some of these theories include Technology Acceptance model (TAM), Technology Organization environment (TOE) and Diffusion of innovation (DOI) Theory.

In 1985 Fred Davis proposed the Technology Acceptance Model in his doctoral thesis (Davis, 1985). He proposed that system use is a response that can be explained or predicted by user motivation, which in turn is directly influenced by an external stimulus consisting of the actual system’s features and capabilities. Davis further

refined his conceptual model and suggested that user motivation can be explained by three factors: Perceived Ease of Use, Perceived Usefulness, and Attitude toward Using the System. He hypothesized that the attitude of a user toward a system was a major determinant of whether the user will actually use or reject the system. The attitude of the user, in turn was considered to be influenced by two major beliefs: perceived usefulness and perceived ease of use, with perceived ease of use having a direct influence on perceived usefulness (Chuttur, 2009).

Tornatzky& Fleischer (1990) developed a framework named TOE that comprises three key determinants that affect organizational adoption: technology, organization, and environment. In this framework, the technological context relates to the technologies available to an organization. The organizational context describes the characteristics of an organization which include firm size, degree of centralization, formalization, complexity of its managerial structure, the quality of its human resources, and the amount of slack resources available internally. The external environmental context is the arena in which an organization conducts its business. This includes the industry, competitors, regulations, and relationships with the government. These are factors external to an organization that present constraints and opportunities for technological innovations (DePietro et al., 1990). TOE framework is a general theory of technology diffusion and therefore is an appropriate theoretical groundwork for studying the adoption of IS innovation (Zhu, Kraemer, & Xu, 2003).

Diffusion of Innovation Theory (DOI) which is also known as Innovation Diffusion Theory (IDT) has been widely used to predict innovation adoption behaviour at organization level and individual level (Masrom & Hussein, 2008). According to Rogers (1995), there are five innovation characteristics that influence the adoption rate of innovation namely: relative advantage, compatibility, complexity, triability, and observability. Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes by a particular group of users, measured in terms that matter to those users, like economic advantage, social

prestige, convenience, or satisfaction. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption is likely to be.

Compatibility is the degree to which an innovation is perceived as being consistent with the values, past experiences, and needs of potential adopters. An idea that is incompatible with their values, norms or practices will not be adopted as rapidly as an innovation that is compatible. Complexity is the degree to which an innovation is perceived as difficult to understand and use. New ideas that are simpler to understand are adopted more rapidly than innovations that require the adopter to develop new skills and understandings. Triability is the degree to which an innovation can be experimented with on a limited basis. An innovation that is trialable represents less uncertainty to the individual who is considering it. Observability is the ease with which individuals see the results of an innovation. The easier it is for individuals and also stimulates peer discussion of a new idea, as friends of an adopter often request information about it.

According to Rogers (1995), the decision on technology adoption is made through a process which decision maker (individual or group of top management) involves from the knowledge that they have about a technology, to establishing the attitude behaviour toward the technology. The process then helps the decision maker to decide whether to adopt, implement or reject or the new idea, and finally to approve this decision.

2.4 Benefits of ERP Systems

ERP system provides a number of advantages for firms to improve the organization performance. Organizations choose and deploy ERP systems for many tangible and intangible benefits. Rashid et al (2002) states the benefits of ERP as reliable information access, delivery and cycle time redundancy, cost reduction, improved scalability, improved maintenance, global outreach, easy adaptability and e-commerce. Many companies have experienced, as a direct result of ERP dramatic increases in responsiveness, productivity, on-time shipments and sales, along with

substantial decreases in lead times, purchase costs, quality problems, and inventories (Wallace & Kremzar, 2001).

Deloitte consulting 1998 cited at (O'Leary, 2004) categorized the benefits from ERP systems into two, tangible and intangible benefits. The tangible benefits are stated as: inventory reduction, personnel reduction, productivity improvements, order management improvements ,financial close cycle reduction ,IT cost reduction, Procurement Cost Reduction, Cash management improvement, Profit increases, logistic cost reductions, maintenance reductions and on time delivery. On the other hand, the intangible benefits are stated as: new improved processes, customer responsiveness, integration, standardization, flexibility, globalization and visibility.
Shang & Seddon (2002) cited at (De Loo et al, 2012) argue that the organizational benefits of ERP implementations evolve around the following six issues: changing work patterns with shifted focus, facilitating business learning and broadening of employee skills, employee empowerment, building common visions, shifting work focus and increased employee morale and satisfaction.

Hunton, Lippincott, & Reck, (2003) compared the Financial Performance of ERP adopters and Non-Adopters. Their total sample size comprised of 123 companies (63 ERP adopters and 60 Non-adopters). They compared the results of Return On Assets (ROA), Return on investment (ROI) and Asset Turn Over (ATO) in different periods of ERP pre-implementation and Post implementation. The study found that (ROA), (ROI), and ATO were significantly better over a 3-year period for adopters, as compared to non-adopters. Poston & Grabski (2001) argued that ERP system effect positively on firm's performance in two way: it reduces the cost by improving efficiency of business processes in a computerized way and it enhances decision making ability by providing accurate information in time.

