

**ENTERPRISE RESOURCE PLANNING IMPLEMENTATION AND
ORGANIZATIONAL PERFORMANCE IN KENYAN ENERGY
SECTOR PARASTATALS**

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DECLARATION

This project is my original work and has not been presented for an award in any university.

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This research project has been submitted for examination with my approval as the university supervisor.

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DEDICATION

To my parents, Mr. and Mrs. Kinya, who have believed in me, supported me and walked with me.

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I thank Mr. Joel K. Lelei for his direction and guidance. I appreciate your patience and understanding.

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ACRONYMS

BI - Business Intelligence

CAD – Computer Aided Design

CPM - Corporate Performance Management

CRM - Customer Relationship Management

DSS - Decision Support Systems

EAM – Enterprise Asset Management

EBS - Energy Billing Systems

EIS - Executive Information Systems

ERP - Enterprise Resource Planning

GIS – Geospatial Information System

ICT - Information Communication Technology

MIS - Management Information Systems

MRP - Materials Requirements Planning

OLAP - Online Analytical Processing Systems

OLTP - Online Transaction Processing

PM – Plant Maintenance

PLM – Product Lifecycle Management

PWC – Price WaterHouse Coopers

SCM – Supply Chain Management

SRM - Supplier Relationship Management

ABSTRACT

Enterprise Resource Planning (ERP) systems utilization have been limited to few large companies in Kenya and specifically to commercial oriented parastatals, for instance Kenya energy ministry parastatals which have adopted information systems as a tool to improve efficiency and effectiveness, visibility and transparency. ERP projects are capital intensive and whereas different companies adopt different methods while implementing ERP systems, they undergo many challenges and overcoming these challenges determine the level of success of the project. The measure of critical success factors and the extent of an ERP implementation in an organization are necessary to determine the success of the project. The extent is determined by the number of ERP modules deployed, level of integration with existing systems and collaboration between business units. This study focused on the impact ERP implementation to the organizational performance in the Kenyan energy sector parastatals. The objectives of this study was to determine the extent of ERP implementation, establish the factors affecting the successful implementation of an ERP system, and to determine the impact of ERP application on organizational performance of Kenya energy sector parastatals. Questionnaires were used to collect data from ICT managers, administrators and functional staff in four Kenya energy sector parastatals and analysis was done using frequency and percentages, means and standard deviations, then regression analysis. The results were presented in tables and charts. The results indicate that most of the Kenyan energy sector parastatals have not implemented ERP systems extensively and that it is imperative to adhere to the critical success factors for a successful ERP implementation as this affects the number of modules that are deployed. The study established there is a relation between extent that an ERP is implemented to the organizational performance of companies in Kenyan energy sector parastatals.

CHAPTER ONE: INTRODUCTION

1.1. Background

The use of information and communication technologies (ICTs) has dramatically changed business models, and people's expectations of the quality and efficiency of information sharing and service delivery in organizations (Bhatnagar & Apikul, 2006). In fact according to a survey in 2011 by PWC (2012) most CEOs were looking to use technology to gain both efficiencies and differentiation simultaneously. Organizations seek technology to innovate, automate, empower and collaborate in order to gain a competitive advantage.

Such use of technology is in integration and convergence of corporate data in a bid to make operations efficient. This has led to many companies seeking superior information systems to provide real time data and decision making systems such as Enterprise Resource Planning (ERP) systems. As Addo and Helo (2011) put it, ERP systems enables the company integrate all the primary business in order to enhance efficiency and maintain a competitive position but without successful implementation of the system, the projected benefits of improved productivity and competitive advantage would not be forthcoming (Addo & Helo, 2011). ERP is a companywide information system that controls the business processes, information, align transactions to ensure performance, ensure optimization using universally accepted practices. ERP has the potential to cover the entire value chain under a cohesive platform supporting management decisions, information access, process support and improvements.

ERP functional capabilities are generally grouped into functional modules from which a company has the prerogative to choose which modules serve the interest of its business. The extent of the ERP system was extended into ERP II in mid 90s. The term ERP II was created by Gartner Group and it is defined as "a business strategy and a set of industry-domain-specific applications that build customer and shareholder value by enabling and optimizing enterprise and inter-enterprise, collaborative operational and financial processes" (Bond et al, 2000).

1.1.1. ERP Adoption

Enterprise Resource Planning (ERP) systems are information systems which are enterprise wide, modular, integrated and have broad business functionality (Hawking, 2005). Like the central nervous system, a company undertakes an Enterprise Resource Planning to connect all its departments in order for the departments to have individual systems to plan, organize and execute their daily duties while at the same time be the sensory nerve that connects the departments into a single unit and inform the management what is going on throughout the company without necessarily moving from their desks. ERP system is the most single investment a company makes that touches every inch of the firm at the same time just like the nerve system (Otieno, 2010). The survey by PWC (2012) noted that many companies looked for ERP as a solution of technological problems and a vehicle for solving operational problems such as uncompetitive business performance and ineffective business processes.

ERPs are managed through a system of modules and have capabilities for handling enterprise-wide business processes while consolidating heterogeneous systems and replace company's transactional systems ranging from functions such as manufacturing, logistics, distribution, inventory, shipping, invoicing, and accounting (Butler, 2011). ERPs can also aid in the control of business activities like sales, marketing, quality control, and human resource management. Hawking (2005) observes that ERPs are large repositories structured to facilitate recording and embed company policies into the system and replace traditional manual approval processes, offer self-service portals and eventually report all business transactions.

The growth in the uptake of ERP systems is due to several factors; the need to streamline and improve business processes, better manage information systems expenditure, competitive pressures to become a low cost producer, increased responsiveness to customers and their needs, integrate business processes, provide a common platform and better data visibility, and as a strategic tool for the move towards electronic business (Hawking, 2005).

1.1.2. Factors for Successful ERP Implementation

ERP systems are designed to provide total integration to a company's resources and to manage the business process efficiently and effectively. As an outgrowth of Materials Requirement Planning (MRP) systems, companies use ERP systems to integrate the enterprise wide information and processes; for example their financial, human resources, manufacturing, logistics, sales and marketing functions. While implementing an ERP system, the ultimate goal will be to have a smooth transition that doesn't compromise or disrupt business continuity. It is certain that ERP deliver great rewards and opportunities, but the risks embedded are equally great as Davenport (1998) noted that ERP implementations can be complex, costly and highly problematic.

The success or failure of an ERP project is associated to how the organization handles the process and hence the results differ from company to company. There are three perspectives of critical success factors which are strategic, tactical and cultural. Which are business process reengineering, top management support under strategy in alignment with the organization vision and mission, project team constitution and change management under cultural factors, while vendor and choice of ERP as tactical. According to Hawking (2005), this is all dependent on how much resources the organization offers the project.

According to Hawkin (2005) considerable research has been done to identify the various factors that are associated with successful ERP implementations. Factors including choice of an IS system, organizational fitness to adopt an ERP and implementation skills as well as without top management endorsement, efficient planning and effective project management, training and user involvement, the company might not fully realize maximum advantage of the product or even risk entire failure of the endeavor. As Brynjolfsson (1993) contends that while analyzing IS ubiquity, many companies have embarked on information systems but the complexities of implementing these systems are enormous.

1.1.3. Organization Performance

A report by Price Water House Coopers (2012) on business innovation, it established that ERP is influential in business core areas, for instance in operations, systems automate

repetitive processes, retire redundant business practices, reduce processing time, keep an audit trail and visibility, improve quality and standards, transparency and traceability, boost employee productivity, data delivery conversion and analysis. PWC (2012) report adds that one of the biggest benefit of ERP systems is standardization of processes and systems.

In managerial, systems store and integrate data from different sources at a central point to create meaningful information and data analysis which leads to enhanced decision making, management of resources, planning, and overall employee performance. As a strategic tool, ERP systems improve service delivery, build innovation, lower cost of business, link business to customers hence supporting growth of business in order to remain competitive. To the organization, ERP offers flexibility to support process reengineering, user involvement, empowerment, vision, and coordination (PWC, 2012).

1.1.4. ERP and Organization Performance

The diverse nature of the outcomes in adoption of ERP systems has attracted a number of researchers who want to understand the reasons and factors that influence its implementation. Davenport (1998) notes some organizations implement ERP systems and they succeed whereas others fail in the same. Outcome success or failure looks at the extent of post-implementation ERP benefits (Delone & Mclean, 2003) as organizations implementing ERP expect transactional, informational and strategic benefits.

There are many cases where companies that have adopted ERP systems have reported dramatic improvements on profitability, control, despite the high implementation costs and implementation problems. According to Shin et al (2001), financial analysis can measure the effect of ERP on costs and profit making, but must also benchmark with the market and pre-ERP business performance. For example, Otieno (2010) observed manufacturing companies in Kenya recorded success stories upon successful implementations of ERP systems.

The ERP implementation failure impact may be fatal to a firm either wasting enormous sums of money or destroying the competitive advantage of the firm (Davenport, 1998). On the other hand its success impacts positively by strategic planning, optimization,

integration, automation and availing information in real time necessitating prompt, timely and accurate decision making. Further, Delone and Mclean (2003) argue that the extent of an ERP implementation affect the process and outcome.

1.1.5. Kenya Energy Parastatals

A parastatal is a government owned corporation that undertakes commercial activities on behalf of the owner government (Kenya Government, 2012). According to The United Nations (2008) parastatals were created in both developed and developing countries to address market deficits and capital shortfalls, promote economic development, reduce mass unemployment and/or ensure national control over the overall direction of the economy (United Nations, 2008).

Whereas nationalization is to forcibly convert a private corporation into a government-owned corporation, privatization is when a government sells off state owned enterprises to private entities. Waiguru et al (2002) note that privatization was advocated by institutions such as the World Bank and the International Monetary Fund (IMF) in the 1980's that pushed for liberalization of economies to pave way for private sector participation, therefore relegating the government's into playing the facilitative role of creating the necessary environment for the market to operate effectively hence emphasizing reforms that favor a free market economy.

