AN INVESTIGATION OF CRITICAL SUCCESS FACTORS FOR SUCCESSFUL IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS IN KENYA

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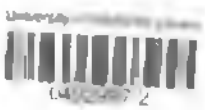

DECLARATION

This research project is my original work and has not been presented for a degree programme in any other university.

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DEDICATION

This work is dedicated to my mum Esther Njoki, my lovely wife Evah, and to my son Junior Ryan who have all been a source of inspiration and strength to me.

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I am most grateful to God for the opportunity to undertake this study and for the provision of His abundant grace to do the research project.

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ABSTRACT

Enterprise resource planning (ERP) systems have emerged as the core of successful information management and the enterprise backbone of organizations. In the past few years, many companies in Kenya have invested a lot of capital in information systems that range from transaction processing systems to complex inter-organizational systems. One of the systems that companies have invested in is the Enterprise Resource Planning Systems (ERPs).

Most companies in Kenya are making frantic efforts to implement ERPs, which are being marketed as perfect solution to the organizational problems of information management. The difficulties of ERP implementations have been widely cited in the literature but research on the critical factors for initial and ongoing ERP implementation success is rare and fragmented. ERP implementation success rate is low with most of ERPs implementation being late or over budget and others failing to deliver the envisaged objectives.

Against this background the research study sought to study critical success factors affecting enterprise resource planning (ERP) systems implementation in Kenya, and the approaches used in ERPs implementation. Identification of these factor and challenges would be based on the perception of the experts who are the ICT consultants involved in ERPs implementation. An understanding of the emerging challenges in ERPs implementation was also focused on in this research study, this would help organizations contemplating adopting ERPs and ERP implementers develop appropriate intervention

mechanisms such as training and communication that can lead to successful ERP implementation.

Forty two ICT consultants who are involved in ERPs implementation were studied. Primary data for the study was collected using questionnaires. From this study critical success factors for successful ERP implementation have been identified. Teamwork and composition in the ERP implementer-vendor-consultant partnership is a key factor influencing ERP implementation success. Good coordination and communication between the implementation partners are essential. Since ERP covers a wide range of functional areas, it is also important to have a cross functional ERP core team. It is extremely critical that partnership trust is present and the team members are working well together. Another very critical factor is change management program and culture.

An organizational culture where the employees share common values and goals and are receptive to change is most likely to succeed in ERP implementation. Furthermore, user training, education and support should be available and highly encouraged. Change agents should also play a major role in the implementation to facilitate change and communication, and to leverage the corporate culture. Other critical factors include top management support, business plan and vision, BPR and minimum customization, effective communication, project management, software development, testing and troubleshooting, monitoring and evaluation of performance, project champion, and appropriate business and IT legacy systems.

The ICT consultants noted that complexity of the ERP system, internal resistance, poorly defined specification, lack of system ownership, lack of user input, budget oversight, undefined expectation and costs constraint to be some the highest faced challenges in the process of ERP implementation. Most of the consultants use the parallel Big Bang approach in ERP implementation.

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CHAPTER I

INTRODUCTION

1.1 Background of the study

Business today faces a stark reality: anticipate, respond, and react to the growing demands of the marketplace, or perish. In a fiercely competitive environment, business strategy not only determines success, it governs business survival. Now, more than ever, effective business strategy centers on aggressive, efficient use of information technology. Effective management in organizations involves a lot of decision making in all aspects of management functions of planning, organizing, staffing, directing and controlling. Management needs to make sound decisions which must be based upon sound information Availability of quality information to management enhances sound decision making leading to good performance of the company in meeting its objectives (Lucey, 1998).

An enterprise resource planning (ERP) system is a packaged businesses software system that enables a company manage the efficient and effective use of resources (materials, human resources, finance, etc.) by providing a total, integrated solution for the organization's information-processing needs. It supports a process-oriented view of the business as well as business processes standardized across the enterprise. Among the most import ant attributes of ERP are its abilities to; (a) Automate and integrate an organization's business processes, (b) Share a common data and practices across the entire enterprise, and (c) Produce and access information in a real-time environment.

An Enterprise Resource Planning (ERP) system is also defined as a software infrastructure embedded with "best practices", thus providing the best ways to do business based on common business practices or academic theory. The aim of an enterprise system is to improve the co-operation and interaction between all departments in organizations (such as product planning, manufacturing, purchasing, marketing and customer service department).

Enterprise resource planning (ERP) system is "configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization" (Kumar et al (2000). ERP systems are expensive, and once ERP systems are implemented successfully, significant benefits such as improved customer service, better production scheduling, etc. can be gained. However, the successful implementation rate is low and many firms that have gained some benefits from ERP are yet to exploit the full potential of ERP in their organizations. According to Martin (1998), about 90% of ERP implementations are late or over budget and ERP implementation success rate is only about 33%. However, preliminary review of ERP systems implementation in Kenya indicates that success rate is extremely low at 10%. The steep difference of ERP systems implementation success rates between western countries and Kenya produces a need to examine general and specific to Kenya critical success factors.

Enterprise system is a fine expression of the inseparability of IT and business. As an enabling key technology, as well as being an effective managerial tool, enterprise system systems allow companies to integrate at all levels and to utilize important enterprise system applications such as supply-chain management, financial and accounting applications, human resource management and customer relationship management (Boubekri, 2001). They represent large, complex, computerized and integrated systems which can strongly influence long-term business success. The researcher in this paper intends to do an investigation on the factors which are important for successful implementation of ERP systems.

The implementation of ERP systems is a complex undertaking, which has a wide-reaching impact on key stakeholders including staff and customers. Enterprise Resource Planning (ERP) packages have, in the last few years, transformed the way organizations go about the process of providing Information Systems. Instead of crafting each new Information System locally, organizations are able to install well-integrated, internationally sourced packages which seek to incorporate best practice from IT systems

world-wide. In the past few years, a number of companies in Kenya have implemented ERP systems in their organizations. Appendix I lists some of the companies that have implemented ERP systems in Kenya. There are many other companies who are planning to implement ERP systems for their operations.

These packages also provide very rich choice in features and functions so that the adopting organization can tailor the package implementation to meet their very specific needs. However, the enormous growth rate in ERP systems adoption has slowed. It is apparent that some adopters are not yet realizing the benefits that they had anticipated. Efforts to make ERP packages successful in small to medium enterprises, in particular, are facing challenges. Consequently there is need to investigate ERP systems implementation with view to address success issues.

Nyandiere (2002) did a study investigating the challenges facing enterprise resource planning systems implementation in Kenya and as such it is extremely important to examine the emerging challenges given that technology is dynamic and furthermore many more organizations have continued to implement and adopt ERP systems in a changing business environment.

1.2 Statement of the problem

With the advent of globalization and liberalization of the Kenya economy many foreign firms have entered the local market. These new entrants have created intense competition as they have taken up the majority market of the existing firms. Information technology (IT) within many organizations has been identified as a tool for building competitive edge in the market as it has substantial effects on many organizations operations, including production, packaging, delivery, marketing, customer and general management of resources thus, many firms are incorporating computer based systems.

Despite the growing in interest in ERP systems, publications on these systems within the academic information systems (IS) community, as reflected by contributions to journals

and international conferences is now emerging. Research on ERP systems has been treated as "secondary" and its importance has been neglected by the IS community. But lately researchers argue the need for more ERP research (Gable 1998, Gable et al. 1997)

As computer based systems grow in popularity in the Kenyan situation, ICT firms must work in order to successfully implement information systems, as there exists low rate of successful systems implementations. It is therefore very important for organizations to enhance success by ensuring the factors considered very important in systems implementation and the challenges encountered during implementation are well considered. The consideration of these factors is very important because it is probably a combination of this factors that are important in explaining success rather than single elements (Laudon, 2000). Consideration of the factors should also be in respect of emerging applications such as ERP.

The process of ERP implementation presents an ongoing challenge for managers. This is because the exact combination of factors for successful ERP implementation varies over time from one organization to another and should be decided regarding a given set of company circumstances. Limited study has been conducted in ERP implementation, with most research consisting of case studies of systems implantation in individual organizations. The difficulties and high failure rate in implementing ERP systems have been widely cited in the literature (Davenport, 1998). However research on critical success factors (CSFs) in ERP implementation is rare and fragmented. To date, little has been done to theorize the important predictors for initial and ongoing ERP implementation success (Brown and Vessey, 1999). This research is an effort to achieve that. It identifies the CSFs in ERP implementation, and discusses the importance of these factors in ERP implementation.

Given the fact that Kenyan organizations are embracing this technology and the enormous resources involved in ERP systems implementation, it is important to examine the challenges involved in successful implementation of ERP as well as the factors considered important for successful implementation of ERP systems. In particular

consider widely documented techniques for improving ERP implementation which include the use of critical success factors. Documentation is not readily available about such factors in Kenya. Moreover, studies in information systems have not focused on the critical success factors for ERP implementation. Consequently this research primarily focuses on ERP implementation in Kenya and raised the following three questions;

(a) What factors are considered key in successful ERP implementation – rather, what are the critical success factors for successful ERP implementation in Kenya?

(b) What new challenges are encountered in ERP implementation in Kenyan business environment?

(c) What approaches are used in ERP implementation?

1.3 Objectives of the study

This study will examine the factors considered to be Important in ERP systems implementation and the challenges encountered in ERP systems Implementation. The study will be timely as many organizations are changing from traditional manual systems to adapt integrated computer based information systems as a tool of competitive advantage Background information on ERP systems and factors considered critical is given in details. Also the challenges encountered in the implementation process are discussed.

The study objectives will be to;

a) Determine the success factors that are Critical for successful implementation of ERP systems by Information Systems (IS) consultants in Kenya.

b) Establish the emerging challenges encountered by IS consultants when implementing ERP systems.

c) Establish the approaches used by IS consultants for implementation of ERP systems in Kenya.

1.4 Importance of the study

The findings of this study would be interest to a number of people. Firstly, the top management in user organizations will know the critical success factors for ERP systems implementation. They will also understand the challenges encountered in the implementation of ERP systems and on that basis be able to propose solutions to overcome the challenges.

The Information, Communication and Technology (ICT) consultants and system developers will use the findings to develop approaches or come up with best practices for successful ERP implementation in Kenya

Kenyan organizations intending to implement ERP systems would make informed decisions through the use of the findings of this study as well as use the findings as a road map in successful ERP implementation.

The government of Kenya, Kenya computer society and other bodies involved in ensuring successful information systems implementation will be interested with the findings of this study They will draw upon the findings of the study to come up with guidelines of enhancing successful systems implementation.

Finally, the findings will be of importance to academics or researchers. The findings may form a foundation on which more in-depth studies could be done with respect to integrated information systems implementation.

CHAPTER 2

LITERATURE REVIEW

2.1 The ERP Concept

An Enterprise Resource Planning (ERPS) system is a suite of integrated corporate wide software. ERP systems integrate across functions to create a single, unified system rather than a group of separate, insular applications.

Enterprise Resource Planning Systems (ERPS) has its origins in the concepts associated with Manufacturing Resource Planning (MRP) packages and their antecedents from the 1970s. Materials Requirement Planning packages. Even then, some such as Davenport (2000) argue that the evolution of ERP software has been such as to make the analogy with MRP inappropriate. In this spirit, there have been moves to replace the term ERP with EWS (Enterprise Wide Systems) or just ES (Enterprise Systems). There is some difficulty in agreeing upon a definition of ERP (Klaus et al, 2000). However, there are certain features that can be seen to characterize ERP packages. These key features are present in the package mostly installed by the organizations to be investigated in this study (Bancroft et al., 1998). A fundamental feature of the package is a high level of integration, with all applications sharing a single corporate database. The system is designed for an on-line client/server environment.

A high level of application functionality, richly configurable to the needs of the individual customer is an important objective embedded in the package. The package is also intended to provide best practice, in a global sense, through a range of standardized business processes.

2.2 ERPs Implementation in Kenya

Research has been done in other parts of word such as America. A recent US survey of 63 companies indicated that the average implementation cost approximately $11 million and took 23 months to complete: a second survey of executives showed that 65% of them believed that their ERP implementation had a moderate chance of damaging their businesses (Willis et al 2001). Research to improve our ability to implement sound functioning ERP systems is vital because the impacts of poor implementation in any organization are far reaching. These may include a huge, unplanned financial commitment to system remediation, inability to carry out core business and reporting activities and consequent threat to business continuity; loss of reputation in the marketplace and impacts on staff workload, morale and consequent turnover and loss of expertise (Glover 1999, Keil 2000).

Opiyo (1999) noted that the computer industry in Kenya is one of the fastest growing economic sectors in Kenya. He noted that of the specialized mission critical systems, banking systems dominate and are closely followed by ERP systems. Among the successful implementations of ERPs in Kenya is the case of Kenya Power and Lighting Company (KPLC). KPLC went live in July of 1997 with SAP R/3 functionality for accounting, materials management, and human resources. The company implemented the system in phases between 1996 and 1998 (Nyandiere 2002).

In 2001, Bidco Oil refineries, manufacturer and marketer of edible oils, fats and soaps implemented **iBaan Sales** and **iBaan Procurement** to help the manufacturer drive online sales and enable strategic procurement solutions. The iBaan solutions helps Bidco staff, suppliers and customers throughout Africa to process sales, pricing and financial information online, and has helped the company to significantly reduce strategic procurement costs.

In Kenya there have been failed cases in ERPs implementation. Uchumi Company for example is a case at hand which attempted to implement ERP systems though did not

succeed. Telkom Kenya Limited where the researcher in this project was involved as project coordinator had embarked on ERP implementation in 2004 and awarded tender to Soluziona to implement SAP. However implementation was interrupted by several factors which included dispute in tender awarding hence court cases, change of the project champion and lack of continued management support. Telkom Kenya resulted to in-house systems development and integration which has been fairly successful.

In Kenya different studies have been done focusing on different aspects of information systems. Kipngetich (1991) studied management satisfaction with information systems, Gatune (1993) studied the factors considered important in implementing local area networks. Nyambane (1996) studied the evaluation of the extent of the factors limiting information technology usage in publicly quoted companies in Kenya while Ochieng (1998) studied the factors considered important in the implementation of information systems. Nyambuti (2001) studied information technology planning practices in Kenya banks. Munguti (2001) in his study of ERP and RDBMS, strategic developments in information technology pointed out that in Kenya , SAP R3 (an ERP system) has been implemented by a number of companies but did not identify factors that are considered critical in successful implementation of this ERP

Nyandiere (2002) studied the challenges that firms in Kenya face during ERPs implementation, however he did not identify factors that are considered critical for successful for ERP systems implementation.