A study by Davenport et al (2002) highlighted the top ten benefits that can be obtained from an ERP implementation. These are improved management decision making, improved financial management, improved customer service and retention,

ease of expansion, faster more accurate transactions, headcount reduction, cycle time reduction, improved inventory, better logistics and improved revenue.

Alshawi et al (2003) contend that IT alone does not deliver benefits and management has to employ clearly defined measurements and apportion responsibilities for delivering benefits. Moreover to be able to extract and exploit benefits fully, IT projects should form part of a larger business vision and strategy and be driven by that strategy.

2.5 Factors that Enhance ERP Implementation

A lot of research has been done on factors influencing ERP implementation. The studies illuminate important issues for consideration when implementing ERP. Parijat & Pranab (2009) recognized seven factors that are critical in implementation of IT projects. These are: Support from Top management, goals and objectives, user knowledge, project champion, project team competency, improve work efficiency, scalability & scope and ERP importance. Out of these, Support from top management and goals and objectives were considered to be most important.

Sarker & Lee (2003) emphasized social enablers such as strong committed leadership, open and honest communication and a balanced and empowered implementation team as necessary antecedents to a successful implementation. On the other hand, Gargeya and Brady (2005) argue that the reason for the many failures that have occurred in ERP implementation is that companies have concentrated exclusively on the technical aspects while ignoring the changed management elements. The lack of appropriate cultural and organizational readiness was found as the most important factor contributing to the failure of an ERP project.

Nah & Delgado (2006) classified seven critical factors in ERP implementation. These were: business plan and vision, change management, communication, ERP team composition, skills and compensation, management support and championship, project management and system analysis. Of the seven categories of critical success

factors, ERP team composition, skills and compensation was found to be the most important overall.

The findings of Nyagah (2006) corroborate the findings of Nah & Delgado (2006). According to Nyagah (2006) critical success factors for successful ERP implementation are teamwork and composition of the ERP team, good communication and coordination between implementation partners, partnership and trust ,change management program and culture ,user training, top management support, business plan and vision, project management, software development ,testing and troubleshooting, monitoring and evaluation of performance and project champion.

Umble et al. (2003) categorized the key success factors in ERP implementation under ten main points namely: clear understanding of strategic goals, commitment by top management, excellent implementation project management, great implementation team, successful coping with technical issues, organizational commitment to change, extensive education and training, data accuracy, focused performance measures, and multi-site issues resolved.

Hawking et al (2004) argue that obstacles in ERP implementation have little to do with lack of software functionality or major technical issues, but are predominantly people issues. A similar view is shared by Elragal &Al –Serafi (2011) who contend that a good implementation partner is considered one of the most important factors for the success of ERP projects, and is another addition to the complexity of ERP implementation projects.

2.6 Challenges of ERP Implementation

Companies that have implemented ERP systems in Kenya have faced a number of challenges. One being incompatibility between the ERP embedded business practices and organization work practices. The difficulty in ERP implementation in developed countries may be exacerbated by the claim that ERP embodies established ways of

doing business thereby requiring organizations adopting ERP systems to change their business processes to conform to business practice. (Otieno, 2010).

Otieno (2010) in his study found six challenges in ERP systems in Kenya. These are integration and staff turnover issues, high cost further escalated by extensive customization, poor change management and failure to realize ERP benefits, unreliability of vendors and poor quality of some ERP systems, lack of skills by both users and consultants and complexity of ERP system further compromising security.

A local study by Kutswa (2011) found similar challenges as those cited by Otieno (2010). The challenges encountered in ERP implementation included; organizational structure incompatible with ERP, non-supportive organizational culture, inadequate allocation of resources, resistance to change, ineffective communication, lack of top management commitment and support, high implementation costs, lack of incentives and reward system and inadequate user training and education.

Wallace & Kremzar (2001) contend that one the challenges in ERP implementation is unplanned change. This includes change in people and change in operating environment. Change in people takes the form of employee turnover of knowledgeable employees leading the implementation effort. Environmental change includes factors such as a sharp increase in business, competitive pressures, and new governmental regulations. Such changes may affect the implementation process negatively.

Wong et al (2005) found fourteen critical failure factors in ERP implementation. The fourteen critical failure factors were as follows: ERP system misfit, High turnover rate of project team members, Over-reliance on heavy customization, Poor consultant effectiveness, Poor IT infrastructure, Poor knowledge transfer, Poor project management effectiveness, Poor quality of Business Process Reengineering (BPR), Poor quality of testing, Poor top management support, Too tight project schedule, Unclear concept of the nature and use of ERP system from the users'

perspective, Unrealistic expectations from top management concerning the ERP System, Users' resistance to change. The study recognized poor consultant effectiveness, poor project management effectiveness and poor quality of business process re-engineering as the three common critical failure factors.