This paradigm shift in the global politico-economic system led to the introduction of Structural Adjustment Programmes (SAPs) to revamp parastatals to be self-sustaining and be competitive under the privatization strategy in its parastatal reform programme under the Policy Paper on Public Enterprise Reform and Privatization (1992) as well as the Policy Framework Paper (1993-96).

Parastatals contribute immensely into the economy of the country among being service delivery as well as profit centers for the government. Parastatals perform diverse functions spanning manufacturing and commerce, financial intermediation and infrastructure development through service provision, regional development, environmental conservation to education and training as well as regulation of the economy (The

Presidential Taskforce on Parastatal Reforms, 2013). Public enterprises used to enjoy monopoly or in near monopolistic conditions (United Nations, 2008), fortunately globalization of economies opened up trade barriers and markets amid reduced government funding and privatization of parastatals (Bhatnagar & Apikul, 2006). According to Njiru (2008), parastatals have encountered myriad challenges and stiff competition from the private sector after liberalization of most of the sectors and industries they operate in terms of wider variety of goods and services, lower prices, more and better-paying jobs, improved health, and higher overall living standards.

Kenya energy sector was liberalized after Energy Sector Policy Framework Papers of 1996 and Kenya's Electric Power Act (1997) reforms to create competition by attracting private investments and enhance operational efficiency (The Presidential Taskforce on Parastatal Reforms, 2013). This resulted to the parastatals endeavoring to enhance and optimize their operations and service delivery through implementation of information systems. According to studies undertaken by Uwizeyemungu and Raymond (2005), ERP implementation is pushed forward by technological (common platform, obsolescence of legacy systems), operational (process improvement, data visibility, operating cost reductions), and strategic (Y2K compliance, multi-site standardization, customer responsiveness, decision-making improvement, need for efficiencies and integration, business restructuring).

When the government sold some of its equity to private, parastatals became co-owned though most of them the government remained the dominant player while others the government had minority shares. Some of the parastatals for posterity had to ultimately be removed from the state corporations act (Waiguru, Wambua, Ngugi, Mutuaruhii, & Ngugi, 2002). This mean that the management of the parastatals were liable to the public and vulnerable to market forces as opposed to the trend before where the exchequer bailed them occasionally whenever they became financially distressed. Hence for better management and financial accountability parastatals had to look for ERP systems.

Therefore governments expect their public institutions to provide services of quality, adapt to the most recent developments in the political, economic, social, and technological environments but at the lowest cost amid strict regulations and global competition. It is inevitable in the light of this modern competitive business environment that parastatals

need to embrace innovation through information systems in order to remain competitive hence the need for ERP systems. State owned enterprises need to streamline and be efficient in order to remain competitive therefore adoption of ERP systems is one of the ways where it is likely to yield significant benefits for organizations.

The government regulatory body, National Environmental Management Authority (NEMA) mandated to manage environmental policy in Kenya has stringent measures for compliance, incident management and standards measures which the parastatals have to adhere to. Hence such regulatory structures have also pushed parastatals to the adoption of ERP systems.

Currently the Kenya government launched a nationwide electronic procurement and payment system which is expected to introduce transparency, accountability and eliminate abuse of the country's existing procurement and financial management process (Kazungu & PSCU, 2014) through the automation of public financial processes, The Integrated Financial Management Information System (IFMIS). In accordance to the Public Financial Management Act (2012), all parastatals must adhere to use of integrated information systems. From competition, to regulatory structures, to privatization and globalization, parastatals have had to seek better governance and efficient survival tactics where adoption of ERP systems is one of the ways where it is likely to yield significant benefits hence their need to adopt ERP systems.

1.2.Statement of the Problem

Kenya parastatals endeavor to improve their performance through operational efficiency has led them adopt ERP systems. In Kenya, some public companies have successfully implemented ERP systems. For instance KPA introduced SAP ERP to automate work processes in order to increase efficiency (Wanyama, 2013). Hence the reason this study seek to establish the extent that ERP has been implemented in Kenyan energy sector parastatals.

Sommer (2011) quips how developing countries lag in terms of technology. For instance according to Otieno (2010), private organizations differ from public organizations at the

environmental, organizational, and individual levels hence why more private sector CEOs considered IT to be critical to their business success and were keen to maintain IT leadership in the industry and were personally involved in planning and monitoring their ERP projects (Otieno, 2010). According to Sommer (2011), ERP systems are affected by environmental factors, organization and environment transactions, internal processes and structures.

Several researchers have taken a general interest in the factors affecting implementation and adoption of ERP in public sector. Studies by Somers, Nelson and Ragowsky (2000) show that ERP implementation approaches used generally must be adapted to the culture and regulations peculiar to the public sector as the success of any ERP application depends on a variety of factors. Another study conducted by Sommer (2011) on Public Sector ERP Implementation, he found that successfully engaging middle management lacked. It was established that there was a significance difference between public and private sector cultures that have a lasting impact on ERP implementations such as no strict bottom line incentives for instance profit maximization, customer satisfaction or competitive advantage.

Investigations were conducted by Huang and Palvia (2001) on ERP implementation issues in advanced and developing countries and noted that little research has been conducted to compare the implementation practices of ERP in developed versus developing countries. Hence this study seek to establish what the challenges were or factors that influenced their ERP implementation in Kenya's energy sector parastatals?

ERP is influential on performance and productivity of an organization Njihia and Mwirigi, (2014), Ochieng (2009) in terms of streamlining processes, information availability accelerating decision and hence this study seeks to find out the impact of ERP application on organizational performance. Even though many studies have dwelt on the success factors influencing ERP implementations, the relationship between the extent of implementation and performance has not been looked into. These parastatals have implemented ERP systems but that is not evident on performance and efficiency (Otieno, 2010). Hence this study seeks to determine the extent of ERP use in Kenya energy

parastatals and how does the extent of an ERP implementation determine the performance of an organization?

1.3.Objective of the Study

The objectives of the study are:

1. To determine the extent of ERP implementation in Kenyan energy sector parastatals
2. To establish the factors affecting the successful implementation of ERP in Kenya energy parastatals
3. To determine the impact of ERP application on organizational performance of Kenya energy sector parastatals.

1.4.Value of the Study

Decision makers will gain valuable information about the factors influencing the successful implementation of ERP systems and how to mitigate challenges associated with public corporations while implementing enterprise information systems.

This study for academics and business researchers will be a basis for further research and to support literary citations as well as develop themes for further research. The study will also inform the government in regards to policy making towards adoption of ERP systems as well as their implementation.

This study will be important to professionals, ERP consultants and experts who will have interest on the knowledge built and the findings to understand and respond appropriately to challenges while implementing ERP systems in public institutions. This study will help consultants recognize the interaction of local factors, understand public institutions and be able to set appropriate project goals.

CHAPTER TWO: LITERATURE REVIEW

2.1.Introduction

The success of an ERP implementation is determined how well the company manages the factors whereas the extent of ERP application is determined by the functions or modules that are activated on a particular system (Rashid, Hossain, & Patrick, 2002). According to Hawkin (2005) an organization implementing an ERP has to be ready for such an investment in management and culture for the company to be able to realize maximum benefits and realize improved performance, eliminate costs, data consistency and inefficiencies. Hence the performance of a company is based on the successful implementation of an ERP which in turn is based on how an organization is fit for its implementation.

The choice and selection of an ERP system is affected by external forces that the players would have no direct control. Moller (2005) acknowledges how external control theories explicit reduces organizations and people's ability to make their goals a reality. For example Cooper and Zmud (1990) examined that IT planning is very critical as investments are costly and organizations need to consequently be assured of return on investments notwithstanding the benefits gained therefore the management must balance to create most effective IT plan (Cooper & Zmud, 1990). Hence theories will explain how systems outcomes and the extent of implementation is based on factors that may be beyond control of the project manager.

The impact of factors within the interaction between the technology and the organization during implementation have an effect in cost reduction and internal control enforcement. Attempts have been made to understand and find out the antecedents of user acceptance and user resistance to adoption and usage of IT systems by Karahanna, Straub, & Chervany (1999). These theories will help us understand and explain how the role of users and willingness to adoption to the systems in order to improve the efficiency of performing their works hence increasing their productivity and impact on performance. How much impact ERP systems have on companies performance will also be looked at in relation to the extent of the implementation on an enterprise.

2.2. Enterprise Resource Planning Application

Organizations have developed Information Systems for enhancing the Business operations and competitive advantage. These systems tended to be confined to functional areas. However the need to integrate systems and their technologies have grown significantly into ERP systems which are enterprise wide, modular, integrated and have broad business functionality (Hawking, 2005).

According to Bond (2000), ERP systems automates processes and integrate virtually all operational business functions to finance and reporting within the enterprise. There are functional modules that must be present and integrated for an ERP to be complete, where these function modules are inside the core modules in a complete ERP system (Bond, et al, 2000). According to SAP (1999), manufacturing core functions are plant maintenance (operations), resource and capacity planning, material planning, work flow management, shop floor management, quality control, bills of material, manufacturing process. Supply Chain Management (SCM) core consists of the functions inventory & material management, sales and distribution management, supplier and purchase management, claim processing. Financials (FI) core module consist of accounts payable, accounts receivable, fixed assets, general ledger, cash management, and billings. Customer Relationship Management (CRM) core module consist of sales and marketing, service, commissions, customer contact and after sales support. Human Resource Management (HRM) core module consist of the functions recruitment, benefits, compensations, training and development, payroll, time sheet, labor laws, employee management (Wortmann, 1998).

Second generation ERP systems take the basic ERP beyond the enterprise boundaries and also focus on operational excellence, process efficiency and automation, consequently being essential in value propositions to be applied in more areas than before including SCM, CRM, EAM, PM, PLM, CAD, GIS (Bond, et al, 2000). These give the highest and best use of ERP functionality including active collaboration with vendors, improve quality, reduce extended supply chain cycle times, and collaborate to produce better products and services (Bond, et al, 2000). Business Intelligence are Decision Support Systems (DSS)

from ERP that help management to make fast, effective and efficient analytical and strategic decisions in real time using tools like Data Warehouse (DW), Data Mining (DM), Key Performance Indicators (KPI) and Dashboards.