2.3 ERP implementation Approaches

There are three key strategies that are commonly employed in ERP implementation.

a) "Big bang": Do it all at once.

b) Modular (Franchising strategy) Implementation: Do a division at a time

c) Process-Oriented (Slam-dunk) Implementation: Do a sub-set of modules (e.g., just general ledger).

The Big Bang –in this, the most ambitious approach to ERP implementation, companies cast off all their legacy systems at once and implement a single ERP system across the entire company.

Though this method dominated early ERP implementations of the late '90s, few large companies attempt it anymore because it calls for the entire company to mobilize and change at once. Getting everyone to cooperate and accept a new software system at the same time is a tremendous effort, largely because the new system will not have any advocates. No one within the company has any experience using it, so no one is sure whether it will work.

A spin-off of the Big Bang that is more commonly used is the mini Big Bang and the parallel Big Bang. The mini Big Bang only switches over certain business functions (i.e. Accounts Receivable, Purchasing, etc.) for a certain period of time and then switches the rest of the business functions when everything is running smoothly with the first phase. In contrast, the parallel Big Bang method is a bit riskier as it attempts to run the ERP system in synchronization with the currently existing legacy system. The parallel method requires tremendous data entry efforts and is very risky because of the possibility of keying in data incorrectly in one of the two live systems.

While using any variation of the Big Bang strategy, it is real important that thorough training, practice runs, and extensive research are done before switching. The larger and more complex a company is, the more effort will be necessary in order to make the Big Bang work.

Modular (Franchising strategy) Implementation

The method of modular implementation goes after one ERP module at a time. This limits the scope of implementation usually to one functional department. This approach suits

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companies that do not share many common processes across departments or business units.

Independent modules of ERP systems are installed in each unit, while integration of ERP modules takes place at the later stage of the project. This has been the most commonly used methodology of ERP implementation. Each business unit may have their own "instances" of ERP and databases. Modular implementation reduces the risk of installation, customization and operation of ERP systems by reducing the scope of the implementation. The successful implementation of one module can benefit the overall success of an ERP project.

Process-Oriented (Slam-dunk) Implementation

The process-oriented implementation focuses on the support of one or a few critical business processes which involves a few business units. The initial customization of the ERP system is limited to functionality closely related to the intended business processes. The process-oriented implementation may eventually grow into a full blown implementation of the ERP system. This approach is utilized by many small to mid-sized companies which tend to have less complex internal business processes.

The variety of software called Enterprise Resource Planning (ERP) systems, which includes PeopleSoft, SAP, Oracle, and others, have their own history of failed implementations. Even then firms generally would have spent millions of shillings on installing these systems and have thrown them out when they realized it was not going to give them what they wanted. In some cases companies have spent so much money on failed implementations they ended up in bankruptcy. A high percentage of reimplementations have resulted in litigation and in seriously damaged reputations of the major consulting firms that implemented them.

Many of the technology solutions implemented by organizations end up overrunning their budgets, delivering late, and not providing the results expected. These are just symptoms of the root causes; however combine the complexity of the environment with the complexity of the technology and it's an almost guaranteed disaster. While the

environment may be highly complex and politically-driven, the technology of ERP systems itself is so complex, and crosses so many organizational boundaries, that it often fails even in a less complex environment. Coca-Cola spent $10million on its SAP implementation and then threw it out when it failed to deliver the expected benefits. Thus, critical success factors need to be determined and considered for successful ERP implementation.

2.4 Success and failure in ERP implementations

Nowadays, in the emerging ERP research, definition and measurement of ERP implementation success is a thorny issue. Markus and Tanis (2000) state that success means different things depending on who defines it. Thus for instance, project managers and implementation consultants, "often define success in terms of completing the project on time and within budget. But people whose jobs is to adopt ERP systems and use them to achieve business results tend to emphasize having a smooth transition to stable operations with new system, achieving intended business improvements like inventory reductions, gaining improved decision support capabilities " This relative point of view for success can also be applied for failure, and people will also qualify an implementation as a failure according to their goals

According to Markus and Tanis (2000), optimal success refers "to the best outcomes the organization could possibly achieve with enterprise systems, given its business situation measured against a portfolio of project, early operational, and longer term business results metrics. " in this research I adopt Markus and Tanis point of view.

Despite the benefits that can be achieved from a successful ERP system implementation, there is already evidence of failure in projects related with ERP implementations (Davenport, 1998). Too often, project managers focus on the technical and financial aspects of a project and neglect to take into account the non-technical issues. To solve this problem CSI's approach to study ERP implementation is important. Pinto and Slevin (1987) defined a model of a project implementation success as $S = f(X_1, X_2, \ldots\ldots, X_n)$

where S is project success and X, the critical success factor i. In this research the same model applies where the defined critical success factors are equal to X_i.

2.5 Critical success factors for ERP implementation

Critical success factors (CSFs) were initially devised as a tool for identifying what organizations must do well in order to succeed and determining the information needs of top executives (Rockart 1979). In the 1970s and 80s, CSFs were defined as those key business activities which, if achieved, would ensure competitive marketplace performance for an organization (Bullen et al 1981). Because they are simple to understand, document and monitor, CSFs have become a useful tool is information systems analysis and research. Critical success factors have been identified and the benefits of their use have been documented in project management and software development and implementation (Parr et al 1999, Holland et al 1999). Many authors use CSFs so generally that they could be viewed as possible influences on success rather than causal factors. Parr and Shanks (2000) argue that CSFs in ERP implementations are defined factors which, while not sufficient to ensure a successful outcome, are necessary to achieve success.

In order to achieve the objectives of this study the following CSFs in ERP implementation were identified. Highlight is also given on the importance of these factors in ERP implementation.

2.5.1 Top management support

Top management support is needed throughout the implementation. The project must receive approval from top management (Bingi, 1999; Buckhout, 1999; Sumner, 1999) and align with strategic business goals (Sumner, 1999). This can be achieved by tying management bonuses to project success (Wee, 2000).

Top management needs to publicly and explicitly identify the project as a top priority (Wee, 2000). Senior management must be committed with its own involvement and willingness to allocate valuable resources to the implementation effort (Holland *et al.*, 1999). This involves providing the needed people for the implementation and giving appropriate amount of time to get the job done (Roberts and Barrar, 1992). Managers should legitimize new goals and objectives. A shared vision of the organization and the role of the new system and structures should be communicated to employees. New organizational structures, roles and responsibilities should be established and approved. Policies should be set by top management to establish new systems in the company. In times of conflict, managers should mediate between parties (Roberts and Barrar, 1992).

2.5.2 Business plan and vision

Additionally, a clear business plan and vision to steer the direction of the project is needed throughout the ERP life cycle (Buckhout *et al*., 1999). A business plan that outlines proposed strategic and tangible benefits, resources, costs, risks and timeline is critical (Wee, 2000). This will help keep focus on business benefits. There should be a clear business model of how the organization should operate behind the implementation effort (Holland *et al.*, 1999). There should be a justification for the investment based on a problem and the change tied directly to the direction of the company (Falkowski *et al.*, 1998). Project mission should be related to business needs and should be clearly stated (Roberts and Barrar, 1992). Goals and benefits should be identified and tracked (Holland *et al.*, 1999). The business plan would make work easier and impact on work (Rosario, 2000).

2.5.3 Effective communication

Effective communication is critical to ERP implementation (Falkowski *et al.*, 1998). Expectations at every level need to be communicated. Management of communication, education and expectations are critical throughout the organization (Wee, 2000). User input should be managed in acquiring their requirements, comments, reactions and

approval (Rosario, 2000). Communication includes the formal promotion of project teams and the advertisement of project progress to the rest of the organization (Holland *et al*., 1999). Middle managers need to communicate its importance (Wee, 2000). Employees should be told in advance the scope, objectives, activities and updates, and admit change will occur (Sumner, 1999).

2.5.4 Project management

Good project management is essential. An individual or group of people should be given responsibility to drive success in project management (Rosario, 2000). First, scope should be established (Rosario, 2000; Holland *et al.*, 1999) and controlled (Rosario, 2000). The scope must be clearly defined and be limited. This includes the amount of the systems implemented, involvement of business units, and amount of business process reengineering needed. Any proposed changes should be evaluated against business benefits and, as far as possible, implemented at a later phase (Sumner, 1999; Wee, 2000).

Additionally, scope expansion requests need to be assessed in terms of the additional time and cost of proposed changes (Sumner, 1999). Then the project must be formally defined in terms of its milestones (Holland *et al.*, 1999). The critical paths of the project should be determined. Timeliness of project and the forcing of timely decisions should be managed (Rosario, 2000). Deadlines should be met to help stay within the schedule and budget and to maintain credibility (Wee, 2000). Project management should be disciplined with coordinated training and active human resource department involvement (Falkowski *et al* , 1998). Additionally, there should be planning of well-defined tasks and accurate estimation of required effort. The escalation of issues and conflicts should be managed (Rosario, 2000). Delivering early measures of success is important (Wee, 2000). Rapid, successive and contained deliverables are critical. A focus on results and constant tracking of schedules and budgets against targets are also important (Wee, 2000).

2.5.5 Project champion

Project sponsor commitment is critical to drive consensus and to oversee the entire life cycle of implementation (Rosario, 2000). Someone should be placed in charge and the project leader should "champion" the project throughout the organization (Sumner, 1999). There should be a high level executive sponsor who has the power to set goals and legitimize change (Falkowski *et al* , 1998) Sumner (1999) states that a business leader should be in charge so there is a business perspective. Transformational leadership is critical to success as well. The leader must continually strive to resolve conflicts and manage resistance.

2.5.6 Appropriate business and legacy systems

Appropriate business and legacy systems are important in the initial chartering phase of the project. According to Roberts and Barrar (1992), a stable and successful business setting is essential. Business and IT systems involving existing business processes, organization structure, culture, and information technology affect success. It determines the IT and organizational change required for success (Holland *et al.*, 1999). Roberts and Barrar also argue that success in other business areas is necessary for successful ERP implementations.

2.5.7 Change management program and culture

Change management is important, starting at the project phase and continuing throughout the entire life cycle. Enterprise wide culture and structure change should be managed (Falkowski *et al.*, 1998), which include people, organization and culture change (Rosario, 2000). A culture with shared values and common aims is conducive to success. Organizations should have a strong corporate identity that is open to change.

An emphasis on quality, a strong computing ability, and a strong willingness to accept new technology would aid in implementation efforts. Management should also have a strong commitment to use the system for achieving business aims (Roberts and Barrar, 1992). Users must be trained, and concerns must be addressed through regular

communication, working with change agents, leveraging corporate culture and identifying job aids for different users (Rosario, 2000).

As part of the change management efforts, users should be involved in design and implementation of business processes and the ERP system, and formal education and training should be provided to help them do so (Bingi *et al.*, 1999; Holland *et al* , 1999). Education should be a priority from the beginning of the project, and money and time should be spent on various forms of education and training (Roberts and Barrar, 1992). Training, res-killing and professional development of the IT workforce is critical. User training should be emphasized, with heavy investment in training and res-killing of developers in software design and methodology (Sumner, 1999). Employees need training to understand how the system will change business processes. There should be extra training and on-site support for staff as well as managers during implementation. A support organization (e.g. help desk, online user manual) is also critical to meet users' needs after installation (Wee, 2000).

2.5.8 Business process reengineering (BPR) and minimum customization

Another important factor that begins at the project phase is BPR and minimum customization. It is inevitable that business processes are molded to fit the new system (Bingi *et al.*, 1999). Aligning the business process to the software implementation is critical (Holland *et al.*, 1999; Sumner, 1999). Organizations should be willing to change the business to fit the software with minimal customization (Holland *et al.*, 1999; Roberts and Barrar, 1992). Software should not be modified, as far as possible (Sumner, 1999). Modifications should be avoided to reduce errors and to take advantage of newer versions and releases (Rosario, 2000). Process modeling tools help aid customizing business processes without changing software code (Holland *et al* , 1999).

Broad reengineering should begin before choosing a system. In conjunction with configuration, a large amount of reengineering should take place iteratively to take advantage of improvements from the new system. Then when the system is in use reengineering should be carried out with new ideas (Wee, 2000). Quality of business

process review and redesign is important (Rosario, 2000). In choosing the package, vendor support and the number of previous implementers should be taken into account (Roberts and Barrar, 1992).

2.5.9 Software development, testing and troubleshooting

Software development, testing and troubleshooting is essential, beginning in the project phase. The overall ERP architecture should be established before deployment, taking into account the most important requirements of the implementation. This prevents reconfiguration at every stage of implementation (Wee, 2000). There is a choice to be made on the level of functionality and approach to link the system to legacy systems. In addition, to best meet business needs, companies may integrate other specialized software products with the ERP suite. Interfaces for commercial software applications or legacy systems may need to be developed in-house if they are not available in the market (Bingi *et al.*, 1999).

Troubleshooting errors is critical (Holland *et al.*, 1999). The organization implementing ERP should work well with vendors and consultants to resolve software problems. Quick response, patience, perseverance, problem solving and firefighting capabilities are important (Rosario, 2000). Vigorous and sophisticated software testing eases implementation (Rosario, 2000).

In addition, there is need for methods, tools and technologies for ERP development. Scheer and Habermann (2000) indicate that modeling methods, architecture and tools are critical. With the facilities, requirements definition can be created and system requirements definition can be documented easily. Also there should be a plan for migrating and cleaning up data (Rosario, 2000). Proper tools and techniques and skill to use those tools will aid in ERP success (Rosario, 2000)

2.5.10 Monitoring and evaluation of performance

Finally, monitoring and evaluation come into play at the shakedown phase. Milestones and targets are important to keep track of progress. Achievements should be measured against project goals. The progress of the project should be monitored actively through set milestones and targets.

Two criteria may be used (Roberts and Barrar, 1992). Project management based criteria should be used to measure against completion dates, costs and quality. Then operational criteria should be used to measure against the production system. Monitoring and feedback include the exchange of information between the project team members and analysis of user feedback (Holland *et al.*, 1999).

There should be an early proof of success to manage skepticism (Rosario, 2000). Reporting should be emphasized with custom report development, report generator use and user training in reporting applications (Sumner, 1999). Management needs information on the effect of ERP on business performance. Reports or processes for assessing data need to be designed. These reports should be produced based on established metrics. It must include effective measurable project goals that meet business needs and are reasonable. Additionally, performance should be tied to compensation (Falkowski *et al*, 1998).