2.7 Summary and Research Gap

Organizations worldwide have launched initiatives to implement ERP systems; there has been a growing increase in using Enterprise Resource Planning (ERP) systems in developing countries also. However, despite the known benefits of implementing ERP systems there have been challenges faced in implementation leading to wastage of resources. It is therefore important for companies planning to purchase ERP systems to understand the factors that affect ERP implementation so as to optimize the ERP system benefits.

Past studies conducted in various contexts have revealed a number of key factors that influence success of implementation of ERP. Some of these factors include: ERP team composition, top management support, end-user training, change management, communication, and business plan and vision and project management. The study was anchored on a number of theories which include: Technology Acceptance model (TAM), Technology Organization environment (TOE) and Diffusion of innovation (DOI) Theory. In the literature review it was noted that most of the studies had been carried out on developed countries hence there was need to carry out similar research based on a developing country context. Additionally, there were limited studies conducted based on the in the Mobile Communications Sector in Kenya.

2.8 Conceptual Framework

Based on the literature review, the conceptual framework below can be drawn.

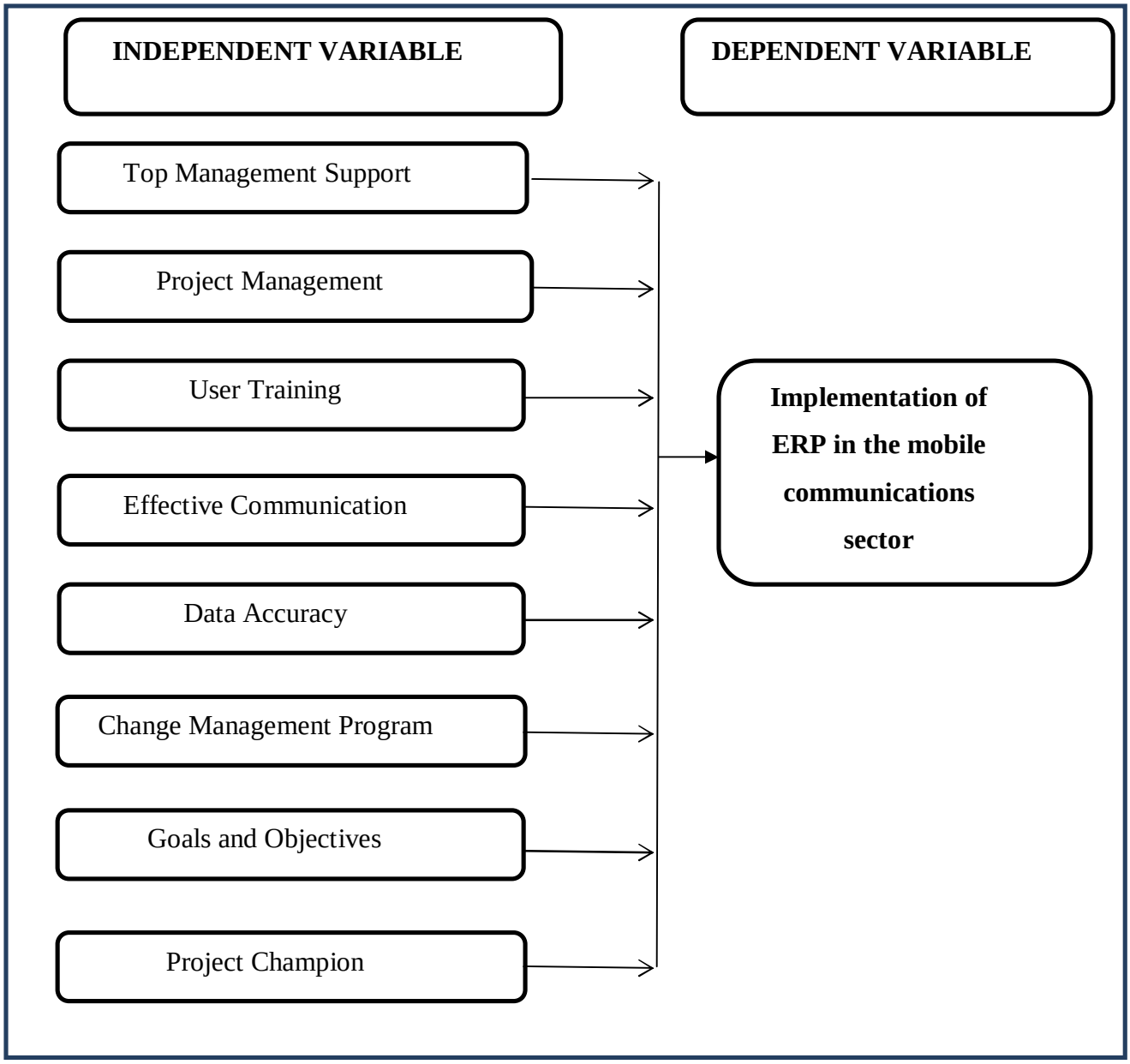

Figure 2.1: Conceptual Framework

Source: Author (2014)

CHAPTER THREE:
RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides a discussion of the research methodology that was used in this study. It discusses the research design especially with respect to the choice of the design. It also discusses the population of study and sample, data collection methods as well as data analysis methods that were employed in the study.