2.3.Factors for Successful ERP Implementation

Addo and Helo maintain that the process of implementing an ERP is expensive, challenging and difficult and hence the decision to adopt an ERP system requires business realignment changes (Addo & Helo, 2011). According to Kimani (2013) the key critical success factors to implement a successful ERP are top management support, training, systems security and its infrastructure, effective project management (Kimani, 2013), while Kutswa (2011) adds organizational structure incompatibility with ERP, non-supportive organizational culture, inadequate allocation of resources, resistance to change, ineffective communication, high implementation costs, lack of top management commitment and support, lack of incentives and reward systems and inadequate user training and education (Kutswa, 2011).

Otieno (2010) identifies the choice of an ERP when selecting from various options, unnecessary ERP package customizations during implementation and inadequate systems testing during implementation as other factors that can affect ERP implementation success. Consequently, by having good project management can help to minimize risk for project to fail and may help to reduce the chance for delaying and over budget which are big problems in ERP project implementation. Sommer (2011) recognizes that many organizations have poor user training and change management during implementation and some ultimately fail to engage employees from the initial stage, making user acceptance low and invites resistance from the employees (Sommer, 2011). There are other technical aspects that also have considerable impact on ERP projects such as poor scoping that result from poor project team and project management to product change management including software development, customisations, testing and troubleshooting.

2.4.Organizational Performance

Continuous performance is the target for any organization and the identification, monitoring and optimization of the factors that drive performance is important to the management (Behn, 2003). The Oxford dictionary defines ‘organization’ as “an organized group of people with a particular purpose” and ‘Performance’ as “the action or process of performing a task or function seen in terms of how successfully it is performed”. Hence organizational performance is a measure of success of an organized group towards its objectives (Oyugi & Seth, 2013).

According to Kaplan and Norton (1992) organizational performance is based on employee productivity and values combined with business strategic focus to provide direction, have a structure on how to specify and measure deliverables in order to recognize and offer rewards. All these parts are interrelated, and a change to one will impact one or more of the others while one poor performing part will potentially negatively impact the others (Wortmann, 1998). Key critical success factors to performance are discipline, planning and analysis, expertise, flexibility, visibility and accessibility. It is only through performance organizations are able to grow and progress (Kaplan & Norton, 1992).

Oguta et al (2014) emphasize IS establish performance and standards to an organization and deliver a competitive strategy in cost leadership, innovation, growth and strategic leadership (Oguta, Egessa, & Musiega, 2014). The balanced-scorecard approach offers a systematic analysis of the ERP effects in organizations (Uwizeyemungu & Raymond , 2005), where organizational performance is determined by measures of faster response to business change, improved service time, economies of scale, and lower administrative costs among others.

2.5.ERP Adoption and Organizational Performance

ERP systems enhance organizational performance by reducing business risks through standardization and automation of processes. ERP systems enhance performance in business by optimizing operations, production and supply chain through selection of the best elements and quantities within allowed set of alternatives by computation of values

under given constraints where ERP delivers simulations and modeling from availability of information and computational speed. The extent of business process improvement (BPI) has a direct impact on organizational performance (Ragowsky, Somers, & Adams, 2005) as it influences both business strategy and organizational capabilities. According to Bhatnagar and Apikul (2006) ERP not only supports cost control and management within, but also support new product development and innovation. By bringing all IS systems and platforms under one roof, ERP systems offer seamless solution through unified approach to their IT systems hence reducing ICT costs and total cost of ownership.

Ragowsky et al (2005) figure out that evaluating an investment in IT is a challenge as well as unclear whether investments in IT in general and ERP systems in particular actually pay off or have a direct impact to an organization's performance (Ragowsky, Somers, & Adams, 2005). Many studies have been done to demonstrate the positive relationship between IT and performance, Brynjolfsson (1993) in his research called this the “productivity paradox”. Studies by Heeks (2011) seek to address this correlation between IT to economic growth in Kenya demonstrating a clear connection between mobiles and economic growth. Strassman (1991) argues that to organization management “Information technology makes sense only when it solves a company’s specific problems, such as overhead cost of control, production management, or support of customer services” (Strassman, 1991).

Other studies in Kenya by Ochieng (2009), Mwanja (2013), Kinuthia (2012), Njihia & Mwirigi (2014), Mahamed & Richu (2012) and Otieno (2010) have demonstrated the impact of ERP systems in organizations and their aim of getting a competitive advantage in their industries. Just to mention a few, there is reduction of cycle time, faster transactions and better financial management. Additionally, it is widely believed that ERP systems contribute to supply chain management particularly in technical areas such as standardization, transparency and globalization. Studies by Addo and Helo (2011) add that ERP systems guarantee streamlined operations, improved productivity, efficient workflows, effortless communication, tracking and forecasting, and eventually improved customer service and satisfaction (Addo & Helo, 2011).

Although, Shin, Dow and Grover (2001) argue that the results of studies relating IT investments and organizational performance have been equivocal those benefits have not been appropriately measured as prior ERP systems, departments ran different isolated Information Systems which hampered the productivity, speed and performance of the overall organization (Shin, Dow, & Grover, 2001). Laudon (2006) reiterates how deploying a comprehensive ERP system across an organization leads to performance increase, workflow synchronization, standardized information exchange formats, complete overview of the enterprise functioning, global decision optimization, speed enhancement and much more (Laudon & Laudon, 2006). ERP performance measure is how it provides business intelligence tools like decision support system, executive information system, reporting, data mining, and early warning system, to enable management to make better decisions and improve business processes. ERP enables the task involved in performing a business process quickly and efficiently.

Delone and McLean (2003) suggested that Information System success is measured as a function of overall system quality, the quality of the information in the system, how that information is used, how satisfied users are with the system, and the impact of those systems on users and organizations (Delone & Mclean, 2003). The rate of performance was pegged on organizations paying close attention to these variables in design and implementations. Because organizations achieve different value from using the same IS application, Ragowsky, Somers, and Adams (2005) suggest that measurement of contribution of an information system to organizational performance should be done at basic levels of the organization. Examples include reduction in inventory holding costs in logistics, reduction in unit production cost in operations, reduction in the costs of after sales service, customer retention through differential advantage in marketing and sales.

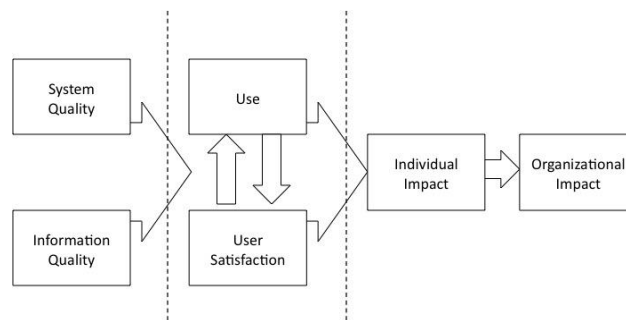
2.6.Theoretical Review

The literature review will look at theories that support ERP implementation and studies done on the extent of ERP implementation in public sector as well as research studies on the factors that affected their implementation. Addo and Helo (2011) argue that for a theory to be useful to researchers, it must address their objectives and since the management of

critical success factors in ERP implementations is a thorny issue in research, and therefore for a theory to fit the facts, it must also address relevant factors that lie outside people direct control.

Under IS success model by Delone and Mclean (1992) they identified and described six relationships that are critical to the success of IS as information quality, system quality, service quality, system use/usage intentions, user satisfaction, and net system benefits (Delone & Mclean, 2003).

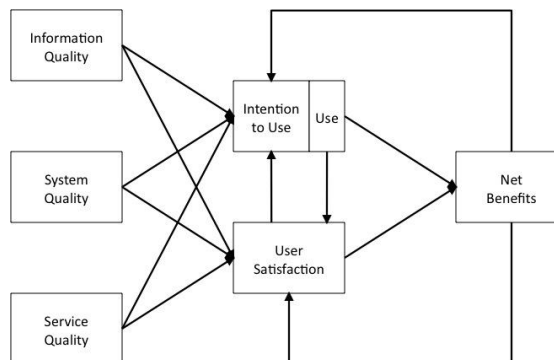
Figure 2.6.0.1: IS success model



IS success model, Delone & Mclean, (1992)

Later on, Delone and Mclean (2003), added that the growth of management support systems and the advent and development of e-commerce systems has become common and hence they advocate “System Use” and “service quality” to be added as critical dimensions of IS success measurement (Delone & Mclean, 2003).

Figure 1.6.0.2: IS success model



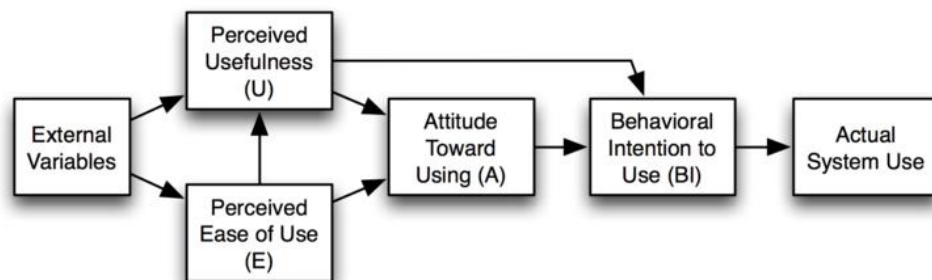
IS success model, Delone & Mclean, (2003)

2.6.1. Technology Acceptance Model Theory

The perceived usefulness is "the degree to which a person believes that using a particular system would enhance his or her job performance" and the perceived ease-of-use as "the degree to which a person believes that using a particular system would be free from effort" (Davis, 1989). The two measurements are based on behavioral elements that there will be freedom to act without constraints hence very relevant when referring to parastatals as decision making is difficult and based on consensus. According to Mauti, Muranga, & Magutu (2013) understanding the factors that influence user acceptance of information technology is undoubtedly of interest to both scholars and researchers in a variety of fields as well as procurers of technology for large organizations (Dillon & Morris, 1996).