2.5.11 Company-Wide Commitment

Since ERP systems are enterprise-wide information systems that integrate information and information based processes within and across all functional areas in an organization, it's imperative to get support from all functional segments of the organization (Ang et al, 1995). Every person and department is responsible/accountable for the overall system and key users from different departments are ensured to commit to the project implementation without being called back to their prior functional job position frequently. Three aspects of company-wide support are considered: (1) Functional department heads are champions

of the ERP project; (2) They provide necessary resources to support their subordinates; (3) Other people outside the team support the project.

2.5.12 Education and Training

Education and training refers to the process of providing management and employees with the logic and overall concepts of ERP system (Sum et al, 1997). Thus, people can have a better understanding of how their jobs are related to other functional areas within the company. The user is the people who produce results and should be held accountable for making the system perform to expectations. The main reason for education and training is to increase the expertise and knowledge level of the people within the company. Three aspects concerning the contents of training are: (1) logic and concepts of ERP; (2) Features of the ERP system software; and (3) hands-on training. Concept training shows the people why the ERP system is implemented and why changes to the ERP system are necessary, while functional training (hands-on training) helps overcome the fear for computer systems since managerial people would fear that they are computer illiterate and they would lose power if manpower is reduced due to computerization, and the education can help overcome such fear.

2.5.13 User Involvement

User involvement refers to participation in the system development and implementation processes by representatives of the target user groups. System implementation represents a threat to users' perceptions of control over their work and a period of transition during which users must cope with differences between old and new work systems. User involvement is effective because it restores or enhances perceived control through participating in the whole project plan. There are two areas for user involvement when the company decides to implement an ERP system: (1) user involvement in the stage of definition of the company's ERP system needs, and (2) user participates in the implementation of ERP systems. Often companies do not recognize the impact of choosing the right internal employees with the right skill set. Internal resources of a company should not only be experts in the company's processes but also be aware of the

knowledge of information systems application in the industry. Involving users in the stage of defining organizational information system needs can decrease their resistance to the potential ERP systems, since by which users have feelings that they are the people who choose and make the decision.

2.5.14 Suitability of Software and Hardware

Due to the lack of professional expertise and experience on developing ERP systems in-house, many companies prefer to buy off-the-shelf systems to shorten the ERP implementation cycle. ERP packages provide generic off-the-shelf business and software solutions to customers. More or less they can't fully meet the company's needs, especially when the business processes of the company are unique. Thus, to increase the chance of success, management must choose software that most closely fits its requirements. ERP vendors use different hardware platforms, databases, and operation systems and certain ERP packages are only compatible with some companies' databases and operation systems. Thus, companies should conduct requirements analysis first to make sure what problems need to be solved and select the ERP systems that most fit their requirements. The hardware then is selected according to the specific ERP systems' requirements. Three aspects should be cared when selecting software and hardware: (1) compatibility of software/hardware and company's needs; (2) Ease of customization.

2.5.15 Data Accuracy

Since ERP system modules are intricately linked to one another, inaccurate data input into one module will adversely affect the functioning of other modules. If you lie to the ERP systems, then the ERP systems will lie to you and you will get inaccurate or misleading results. Thus, data accuracy is a major determinant of ERP success (Sum et al, 1997, Hammer and Champy, 2001).

2.5.16 ERP teamwork and composition

ERP teamwork and composition is important throughout the ERP life cycle. The ERP team should consist of the best people in the organization (Buckhout *et al.*, 1999; Bingi *et*

al., 1999; Rosario, 2000; Wee, 2000). Building a cross-functional team is also critical. The team should have a mix of consultants and internal staff so the internal staff can develop the necessary technical skills for design and implementation (Sumner, 1999). Both business and technical knowledge are essential for success (Bingi *et al.*, 1999; Sumner, 1999).

The ERP project should be their top and only priority and their workload should be manageable (Wee, 2000). Team members need to be assigned full time to the implementation (Wee, 2000). As far as possible, the team should be co-located together at an assigned location to facilitate working together (Wee, 2000). The team should be given compensation and incentives for successfully implementing the system on time and within the assigned budget (Wee, 2000). The team should be familiar with the business functions and products so they know what needs to be done to support major business processes (Rosario, 2000).

The sharing of information within the company, particularly between the implementation partners, and between partnering companies is vital and requires partnership trust (Stefanou, 1999). Partnerships should be managed with regularly scheduled meetings. Incentives and risk-sharing agreements will aid in working together to achieve a similar goal (Wee, 2000).

2.6 Challenges in ERP Implementation

Implementing any ERP system is a challenge for an organization because of the declining success rate of ERP implementations world-wide. The commercial penetration of ERP is incontrovertible. It was recently claimed that "most very large organizations world-wide have already adopted ERP, and increasingly small- and medium sized enterprises (SMEs) too are finding it cost effective and a competitive necessity to follow suit.", (Klaus et al., 2000). However, this global success is facing challenges. Some implementers of ERP have failed to achieve the expected benefits while others have abandoned ERP implementations or reduced their scale (Al-Mashari et al., 2000; Scott, 1999). In large

part, these disappointments have been attributed to the great size and complexity of the packages and the associated problems in customization and organizational change.

Others have noted that ERP implementers outside Europe and North America can also experience problems arising from what have been called "cultural misfits", (Soh et al., 2000). These cultural misfits relate to the inability of the global packages, in spite of their enormous functional flexibility, to readily address specific functional needs associated with the local laws and local practices. In such cases, workarounds in the form of add-on modules have been more common than changes to the package source code, presumably because these less populous counties do not justify suppliers changing the packages.

A by-product of this approach is increased maintenance costs for the organizations involved, since upgrades of an ERP package may not interface properly with the add-on module and, worse still, the mismatches may not be detected until after the package has been customized and put into operation. Again, the risk of introducing software bugs is increased by this "bolt on" approach.

2.6.1 Lack of Management dedication

Management being involved but not dedicated, a bottom up approach is employed (the Process is not viewed as a Top Management priority) Management must keep focus on the overall objectives and contribute sufficient time to the endeavor while avoiding being bogged down with the project's finer details (Summer, 1999).

2.6.2 Business processes

Failure to examine business processes to match an ERP function and enhance the business process to meet the needs of the desired ERP system outcome. Failure to determine whether current processes make sense, examination of a company's routine processes reveals substantial truths about what actually works and what doesn't. Key rule in implementing any system, "don't automate a bad process." in its simplest form. To do ERP right, the ways you do business will need to change and the ways people do their

jobs will need to change too. And that kind of change doesn't come without pain. Unless, of course, the ways of doing business are working extremely well in which case there is no reason to even consider ERP.

2.6.3 Internal Resistance

Internal Resistance to changing the 'old' processes; a key challenge in deploying an ERP "is getting people to rethink how things are done". To get the most from the software, people inside the company have to adopt the work methods outlined in the software. If the people in the different departments that will use ERP don't agree that the work methods embedded in the software are better than the ones they currently use, they will resist using the software or will want IT to change the software to match the ways they currently do things. This is where ERP projects break down. The whole process of change is challenging and employees often unprepared for new procedures and roles (Laudon, 2000).

2.6.4 Lack of involvement of major stakeholders

Critical stakeholders don't accept or get involved with the implementation; the end result of ERP will be a significant change to the way the organization looks and operates. By the very nature of ERP systems, departments are forced to share information that they considered proprietary in the past. Silos, constructed over the years for hoarding information must be dismantled. Middle managers should alleviate their fears that the new software will reduce their influence. Senior managers must reinforce the project's benefits and stress the importance of sharing information (Hartwick and Barki, 1994).

2.6.5 Lack of user input

Lack of user input will likely contribute to a bad ERP implementation. Failure to include not only the users, but also the business partners and other internal departments whose cooperation will be needed could pose a serious challenge in ERP implementation (Hartwick and Barki, 1994). Even though this may slow things down, the project management team must identify all the key resources needed to implement and support

the ERP project. A complete list of users from whom input should be sought– without their support, a successful implementation will be hard to achieve.

2.6.6 Unrealistic and undefined Expectations

Estimating ERP project schedules and resource requirements has always been a hit-and-miss affair. Stakeholders, less knowledgeable about what the technology can really do, create their own expectations — even fantasies.

If expectations are not set, scope creep is inevitable. An initially straightforward project can evolve into an unmanageable one, violating schedules and consuming resources
A formal project charter must be established to set expectations. Project management must ensure that formal budgeting and risk assessment happen while senior management makes sure the culture is in place for a strong project management discipline. Projects fail, not because the tasks are insurmountable, but because they're engendered by an effort to transform the company. Information Technology is used as the catalyst for that change and makes a very convenient scapegoat if things turn ugly. When a project falls short, it may look like IT failed –but it's almost always because the organizational change was unsuccessful.

2.6.7 Poor Communication

The everyday communication problem is worse when IT is involved, simply because it's hard for a lay person to grasp the lingo. Use of non-technical terminology whenever possible, especially when communicating outside the project team is inevitable. The project manager must be forthcoming with any news good or bad. Line workers don't want to be the bearers of bad news, and senior managers contrive to not hear bad news if it's ever delivered. As a result, nobody sounds the alarm on IT projects that have "disaster" written all over them until it's too late. Senior executives' unavailability when they're needed and their lack to stay in constant touch with the project management can be disastrous.

2.6.8 Poorly defined Specifications and change control procedures

Poorly defined specifications and a lack of change control procedures are prime causes of ERP project failure (O' Brien, 1999). Requirements must be well defined up front to obtain the required consensus among the stakeholders. One of the keys is to secure input from the stakeholders through a series of planning meetings to define in clear terms what the project can, and cannot do. Senior management must ensure project scope changes are managed in a formal manner. This includes, but is not limited to, delays in the schedule or requests for additional money.

2.6.9 Unclear and Untested implementation methodology

Perhaps the biggest and deadliest mistake organizations make when implementing ERP is relying on an unrefined, and even untested, methodology. Too often, the key players in ERP implementations assume that they can get by on their own. They dive into the project only to discover that implementing ERP is more complex than any garden variety project-management style or approach can handle. The most ambitious and difficult of approaches to ERP implementation - companies cast off all their legacy systems at once and install a single ERP system across the entire company. Though this method dominated early ERP implementations, few companies dare to attempt it anymore because it calls for the entire company to mobilize and change at once (Laudon, 2000)

2.6.10 Budgeting Oversights

Needless to say, the move to ERP is a project of breathtaking scope, and the price tags on the front end are enough to make the most placid CFO a little twitchy. In addition to budgeting for software costs, financial executives should plan to write checks to cover consulting, process rework, integration testing and a long laundry list of other expenses before the benefits of ERP start to manifest them. Underestimating the price of teaching users their new job processes can lead to a rude shock down the line, and so can failure to consider data warehouse integration requirements and the cost of extra software to duplicate the old report formats. A few oversights in the budgeting and planning stage can send ERP costs spiraling out of control faster than oversights in planning almost any

other information system undertaking. The most common reason for the performance problems is that everything looks and works differently from the way it did before. When people can't do their jobs in the familiar way and haven't yet mastered the new way, they panic, and the business goes into spasms.

2.6.11 Political Influence

Political fights break out over how-or even whether-the software will be installed. IT gets bogged down in long, expensive customization efforts to modify the ERP software to fit with powerful business barons' wishes. Customizations make the software more unstable and harder to maintain when it finally does come to life. The challenges can be summarized as follows; Complexity of the ERP systems, Current management practices being maverick and "shoot from the lip" style, Organizations that move to ERP solutions are large, complex, and are all dispersed globally/regionally, High cost of the ERP systems and Lack of in-house training, lack of written procedures, inadequate operations personnel input

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Research Design

This research is being conducted using the survey approach. The methodology to be employed in this research is an empirical survey.

3.2 Population of study

The population of interest in this study consists of consultants from Information and Communications Technology (ICT) consulting firms in Nairobi. The respondents in this study are the Kenya's ICT consultants. The rationale for considering the respondents in this study is that the consultants perform the function of systems implementation; consequently they have knowledge, skills and experience of systems implementation and changeover approaches. Thus they can offer the information being sought for the study.

The current list of ICT consulting firms were obtained from Nation Business directory 2006, the Kenya computer society and Kenya telephone directory 2006. Also Wachira (2001) listed some 77 firms for his study. In addition snowball method will be used to identify firms, which may not necessarily be in the above-mentioned sources for inclusion in the study.

3.3 Data Collection

The study used primary data. The data required to perform the study will be gathered from the ICT consultants through the administration of a self-completion questionnaire. The questionnaires were largely administered on the "drop and pick later" method, this was be to the managing consultant, the head of the ICT consultancy department and consultants who have previously implemented ERP systems.

The questionnaire has 4 sections that were used in tapping information to meet the objectives of the study:

Section A was used to collect data on demographic information for both the firms and the consultants.

Section B was used to collect data on the factors considered during ERP systems implementation.

Section C was used to collect data on implementation approaches used during ERP systems implementation.

Section D was used to collect data on challenges encountered during ERP systems implementation.

3.4 Data Analysis

This being an exploratory study the data analysis involves summarization of data using statistical averages, percentages and frequency. The results were presented using tables and graphs. This was done for all the objectives and sections of questionnaires.

Further data analysis was done considering the demographic factors to provide different perspectives on the results in section A.

Factor analysis was used to analyze the relative importance the respondents gave to various factors presented in section B of the questionnaire.

In section C of the questionnaire summarization, mean, standard deviation and frequency distribution was used to analyze data in respect to implementation approaches used by responding firms during ERP implementation.

Factor analysis was used to summarize the challenges presented in section D of the questionnaire impended the ERP systems implementation process.

CHAPTER 4

DATA ANALYSIS AND PRESENTATION OF FINDINGS

4.1 Introduction

The data was collected using questionnaires of which 101 were dispatched. Out of the 101 questionnaires, 42 (41%) responses were received, edited, validated and analyzed. This chapter presents the data analysis techniques, results and interpretation.

4.2 Demographic Characteristics

4.2.1 Firm ownership

This aimed at establishing the ownership of the most of the respondent's firms; Table 4.2.1 shows the distribution of firms of the respondents by ownership. A large number 30 (71%) of the responding firms are mainly locally owned.

Table 4.2.1 Firm Ownership

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Locally Owned	30	71.4	75.0	75.0
	Foreign Owned	6	14.3	15.0	90.0
	Both (locally and foreign)	4	9.5	10.0	100.0
	Total	40	95.2	100.0	
Missing	System	2	4.8		
Total		42	100.0		

4.2.2 Gender

The gender of the respondents was analyzed so as to find out the proportion of men to women in the ICT industry. Of the total population 69% were men and 31% were women as shown in Table 4.2.2. This explains the fact that the information technology is widely dominated by men, though women are getting into IT career in the recent past.