3.2 Research Design

The research methodology employed in this study was descriptive research design which involves gathering data from a specified population to examine their opinions on the different areas comprising the research questions. Descriptive research design was appropriate because the study sought to establish the factors influencing Enterprise Resource Planning in the Mobile Communications Sector in Kenya. This research design had been used successfully by several past studies including Mboya (2013) who studied the factors influencing compliance with the public procurement legislation in Kenya.

3.3 Population and Sample

The population of this study was made up of the three MNOs in Kenya. These are: Safaricom Limited, Airtel Kenya Networks Limited and Telkom Kenya Limited. For purposes of the present study, a census was carried out since the population defined is relatively small. A total of 90 questionnaires were distributed among the three companies. Sapnas and Zeller (2002) suggest that sample sizes for factor analysis should be no less than 50 participants. The target respondents for this study included heads of IT department, IT managers, ERP support team, managers of functional departments and system end users. These people were likely to have been involved in the ERP implementation project and could give insight into the factors affecting ERP implementation.

3.4 Data Collection

The study utilized primary data. This was gathered through structured and semi-structured questionnaires. The questionnaire comprised both open-ended and close-ended questions. The close-ended questions captured quantitative data whereas open-ended questions captured qualitative data. The questionnaire contained two sections. The first part consisted of demographics designed to determine fundamental characteristics of the respondent. The second part was devoted to the identification of the factors influencing implementation of ERP Systems in the Mobile Communications Sector in Kenya. The questionnaires were self-administered using the drop and pick-later approach.

3.5 Data Analysis

The data collected was summarized and screened to identify missing information and improper responses. Data was then fed into the Statistical Package for Social Sciences (SPSS) for purpose of analysis. Factor analysis was used to identify the underlying factors. This technique was successfully used by Nzuve (2013) while researching on implementation of e-procurement practices among private hospitals in Nairobi. Descriptive statistics was used to summarize the results for each of the main variables. The resulting factors were used as independent variables and the implementation of ERP system was the dependent variable. Regression analysis was applied to determine the joint relationships between the factors.

Table 3.1 Summary of Research Methodology

OBJECTIVE	DATA COLLECTION	DATA ANALYSIS TECHNIQUE
Establish the factors influencing implementation of ERP in the Mobile Communications Sector in Kenya	Section 2 of questionnaire	Factor Analysis
Find out the relationship between the identified factors and implementation of ERP in the Mobile Communications Sector in Kenya	Derived from Section 2 of questionnaire	Regression Analysis

Source (Author, 2014)

CHAPTER FOUR:
DATA ANALYSIS AND INTERPRETATION

4.1 Introduction

This chapter presents the data analysis results, as well as interpretation and discussion of findings in line with the specific objectives of the study.

4.1.1 Overview of analyzed data

The data was collected using questionnaire method comprising of close ended and open ended questions. The questionnaires were self-administered to the respondents and a drop and pick later method was preferred for the exercise. Out of the 90 questionnaires that were issued 75 questionnaires were returned. This represents a response rate of 83% which is significant to give reliable findings for this study. According to McBurney (2001), a low response rate could have a potentially biasing effect on the study results. However, a 70% and above response rate is acceptable for the study. The table 4.1 below shows the response rate:

Table 4.1: Response Rate

	Frequency	**Percent**
Non Respondent	15	17%
Actual Respondents	75	83%
Target Population	**90**	**100%**

Source: (Field data, 2014)

4.2 Demographic Information

In order to capture the general information of the respondents, issues such as gender and age of the respondents, level of education and the years of service in current position were discussed.

4.2.1 Gender of employees

The findings showed that majority (55%) of the respondents were male while females constituted 45% of the employees. This suggests a near equal distribution of respondents by gender. The findings are illustrated in the figure 4.1 below:

Table 4.2 Gender of employees

Genders	Frequency	Percent
Male	41	55
Female	34	45
Total	75	100

Source: (Field data, 2014)

4.2.2 Level of Education

The findings indicate that majority (72%) of the respondents have undergraduate level of Education, 14.7% had diploma level of education, 12% having postgraduate degrees while 1.3% possess secondary level of education as their highest academic qualification. This implies that majority of the respondents had a high level education that is important in implementation of the ERP systems. The table 4.3 below shows the educational level.