This theory informs the study that since ERP systems are complex and in public institutions there exists a level of uncertainty in decision making there the rate of adoption of IT systems is governed by the degree of usefulness and ease of use. According to Otieno (2010), he finds from his study how public sector implement ERP in modular form then covering site by site at 69% whereas in private implemented ERP systems within a short period at 70%. From his summary, it was evident how the private sector gained performance advantages in almost all areas than public institutions e.g. inventory management, interactions, delivery, financial management, customer and supplier relationships and management, order cycles, and overall reduced operating costs whereas on the public side the most notable impact was in business processes integration and availability of quality information (Otieno, 2010).

Figure 2.6.1: Technology acceptance model



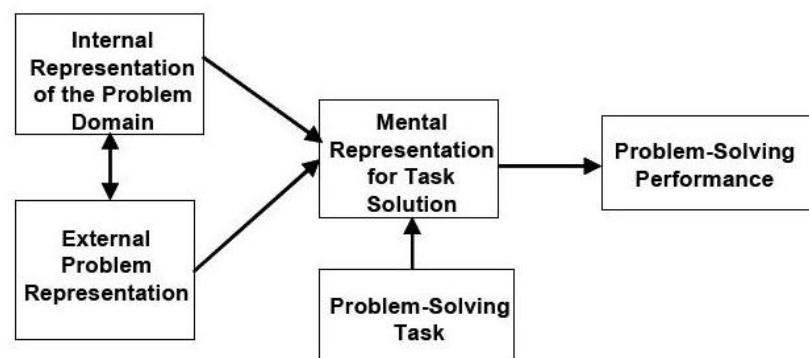
Technology Acceptance Model (TAM), Davis (1989)

According to a study by Otieno (2010) in his thesis on Kenyan parastatals, Agrochemical Foods Company while evaluating their ERP, they analyzed Ebizframe versus iBaan where they concluded that one was a best fit to their company needs despite a 10% price difference than the latter which is designed to suit the market hence would enjoy a wider user acceptance and low investments risks stating “the weightier selection criteria of fitness for the purpose/technical features, functional fit, vendor back-up support and user acceptance are used to arrive at the above recommendation” (Otieno, 2010) though later due to lack of transparency, they chose Ebizframe that collapsed.

2.6.2. Cognitive Fit Theory

Cognitive fit theory was developed by Iris Vessey (1991) where she explains how the correspondence between task and information presentation format leads to superior task performance for individual users demonstrated by performance differences among users across different presentation formats such as tables, graphs, and schematic faces (Vessey, 1991). The theory suggests that, for most effective and efficient problem solving to occur, the problem representation and any tools or aids employed should all support the strategies required to perform that task because problem solvers induce their mental representations by materials presented, interpret problems and formulate a solution based on the type of information that best supported the task solution (Vessey & Galletta, 1991).

Figure 2.6.2: Cognitive fit model



Cognitive fit model, Vessey (1991)

These theories inform the study that ERP systems in organizations work well to remove inconsistent information systems that may run parallel by changing one or more of the cognitive elements and seeking consonant information by integrating all systems under one roof. Representations can be delivered to management through conclusive charts and graphical diagrams that are representations from all departments if they are all centrally run contrary to when each department runs its independent application. Otieno (2010) from an analysis of KenGen, KPLC (Kenya Power and Lighting Company), ACFC (Agrochemical and Food Company) and BCL (Bidco) noted that they justified running a single platform would be cheaper than many different systems though information was not affected because legacy systems for plant maintenance and production were not abandoned, while on the other hand, private companies for example Bidco who discarded all bespoke systems for integrated systems experienced positive impact, short implementation cycles and less costs.

2.6.3. Organizational Fit Theory

This theory is also known as cultural fit theory. This theory observes that “no one acts alone” and everyone placed in his environment, *in-situ*, has technical and non-technical elements that shape or influence the innovation of technology. This theory is dependent on the perfect mix of strategy, technology, task, organizational size, structure, and culture of the organization as there is no universal way to management for maximum efficiency and optimal performance to form a proper 'fit' with the environment and its systems (Reinking, 2012). Hence, there must be a congruence between the information system and the organization as information systems become more and more integral to the business. The institution must strive to find a system that is a good fit for the organization that quickly and naturally fall into the rhythm with the organization.

This theory informs the study that ERP systems and the structure are intertwined unpredictably in a complex social interaction of IT and organization hence the critical challenge of ERP implementation is the mutual adaptation between the IT and user environment. As Otieno (2010) finds out from survey findings, that public organizations favored SAP/R3 more than private organizations (41.5% vs 10.5%) adoption driven by

their best fit, current business practices and package flexibility as more firms favored systems evolved from MRP II while the private firms (71% vs 42%) favored a mix of multiple systems which he owed the phenomenon to complexity of the organizations (Otieno, 2010). He noted that private firms are more likely to be involved in more business, complex operations, and more presence locally and globally as such ERP systems might not be covering their needs which in cases might be specialized. On the other hand, local legislation has a great impact on public institutions as systems have to be configured to conform to Kenya's complex taxation policy, tax returns process, lack of legislation to support electronic documents etc.

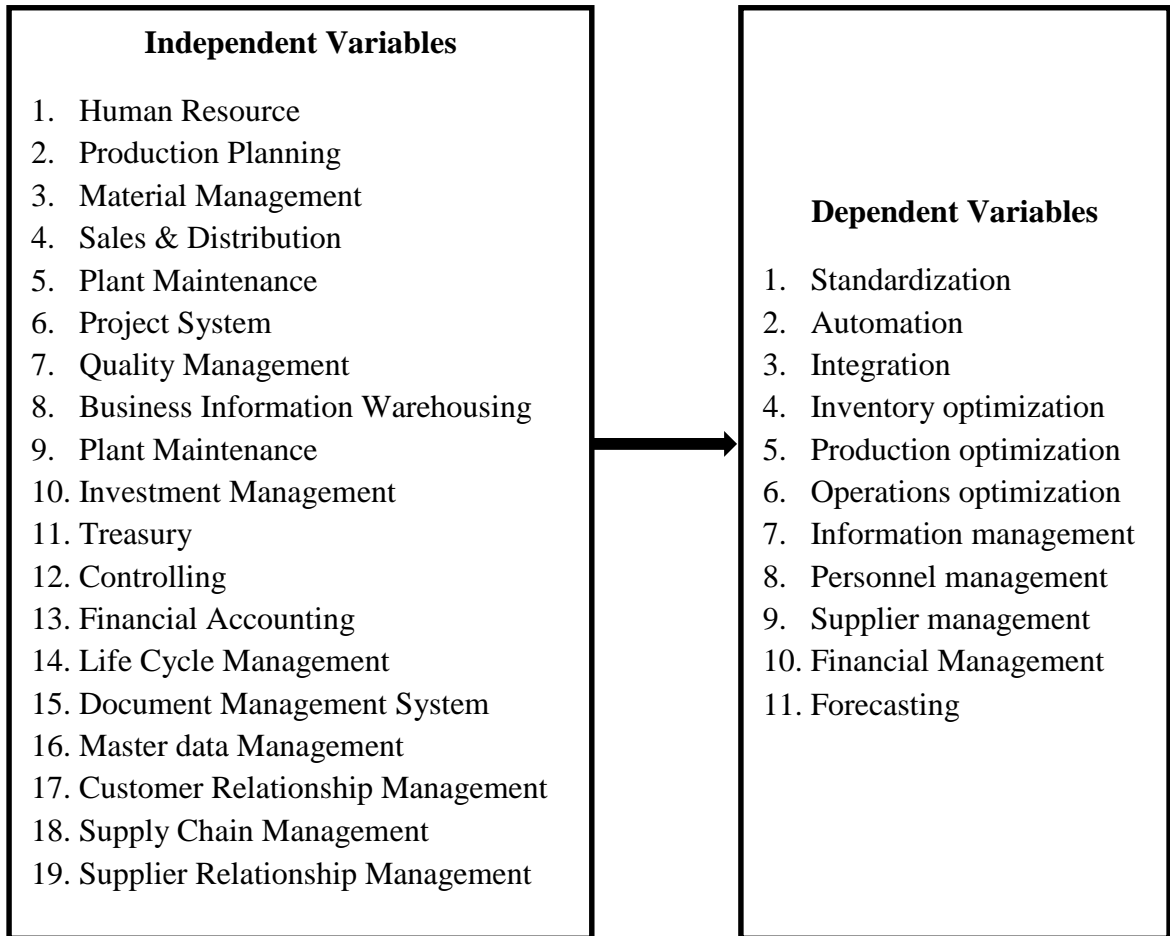
2.7. Conceptual Framework for ERP to Organizational Performance

The conceptual framework explains the relationship between the dependent and the independent variables in the study.

In this study, the dependent variable is organizational performance. Organizational performance is considered dependent since the success of any organization depends how well it manages its resources for profit maximization. According to Behn (2003) different factors acting independently have a collective impact on performance. Many measurements and aspects contribute to overall organizational performance for instance standardization, automation, integration, inventory optimization, production optimization, operations optimization, information management, personnel management, supplier management, financial management and forecasting to predict the future.

The independent variables in this case are the factors that lead to positive impact to organizational performance. The number of ERP modules deployed by a company determines the extent of implementation. Kaplan & Norton (1992) contend that technology and innovation impact directly on organizational performance through automation, standardization, speed and accuracy as are the skills, ability and absorptive capacity of an organization's people to get the best out of new technology. When all the information systems are integrated into one, an enterprise resource planning system is born. The relationship will be demonstrated using the conceptual model below.

Figure 2.7: Conceptual framework



CHAPTER THREE: RESEARCH METHODOLOGY

3.1.Introduction

This chapter presents the research methodology that was used to carry out the survey, the selection of the research design, population, sampling method, data collection instrument and how data will be analyzed, interpreted and presented.