Table 4.2.2 Gender

		Frequency	Percent	Cumulative Percent
Valid	Male	29	69.04	75.0
	Female	13	30.95	100.0
	Total	42	100.0	

4.2.3 Age Bracket

Age bracket of the respondent was considered of importance, as it would indicate the number of years that the professional have worked in relation to their experience in the ERP implementation. As illustrated on Table 4.2.3 none of the total population was below 25 Years, 38% were between 26-30 years and 4.8 % were between 31-35 years and only 19% were between 36-40 years. Only 4.8% were between 41-45 years while those who were between 46-50 years were 9.5%.

Table 4.2.3 Age of the Respondent

		Frequency	Percent	Valid Percent
Valid	26-30	16	38.1	50.0
	31-35	2	4.8	6.3
	36-40	8	19.0	25.0
	41-45	2	4.8	6.3
	46-50	4	9.5	12.5
	missing	10		
	Total	32	76.2	100.0
Total		42	100.0	

4.2.4 Level of Education

The main aim was to determine the highest level of education the respondent had attained, 4.8% had a diploma, 38% had attained a graduate level while 28.6% had attained postgraduate level and 28% were not willing to disclose their highest level of education, this is shown on Table 4.2.4.

Table 4.2.4 Education of the respondent

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Diploma	2	4.8	6.7	6.7
	Graduate	16	38.1	53.3	60.0
	Postgraduate	12	28.6	40.0	100.0
	Missing	12	28.6		
Total		42	100.0		

4.2.5 Main job positions

The respondents were analyzed in terms of the job they do in their firm. The results in Table 4.2.5 show that majority of the respondents gave their roles as Systems Analyst with 24%, Projects manager with 19% and 10% were training and change management

consultants which are the most commonly used professional in ERP implementation and had authority to give information on ERPs implementation process.

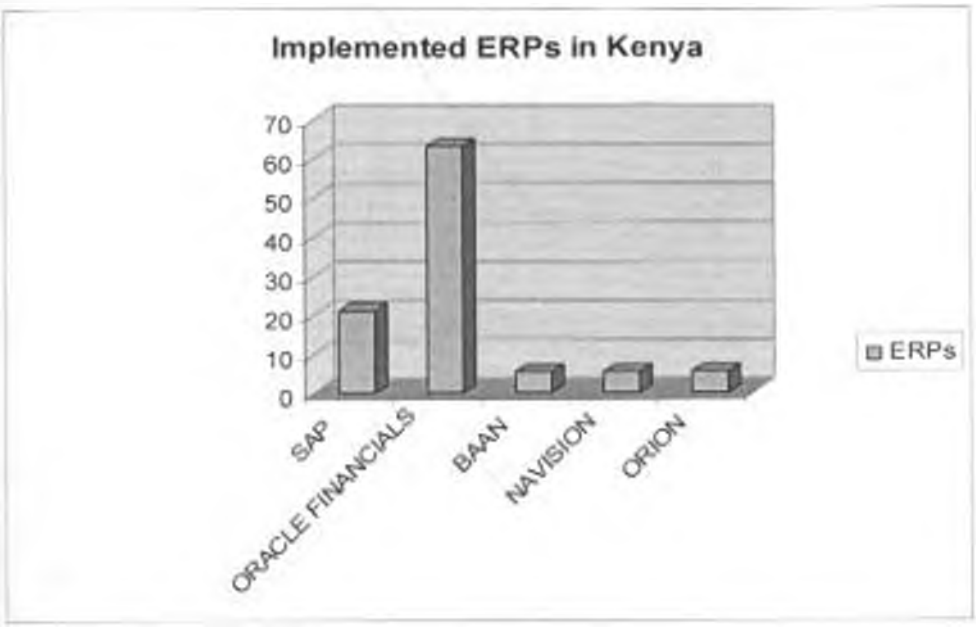
Table 4.2.5 Main job positions in the organization

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CIO	2	4.8	7.1	7.1
	Projects Manager	8	19.0	28.6	35.7
	Training & Change management consultant	4	9.5	14.3	50.0
	Systems Analyst	10	23.8	35.7	85.7
	System designer & developer	2	4.8	7.1	92.9
	Database administrator	2	4.8	7.1	100.0
	Total	28	66.7	100.0	
	Missing	14	33.3		
Total		42	100.0		

4.3 ERP Solutions Implementation

The study found out that the most common of the ERP system implemented was Oracle financials 63% followed by SAP 21%, BAAN represented 5%, Navision 5% and ORION 3%. However it should be noted that a few companies also use other ERP solutions that are slowly entering Kenyan market, for example, Sage line 500.

Table 4.3.1 ERPs implemented in Kenya



4.4 Factor Analysis of the factors considered to be critical in ERP systems implementation

This section addresses the first objective of the study, which is to determine the factors that are considered to be critical in ERPs implementation in Kenya

Factor analysis is a technique applicable when there is a systematic interdependence among a set of observed or manifest variables and the researcher is interested in finding out something more fundamental or latent which creates this commonality. Thus factor analysis seeks to resolve a large set of measured variables in terms of relatively few categories, known as factors.

4.4.1 The correlation Matrix

Each respondent has indicated the degree of importance which they attach to various factors as critical for ERP implementation. However, there may be some groups of factors that are similar to each other and thus factor analysis was used to identify such factors and group them together.

The principle concern of factor analysis is to resolve a large set of measured variables in terms of relatively few categories known as factors. This technique allows a researcher to group variables into factors based on correlation between the variables (Kothari 2003).

In correlation matrix variables, the existence of clusters of large correlation coefficients between subsets of the variables suggests that the variables could be measuring aspects of the same underlying dimension or factors (Field, 2000). Attempts are made to reduce the correlation matrix down to its component dimension by looking for variables that correlate highly with a group of the other variables outside that group.

The following is the correlation matrix of the factors considered critical for successful implementation of ERPs in Kenya by the respondents in this study. The extraction method was primary component analysis

Table 4.4.1 Correlation Matrix

correlation	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6	VAR7	VAR8	VAR9	VAR10	VAR11	VAR12
VAR1	1.000	0.762	0.824	0.648	0.688	0.079	-0.133	0.760	0.386	0.335	0.368	0.351
VAR2	0.762	1.000	0.694	0.335	0.766	0.000	-0.145	0.690	0.365	0.408	0.369	0.513
VAR3	0.824	0.694	1.000	0.760	0.779	0.378	0.010	0.684	0.597	0.558	0.518	0.496
VAR4	0.648	0.335	0.760	1.000	0.551	0.472	0.219	0.574	0.358	0.282	0.414	0.335
VAR5	0.688	0.766	0.779	0.551	1.000	0.070	-0.223	0.486	0.252	0.396	0.382	0.461
VAR6	0.079	0.000	0.378	0.472	0.070	1.000	0.157	0.227	0.553	0.311	0.406	0.311
VAR7	-0.133	-0.145	0.010	0.219	-0.223	0.157	1.000	0.157	0.155	0.214	-0.033	0.198
VAR8	0.760	0.690	0.684	0.574	0.486	0.227	0.157	1.000	0.574	0.430	0.126	0.492
VAR9	0.386	0.365	0.597	0.358	0.252	0.553	0.155	0.574	1.000	0.598	0.267	0.686
VAR10	0.335	0.408	0.558	0.282	0.396	0.311	0.214	0.430	0.598	1.000	0.338	0.624
VAR11	0.368	0.369	0.518	0.414	0.382	0.406	-0.033	0.126	0.267	0.338	1.000	0.369
VAR12	0.351	0.513	0.496	0.335	0.461	0.311	0.198	0.492	0.686	0.624	0.369	1.000
VAR13	0.444	0.600	0.525	0.282	0.682	0.000	0.064	0.382	0.386	0.776	0.391	0.772
VAR14	0.566	0.625	0.657	0.214	0.533	0.157	-0.133	0.510	0.454	0.677	0.256	0.556
VAR15	0.700	0.693	0.665	0.512	0.554	0.194	0.298	0.843	0.432	0.434	0.205	0.580
VAR16	0.662	0.658	0.665	0.499	0.617	0.198	0.282	0.800	0.441	0.546	0.204	0.658
VAR17	0.499	0.661	0.661	0.517	0.484	0.329	0.226	0.804	0.689	0.428	0.264	0.661
VAR18	0.572	0.546	0.731	0.517	0.419	0.461	0.081	0.735	0.859	0.428	0.264	0.604
VAR19	0.521	0.494	0.701	0.312	0.651	0.378	-0.104	0.400	0.569	0.658	0.403	0.494
VAR20	0.668	0.487	0.819	0.604	0.586	0.444	0.213	0.686	0.669	0.596	0.282	0.564
VAR21	0.074	0.047	0.395	0.318	0.156	0.711	0.397	0.284	0.586	0.758	0.244	0.543
VAR22	0.324	0.233	0.519	0.260	0.333	0.227	0.093	0.443	0.402	0.558	-0.019	0.430
VAR23	-0.254	-0.259	0.014	0.129	-0.155	0.568	0.379	0.046	0.468	0.358	0.195	0.582
VAR24	-0.141	-0.251	0.129	0.387	0.119	0.502	0.141	-0.070	0.237	0.106	-0.075	0.331
VAR25	0.480	0.351	0.574	0.561	0.455	0.315	0.214	0.510	0.386	0.129	0.256	0.419
VAR26	-0.251	-0.248	0.181	0.188	0.056	0.627	0.251	0.000	0.490	0.347	0.162	0.446
VAR27	-0.001	0.151	0.348	0.142	0.200	0.440	0.350	0.384	0.626	0.614	0.037	0.588
VAR28	0.444	0.470	0.654	0.466	0.688	0.165	0.102	0.571	0.439	0.465	0.097	0.613
VAR29	0.407	0.233	0.679	0.510	0.333	0.605	0.260	0.443	0.597	0.492	0.196	0.233
VAR30	-0.255	-0.054	-0.137	-0.168	-0.033	-0.192	0.149	0.036	-0.320	0.054	-0.288	-0.221
VAR31	-0.303	-0.053	-0.171	-0.352	-0.086	-0.297	0.058	0.014	0.004	0.118	-0.323	-0.053
VAR32	0.648	0.537	0.659	0.535	0.693	0.330	-0.011	0.566	0.200	0.326	0.138	0.178
VAR33	0.427	0.426	0.604	0.574	0.412	0.681	0.157	0.599	0.574	0.167	0.234	0.426
VAR34	0.344	0.242	0.460	0.369	0.490	0.324	0.155	0.294	0.321	0.490	0.389	0.693
VAR35	0.317	0.162	0.605	0.518	0.223	0.620	0.442	0.416	0.724	0.677	0.270	0.642
VAR36	0.354	0.260	0.521	0.299	0.225	0.000	0.371	0.386	0.350	0.658	0.171	0.202

Table 4.1 Correlation Matrix (continued)

	VAR13	VAR14	VAR15	VAR16	VAR17	VAR18	VAR19	VAR20	VAR21	VAR22	VAR23	VAR24
VAR1	0.444	0.566	0.700	0.662	0.499	0.572	0.521	0.668	0.074	0.324	-0.254	-0.141
	0.600	0.625	0.693	0.658	0.661	0.546	0.494	0.487	0.047	0.233	-0.259	-0.251
	0.525	0.657	0.665	0.665	0.661	0.731	0.701	0.819	0.395	0.519	0.014	0.129
VAR4	0.282	0.214	0.512	0.499	0.517	0.517	0.312	0.604	0.318	0.260	0.129	0.387
	0.682	0.533	0.554	0.617	0.484	0.419	0.651	0.586	0.156	0.333	-0.155	0.119
	0.000	0.157	0.194	0.198	0.329	0.461	0.378	0.444	0.711	0.227	0.568	0.502
	0.064	-0.133	0.298	0.282	0.226	0.081	-0.104	0.213	0.397	0.093	0.379	0.141
	0.382	0.510	0.843	0.800	0.804	0.735	0.400	0.686	0.284	0.443	0.046	-0.070
	0.380	0.454	0.432	0.443	0.689	0.859	0.569	0.669	0.586	0.402	0.468	0.237
VAR10	0.776	0.677	0.434	0.546	0.428	0.428	0.658	0.596	0.758	0.558	0.358	0.106
	0.391	0.256	0.205	0.204	0.264	0.264	0.403	0.282	0.244	-0.019	0.195	-0.075
	0.772	0.556	0.580	0.658	0.661	0.604	0.494	0.564	0.543	0.430	0.582	0.331
	1.000	0.589	0.495	0.636	0.396	0.275	0.610	0.515	0.444	0.386	0.197	0.094
VAR14	0.589	1.000	0.629	0.662	0.499	0.572	0.729	0.668	0.466	0.657	0.184	-0.080
	0.495	0.629	1.000	0.972	0.758	0.639	0.428	0.809	0.409	0.528	0.173	-0.113
VAR16	0.636	0.662	0.972	1.000	0.700	0.579	0.523	0.843	0.509	0.595	0.250	-0.009
VAR17	0.396	0.499	0.758	0.700	1.000	0.879	0.348	0.631	0.343	0.382	0.274	0.009
	0.275	0.572	0.639	0.579	0.879	1.000	0.523	0.713	0.109	0.451	0.327	0.112
	0.610	0.729	0.428	0.523	0.348	0.523	1.000	0.705	0.565	0.501	0.226	0.148
VAR20	0.515	0.668	0.809	0.843	0.631	0.713	0.705	1.000	0.650	0.631	0.308	0.122
	0.341	0.466	0.409	0.509	0.343	0.409	0.565	0.650	1.000	0.621	0.686	0.422
	0.386	0.657	0.528	0.595	0.382	0.451	0.501	0.631	0.621	1.000	0.255	0.306
	0.197	0.184	0.173	0.250	0.274	0.327	0.226	0.308	0.686	0.255	1.000	0.470
	0.094	-0.080	-0.113	-0.009	0.009	0.112	0.148	0.122	0.422	0.306	0.470	1.000
	0.154	0.306	0.629	0.589	0.572	0.645	0.312	0.570	0.309	0.491	0.309	0.289
	0.210	0.126	0.103	0.210	0.263	0.315	0.377	0.425	0.738	0.483	0.725	0.579
	0.449	0.411	0.418	0.507	0.535	0.477	0.498	0.574	0.758	0.681	0.505	0.523
	0.573	0.626	0.726	0.802	0.645	0.569	0.546	0.791	0.431	0.566	0.344	0.205
	0.176	0.407	0.528	0.525	0.451	0.591	0.501	0.819	0.696	0.599	0.195	0.188
VAR30	-0.057	0.168	0.215	0.208	0.146	-0.120	-0.127	0.056	0.079	0.167	-0.013	-0.366
	0.012	0.188	0.083	0.081	0.262	0.125	0.000	0.022	0.030	0.144	0.083	-0.403
	0.340	0.466	0.695	0.721	0.345	0.345	0.546	0.749	0.392	0.196	-0.081	0.053
	0.103	0.260	0.637	0.591	0.665	0.665	0.300	0.686	0.434	0.283	0.287	0.285
	0.674	0.487	0.531	0.674	0.221	0.221	0.599	0.648	0.601	0.528	0.533	0.393
	0.426	0.545	0.495	0.553	0.463	0.590	0.547	0.766	0.799	0.532	0.638	0.443
	0.316	0.572	0.400	0.396	0.393	0.454	0.436	0.467	0.409	0.521	0.117	-0.145