Table 4.3: Education level

Education level	Frequency	Percent
Secondary level	1	1.3
College Diploma	11	14.7
Undergraduate level	54	72
Masters degree	9	12
Doctoral degree	0	0
Total	**75**	**100**

Source: (Field data, 2014)

4.2.3 Department of work

The findings indicate that (70.7%) of the respondents worked in IT department, 9.3% were working in supply chain management department, 8% were in finance department, 6.7% were in marketing department and 5.3% were in human resource department. This implies that majority of the respondents were from IT department. This is shown in the table below

Table 4.4 Department of work

Department	Frequency	Percent
Human resource	4	5.3
Information technology	53	70.7
Supply chain management	7	9.3
Finance	6	8
Marketing	5	6.7
Total	**75**	**100**

Source: (Field data, 2014)

4.2.4 Duration of service

Findings indicate that majority (57.3%) of the employees have worked for their organizations between 1 to 5 years, 24.0% have worked for between 6 to 10 years, 16 % have worked for over 11 years while 2.7% had below 1 year of experience. This implies that the respondents had worked in their organizations for a period long enough to provide meaningful feedback.

Table 4.5 Duration of service

Work experience	Frequency	Percent
Less than 1 yrs	2	2.7
1 to 5 yrs	43	57.3
6 to 10 yrs	18	24.0
Over 11 yrs	12	16.0
Total	**75**	**100**

Source: (Field data, 2014)

4.3 Factors Affecting Implementation of ERP Systems

The study sought to establish the factors influencing ERP implementation in the communications sector in Kenya. The respondents were asked to rate their levels of agreement with 34 items which were indicators of the factors influencing ERP implementation. The 34 items were subjected to factor analysis with varimax rotation and the researcher obtained four underlying variables which are employee knowledge and skills, top management support, project team and organization goals and objectives.

Table 4.6 Factor loadings and univariate descriptives of identified factors

	Factor loading	**Underlying factor**	**Mean**	**Std dev**
Users were given the opportunity to perform tests in the ERP system before it was implemented	0.590	Employee Knowledge and Skills	4.20	1.00
ERP implementation requires extensive knowledge sharing	0.891		4.12	1.20
I am aware of the benefits of implementing an ERP system	0.775		4.01	0.14
Employees in my organization are highly trained in the use of ERP systems	0.453		3.78	1.20
Staff in my organization are receptive to new technological innovations	0.467		3.54	1.00
ERP Systems make work more difficult	0.245		3.48	2.01
There is adequate training material on ERP modules in my organization	0.704		3.52	2.10

	Factor loading	Underlying factor	Mean	Std dev
Users participated in the system development in the early stages of ERP Project	0.712	Employee Knowledge and skills	2.90	1.33
There is continuous training on new technologies among staff	0.554		2.46	0.45
There is top management support to technological innovations	0.611	Top Management Support	4.33	1.25
Top management is familiar with ERP system's functionalities	0.548		4.31	0.41
Top management provided leadership for ERP implementation	0.752		4.25	0.15
Arrival of a new system is always communicated to employees	0.890		3.94	0.86
In my department/section there is an employee who is very knowledgeable on ERP functionalities	0.582		3.50	1.05
Key stakeholders in the organization are alerted when a new system is being implemented	0.798		2.16	0.89
The people tasked to implement the ERP system work as a team	0.523	Project Team	4.67	0.12

	Factor loading	Underlying factor	Mean	Std dev
All data required by users was loaded into the ERP system from the old system	0.703	Project Team	4.52	0.05
There was a support team available to staff during ERP implementation	.981		4.00	1.02
User feedback is considered important in ERP implementation	0.761		3.92	0.25
ERP implementation team consisted of other departments apart from IT	0.384		3.12	1.01
Work culture that favours collaboration is important to ERP implementation	0.690	Organization goals and objectives	4.75	0.64
The organization is devoted towards greater utilization of technology in all its operations	0.810		4.63	0.15
Adoption and full implementation of ERP systems is in line with the organization's mission and vision	0.781		4.62	1.12
ERP implementation is part of our organization's long term strategy	7.64		4.08	2.00
ERP systems infrastructure are easily compatible with existing technologies already in use in the organization	0.452		4.05	0.19

	Factor loading	Underlying factor	Mean	Std dev
There is fear of loss of jobs due to full implementation of ERP systems	0.555	Organization goals and objectives	4.01	0.15
The ERP system is customized to organizational needs	0.62		3.92	1.51
ERP system implementation leads to major organizational changes	0.745		3.89	1.02
Data migration from previous system to ERP system was accurate	0.348		3.66	1.00
Major conflicts emerged between functional departments during ERP implementation	0.351		2.03	0.08
Our organizational culture supports implementation of ERP systems	0.781		1.25	0.05
Integration of ERP system with those of suppliers is easily achievable	0.892		3.60	0.45
ERP Systems are easy to implement and do not cause disruption	0.526		1.05	2.00

4.3.1 Employee Knowledge and skills

Majority (78%) of the respondents felt that most of the ERP users were able to operate the system; however, 22% of the respondents were of contrary opinion stating that not all users were able to operate the ERP systems in their organizations. The findings are represented in the table below:

Table 4.7 Employee Knowledge and skills

ERP usage	Frequency	Percent
Able to operate	58	78
Unable to operate	17	22
Total	75	100

Source: (Field data, 2014)