3.2.Research Design

This study adopted a cross sectional descriptive survey design as it is simple and easier to carryout and can lead to gathering the relevant information required by a study from a population at one specific point in time, however Levin (2006) contends, they are limited by the fact that they are carried out at one time point and give no indication of the sequence of events. Oguta et al (2014) adds descriptive studies are not just simple data collection but involves measurement, classification, analysis, comparison and interpretation of data implying that detailed information can be gathered by subjecting the respondents to several items of a questionnaire or interviews (Oguta, Egessa, & Musiega, 2014). A similar research design was used by Kutswa, (2011) and Sakwa (2013) successfully to show relationship between successful implementation of an ERP and performance of an organization. A descriptive study enabled the researcher study the elements in-situ without need for manipulation. This allowed the researcher collect information from a broad sample space and use the findings to generalize the inference to validate the study.

3.3.Population

The target population is all the eight Kenyan energy sector parastatals (Appendix 1). Given the small number of the population and since all the companies have their headquarters in Nairobi a census survey was conducted for data collection.

3.4.Data Collection

Data collection was done using a structured and semi-structured questionnaire. The structured questionnaire gives uniformity on the questions and likewise compatibility of

the responses where the respondent indicates views on a scale of 1 to 5 in the form of a Likert. The questionnaire is structured into Part A that collected demographic data to find out about the respondent profile and information about company, Part B sought to establish the impact of ERP on performance of parastatals in Kenya energy sector parastatals, Part C was concerned with determining the factors affecting the successful implementation of Enterprise Resource Planning (ERP) in Kenyan parastatals in energy sector, and lastly Part D was concerned to determine the extent of ERP implementation in parastatals in Kenyan energy sector.

Data was gathered from ICT departmental heads, ICT Managers, ERP functional heads, and ICT administrators in the Kenya energy sector parastatals. The questionnaires were self-administered. Techniques to minimize nonresponse included email follow up, telephone calls and mail prompting outlining the importance of replying.

3.5.Data Analysis

After the data was collected, it was scrutinized, keyed and analyzed. Demographic data was analyzed using frequency and percentage then presented in form of tables and pie charts. Data on extent of ERP implementation in the organization and factors influencing ERP implementation success and organizational performance was analyzed using means and standard deviations. As for the relationship of impact of ERP implementation to organizational performance, regression analysis was used.

The regression model assumed the following equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where: Y = Dependent variable (ERP extent)

β_0 = Constant

$\beta_1 - \beta_3$ = Coefficients

ε = Error

X_1 = Human Resource

X_2 = Production Planning

X_3 = Material Management

X_4 = Sales & Distribution
 X_5 = Plant Maintenance
 X_6 = Project System
 X_7 = Quality Management
 X_8 = Business Information Warehousing
 X_9 = Plant Maintenance
 X_{10} = Investment Management
 X_{11} = Treasury Management
 X_{12} = Finance Controlling
 X_{13} = Financial Accounting
 X_{14} = Asset and product lifecycle management
 X_{15} = Document Management System
 X_{16} = Master data Management
 X_{17} = Customer Relationship Management
 X_{18} = Supply Chain Management
 X_{19} = Supplier Relationship Management

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND FINDINGS

4.1.Introduction

This chapter presents the analysis and findings of the study. The research was gathered exclusively through questionnaires as the primary research instrument as in Appendix 2. Each of the eight parastatals were issued with ten printed questionnaires. The research secured 32 questionnaires back.

4.2.Demographics

The first part of the questionnaire asked the respondents for their demographics. Demographic factors included gender, designation, education level, age and years of service of the respondents in their respective firms. The results were analyzed as follows.

4.2.1. Gender of Respondents

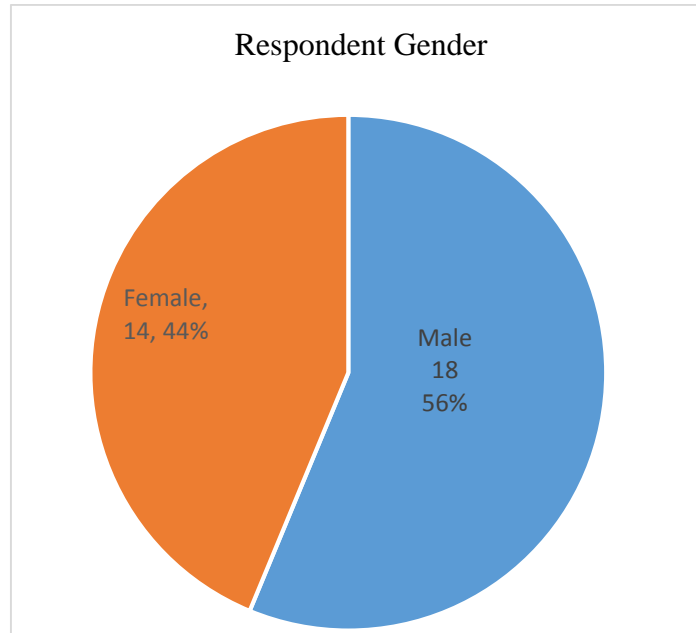
The research sought to find out the gender of the respondents for general demographic pattern. The responses were analyzed and the results are shown in Table 4.2.1 and presented in Figure 4.2.1

Table 4.2.1: Respondents Gender

Gender	No.
Male	18
Female	14

Source: Survey (2014)

Figure 4.2.1 Respondents Gender



Source: Survey (2014)

From Table 4.2.1, male respondents constituted 56% while the female respondents comprised of 44% of the total. This shows the research considered all the gender.

4.2.2. Designations of Respondents

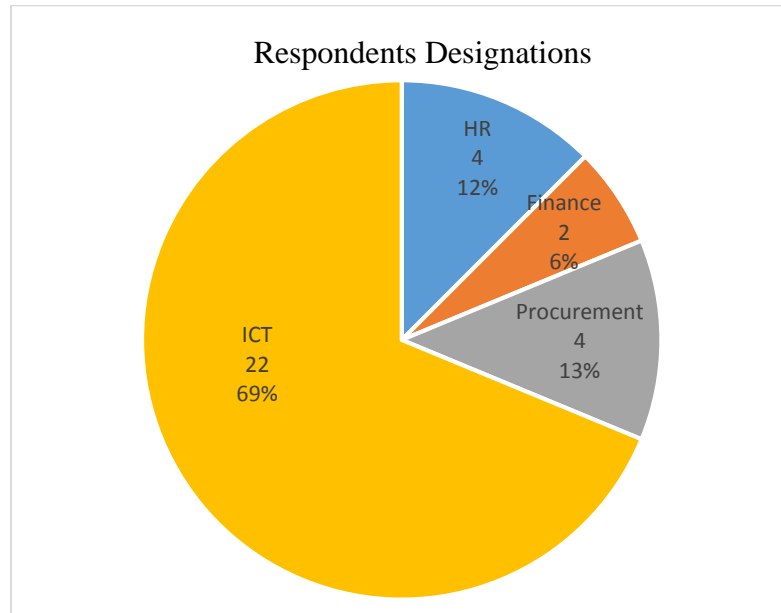
The research sought to find out the designations of the respondents from the different functional departments on the research. The responses were analyzed and the results are shown in Table 4.2.2 and presented in Figure 4.2.2.

Table 4.2.2: Designations of Respondents

HR	4
Finance	2
Procurement	4
ICT	22

Source: Survey (2014)

Figure 4.2.2 Designations of Respondents



Source: Survey (2014)

From Table 4.2.2 respondents from ICT department constituted 69% followed by procurement at 13%, then Human Resources at 12% and finally 2% from Finance department. Although ERP is an information system where it is likely to get more respondents, functional persons from other departments are noted to be quite few.

4.2.3. Education Level of Respondents

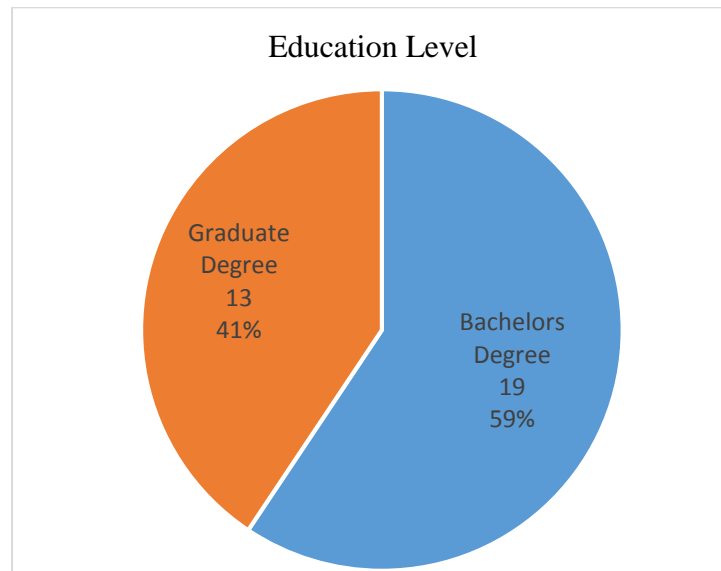
The research wanted to find out the educational level of the respondents for general demographic pattern. The responses were analyzed and the results are shown in Table 4.2.3 and presented in Figure 4.2.3

Table 4.2.3: Education Level of Respondents

Bachelor's Degree	19
Graduate Degree	13

Source: Survey (2014)

Figure 4.2.3 Education Level of Respondents



Source: Survey (2014)

From Table 4.2.3, the research noted that the respondents were highly educated. Of the 32 respondents, 41% had university graduates degrees while the other 59% had bachelor's degrees. This means that most of the persons in energy sector are well conversant with their field of study and knowledgeable.