Table 4.1 Correlation Matrix (continued)

	VAR25	VAR26	VAR27	VAR28	VAR29	VAR30	VAR31	VAR32	VAR33	VAR34	VAR35	VAR36
	0.480	-0.251	-0.004	0.444	0.407	-0.255	-0.303	0.648	0.427	0.344	0.317	0.354
	0.351	-0.248	0.151	0.470	0.233	-0.054	-0.053	0.537	0.426	0.242	0.162	0.260
	0.574	0.181	0.348	0.654	0.679	-0.137	-0.171	0.659	0.604	0.460	0.605	0.521
	0.561	0.188	0.142	0.466	0.510	-0.168	-0.352	0.535	0.574	0.369	0.518	0.299
	0.455	0.056	0.200	0.688	0.333	-0.033	-0.086	0.693	0.412	0.490	0.223	0.225
	0.315	0.627	0.440	0.165	0.605	-0.192	-0.297	0.330	0.681	0.324	0.620	0.000
	0.214	0.251	0.350	0.102	0.260	0.149	0.058	-0.011	0.157	0.155	0.442	0.371
	0.510	0.000	0.384	0.571	0.143	0.036	0.014	0.566	0.599	0.294	0.416	0.386
	0.386	0.490	0.626	0.439	0.597	-0.320	0.004	0.200	0.574	0.321	0.721	0.350
	0.129	0.347	0.611	0.465	0.492	0.054	0.118	0.326	0.167	0.490	0.677	0.658
	0.256	0.162	0.037	0.097	0.196	-0.288	-0.323	0.138	0.234	0.389	0.270	0.171
	0.419	0.446	0.588	0.613	0.233	-0.221	-0.053	0.178	0.426	0.693	0.642	0.202
	0.154	0.210	0.449	0.373	0.176	-0.057	0.012	0.340	0.103	0.674	0.426	0.336
	0.306	0.126	0.411	0.626	0.407	0.168	0.188	0.466	0.260	0.487	0.545	0.572
	0.629	0.103	0.418	0.726	0.528	0.215	0.083	0.695	0.637	0.531	0.495	0.400
	0.569	0.210	0.507	0.802	0.525	0.208	0.081	0.721	0.591	0.674	0.553	0.396
	0.572	0.263	0.535	0.615	0.451	0.146	0.262	0.345	0.665	0.221	0.463	0.393
	0.645	0.315	0.477	0.569	0.591	-0.120	0.125	0.345	0.665	0.221	0.590	0.454
	0.312	0.377	0.498	0.546	0.501	-0.127	0.000	0.546	0.300	0.599	0.547	0.436
	0.570	0.425	0.574	0.791	0.819	0.056	0.022	0.749	0.686	0.648	0.766	0.467
	0.309	0.738	0.758	0.431	0.696	0.079	0.030	0.392	0.434	0.603	0.799	0.409
	0.491	0.483	0.681	0.566	0.599	0.167	0.144	0.396	0.283	0.528	0.532	0.521
	0.309	0.725	0.505	0.344	0.195	-0.011	0.083	-0.081	0.287	0.533	0.638	0.117
	0.289	0.579	0.323	0.205	0.188	-0.366	-0.403	0.053	0.285	0.393	0.443	-0.145
	1.000	0.251	0.204	0.535	0.491	-0.149	-0.140	0.466	0.594	0.415	0.393	0.354
	0.251	1.000	0.801	0.395	0.483	0.077	0.178	0.066	0.362	0.516	0.549	0.053
	0.204	0.801	1.000	0.525	0.548	0.238	0.353	0.201	0.384	0.475	0.584	0.303
	0.535	0.395	0.525	1.000	0.479	0.294	0.243	0.624	0.571	0.651	0.581	0.340
	0.491	0.483	0.548	0.479	1.000	0.066	-0.014	0.659	0.684	0.323	0.678	0.451
	-0.149	0.077	0.238	0.294	0.066	1.000	0.786	0.150	-0.066	-0.133	-0.136	0.234
	-0.140	0.178	0.353	0.243	-0.014	0.786	1.000	-0.157	-0.222	-0.253	-0.160	0.330
	0.466	0.066	0.201	0.624	0.659	0.150	-0.157	1.000	0.654	0.471	0.375	0.193
	0.594	0.362	0.384	0.571	0.684	-0.066	-0.222	0.654	1.000	0.363	0.562	-0.033
	0.415	0.516	0.475	0.651	0.323	-0.133	-0.253	0.471	0.363	1.000	0.620	0.102
	0.393	0.549	0.584	0.581	0.678	-0.136	-0.160	0.375	0.562	0.620	1.000	0.461
	0.354	0.053	0.303	0.340	0.451	0.234	0.330	0.193	-0.033	0.102	0.463	1.000

4.4.2 The communalities

The communality shows how much each variable is accounted for by the underlying factor taken together. A high value of commonality means that not much of the variable is left after whatever factors represent is taken into consideration. Each of the factors has associated with it a variance reflecting the variation of the respondents. The amount of variance associated with each factor is thus the communality of the variable. Communality here is the percentage of a factor variance that contributes to the correlation with other factors or is common to other factors. The Table 4.4.2 shows the communalities calculated. The extraction method was the principal component analysis.

Table 4.4.2 Communalities

	Initial	Extraction
Sustained management support	1.000	0.946
Clear business plan and vision	1.000	0.904
Effective communication inwards	1.000	0.932
Effective communication outwards	1.000	0.736
Use of project management techniques	1.000	0.856
Appropriate legacy systems	1.000	0.929
Organizational culture	1.000	0.871
Adequate change management practices	1.000	0.834
Comprehensive business process reengineering (BPR)	1.000	0.923
Extend of system testing and troubleshooting	1.000	0.894
Companywide commitment	1.000	0.782
End users training	1.000	0.979
User involvement	1.000	0.921
Data accuracy	1.000	0.809
Suitability of software	1.000	0.950
Suitability of hardware	1.000	0.965
Adequate project team composition	1.000	0.961
Adequate ERP implementation strategy	1.000	0.977
Evaluation of performance	1.000	0.840
Integrated nature of the system being implemented	1.000	0.918
Complexity of the system being implemented	1.000	0.936
Flexibility of the conversion approach	1.000	0.837
Employee level of resistance	1.000	0.845

Table 4.4.3 Communalities (continued)

	Initial	Extraction
Extent of political influence	1.000	0.868
Availability of funds	1.000	0.681
Clients recommendation	1.000	0.911
Effective organizational change	1.000	0.842
Adequacy of system documentation	1.000	0.867
Level of project risks	1.000	0.913
Use of consultants in adoption	1.000	0.921
Use of consultant in implementation	1.000	0.919
Clear definition of implementation scope	1.000	0.934
Clearly stated project objectives	1.000	0.943
End users support of the system	1.000	0.926
Level of customization	1.000	0.868
Vendor support	1.000	0.914

Extraction Method: Principal Component Analysis.

4.4.3 Factor extraction

The percentage of variance explained is the summary measure indicating how much of the total original variance of all the factors explained. Table 4.4.3 indicates that 36 factors have been extracted. The extraction method was the principal component analysis. However, not all factors were maintained in the analysis. Factors with relatively large Eigen values were considered while those with relatively small Eigen value were left out. Eigen values or latent root indicate the relative importance of each factor in accounting for the particular set. Only eight factors were considered significant as shown in the table.

Table 4.4.4 Total Variance

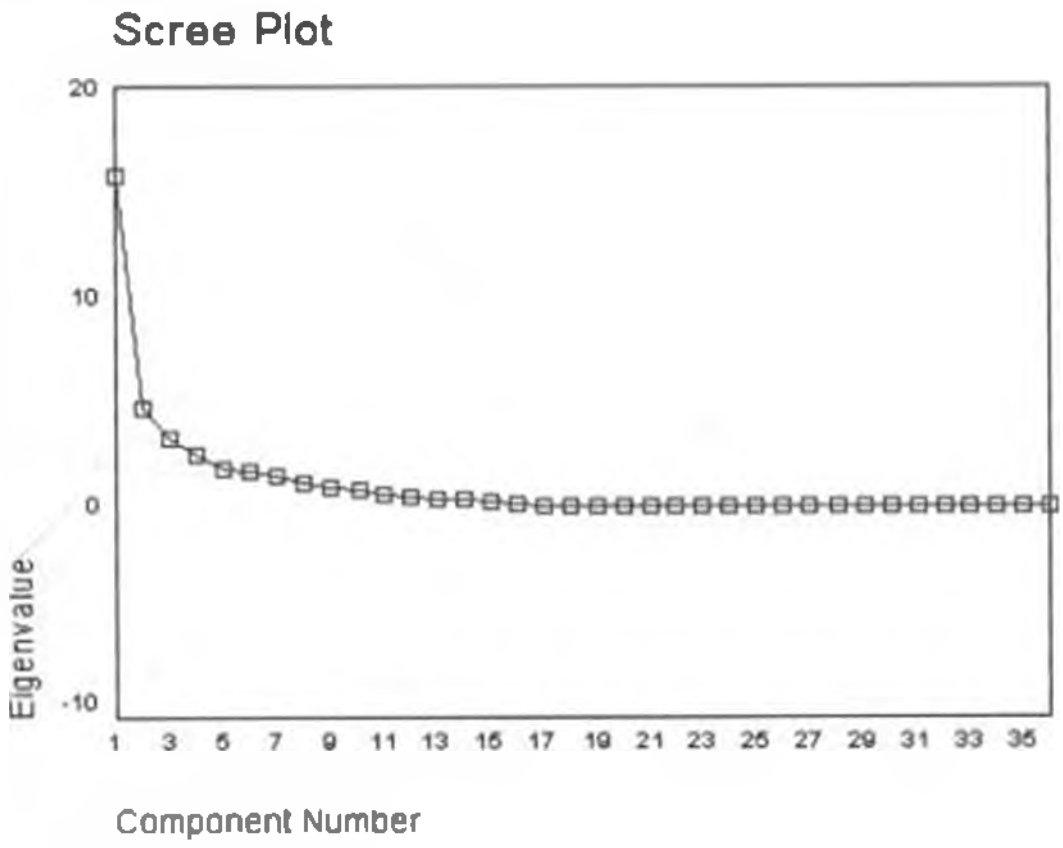
Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	15.690	43.584	43.584	15.690	43.584	43.584	7.675	21.319	21.319
2	4.639	12.886	56.470	4.639	12.886	56.470	6.088	16.912	38.232
3	3.289	9.135	65.605	3.289	9.135	65.605	4.339	12.053	50.285
4	2.436	6.768	72.373	2.436	6.768	72.373	4.293	11.924	62.209
5	1.821	5.059	77.432	1.821	5.059	77.432	3.579	9.941	72.151
6	1.643	4.563	81.995	1.643	4.563	81.995	2.860	7.944	80.095
7	1.420	3.945	85.940	1.420	3.945	85.940	1.748	4.856	84.950
8	1.116	3.099	89.039	1.116	3.099	89.039	1.472	1.089	89.039
9	0.944	2.622	91.661						
10	0.800	2.222	93.883						
11	0.567	1.575	95.459						
12	0.506	1.407	96.865						
13	0.407	1.130	97.995						
14	0.333	0.926	98.922						
15	0.260	0.722	99.644						
16	0.128	0.356	100.000						
17	0.000	0.000	100.000						
18	0.000	0.000	100.000						
19	0.000	0.000	100.000						
20	0.000	0.000	100.000						
21	0.000	0.000	100.000						
22	0.000	0.000	100.000						
23	0.000	0.000	100.000						
24	0.000	0.000	100.000						
25	0.000	0.000	100.000						
26	0.000	0.000	100.000						
27	0.000	0.000	100.000						
28	0.000	0.000	100.000						
29	0.000	0.000	100.000						
30	0.000	0.000	100.000						
31	0.000	0.000	100.000						
32	0.000	0.000	100.000						
33	0.000	0.000	100.000						
34	0.000	0.000	100.000						
35	0.000	0.000	100.000						
36	0.000	0.000	100.000						

Extraction Method: Principal Component Analysis

4.4.4 The Scree Plot

The Scree plot below confirms that only eight factors have been selected. This is a plot of the Eigen values against the component (Factor) numbers. The point of inflexion on the curve suggests that only eight factors are significant.

Figure 1 Scree plot



4.4.5 Factor Matrix

Once factors have been extracted, then it is possible to calculate the loading on each factor. Factor loadings are those values, which explain how closely the variables are related to each one of the factors discovered. This is well demonstrated on Table 4.4.4. The extraction method used was the principal component analysis. Eight components were extracted.

Table 4.4.5 Rotated Component Matrix

	Component							
	1	2	3	4	5	6	7	8
VAR1	0.685							
VAR2	0.490							
VAR3	0.683							
VAR4	0.677							
VAR5	0.638		0.526					
VAR6		0.767						
VAR7							0.883	
VAR8	0.600			0.614				
VAR9				0.711				
VAR10					0.679			
VAR11								0.751
VAR12			0.726	0.509				
VAR13			0.870					
VAR14					0.554			
VAR15	0.720							
VAR16	0.691		0.523					
VAR17				0.816				
VAR18				0.831				
VAR19					0.501			
VAR20	0.708							
VAR21		0.795						
VAR22					0.520			
VAR23		0.785						
VAR24		0.632						
VAR25	0.584							
VAR26		0.937						
VAR27		0.703						
VAR28	0.594		0.503					
VAR29	0.639							
VAR30						0.919		
VAR31						0.882		
VAR32	0.929							
VAR33	0.713							
VAR34			0.710					
VAR35		0.624						
VAR36					0.860			

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 15 iterations.