4.3.1.1 User training on ERP system

The findings shows that 79% of the respondents were of the opinion that ERP implementation requires extensive knowledge sharing as illustrated by a mean of 4.12. Majority (76%) agreed that Users were given the opportunity to perform tests in the ERP system before it was implemented, with only 9% saying there was no opportunity for testing (4.20 mean score). Most (62%) disagreed that there was a continuous training on new technologies among staff in the organization while 26% agreed with the statement (2.46 mean score). Majority (59%) of the respondents agreed that they were aware of the benefits of implementing an ERP system, 20% of the respondents disagreed while 21% of the respondents were not sure of the benefits of implementing an ERP system as shown by a 4.01 mean score. 53% of the respondents were not sure whether there was adequate training material on ERP modules in the organization (3.52 mean score). Majority (53%) of the respondents agreed that employees in the organization were highly trained in the use of ERP systems, 14% disagreed with this statement while 33% of the respondents were not sure (3.78 mean score).

4.3.2 Top management Support

Majority (65%) of the respondents reported that there was management support in the implementation process, 25% said they didn't know while 15% disagreed that there was management support**.**

Table 4.8 Top management Support

Management support	Frequency	Percent
Have management support	49	65
Lack management support	11	15
I don't know	15	20
Total	**75**	**100**

Source: (Field data, 2014)

4.3.2.1 Level of top management support of ERP implementation

The findings shows that Majority (68%) of the respondents agreed that the top management is familiar with ERP system's functionalities (4.31 mean score). Similarly, 65% of the respondents agreed that top management supports technological innovation while 20% was not sure of the support (4.33 mean score). 59% of the respondents disagreed that key stakeholders in the organization are alerted when a new system is being implemented (2.16 mean score). 59% of the respondents agreed that ERP System vendors are supportive and have efficient customer care (4.00 mean score). Majority (37%) of the respondents agreed that arrival of a new system is always communicated to employees while almost equal number 33% disagreed with the statement.

4.3.3 Project team

Majority (95%) of the respondents reported that there was a project team selected to spearhead the ERP implementation process while 5% were not in agreement.

Table 4.9 Project team

	Frequency	Percent
Project team available	71	95
Project team not available	4	5
Total	75	100

Source: (Field data, 2014)

4.3.3.1 Function of project team

The findings show that 76% of the respondents agreed that people who were tasked to implement the ERP system work as a team (4.67 mean score), 63% of the respondents agreed there was a support team available to staff during ERP implementation (4.00 mean score), 57% of the employees were not sure whether ERP implementation team consisted of other departments apart from IT department (3.12 means score), 42% of the respondents were in agreement that user feedback is considered important in ERP implementation.

4.3.4 Organization goals and objectives

The researcher aimed at evaluating the internal environment that affects ERP implementation. From the findings, 86% of the respondents agreed the organization is devoted towards greater utilization of technology in all its operations (4.63 mean score), 85% of the respondents agreed a work culture that favours collaboration is important to ERP implementation (4.75 mean score), on the other hand majority (75%) of the respondents disagreed that major conflicts emerged between functional departments during ERP implementation (2.03 mean score), 71% of the respondents agreed the ERP system is customized to organizational needs (3.92 mean score) and a similar number of respondents said adoption and full implementation of ERP systems was in line with the organization's mission and vision (4.62 mean score). Majority (69%) agreed that there was fear of loss of jobs due to full implementation of ERP systems. Most of the respondents (66%) agreed that ERP implementation is part of their organization's long term strategy. Half of the respondents agreed the organizational culture supports implementation of ERP systems and similar number

was not sure whether integration of ERP system with those of suppliers was easily achievable.

4.4 Inferential statistics on factors affecting ERP implementation

The study used inferential statistics in trying to reach conclusions that extend beyond the immediate data . Correlation analysis was used to find the relationship between two or more sets of variables. It also tells the direction as well as how much relationship exist between these variables. In this study the researcher used Pearson's coefficient of correlation . The value of the correlation lies between "-1" to "+1".

The table below shows the correlation values of different variables. The first variable employee knowledge and skills in relation to the dependent variable ERP implementation has the coefficient of correlation of "0.768 *" which shows a strong positive relationship between the two variables. This implies the better the knowledge and skills are provided to employees the better the ERP implementation process. Similarly, the second independent variable of top management support also has a positive correlation of "0.709" with the ERP implementation. Project team also has a positive relationship with the ERP implementation with the value of 0.685. Organization goal and objectives has moderate but positive relationship with implementation of ERP with the value of 0.562. All the independent variables used in the study have a positive relationship with dependent variable which shows that they significantly affect the dependent variable.