4.2.4. Age of Respondents

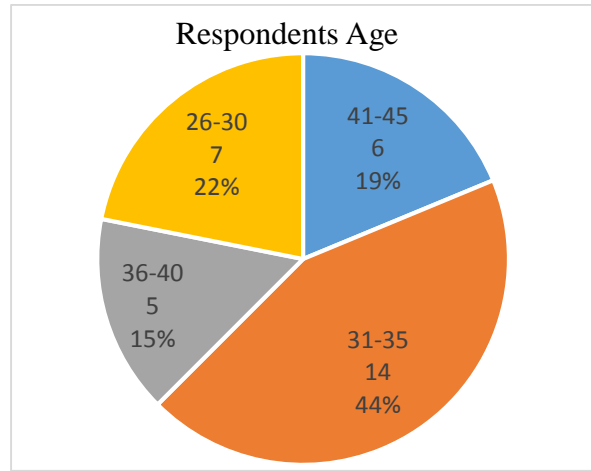
The research wanted to find out the age categories of the respondents for general demographic pattern. The responses were analyzed and the results are shown in Table 4.2.4 and presented in Figure 4.2.4

Table 4.2.4: Age of Respondents

Age Group	Respondents Age
41-45	6
31-35	14
36-40	5
26-30	7

Source: Survey (2014)

Figure 4.2.4 Age of Respondents



Source: Survey (2014)

From Table 4.2.4, about 44% of the respondents were aged between 31-35 years, meaning that the majority of the respondents were young people on their prime years. Of the respondents, 19% are between 41-45, 15% were aged between 36-40 years and a small group of young guys at 7% between 26-30 years. From this analysis, we note that most of the respondents working with ERP are aged above 30 years meaning they have abundant experience in ERP.

4.2.5. Years of Service by Respondent

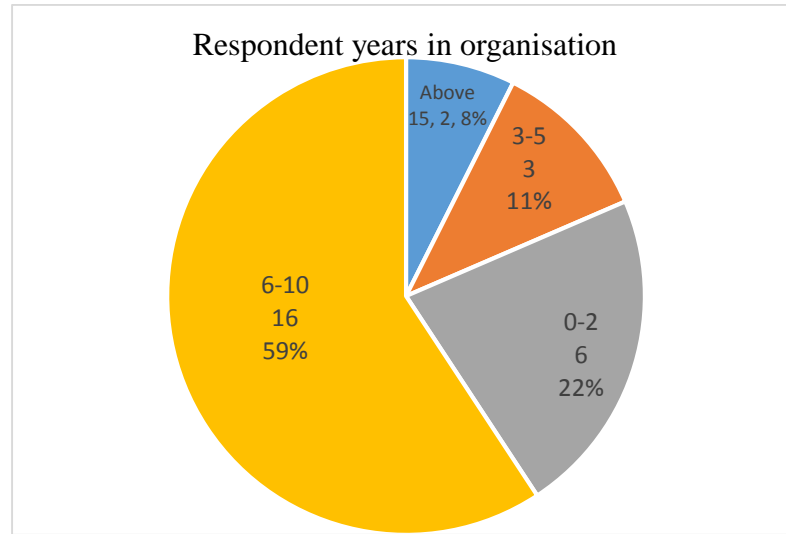
The research wanted to find out the years the respondent has been with the organization for general demographic pattern. The responses were analyzed and the results are shown in Table 4.2.5 and presented in Figure 4.2.5.

Table 4.2.5: Years of Service by Respondent

Years	Respondent time in organization
Above 15	2
6-10	16
3-5	3
0-2	6

Source: Survey (2014)

Figure 4.2.5 Years of Service by Respondent



Source: Survey (2014)

From Table 4.2.5, over 59% of the respondents have 6-10 experience in the organizations. This mean that the respondents have vast knowledge of their companies and well suited for the research.

4.2.6. Respondent's Organization

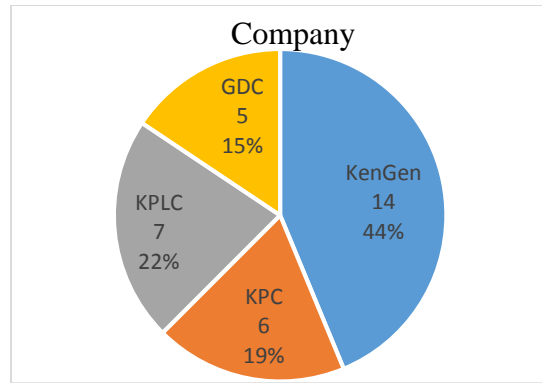
The research was done in the energy sector and the distribution of the researched firms in the energy sector parastatals was four out of a total of eight. Appendix 4, 5 and 6 show approval letters from three respective firms allowing researcher to undertake the research. The responses were analyzed and the results are shown in Table 4.2.6 and presented in Figure 4.2.6

Table 4.2.6: Distribution of ERP Systems

Companies	Respondents	IS System
KenGen	14	SAP
KPC	6	SAP
KPLC	7	SAP
GDC	5	SAP

Source: Survey (2014)

Figure 4.2.6 Distribution of ERP Systems



Source: Survey (2014)

From Table 4.2.6, KenGen produced the most respondents at 44% followed by KPLC at 22%, then 15%, 19% for GDC and KPC respectively. It was noted from the research that all the parastatals surveyed used SAP ERP system and on average the firms had implemented over 5 SAP modules. Though research studies by Momanyi (2012) on business process reengineering at KPRL also confirms presence of SAP in the company.

4.2.7. Location of the Firms

Nairobi is the capital city of Kenya and the commercial headquarters, as such all the parastatals surveyed had their headquarters located in Nairobi the capital city of Kenya. All the firms that had implemented ERP systems had more branch offices located in other towns apart from Nairobi. Analysis of the firms researched is shown on Table 4.2.7.

Table 4.2.7: Firm Locations

Firms	Locations
KenGen	5-6
KPLC	Over 20
GDC	4
KPC	5

Source: Survey (2014)

From Table 4.2.7, it's clear that the company's preference of their headquarters is Nairobi though most of their business operations are not in Nairobi.

4.3.Extent of ERP Implementation

The research sought to find out the extent to which the target firms in the energy sector have implemented ERP in each of the respective ERP functions. The respondents were required to indicate the extent using a Likert scale; 1-No extent, 2-Little extent, 3-Moderate extent, 4-Great extent, 5-Very great extent. Analysis was done using mean and standard deviation. Mean values are rated according to Likert scale and results of the analysis are shown in Table 4.3.

Table 4.3: Extent of ERP Implementation

	Mean	StdDev
Human Resource	3.719	1.246
Production Planning	2.862	0.774
Material Management	3.516	0.601
Sales & Distribution	2.393	0.404
Plant Maintenance	4.172	1.240
Project System	3.276	0.466
Quality Management	2.929	0.297
Business Information Warehousing	2.630	0.519
Plant Maintenance	4.037	1.143
Investment Management	2.679	0.632
Treasury Management	3.367	0.786
Finance Controlling	3.844	1.068
Financial Accounting	3.875	1.012
Asset and product lifecycle management	2.667	0.389
Document Management System	3.000	0.830
Masterdata Management	2.839	0.557
Customer Relationship Management	2.724	0.543
Supply Chain Management	3.633	0.690
Supplier Relationship Management	3.200	0.451

Source: Survey (2014)

From Table 4.3, plant maintenance was the most extensive implemented module at 4.17 while the least was sales and distribution at 2.39. The standard deviation had an average of 0.689. An average on the standard deviation of less than one shows that the respondents were very close to each other meaning the respondents had almost the same view of the level of extent of ERP implementation in their organizations.

4.4.Factors Contributing to Successful ERP Implementation

The research sought to find out to what extent the factors that influence or contribute to successful ERP implementation in the firm were experienced by the target firms. The respondents were required to indicate the extent using a Likert scale; 1-No extent, 2-Little extent, 3-Moderate extent, 4-Great extent, 5-Very great extent. Analysis was done using mean and standard deviation. Mean values are rated according to Likert scale and results of the analysis are shown in Table 4.4.

Table 4.4: Factors Contributing to Successful ERP Implementation

	Mean	StdDev
Top management support	4.250	1.144
Financial resources	4.469	1.243
Organizational resistance	3.250	0.544
Choice of ERP	3.844	0.733
Project and scope management	3.844	1.134
Customizations	3.813	1.153
User engagement	3.750	1.013
System Testing	3.344	0.774
Change management	3.719	1.199
Training and knowledge transfer	3.906	1.326
Project management	3.548	0.916
Project team competency	3.438	0.793
Communication management	3.281	0.720
Business process reengineering	3.419	0.766
Vendor selection and partnership	3.625	1.134
Management expectation	3.625	0.993
Software Development, Testing & Troubleshooting	3.281	0.806
Monitoring & Evaluation of Performance	3.161	0.858
Project scope	3.839	1.245

Source: Survey (2014)

From Table 4.4, the highest considered factor was financial resources at 4.45 while the least factor was monitoring and evaluation of performance at 3.16. The standard deviation had an average of 0.973. An average on the standard deviation of less than one shows that the respondents were very close to each other meaning the respondents had almost the same view of the factors that influence ERP implementation in their organizations.

4.5.ERP Contribution to Performance

The research sought to find out the rate and extent to which implementation of ERP system contributes to the performance of an organization. The respondents were required to indicate the extent of performance using a Likert scale; 1-No extent, 2-Little extent, 3-Moderate extent, 4-Great extent, 5-Very great extent. Analysis was done using mean and standard deviation. Mean values are rated according to Likert scale and results of the analysis are shown in Table 4.5.1.

4.5.1. Mean and Standard Deviation

Table 4.5.1: ERP Contribution to Performance

	Mean	StdDev
Standardization to reduced business risks	3.938	0.779
Automation to enhance business processes	3.969	1.025
Integration to enhance business operations	3.906	0.970
Improved inventory optimization	4.031	0.794
Production optimization	3.484	0.561
Operations optimization	3.742	0.656
Efficient project management	3.452	0.517
Effective asset and product lifecycle management	2.900	0.549
Enhanced information management	3.750	1.067
Enhanced personnel management	3.438	0.643
Enhanced supplier management	3.375	0.865
Enhanced customer management	3.000	0.655
Enhanced financial management	3.719	0.922
Improved forecasting	3.710	0.593
Enhanced the company regulatory compliance	2.903	0.555
Reduce ICT costs	2.844	0.598

Source: Survey (2014)

From Table 4.5, the area that benefited most from ERP systems was improved inventory optimization at 4.03 and the area that least benefited was reduction of ICT costs at 2.84. The standard deviation had an average of 0.734. An average on the standard deviation of less than one shows that the respondents were very close to each other meaning the respondents had almost the same view of the contribution of ERP to the performance of their organizations.