Table 4.4.6 Summary of loadings

FACTOR	VARIABLE(s)
1	1,2,3,4,5,8,15,16,20,25,28,29,32,33
2	6,21,23,24,26,27,35
3	5,12,13,16,28,34
4	8,9,12,17,18,
5	10,14,19,22,36
6	30,31
7	7
8	11

The Statements that make up the various Factors are listed in Table 4.4.6.

4.4.6 Factor Isolation

Table 4.4.7 Statements from the loadings (Factors)

Factor	Statement
1	• Sustained management support • Clear business plan and vision • Effective communication inwards • Effective communication outwards • Use of project management techniques • Adequate change management practices • Suitability of software • Suitability of hardware • Integrated nature of the system being implemented • Availability of funds • Adequacy of system documentation • Level of project risks • Clear definition of implementation scope • Clearly stated project objectives
2	• Appropriate legacy systems • Complexity of the system being implemented • Employee level of resistance • Extent of political influence • Clients recommendation • Effective organizational change • Level of customization

Table 4.4.8 Statements from the loadings (continued)

3	• Use of project management techniques • End users training • User involvement • Suitability of hardware • Adequacy of system documentation • End users support of the system
4	• Adequate change management practices • Comprehensive business process reengineering (BPR) • End User Training • Adequate project team composition • Adequate ERP implementation strategy
5	• Extent of system testing and troubleshooting • Data accuracy • Evaluation of performance • Flexibility of the conversion approach • Vendor Support
6	• Use of consultants in adoption • Use of consultants in implementation
7	• Organizational culture
8	• Companywide Commitment

Factor 1 indicates that most factors have been grouped under this factor due to their similarity. They include Sustained management support, Clear business plan and vision, Effective communication inwards, Effective communication outwards, Use of project, management techniques, Adequate change management practices, Suitability of software, Suitability of hardware, Integrated nature of the system being implemented, Availability of funds, Adequacy of system documentation, Level of project risks, Clear definition of implementation scope and Clearly stated project objectives.

Factor 2 has a focus on appropriate legacy systems, complexity of the system being implemented, employee level of resistance, extent of political influence, clients recommendation, effective organizational change and level of customization.

Factor 3 focuses on Use of project management techniques, end users training, user involvement, Suitability of hardware, adequacy of system documentation and end users support of the system.

Factor 4 concentrates on adequate change management practices, comprehensive business process reengineering (BPR), end user training, adequate project team composition, and adequate ERP implementation strategy.

Factor 5 revolves around the extent of system testing and troubleshooting, data accuracy, evaluation of performance, flexibility of the conversion approach and vendor support

Factor 6 involves use of consultants in adoption and use of consultants in implementation.

Factor 7 is organizational culture and Factor 8 is companywide commitment.

4.5 Extent of use of various approaches during ERPs implementation

The respondents were asked to indicate the extent to which they used various approaches in ERPs implementation process. The findings showed that Parallel Big Bang was the most used approach with 56% whereas the Big Bang approach was the least used approach.

Table 4.5.1 Big Bang

	Frequency	Percent
Not at all	6	14.3
Very little	24	57.1
Moderately	6	14.3
Quite a lot	4	9.5
Extensively	2	4.8
Total	42	100

This approach involves the installation of ERP systems of all modules across the entire organization at once. Table 4.5.1 shows the highest of the population of 24 (57%) rarely use Big Bang approach. This may be associated to the risks associated with this approach.

Table 4.5.2 Mini Big Bang

	Frequency	Percent
Not at all	4	9.5
Very little	6	14.3
Moderately	12	28.6
Quite a lot	18	42.9
Extensively	2	4.8
Total	42	100

Mini Big Bang involves switching over certain business functions (e.g. Accounts Receivable, Purchasing, etc.) for a certain period of time and then switching the rest of the business functions when everything is running smoothly with the first phase. Table 4.5.2 shows that this approach is used quite a lot (42.9%)

Table 4.5.3 Parallel Big Bang

	Frequency	Percent
Not at all	4	9.5
Very little	6	14.3
Moderately	8	19
Quite a lot	14	33.3
Extensively	10	23.8
Total	42	100

Parallel Big Bang attempts to run the ERP system in synchronization with the currently existing legacy system. Table 4.5.3 shows that a total of 57% of the population use this approach to a large extent (Quite a lot combined with extensively).

Table 4.5.4 Modular ("Franchising") Implementation

	Frequency	Percent
Not at all	2	4.8
Very little	6	14.3
Moderately	12	28.6
Quite a lot	16	38.1
Extensively	6	14.3
Total	42	100

This approach adopts a strategy of one module at a time. Limits the scope of implementation usually to one functional department. Independent modules of ERP systems are installed in each unit, while integration of ERP modules is taken place at the later stage of the project. Table 4.5.4 shows that 38% of the respondents use this approach quite a lot while 14% use this approach extensively.

Table 4.5.5 Process-Oriented ("Slam Dunk") Implementation.

	Frequency	Percent
Not at all	2	4.8
Very little	14	33.3
Moderately	6	14.3
Quite a lot	14	33.3
Extensively	6	14.3
Total	42	100

Process-Oriented ("Slam Dunk") implementation focuses on the support of one or a few critical business processes which involves a few business units. The initial customization

of the ERP system is limited to functionality closely related to the intended business processes. Table 4.5.5 shows that 33% of the respondents use this approach quite a lot and yet 33% use this approach very little.

Table 4.5.6 Mean and Standard deviation of the approaches

		The Big Bag	Mini Big Bag	Parallel Big Bang	Modular implementation	Process-oriented implementation
N	Valid	42	42	42	42	42
	Missing	0	0	0	0	0
Mean		2.33	3.19	3.48	3.43	3.19
Std. Deviation		1	1.06	1.27	1.06	1.19

From the Table 4.5.6 the most popular approach is the parallel Big Bang with a mean of 3.48 and a standard deviation of 1.27. This could be associated with the low risk of the approach. Despite the fact that it is very expensive to run the two systems ICT firms still preferred it to others.

The next preferred approach is Modular (Franchising) implementation with a mean of 3.43. This could be due to the fact that the risks are well spread by solving problems from a certain module and then moving to the next module.

The next preferred approach is Mini Big Band and Process-oriented (slam-dunk) with a mean of 3.19 each. This could be attributed to the time it takes to implement using this approaches.

The least used approach is Big Bang with a mean of 2.33. This has the highest risk because it provides no fall back position incase of error and may thus lead to huge losses in the firms involved.

If an attribute has a high mean and a high variation it means that there were extremes in the way respondents rated the particular variable.

4.6 Analysis of the challenges Encountered during ERP systems implementation

This section addresses the third objective of the study, which is to determine the emerging challenges encountered by ICT consultants in Kenya during the ERP systems implementation.

Factor analysis is a technique applicable when there is a systematic interdependence among a set of observed or manifest variables and the researcher is interested in finding out something more fundamental or latent which creates this commonality. Thus factor analysis seeks to resolve a large set of measured variables in terms of relatively few categories, known as factors.

4.6.1 Factors to asses challenges companies face in ERP systems implementation.

From the literature review, the researcher identified 26 factors that could be used to asses the challenges that ICT consultants faced in ERP implementation. The factors are listed below

1 Lack of top management support

2	Internal resistance
3	Lack of stakeholders involvement of implementation
4	Lack of user input
5	Undefined Expectation
6	Unrealistic expectation
7	Poor communication
8	Poorly defined specification
9	Lack of control procedure
10	Unclear implementation methodology
11	Untested implementation methodology
12	Budgeting oversight
13	Political influence
14	Complexity of the ERP system
15	Costs constraint
16	Company policy
17	Ignorance of user needs
18	Incompetent IT staff
19	Company politics
20	Time limitation
21	Bureaucracy Constraints
22	Poor coordination
23	Users' resistance
24	Lack of system ownership
25	Conflicts of interest
26	Bad Business process

The factors were included in the questionnaire and respondents were asked to state the extent to which they face the challenges during the process of ERP systems implementation. The statements were in a likert scale of 1-No extent, 2- Little extent, 3-Moderate extent, 4-Greate extent and 5-Greatest extent. The factors were analyzed using SPSS.

4.6.2 The Correlation Matrix

Each respondent has indicated the extent to which they face various challenges during ERP systems implementation process. Some challenges could be said to be similar and therefore factor analysis was used to identify such problems and group them into meaningful classes.

Table 4.6.1 shows the correlation matrix of the challenges faced in the process of ERP implementation by the respondents.

Table 4.6.1 Correlation Matrix

	VAR1	VAR2	VAR3	VAR4	VAR5	VAR6	VAR7	VAR8	VAR9	VAR10	VAR11	VAR12	VAR13
VAR1	1	0.536	0.569	0.141	-0.03	0.25	0.519	0.453	0.638	0.674	0.404	0.595	0.499
VAR2	0.536	1	0.695	0.419	0.135	0.529	0.608	0.236	0.433	0.538	0.397	0.556	0.344
VAR3	0.569	0.695	1	0.187	0.124	0.353	0.498	0.163	0.346	0.475	0.33	0.397	0.455
VAR4	0.141	0.419	0.187	1	0.321	0.135	0.242	-0.05	-0.04	0.214	0.097	0.244	0.153
VAR5	-0.03	0.135	0.124	0.321	1	0.688	0.142	0.233	0.142	0.018	-0.145	-0.054	0.051
VAR6	0.25	0.529	0.353	0.135	0.688	1	0.41	0.314	0.457	0.443	0.213	0.338	0.085
VAR7	0.519	0.608	0.498	0.242	0.142	0.41	1	0.639	0.553	0.51	0.474	0.588	0.279
VAR8	0.453	0.236	0.163	-0.05	0.233	0.314	0.639	1	0.711	0.303	0.331	0.369	0.133
VAR9	0.638	0.433	0.346	-0.04	0.142	0.457	0.553	0.711	1	0.508	0.349	0.437	0.041
VAR10	0.674	0.538	0.475	0.214	0.018	0.443	0.51	0.303	0.508	1	0.796	0.797	0.514
VAR11	0.404	0.397	0.33	0.097	-0.15	0.213	0.474	0.331	0.349	0.796	1	0.599	0.482
VAR12	0.595	0.556	0.397	0.244	-0.05	0.338	0.588	0.369	0.437	0.797	0.599	1	0.538
VAR13	0.499	0.344	0.455	0.153	0.051	0.085	0.279	0.133	0.041	0.514	0.482	0.538	1
VAR14	0.066	0	-0.04	-0.46	0.049	0.273	0.244	0.319	0.326	0.04	0.257	0.041	-0.058
VAR15	0.488	0.199	0.137	0.104	-0.04	-0.01	0.21	0.155	0.074	0.32	0.457	0.046	0.346
VAR16	0.703	0.318	0.357	-0.02	0.137	0.359	0.26	0.26	0.477	0.479	0.2	0.608	0.478
VAR17	0.624	0.483	0.46	0.051	0.337	0.486	0.436	0.561	0.607	0.437	0.309	0.534	0.299
VAR18	0.076	0.033	0.223	-0.19	0	0.217	0.271	0.031	-0.13	0.246	0.298	0.45	0.259
VAR19	0.534	0.582	0.81	0.041	-0.08	0.332	0.294	0.036	0.287	0.563	0.494	0.458	0.451
VAR20	0.285	0.44	0.176	0.627	-0.02	0.145	0.391	0.03	0.295	0.423	0.472	0.412	0.182
VAR21	0.291	0.315	0.421	-0.34	0.08	0.33	0.226	0.303	0.254	0.383	0.46	0.431	0.398
VAR22	0.411	0.309	0.284	-0.15	0.181	0.438	0.509	0.444	0.573	0.622	0.652	0.544	0.466
VAR23	0.28	0.763	0.58	0.15	0.183	0.524	0.501	0.147	0.393	0.437	0.407	0.453	0.422
VAR24	0.344	0.356	0.015	0.235	0.148	0.35	0.377	0.416	0.167	0.479	0.587	0.355	0.466
VAR25	0.363	0.377	0.326	-0.25	-0.12	0.352	0.501	0.482	0.475	0.539	0.73	0.504	0.385
VAR26	0.15	0.208	0.264	-0.36	0.021	0.307	0.358	0.298	0.105	0.216	0.464	0.343	0.461

Table 4.4.1 *Correlation Matrix (continued)*

	VAR14	VAR15	VAR16	VAR17	VAR18	VAR19	VAR20	VAR21	VAR22	VAR23	VAR24	VAR25	VAR26
VAR1	0 066	0 488	0.703	0 624	0 076	0 534	0 285	0 291	0 411	0 28	0 344	0 363	0 15
VAR2	0	0 199	0 318	0 483	0 033	0 582	0 44	0 315	0 309	0 783	0 356	0 377	0 208
VAR3	-0 04	0 137	0 357	0 46	0 223	0 81	0 176	0 421	0 284	0 58	0 015	0 326	0 264
VAR4	-0 459	0 104	-0 017	0 051	-0 186	0 041	0 627	-0 34	-0 15	0 15	0 235	-0 254	-0 357
VAR5	0 049	-0 039	0 137	0 337	0	-0 082	-0 022	0 08	0 181	0 183	0 148	-0 122	0 021
VAR6	0 273	-0 011	0 359	0 486	0 217	0 332	0 145	0 33	0 438	0 524	0 35	0 352	0 307
VAR7	0 244	0 21	0 26	0 436	0 271	0 294	0 391	0 226	0 509	0 501	0 377	0 501	0 358
VAR8	0 319	0 155	0 26	0 561	0 031	0 036	0 03	0 303	0 444	0 147	0 416	0 482	0 298
VAR9	0 326	0 074	0 477	0 607	-0 132	0 287	0 295	0 254	0 573	0 393	0 167	0 475	0 105
VAR10	0 04	0 32	0 479	0 437	0 246	0 563	0 423	0 383	0 622	0 437	0 479	0 539	0 216
VAR11	0 257	0 457	0 2	0 309	0 298	0 494	0 472	0 46	0 652	0 407	0 587	0 73	0 464
VAR12	0 041	0 046	0 608	0 534	0 45	0 458	0 412	0 431	0 544	0 453	0 355	0 504	0 343
VAR13	-0 058	0 346	0 478	0 299	0 259	0 451	0 182	0 398	0 466	0 422	0 468	0 385	0 461
VAR14	1	0 179	0 313	0 359	0 402	0 126	0 154	0 478	0 58	0 14	0 068	0 558	0 612
VAR15	0 179	1	0 135	0 058	-0 104	0 233	0 273	0 137	0 241	-0 101	0 514	0 124	0 251
VAR16	0 313	0 135	1	0 762	0 362	0 425	0 202	0 559	0 482	0 354	0 178	0 42	0 274
VAR17	0 359	0 058	0 762	1	0 341	0 4	0 09	0 642	0 451	0 503	0 257	0 567	0 3
VAR18	0 402	-0 104	0 362	0 341	1	0 309	0 03	0 553	0 347	0 131	0 059	0 485	0 572
VAR19	0 126	0 233	0 425	0 4	0 309	1	0 238	0 544	0 243	0 45	0 031	0 41	0 484
VAR20	0 154	0 273	0 202	0 09	0 03	0 238	1	-0 065	0 39	0 271	0 244	0 206	0 004
VAR21	0 478	0 137	0 559	0 642	0 553	0 544	-0 065	1	0 499	0 425	0 175	0 656	0 595
VAR22	0 58	0 241	0 482	0 451	0 347	0 243	0 39	0 499	1	0 489	0 394	0 697	0 498
VAR23	0 14	-0 101	0 354	0 503	0 131	0 45	0 271	0 425	0 489	1	0 324	0 605	0 307
VAR24	0 068	0 514	0 178	0 257	0 059	0 031	0 244	0 175	0 394	0 324	1	0 536	0 281
VAR25	0 558	0 124	0 42	0 567	0 485	0 41	0 206	0 656	0 697	0 605	0 536	1	0 603
VAR26	0 612	0 251	0 274	0 3	0 572	0 484	0 004	0 595	0 498	0 307	0 281	0 603	1