Table 4.10 Correlation of variables

Variable Title		Implementation of ERP	Employee knowledge and skills	Top management support	Project team	Organization goals and objectives
Implementation of ERP	Pearson correlation	1.00	.768	.709 *	.685	.562
	Sig. (2 tailed)		.000	.020	.016	.004
Employee knowledge and skills	Pearson correlation	.762	1.00	.467	.651*	.614
	Sig. (2 tailed)	.004		.058	.062	.000
Top management support	Pearson correlation	. 705*	.425	1.00	.681 *	.621
	Sig. (2 tailed)	.002	.003		.001	.001
Project team	Pearson correlation	.654	6.32	.673	1.00	.514
	Sig. (2 tailed)	.000	.006	.005	.016	.000
Organization goals and objectives	Pearson correlation	.862	.514	.621	.517	1.00
	Sig. (2 tailed)	.000	.005	.001	.000	.000

*Correlation is significant at the 0.05 level (2-tailed)

Source: (Field data, 2014)

4.4.1 Regression Analysis

The researcher conducted regression analysis to determine the effects of employee knowledge and skills, top management support, organization goals and objectives and project team on implementation of ERP systems in the mobile communications sector. The following regression equation was derived:

$Y = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + e$

Whereby α_0 is the regression constant, $\alpha_1 \ldots \alpha_4$ are regression coefficients,

Y= implementation of ERP in the mobile communications sector

X_1 = employee knowledge and skills

X_2 = top management support

X_3= project team

X_4 = organization goals and objectives

Where as *e* = Error term

Table 4.11 Goodness of Fit Model

R	R Square	Adjusted R Square	Std. Error of the Estimate
.784[a]	.740	.700	.271

Source: (Field data, 2014)

The findings show a correlation value of 0.784 as this illustrates a linear relationship between the dependence and independent variables. An R-square value of 0.740 was established and adjusted to 0.700. This coefficient of determination shows that all independent variables affect implementation of ERP at a rate of 74.0% the remaining 26% of variations are brought about by factors not captured in the objectives.

Analysis of Variance (ANOVA) was further carried out to test the significance of the regression model in relation to the differences in means of the dependent and independent variables.

Table 4.12 Analysis of Variance (ANOVA)

	Sum of Squares	**Df**	**Mean Square**	**F**	**Sig.**
Regression	6.05	52	3. 71	40.10	0.0001
Residual	4.11	23	1.15	15.03	
Total	10.15	75	4.86	55.13	

Source: (Field data, 2014)

The findings ANOVA test produced an f-value of 40.10 which was significant at $p<0.02$. This illustrates that the regression model is significant at 95% confidence level and has 2 % probability of misrepresentation.

Table 4.13 Regression Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**	**Sig.**
	B	**Std. Error**	**Beta**	
(Constant)	0.407	.321		.001
Employee knowledge and skills	0.456	.415	0.781	.003
Top management support	0.512	.004	0.810	.000
Project team	0.152	.312	0.623	.000
Organization goals and objectives	0. 063	.451	0.721	.000

Source: (Field data, 2014)

The regression equation therefore becomes:

$Y = 0.407 + 0.781X_1 + 0.810X_2 + 0.623X_3 + 0.721X_4 + e$

$p<0.001$

This study sought to identify the factors influencing ERP implementation in the mobile communications sector in Kenya. The study identified four factors that have a positive relationship with ERP implementation. These are employee knowledge and skills, top management support, project team and organization goals and objectives. The findings of this study corroborate the findings of Parijat and Pranab (2009) who in their study found top management support and goals and objectives to be the most critical factors in implementation of IT projects.

The results of this study also uphold the findings of Sarker and Lee (2003) who emphasized social enablers such as strong committed leadership, open and honest communication and a balanced and implementation team as necessary antecedents to a successful ERP implementation.

CHAPTER FIVE:
SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter consists of a summary of the findings of the research, conclusions relating to the research objectives and suggestions and recommendations on the factors influencing implementation of Enterprise Resource Planning in the mobile communications sector in Kenya.

5.2 Summary of the Findings

In regard to the demographic information about the respondents, the findings indicated that there was a 83% response rate. Majorities of the respondents were men and a big percentage of the respondents possessed an undergraduate degree as their highest academic qualification. In addition, majority of the respondents were from Information Technology department and many of them had worked in their current organization for a period between 1 and 10 years.

Four factors that influence implementation of ERP systems were identified through factor analysis. These include: employee knowledge and skills, top management support, project team and organizational goals and objectives. Three out of the four variables were found to have strong positive relationships with ERP implementation. These include: employee knowledge and skills, top management support and project team. Organizational goals and objectives had a moderate positive relationship with ERP implementation. An examination of the joint relationship established that the four variables jointly account for 74% of the variability in ERP implementation.

5.3 Conclusions

The findings show a strong positive relationship between employee knowledge and skills and ERP implementation. The two variables have a positive correlation of 0.768. This indicates that investment in employee training and skill building will raise the chance of successful ERP implementation.

Similarly, there is a positive correlation of 0.709 between top management support and ERP implementation. This shows that top management are a key factor in the ERP implementation project. Top management therefore needs to spearhead the ERP implementation project and provide resources needed to ensure successful implementation.

Project team is also a very important factor in the ERP implementation process. Project team has a positive relationship with the ERP implementation with a correlation of coefficient of 0.685. It can therefore be concluded that putting together an effective project team is a critical step in successful ERP implementation.