4.5.2. Regression Analysis

The relationship of the extent of implementation to the performance of an organization was sought and done via regression analysis where means and standard deviations are the variables used in the study. Because the unit of analysis in this study organizations in energy sector, multiple responses from the same organization were averaged to be used as organization level variables.

Table 4.5.2: Descriptive Statistics of Organizational Variables

Variable	Extent of ERP implementation	ERP contribution to performance
Mean	3.229	3.510
Std. Deviation	0.718	0.734

Source: Survey (2014)

One of the objectives was to relate the extent ERP system implementation and the performance of the company. Regression analysis is a good tool to investigate the strength of the relationship between one dependent variable (Y) against a changing variable (independent variable). The regression model assumes the following equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

Where: Y = Dependent variable (Organizational Performance)

β_0 = Constant

$\beta_1 - \beta_3$ = Coefficients

ε = Error

X_1 = Human Resource

X_2 = Production Planning

X_3 = Material Management

X_4 = Sales & Distribution
 X_5 = Plant Maintenance
 X_6 = Project System
 X_7 = Quality Management
 X_8 = Business Information Warehousing
 X_9 = Plant Maintenance
 X_{10} = Investment Management
 X_{11} = Treasury Management
 X_{12} = Finance Controlling
 X_{13} = Financial Accounting
 X_{14} = Asset and product lifecycle management
 X_{15} = Document Management System
 X_{16} = Master data Management
 X_{17} = Customer Relationship Management
 X_{18} = Supply Chain Management
 X_{19} = Supplier Relationship Management

The correlation matrix between variables is presented. A common concern of any regression analysis is the multi-collinearity that may exist among the independent variables (Hair, et al., 1995).

Table 4.5.3: Regression table

	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9
GDC	2.920	2.000	2.640	0.760	2.720	2.040	1.840	0.760	2.920
KenGen	0.929	0.403	1.031	0.316	1.046	0.673	0.439	0.393	0.801
KPC	2.667	1.944	2.583	1.444	2.917	2.639	2.444	1.667	2.722
KPLC	2.000	1.714	1.020	1.102	2.143	1.000	0.939	1.000	2.143

X₁₀	X₁₁	X₁₂	X₁₃	X₁₄	X₁₅	X₁₆	X₁₇	X₁₈	X₁₉
1.160	2.120	2.920	2.920	0.760	1.600	2.040	1.480	2.200	2.080
0.413	0.592	1.005	1.005	0.449	0.577	0.444	0.214	0.668	0.321
1.556	2.278	2.917	3.167	1.861	1.556	1.750	3.722	3.917	3.917
1.000	2.000	2.327	2.327	1.429	1.939	1.612	1.429	2.327	2.327

Statistical analysis showing the relationship between the extent of ERP implementation and the performance of an organization.

Table 4.5.4: Regression analysis

**SUMMARY
OUTPUT**

<i>Regression Statistics</i>	
Multiple R	0.7507
R Square	0.5636
Adjusted R Square	0.4293
Standard Error	4.0331
Observations	18.0000

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	273.0470	68.2618	4.1967	0.0213
Residual	13	211.4530	16.2656		
Total	17	484.5			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P- value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	2.7035	3.6908	0.7325	0.4769	-5.2700	10.6770	-5.2700	10.6770
GDC	-3.2897	2.8609	-1.1499	0.2709	-9.4702	2.8909	-9.4702	2.8909
KenGen	-4.8082	6.3012	-0.7631	0.4590	-18.4212	8.8047	-18.4212	8.8047
KPC	2.5876	1.5867	1.6308	0.1269	-0.8402	6.0153	-0.8402	6.0153
KPLC	6.4075	2.4081	2.6609	0.0196	1.2052	11.6098	1.2052	11.6098

5-point scale: 1=No extent, 2=Little extent, 3=Moderate extent, 4=Great extent, and lastly 5=Very great extent.

Source: Survey (2014)

The overall regression accuracy is determined by the R square (0.5636) that represents the percent (56%) of the output of the variance variable. This means that the performance of the companies are in fact relying on 56% and 42% extent on the extent of ERP implementation. The significance F (0.0213) which is small shows that the probability it was not by chance, that only 2.8% was by chance since it's lower than 5% hence not significant.

The reliability of the regression line coefficients and the Y intercept (2.7035) and each slope of the lines are determined by the P values of each. The lower the p value the greater the probability that those outputs were not obtained by chance.

Hence from the equation

$$y = a + bx + e$$

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon$$

the regression equation takes the form

$$Y = 2.7035 - 3.2892X_1 - 4.8082X_2 + 2.5876X_3 + 6.4075X_4 + 4.0331$$

Correlation is a measure of association between two variables. The value of a correlation coefficient can vary from -1 to =1, correlation of zero means there is no relationship, a negative correlation means the variables are inversely related, while a positive correlation means they are equally related. The correlation and the Pearson R is -0.084100557 (-8.4%). Meaning that the values are just slightly related. This means that the factors for a successful ERP implementation are related slightly to the number of modules implemented. On the correlation of the performance of the organization to the factors and extent of implementation, it shows there is a very strong correlation with all the factors and modules meaning that the more we deploy more modules, the further we make the organizations efficient and productive apart from Document Management System (DMS) whose values are at very low levels of between 0 and -1.6.

4.6. Discussions of the Findings

The research was successful in showing the relationship between the extent of ERP implementation and the performance of a company. The higher the extent of ERP deployment and usage the higher the value to the company and performance.

The findings are in line with study by Njihia and Mwirigi (2014) Kyung and Young (2001) where they found out that there was a significant interaction effect of ERP adaptation on the relationship between organizational fit of ERP, ERP implementation success and the performance of the organizations.

The also study agrees with Prosser and Canty (1998) Lucas, Walton, and Ginzberg (1988) Soh, Kien, and Tay-Yap (2000) who found out the organization has to be fit for the complexity of an ERP system and outlined steps to ensure that the ERP selection is successful and fool proof.

The study is also in line with recommendations by Uwizeyemungu and Raymond (2005) Ragowsky, Somers, and Adams (2005) in their paper on motivation to higher adoption and value of adoption of information systems in public sector supported by Mauti, Muranga, and Magutu (2013) Bond, et al, (2000) study of e-procurement on how the factors for a successful implementation are the most important factors that a firm needs to pay attention to.

CHAPTER FIVE: SUMMARY AND CONCLUSION

5.1.Introduction

This chapter provides the summary of the findings from the study and also gives conclusions and recommendations of the study.

5.2.Summary of the Findings

The respondents were energy sector parastatals ICT administrators, ICT managers and ERP functional staff where most of the respondents have been working with ERP systems or have been in ICT management for more than 5 years. All the respondents are well educated as all have degrees from universities and most of the respondents had more certifications and qualified in various diverse areas. Most of the respondents were young with experience and management level was also represented.

5.2.1. Extent of ERP Implementation

One of the objectives of the research was to find out the extent of ERP implementation and adoption in the energy sector parastatals in Kenya. The research found out that all the parastatals that emanated from Kenya Power and Lighting Company (KPLC) were using or are planning to adopt ERP from SAP. KPLC implemented SAP in 1996 which it made a copy of the same to KenGen when it broke up into two independent parastatals in 1998 on the onset of a new energy regulatory framework. KenGen was vested with the mandate to research, explore, develop and manufacture electricity while KPLC was mandated to transmit and distribute electricity. Both firms continued to use SAP R/3 and upgraded to SAP ECC 6.0 in 2010.

The survey also established that KenGen started sharing power research and exploration mandate with GDC as from 2010 where it had a very big influence in terms of manpower and experience adopted from KenGen. Having most of its initial employees from KenGen, and most influential the MD and ICT manager, GDC adopted SAP too.

The survey looked into Ketracco, a breakaway parastatal from KPLC incorporated on 2nd December 2008 established to develop new high voltage electricity transmission infrastructure that form the backbone of the National Transmission Grid. The company has not yet deployed an ERP though they are in the procurement process to deploy SAP HANA ERP.

The survey looked into Kenya Pipeline Company (KPC) which recently upgraded their SAP ERP. KPC are on the process of rolling out modules under ERP II. Currently, the company has deployed EAM, PM and DMS.

Although ERP implementation has been one of the most significant challenges for IS practitioners in the last decade (Volkoff, Strong, & Elmes, 2004), in Kenya energy sector, with the parastatals that deal with electricity energy, it is evident that the choice of ERP is influenced by the parent KPLC that broke up into the current 4 state companies. Even though it is expected that experience in terms of ERP implementation and adoption should not be a problem for these parastatals, the findings show that there is a little disconnect between the level of experience and level of adoption of ERP systems. Research has found out that adoption is skewed towards financial modules which have been greatly been deployed, meaning that the management are only conversant with modules under ERP I including HR and Materials. Modules under finance include Investments management, Treasury Management, Financial Accounting, and Finance Controlling.

From the survey, modules that came in with ERP II have greatly been under deployed and unknown to many within these parastatals. These are modules that bring in efficiency in administration, optimization of operations and supporting the business. Most of the respondents did not have a clue on most of the modules under ERP II that include EAM, ELM, PM, SRM, CRM, DMS and SCM. This is evident from the research study where many respondents left blank spaces on many instances. We were keen to note that most of the companies that deploy ERP was primarily for finance and cash flow purposes.

According to the survey, the extent of ERP implementation within the energy sector parastatals had a mean of 3.229 with a standard deviation of 0.718 showing that the respondents agree that the extent of ERP implementation is low.

5.2.2. Successful ERP Implementation

Another objective of the research was to find out factors that contribute to successful ERP implementation. The research has established that the respondents were very conversant with problems encountered during implementation of ERP systems. The study will establish a relation on how the rate the extent to which implementation of ERP system has contributed to the performance of the organization and how the extent of ERP implementation is dependent on the factors influencing its implementation.