Principal Component Analysis (PCA) was performed on the respondents' scores. The 26 factors or components were extracted and the communalities achieved are shown in Table 4.6.2

Table 4.6.2 Communalities

	initial	Extraction
Lack of top management support	1	0.947
internal resistance	1	0.861
Lack of stakeholders involvement of implementation	1	0.877
Lack of user input	1	0.899
Undefined Expectation	1	0.929
Unrealistic expectation	1	0.818
Poor communication	1	0.672
Poorly defined specification	1	0.824
Lack of control procedure	1	0.946
Unclear implementation methodology	1	0.786
Untested implementation methodology	1	0.866
Budgeting oversight	1	0.897
Political influence	1	0.784
Complexity of the ERP system	1	0.945
Costs constraint	1	0.95
Company policy	1	0.893
Ignorance of user needs	1	0.838
Incompetent IT staff	1	0.788
Company politics	1	0.9
Time limitation	1	0.942
Bureaucracy Constraints	1	0.788
Poor coordination	1	0.766
Users' resistance	1	0.801
Lack of system ownership	1	0.886
Conflicts of interest	1	0.897
Bad Business processes	1	0.805

Extraction Method: Principal Component Analysis.

Communalities refer to the proportion of variance of a particular item that is due to common factors (shared with other items). It expresses the proportion of variance that is extracted or accounted for the factors. As shown in Table 4.6.2, most of the variations in the variables were captured with the lowest variation being 67% for variable 7.

Table 4.6.3 Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.811	37.734	37.734	9.811	37.734	37.734
2	3.054	11.747	49.481	3.054	11.747	49.481
3	2.23	8.578	58.058	2.23	8.578	58.058
4	2.045	7.866	65.924	2.045	7.866	65.924
5	1.586	6.099	72.023	1.586	6.099	72.023
6	1.332	5.124	77.147	1.332	5.124	77.147
7	1.191	4.581	81.728	1.191	4.581	81.728
8	1.057	4.064	85.792	1.057	4.064	85.792
9	0.858	3.301	89.092			
10	0.701	2.697	91.789			
11	0.615	2.364	94.153			
12	0.471	1.813	95.966			
13	0.366	1.407	97.374			
14	0.287	1.103	98.477			
15	0.151	0.579	99.056			
16	0.116	0.446	99.502			
17	7.45E-02	0.286	99.788			
18	4.52E-02	0.174	99.962			
19	9.82E-03	3.78E-02	100			
20	1.27E-15	4.88E-15	100			
21	3.84E-16	1.48E-15	100			
22	2.74E-16	1.06E-15	100			
23	3.21E-17	1.24E-16	100			
24	-1.12E-16	-4.32E-16	100			
25	-2.42E-16	-9.32E-16	100			
26	-6.80E-16	-2.61E-15	100			

Extraction Method: Principal Component Analysis

Table 4.6.3 shows the total variance explained for each of the extracted factors. Each factor accounts for a decreasing proportion of variance subject to the condition that it is uncorrelated to all previous factors. For a factor to account for at least one variable, it

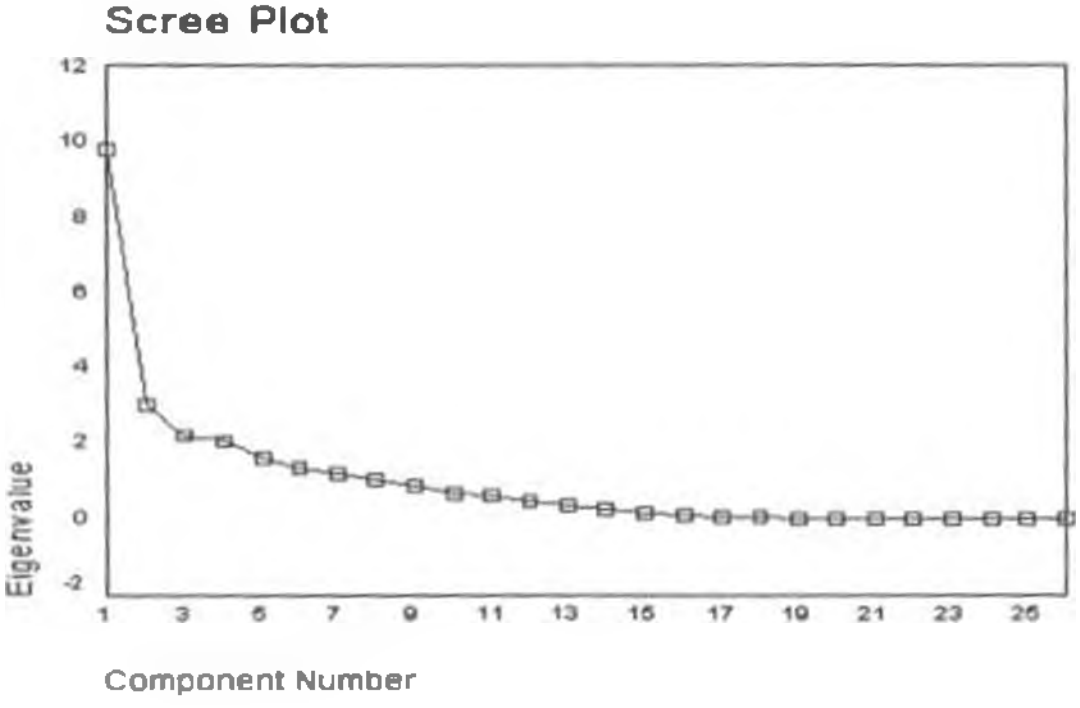
should have an Eigen value of at least 1. This serves as a cut-off point for determining the number of factors to be extracted.

From Table 4.6.3, variable 1 accounts for 37.7% of the total observed variation, factor 2 explains 11.7% of the total variation, variable 3 accounts for 8.6 % of the total variation, variable 4 explains 7.9% of the total variation, variable 5 accounts for 6% of the total variation while variable 6 explains 5% of the total variation, variable 7 accounts for 4.6% of total variation and variable 8 explains 4 % of the total variation. The eight factors cumulative solution explained 85.8% of the total observed variation.

4.6.3 The Scree plot

Figure 2 is a graph of the eigen values plotted against all factors. This observation is very important as it helps us in knowing how many factors to maintain. The point of interest is usually where the curve starts to flatten. As seen in Figure 2 the curve begins to flatten after factors 8. Thus only 8 factors are considered and this confirms that only eight challenges are considered important in analysis.

Figure 2 Scree plot



Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 12 iterations.

Table 4.6.4 Rotated Component Matrix

	Component							
	1	2	3	4	5	6	7	8
Lack of top management support					0.644			
internal resistance		0.775						
Lack of stakeholders involvement of implementation		0.889						
Lack of user input						0.624		
Undefined expectation							0.959	
Unrealistic expectation							0.731	
Poor communication			0.547					
Poorly defined specification			0.815					
Lack of control procedure			0.885					
Unclear implementation methodology				0.496				
Untested implementation methodology				0.615				
Budgeting oversight					0.579			
Political influence				0.639				
Complexity of the ERP system	0.866							
Costs constraint								0.901
Company policy					0.862			
Ignorance of user needs					0.614			
Incompetent IT staff	0.668							
Company politics		0.822						
Time limitation						0.938		
Bureaucracy Constraints	0.648							
Poor coordination	0.570							
Users' resistance		0.678						
Lack of system ownership				0.838				
Conflicts of interest	0.651							
Bad Business processes	0.792							

Table 6.4 show the results of orthogonal varimax rotation with Kaiser Normalization done on the initial factor matrix. From the results, Variables14,18,21,22,25 and 26 loads heavily on factor 1, variables 2,3,19 and 23 load heavily on factor 2. A summary of factor loadings is shown on Table 4.6.5 below and Table 4.6.6 is a listing of all the statements that make up the various factors.

Table 6.5 Summary of Loadings (challenges)

Factor	Variable(s)
1	14,18,21,22,25,26
2	2,3,19,23
3	7,8,9
4	10,11,13,24
5	1,12,16,17
6	4,20
7	5,6
8	15

Table 6.6 Statements from the loadings (Challenges)

Factor	Statement
1	• Complexity of the ERP system • Incompetent IT staff • Bureaucracy constraints • Poor coordination • Conflict of interest • Bad business process
2	• Internal resistance. • Lack of stakeholders involvement of implementation • Company politics • Users' resistance
3	• Poor communication • Poorly defined specification • Lack of control procedure
4	• Unclear implementation methodology • Untested implementation methodology • Political influence • Lack of system ownership
5	• Lack of top management support • Company policy • Budget oversight • Ignorance of user needs
6	• Lack of user input • Time limitation
7	• Undefined expectation • Unrealistic expectation
8	• Costs constraint

4.6.4 Conclusions of analysis of the challenges ICT consultants face in ERP implementation.

From the 26 statements, we conclude that the following factors have been given a lot weight from the respondents as being major challenges in ERPs implementation in Kenya.

- Complexity of the ERP system
- Internal resistance.
- Poorly defined specification
- Lack of system ownership
- Lack of user input
- Budget oversight
- Undefined expectation
- Costs constraint

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CHAPTER 5

SUMMARY, CONCLUSIONS AND RECOMMENDATION

5.1 Introduction

In this chapter a summary of the findings, the conclusions and the recommendations are presented. In addition suggestions for further research and the limitations of the study are also given.

5.2 Summary of the findings

5.2.1 Demographic information

Demographic data were collected and analyzed mainly to provide more information for confirming the findings.

It was found that most of the respondents were male most of who were between 26-30 years. The level of education of the respondents showed that 4.8% of the respondent had attained a diploma, 38% had attained a graduate level while 28.6 had attained postgraduate level.

Most of the respondents were systems analysts and project managers which are the most commonly used professional in ERP implementation and had authority to give information on ERPs implementation process.

Further most of the respondents have been in consultancy for more than five years which means they are conversant with the factors considered critical for successful ERPs implementation, challenges faced during implementation and the approaches used in

implementation.

It was further found that Oracle financials is the highest (63%) ERP system implemented in Kenya followed by SAP (21%).

5.2.2 Factors considered critical for successful implementation of ERPs

The following conclusions were drawn from the factor analysis done on the responses from ICT consultants who implement ERPs

Teamwork and composition in the ERP implementer-vendor-consultant partnership is a key factor influencing ERP implementation success. Good coordination and communication between the implementation partners are essential. Since ERP covers a wide range of functional areas, it is also important to have a cross functional ERP core team. It is extremely critical that partnership trust is present and the team members are working well together. Another very critical factor is change management program and culture. An organizational culture where the employees share common values and goals and are receptive to change is most likely to succeed in ERP implementation. Furthermore, user training, education and support should be available and highly encouraged. Change agents should also play a major role in the implementation to facilitate change and communication, and to leverage the corporate culture. Other critical factors include top management support, business plan and vision, BPR and minimum customization, effective communication, project management, software development, testing and troubleshooting, monitoring and evaluation of performance, project champion, and appropriate business and IT legacy systems.

All these factors are critical for successful ERP implementation and should be well thought out by any organization or individual who envisages to implement an ERP and succeed.

5.2.3 Approaches Used in ERP Implementation

The findings showed that Parallel Big Bang was the most used approach with 56% whereas the Big Bang approach was the least used approach. The choice of the approach could be associated with the risk involved.

5.2.4 Challenges encountered in ERP implementation

The following challenges were encountered to a large extent by the ICT consultants in ERP implementation. Complexity of the ERP system, Internal resistance, Poorly defined specification, Lack of system ownership, Lack of user input, Budget oversight, Undefined expectation, Costs constraint

5.3 Conclusions

The main findings of this study are that certain factors contribute highly to success or failure of ERPs implementation. Factors such as User involvement, training and support of the system are very important. The control processes of a company and project team composition are very critical for successful implementation. Challenges like, lack of sustained management support, budget oversights, Complexity of the ERP system, Internal resistance, Poorly defined specification, Lack of system ownership, Lack of user

input, Budget oversight, Undefined expectation, Costs constraint are most encountered and could affect the implementation process.

5.4 Limitations of the Study

The use of the findings of this study can only be undertaken with due considerations of the following limitations:

Some respondents refused to participate in the study by not responding to questionnaires sent to them.

There is the tendency of respondents to protect their self image through providing inaccurate information. Therefore, some of the information provided by respondents on such areas such as the critical factors for successful ERPs implementation, their criticality to their operations, failures they have encountered with the systems, may have been answered subjectively and thus not a true representation of reality.

The time available to complete the study was short and therefore it was not possible to personally guide all respondents in filling in the questionnaires. This made some respondents to give irrelevant and sometimes inconsistent information. It was clear from some returned questionnaires that they were hurriedly filled in.

Factors affecting ERP implementation are complex and abundant, thus many researchers conduct case study only to find out some specific problems with ERP implementation. Undoubtedly, detailed case study is a powerful tool to solicit important issues

disregarding to its disadvantage of generalization problems. Thus, combining detailed case study and a large survey would be an ideal method to researchers in the ERP field.