The findings of the study also show that organization goals and objective has a moderate positive relationship with the ERP implementation having a correlation of 0.562. This implies for an ERP implementation project to be successful it must be in line with the business goals and objectives of the organization otherwise the implementation mail fail.

5.4 Recommendations

The following recommendations can be made from the findings of this study:

The organization's management must strive to improve employees' knowledge and skills to ensure successful ERP implementation. This can be done through user training before the system goes live and continuous training post implementation to fill the knowledge gaps. This will ensure that all employees are conversant with the ERP system and develop ownership of the system.

Top management should involve all the key stakeholders in the implementation process. The involvement can enhance adoptability of the system and overcome resistance to change and prevent conflicts from emerging during the implementation process. Top management should also provide leadership during the implementation process and provide support to the project team.

In addition, the project team must be properly selected to ensure all the departments are represented. The project team should work as a team and be available to support employees during the implementation process.

5.5 Limitations of the Study and Suggestions for Further Research

The study largely relied on primary data collected using questionnaires and is limited to the responses received. The researcher assumed that the feedback given was credible as there was no way of telling how much thought the respondent had put in while filling the questionnaire. Although the study focused on the mobile communications sector, the researcher did not consider whether the size of the firms had an effect on the ERP implementation process. Future studies could look at factors influencing ERP implementation based on the size of the firms.

The researcher focused on the mobile communications sector in Kenya only, future studies could focus on the telecommunications industry as a whole because the findings of this study cannot be generalized to the telecommunications industry in Kenya. The scope could also be extended to include other East African countries. Additional studies could also focus on the level of adoption of ERP systems in Telecommunications Industry.

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Appendix I: Questionnaire

QUESTIONNAIRE

This questionnaire is aimed at collecting information on the factors influencing implementation of ERP Systems in the Mobile Communications Sector in Kenya. This information is being sought solely for academic purposes and will be treated with strict confidence. Kindly answer the questions by writing a brief statement or ticking the boxes provided as will be applicable.

Section 1: Background Information

1. Which Department/Section do you work?……
2. What is your gender?

   Male [ ] Female [ ]

3. What is your highest level of education?

a. Secondary Education [ ]
b. College Diploma [ ]
c. Undergraduate degree [ ]
d. Masters degree [ ]
e. Doctoral degree [ ]

4. How long have you worked in your current organization?

Less than 1 year	[ ]	6-10 years	[ ]
1-5 years	[ ]	Over 10 years	[ ]

Section 2: Factors Affecting ERP Implementation

5. To what extent do you agree with the following statements regarding ERP implementation?

Use a scale of 1 – 5.Where:

[1] =Strongly Disagree [2] =Disagree [3] =Neutral [4] =Agree [5] =Strongly Agree

Factors	1	2	3	4	5
I am aware of the benefits of implementing an ERP system					
ERP implementation team consisted of other departments apart from IT					

Factors	1	2	3	4	5
There was a support team available to staff during ERP implementation					
ERP systems infrastructure are easily compatible with existing technologies already in use in the organization					
Data migration from previous system to ERP system was accurate					
Top management provided leadership for ERP implementation					
Employees in my organization are highly trained in the use of ERP systems					
Staff in my organization are receptive to new technological innovations					
Arrival of a new system is always communicated to employees					
Work culture that favours collaboration is important to ERP implementation					
There is continuous training on new technologies among staff					
There is top management support to technological innovations					
Users were given the opportunity to perform tests in the ERP system before it was implemented					
Top management is familiar with ERP system's functionalities					
Users participated in the system development in the early stages of ERP Project					
Integration of ERP system with those of suppliers is easily achievable					
The organization is devoted towards greater utilization of technology in all its operations					
Key stakeholders in the organization are alerted when a new system is being implemented					
The ERP system is customized to organizational needs					
ERP implementation is part of our organization's long term strategy					

Factors	1	2	3	4	5
Our organizational culture supports implementation of ERP systems					
ERP system implementation leads to major organizational changes					
All data required by users was loaded into the ERP system from the old system					
ERP implementation requires extensive knowledge sharing					
There is adequate training material on ERP modules in my organization					
Adoption and full implementation of ERP systems is in line with the organization's mission and vision					
User feedback is considered important in ERP implementation					
ERP Systems make work more difficult					
Major conflicts emerged between functional departments during ERP implementation					
The people tasked to implement the ERP system work as a team					
ERP Systems are easy to implement and do not cause disruption					
In my department/section there is an employee who is very knowledgeable on ERP functionalities					
ERP System vendors are very supportive and have efficient customer care					
There is fear of loss of jobs due to full implementation of ERP systems					

9. State factors that you believe influence the level of implementation of the ERP system.

……

……

……

Appendix II: List of licensed Mobile Network Operators in Kenya

	COMPANY NAME
1	Airtel Networks Kenya Limited
2	Safaricom Limited
3	Telkom Kenya Limited

Source: Communications Authority of Kenya. Register of Telecommunications Licensees.