A research by Njihia and Mwirigi (2014) in their study they found that there is a significant interaction effect of ERP adaptation on the relationship between organizational fit of ERP and ERP implementation success (Kyung & Young, 2001). Before ERP adoption, the CIO must establish thorough misfit analysis and resolution plan based on ERP knowledge how to mitigate any escalating project risk over the course of implementation. These will help calculate the level of resource engagement, finances, scope, and choice of ERP among other challenges. According to Prosser and Canty (1998), to assure the organizational fit of an ERP, the CIO can also utilize the proof of concept methodology to be able to land a good ERP system.

According to the survey, the factors that contribute or influence successful ERP implementation within the energy sector parastatals had a mean average of 3.653 with a standard deviation of 0.973 showing that the respondents agree that the success factors of ERP implementation is greatly influenced by the perception of the management and culture of the organization.

5.2.3. ERP and Performance of the Organization

This survey established how the choice of ERP has a direct effect on the outcome of the project since it brings along other factors that will influence. They include the vendor, consultant knowledge and skills, project team competency among others. This is in line with recommendations by Prosser and Canty (1998) who outline steps to ensure that the ERP selection is successful and fool proof. They recommend proof of concept (POC) and request for proposal (RFP) from the vendors.

For example from the research, it can be established how the factors that can determine the successful adoption of e-procurement systems such as SRM and SCM. The level of efficiency in operations and maintenance can be established from deployments of PM and EAM modules. These are the most important factors that a firm needs to pay attention to in their efforts of implementing electronic systems and practices aimed at improving their competitiveness.

The CIO has to balance between having more features from the ERP and complexity of adoption and usage by the organization and at the same time ensure that the level of customizations of ERP are kept at minimal to avoid having too many alterations and deviations from the best practices. Poor planning and execution of the project is a major factor that influences adoption of the systems. This is in line with recommendations by Uwizeyemungu and Raymond (2005) in their paper on motivation to higher adoption of systems in public sector.

According to the survey, the performance of the organization within the energy sector parastatals had a mean of 3.510 with a standard deviation of 0.734 showing that the respondents agree that the extent of ERP implementation has influence over the performance of the organization.

5.3. Conclusion

The findings established there is a correlation between the extent of ERP adoption, ERP implementation and performance of an organization. As observed in the literature on ERP implementation challenges, they tend to be skewed heavily towards top management, processes and organizational culture. The organizational fit of the company has a significant effect on ERP implementation success, project managers, first of all, must evaluate organizational fit of ERP based misfit analysis as it requires both comprehensive understanding of critical organizational processes and detailed knowledge of the complex ERP.

From the research, it is evident how the extent of implementation of modules affects performance. The areas of efficiency of IS systems are dependent on the modules of ERP

has been deployed to. As such, management must be aware through sensitization and education on potential and capability of reengineering of processes to using IS systems to enhance efficiency and overall performance of the company. The factors that determine the successful adoption of information systems are the most important factors that a firm needs to pay attention to in their efforts of implementing electronic information systems and practices aimed at improving their competitiveness.

It was also established from the survey that most of the energy sector parastatals have their ICT department under a financial docket. This means the top management perceive ICT and ERP as an expenditure department rather than a strategic department to the organization. This study also noted that lack of consensus between top management and user department in parastatals delay ERP implementations. This is due to lack of awareness among the managers on the potential and viability of IS systems. These findings are in line with conclusions by Ragowsky, Somers and Adams (2005) on the value added to the organization by adoption of ERP systems.

5.4.Recommendations

To improve the success of information systems in energy sector parastatals this study recommends improved planning and consensus. From our literature review, we noted that public companies decisions are consensus based, therefore for efficient consensus to happen such projects must be sponsored and coordinated from the top most management.

Top management will ensure transparency and accountability in procurement processes to ensure that the ERP choice is keenly scrutinized, request for proposals and proof of concept done diligently. Top management will ensure that departmental managers comply, play and execute their part diligently avoid complacency and be open to business processes reengineering. This will reduce organizational culture creeping into the project and prevent the organization realize the full benefits of an ERP.

The study proposes best practice adoption in order to reduce customizations. This study proposes that this should be done after adequate sensitization and awareness through efficient and effective change management and communication structures. Training and

capacity building must be undertaken prior to such projects being undertaken to ensure that there will be efficient knowledge transfer and experience as project takes shape.

This study proposes that public institutions top management must embrace ICT as a strategic partner and no longer the desktop and keyboard support personnel. Hence qualified IT professionals should be engaged in these projects to drive innovation, automation and collaboration.

5.5.Limitations of the Study

Whereas the study recognizes there are many and diverse areas of ERP that it couldn't cover, the study would have covered all processes in the industry and compared to a vertical integrated company to determine the overall extent that a company can exploit the benefits of an ERP system. The study would also have sought to establish the difference between public and private sector company's level of ERP systems adoption and how the critical success factors compare within. The study would have sought to understand how other companies in the energy industry use ERP Systems and solve the challenge of integrating information spread through several heterogeneous information systems.

5.6.Recommendations for Further Study

The study recommends some areas for further research. One area is finding out the perception of top management of public organizations to ERP systems and the relationship to performance of the respective companies. The other area of study would be the impact of the level of technological knowhow in the country and how it affects ICT systems adoption and the productivity paradox.

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APPENDICES

APPENDIX 1: KENYA ENERGY SECTOR PARASTATALS

The Kenya energy sector parastatals include (The Presidential Taskforce on Parastatal Reforms, 2013)

1.	Kenya Power & Lighting Company Limited (KPLC).
2.	Rural Electrification Authority (REA).
3.	Kenya Petroleum Refineries Ltd. (KPRL)
4.	Kenya Electricity Generating Company Ltd (KENGEN).
5.	National Oil Corporation of Kenya (NOCK).
6.	Kenya Pipeline Company (KPC).
7.	Electricity Regulatory Board (ERB)
8.	Geothermal Development Company (GDC)

APPENDIX 2: QUESTIONNAIRE

INSTRUCTIONS

I am currently a student at University of Nairobi pursuing a post graduate degree in masters of business administration. This questionnaire seeks to collect data to find out the information on **Implementation of an Enterprise Resource Planning (ERP) System in your organization and relation to its impact on performance**. Your responses will be kept as confidential as required. Your opinion is highly valued. Please fill the questions by putting a tick in the appropriate box or by writing in the space provided.

Part A: Demographic Information: Respondent

1. Gender: Male ☐ Female ☐
2. What is your age group?
3. 18 – 25 years ☐ 26 – 30 years ☐ 31 – 35 years ☐ 36 – 40 years ☐
41 – 45 years ☐ 46 – 50 years ☐ Over 50 years ☐
4. What is your area of specialization?
HR ☐ Finance ☐ ICT ☐ Engineering ☐ Procurement ☐
Others (Please specify) _____
5. What is your highest level of education?
High School ☐ College ☐ Bachelor Degree ☐ Graduate Degree ☐
6. How long have you been working with your organization?
0-2 years ☐ 6 -10 years ☐ Above 15 years ☐
3-5 years ☐ 11 -15 years ☐
7. Which of the cadres below best describe your job level:
Top management (Level 1) ☐ Middle management (Level 3) ☐
Senior management (Level 2) ☐ Lower management (Level 4) ☐
Others (Please specify) _____

Demographic Information: Firm

8. Name of organization _____

9. Number of years in operation _____

10. Number of employees _____

11. Annual turnover of firm in Kshs. _____

12. Main source of revenue _____

13. Number of branches _____

14. Headquarters location _____

15. What is your organization main line of business in industry?

16. Name of Enterprise Resource Planning system in place?

17. Year of ERP implementation? _____

18. Years ERP implementation undertook? _____

19. Number of ERP modules implemented? _____

Part B: Indicate the extent to which your firm has implemented ERP in each of the following functions? Indicate the extent using the scale.

1. No extent,
2. Little extent,
3. Moderate extent,
4. Great extent,
5. Very great extent.

		1	2	3	4	5
1.	Human Resource					
2.	Production Planning					
3.	Material Management					
4.	Sales & Distribution					
5.	Plant Maintenance					
6.	Project System					
7.	Quality Management					
8.	Business Information Warehousing					
9.	Plant Maintenance					
10.	Investment Management					
11.	Treasury Management					
12.	Finance Controlling					
13.	Financial Accounting					
14.	Asset and product lifecycle management					
15.	Document Management System					
16.	Masterdata Management					
17.	Customer Relationship Management					
18.	Supply Chain Management					
19.	Supplier Relationship Management					
20.	Others					
21.						
22.						

Part C: To what extent did each of these factors contribute to successful ERP implementation in the firm? Indicate the extent using the scale.

1. No extent,
2. Little extent,
3. Moderate extent,
4. Great extent,
5. Very great extent.

		1	2	3	4	5
1.	Top management support					
2.	Financial resources					
3.	Organizational resistance					
4.	Choice of ERP					
5.	Project and scope management					
6.	Customizations					
7.	User engagement					
8.	System Testing					
9.	Change management					
10.	Training and knowledge transfer					
11.	Project management					
12.	Project team competency					
13.	Communication management					
14.	Business process reengineering					
15.	Vendor selection and partnership					
16.	Management expectation					
17.	Software Development, Testing & Troubleshooting					
18.	Monitoring & Evaluation of Performance					
19.	Project scope					
20.	Others, specify and rate accordingly					
21.						
22.						

Part D: Rate the extent to which implementation of ERP system has contributed to the performance of the organization. Indicate the extent or each of the following indicators of performance using the scale.

1. No extent,
2. Little extent,
3. Moderate extent,
4. Great extent,
5. Very great extent.

		1	2	3	4	5
1.	Standardization to reduced business risks					
2.	Automation to enhance business processes					
3.	Integration to enhance business operations					
4.	Improved inventory optimization					
5.	Production optimization					
6.	Operations optimization					
7.	Efficient project management					
8.	Effective asset and product lifecycle management					
9.	Enhanced information management					
10.	Enhanced personnel management					
11.	Enhanced supplier management					
12.	Enhanced customer management					
13.	Enhanced financial management					
14.	Improved forecasting					
15.	Enhanced the company regulatory compliance					
16.	Reduce ICT costs					
17.	Others					
18.						
19.						

Thank you so much for your time and your candor!