5.5 Suggestion for further research

This study has presented a survey of research relating to critical success factors for successful implementation of ERPs. Much research is still needed to better understand the ERP phenomenon from a balanced perspective. Future work should continue to survey the other areas in this emerging field.

Unanswered issues such as ERP complexity, integration and flexibility should be addressed in future. Technologically, other areas where researchers can help are the development of interfaces, componentization and integration of technologies. The improvement of business models fit, and adequacy of ERP systems to business models are also areas that lack research.

Also ERP impact on organizations at all levels (technological, organizational and business) should be analyzed. Adequate ERP implementation methodologies were pointed out as critical success factors in this study; however there is lack of studies about the definition, usage and adequacy of these methodologies and their value in ERP projects.

With this study focusing on critical success factors there is need to study operationalization of the critical success factors. Research of how ERP platforms maybe

combined with other tools is needed, especially for the creation of standards and improvement of ERP efficiency. When should an organization introduce emerging ERP capabilities and how should they integrate them in an overall information system function. Finally, what is the impact of these emerging ERP capabilities in organizations from an organizational perspective?

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Appendices.

Appendix I: Questionnaire to ICT/IS Consultants.

Research Instrument

Investigation of Critical success factors for successful implementation of ERP systems in Kenya Questionnaire

Please complete the questions as accurate and as complete as possible. And return the completed questions as soon as you can to the bearer. Thank you in advance.

SECTION A:

Organization

1. In which year was your organization established?.....

2. a) Approximately, how many people are employed in your organization?.....

   b) How many of your employees in total are in the area of Information systems management, development and implementation? .....

3. How would you classify your organization with regard to ownership?
   - ❑ Locally owned
   - ❑ Foreign owned
   - ❑ Both (Local and Foreign owned)

   Other (Please state).....

4. a) How many years have you worked as an ICT consultant? .....

   b) Which ERP solutions have you implemented in Kenya.
   - ❑ SAP
   - ❑ ORACLE FINANCIALS
   - ❑ BAAN
   - ❑ NAVISION
   - ❑ ORION
   - ❑ SAGE LINE 500

   Other (Please state).....

   c) ICT/IS consultancy has a wide scope, and involve the following components and related systems; Tick as appropriate, the components or related services in which you have offered consulting services.

   - ❑ Hardware

- ❑ IS Services
- ❑ Software
- ❑ Communication & Networks
- ❑ Project Management
- ❑ Business Intelligence

State any other service you have offered related to ERP implementation.....
.....
.....

5. a) How many ERP systems have you implemented in Kenya? .....

   b) How long do you take to implement the system? .....Months **(on average)**.

SECTION B: FACTORS CONSIDERED DURING ERP SYSTEMS IMPLEMENTATION.

Many factors determine the success of Enterprise Resource planning (ERP) system implementation. Rate by ticking, appropriately, **the degree of importance you attach to the following factors as critical for ERP implementation success**.

Use the scale below.

1. Not important.
2. Somewhat important.
3. Important.
4. Very Important.
5. Extremely important.

	1	2	3	4	5
1) Sustained management support	❑	❑	❑	❑	❑
2) clear business plan and Vision	❑	❑	❑	❑	❑
3) Effective communication inwards	❑	❑	❑	❑	❑
4) Effective communication outward.	❑	❑	❑	❑	❑
5) Use of project management techniques	❑	❑	❑	❑	❑
6) Appropriate legacy systems	❑	❑	❑	❑	❑

	1	2	3	4	5
7) Organizational Culture	❑	❑	❑	❑	❑
8) Adequate change management practices	❑	❑	❑	❑	❑
9) Comprehensive business process reengineering (BPR)	❑	❑	❑	❑	❑
10) Extent of system testing and troubleshooting	❑	❑	❑	❑	❑
11) Companywide commitment	❑	❑	❑	❑	❑
12) End users training.	❑	❑	❑	❑	❑
13) User involvement	❑	❑	❑	❑	❑
14) Data accuracy	❑	❑	❑	❑	❑
15) Suitability of software	❑	❑	❑	❑	❑
16) Suitability of hardware	❑	❑	❑	❑	❑
17) Adequate project team composition.	❑	❑	❑	❑	❑
18) Adequate ERP implementation strategy	❑	❑	❑	❑	❑
19) evaluation of performance	❑	❑	❑	❑	❑
20) Integrated nature of the system being implemented	❑	❑	❑	❑	❑
21) Complexity of the system being implemented	❑	❑	❑	❑	❑
22) Flexibility of the conversion approach	❑	❑	❑	❑	❑
23) Employee level of resistance	❑	❑	❑	❑	❑
24) Extent of political influence	❑	❑	❑	❑	❑
25) Availability of funds	❑	❑	❑	❑	❑
26) Clients recommendation	❑	❑	❑	❑	❑
27) Effective organizational change	❑	❑	❑	❑	❑

	1	2	3	4	5
28) Adequacy of System documentation	❑	❑	❑	❑	❑
29) Level of projects risks	❑	❑	❑	❑	❑
30) Use of consultants in adoption	❑	❑	❑	❑	❑
31) Use of consultants in implementation.	❑	❑	❑	❑	❑
32) Clear definition of implementation scope.	❑	❑	❑	❑	❑
33) Clearly stated project objectives.	❑	❑	❑	❑	❑
34) End users support of the system.	❑	❑	❑	❑	❑
35) Level of customization	❑	❑	❑	❑	❑
36) Vendor support.	❑	❑	❑	❑	❑
Others (specify and rate)					

SECTION C: IMPLEMENTATION APPROACHES USED DURING ERP SYSTEMS IMPLEMENTATION.

Please rate by ticking appropriately the degree to which you use any of the following approach in ERP systems implementation?

1. **Not at all.**
2. **Very little.**
3. **Moderately.**
4. **Quite a lot.**
5. **Extensively.**

	1	2	3	4	5
1) ***The Big Bang*** - Companies layout a grand plan for their ERP implementation. The installation of ERP systems of all modules happens across the entire organization at once. **(Direct)**	❑	❑	❑	❑	❑
2) ***The mini Big Bang*** - only switches over certain business functions (e.g. Accounts Receivable.	❑	❑	❑	❑	❑

Purchasing, etc.) for a certain period of time and then switch the rest of the business functions when everything is running smoothly with the first phase. **(Mini Direct)**	❑	❑	❑	❑	❑
3) ***Parallel Big Bang*** – This method attempts to run the ERP system in synchronization with the currently existing legacy system. **(Parallel)**	❑	❑	❑	❑	❑
4) ***Modular ("Franchising") Implementation*** – One module at a time. Limits the scope of implementation usually to one functional department. Independent modules of ERP systems are installed in each unit, while integration of ERP modules is taken place at the later stage of the project. **(Phased)**	❑	❑	❑	❑	❑
5) ***Process-Oriented ("Slam-dunk") Implementation*** - focuses on the support of one or a few critical business processes which involves a few business units. The initial customization of the ERP system is limited to functionality closely related to the intended business processes	❑	❑	❑	❑	❑
7. **Other**, specify and rate	❑	❑	❑	❑	❑

SECTION D: CHALLENGES ENCOUNTERED DURING ERP SYSTEMS IMPLEMENTATION.

1. Indicate by ticking the extent to which you face the following challenges during the process of ERP systems implementation in Kenya.

   1. **No Extent**
   2. **Little Extent**
   3. **Moderate Extent**
   4. **Great Extent**
   5. **Greatest Extent**

	1	2	3	4	5
1. Lack of top management support	❑	❑	❑	❑	❑
2. Internal Resistance	❑	❑	❑	❑	❑
3. Lack of stakeholders involvement of in Implementation	❑	❑	❑	❑	❑
4. Lack of user input	❑	❑	❑	❑	❑
5. Undefined Expectations	❑	❑	❑	❑	❑
6. Unrealistic Expectations	❑	❑	❑	❑	❑
7. Poor Communication	❑	❑	❑	❑	❑
8. Poorly defined Specifications	❑	❑	❑	❑	❑
9. Lack of control Procedures	❑	❑	❑	❑	❑
10. Unclear implementation methodology	❑	❑	❑	❑	❑
11. Untested implementation methodology	❑	❑	❑	❑	❑
12. Budgeting Oversights.	❑	❑	❑	❑	❑
13. Political Influence	❑	❑	❑	❑	❑
14. Complexity of the ERP systems	❑	❑	❑	❑	❑
15. Costs constraint	❑	❑	❑	❑	❑
16. Company policy	❑	❑	❑	❑	❑
17. Ignorance of user needs	❑	❑	❑	❑	❑
18. Incompetent IT staff	❑	❑	❑	❑	❑
19. Company politics	❑	❑	❑	❑	❑
20. Time limitation	❑	❑	❑	❑	❑
21 Bureaucracy constraints	❑	❑	❑	❑	❑

22. Poor Coordination	❑	❑	❑	❑	❑
23. Users' resistance	❑	❑	❑	❑	❑
24. Lack of system ownership	❑	❑	❑	❑	❑
25. Conflicts of interest	❑	❑	❑	❑	❑
26. Bad business processes	❑	❑	❑	❑	❑
Others (specify and rate)					

You have now completed the questionnaire. Please hand it over to the bearer as soon as you can. Once again **thank you** for your help.

Respondents Letter

Appendix II

Evans Nyagah
P.O. Box 8401-00100
Nairobi.
Tel: 3232183/0722 996865
ejnyagah@Telkom.co.ke

September 27, 2006

Dear Sir/Madam,

My name is Evans Nyagah, a postgraduate student undertaking a Master of Business Administration (MBA - *MIS*) degree at the Faculty of commerce, University of Nairobi. As a partial fulfillment of the requirements for the award of the MBA degree, I am currently conducting a study on 'INVESTIGATION OF CRITICAL SUCCESS FACTORS FOR SUCCESSFUL IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING (ERP) SYSTEMS IN KENYA'.

Your firm is one of the ICT Consultant firms selected and therefore forms part of the population of study. I kindly, request for your valuable time in assisting to complete the attached questionnaire. The research is intended to provide a better understanding of the prevailing Information Systems implementation practice in the industry.

The information provided in this study will be treated with utmost confidentiality and will not be used for any other purpose apart from its intended academic use. I hereby, therefore, undertake not to make direct reference to your name or that of your organization in any presentation or report thereto the study.

I would appreciate any additional information; in the form of suggestions and comments, which you deem necessary to make my research findings more conclusive, relevant and reflective of the study area. A copy of the research report will be availed to you as respondent.

Thank you.

Yours faithfully,

Evans Nyagah
MBA Student

Mr. J.K. Lelei
Lecturer, Dept. of Management Science

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Thank you.

Yours faithfully,

Evans Nyagah
MBA Student

Mr. J.K. Lelei
Lecturer, Dept. of Management Science

Appendix III: List of ICT consulting firms to be surveyed

1 Africaland computers Kenya ltd
2 Aftron Computer Systems
3. Amarco (Kenya) Ltd
4. Ascent technologies and Business Ltd
5. Automated Business Systems
6 Arch Way technologies Ltd.
7. Blue Chip Technologies Ltd
8. Blue Chip 2000 systems Ltd
9. Business connection and Technologies
10. Busi ness inn Ltd
11 Bytec h Engineering Ltd
12. Carlbro (Ken ya) Ltd.
13. Co mpaq East Africa representative Office
14 Co mp-Rite Kenya Ltd
15. Co mputer World
16 Co mpucare
17. Co mpulynx ltd
18. Co mpustat Technologies
19. Co mputech Ltd
20 Co mputer City
21 Co mputer Point (K) Ltd
22. Co mputer Technics Ltd
23. Co mputron systems (K) Ltd
24. Co mtech Systems Ltd
25. Cop y Cat Ltd
26. Dee Dee Co mputers Plus
27. Digital Africa Services Ltd
28 Digital Systems Solutions.
29. Donn Consultants l td
30 Esco m Computers.
31. Fine sse Technologies Ltd.
32. Fintec h Ltd.
33. Firsi Co mputers Ltd
34. Fut ure Logic Ltd
35. IBM East A frica Ltd
36. ICL Ke nya Ltd
37. ICN - Toshiba Ltd
38. Infotec h Computer Systems Ltd
39. Insi ght Technologies Ltd
40. Inter co mputer services.
41. Kena fro computers ltd
42. Ken ya Microcomputers Ltd
43. Kin gaway Business Systems l td
44. Le gend Technologies (EPZ) Ltd
45. Li mpo Business Systems Ltd
46. Matrix Group
47 Mauzio Con sultants
48 Metropolitan Technologies Ltd
49. Micro Ken ya Ltd
50 Microflex Ke nya Ltd
51. Microlan Ken ya l td
52. Millen nium Automation Ltd
53. Mits umi Computer Garage Ltd
54. M -M Computers
55. Modern busine ss communications Ltd
56. Multi Optio ns Ltd
57 NCR (KENY A) Ltd
58 Next Technologie s
59 Net work source Ltd.
60. Niche Net work Management Systems
61 Nurku n Intakes Ltd
62. Novaco m consultants
63 OEL s ystnet Ltd
64. Orbix Ltd.
65. Openvie w business Systems
66. Personal Co mputer World Ltd
67 PCTech Sy stems l td
68 Pentiu m Technologies
69 Peripherals Technologies L td
70. Personal Co mputer World Ltd
71. Personal S ystems Ltd
72. Pinnacle Re lational Database systems
73 Precision soft ware consultants.
74. Premier Sof tware Ltd
75. Prime co mputer
76. Pro data Computers Ltd
77 Professional Co mputer Consultants Ltd
78. Protec Data s ystems l td
79 Sai Of fice Supplies Ltd
80. Silicon Communication Solution
81. Si mba Technologies
82. Si mple Computers
83 Startup S uppliers Ltd
84. Sur fnet Communication Systems
85. Soft ware Applications Ltd
86. Soft ware Wise Kenya Ltd.
87. Soft ware Technologies Ltd
88 S ymphony
89 Teler osa Computer Services
90. Trans Busuic ss Machines Ltd (TBM)
91. Ticentric Co mputers
92 Tr onic World l td
93 Unite k Computer Services Ltd
94. Violet Co mputers Ltd
95. Virtual Co mputers Ltd
96. Vision Technolog ies
97. Voice and Data S ystems
98 Web Engineeri ng Limited
99. Wink soft Technologies
100. WillPower communications Ltd
101 Zodiac Systems ltd