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Effects of Information Communication Technology Adoption on Procurement Process in Kenya's Oil Industry: A Survey of Total Kenya Limited Mombasa County

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Abstract: **The purpose of this study was to map the effects of ICT adoption in procurement processes using Total Kenya limited case. This was guided by four specific objectives: To identify ICT applications adopted in the organizations procurement processes, to establish the firms supply chain propensity to partner with suppliers in ICT adoption. To identify the influence of individual factors in adopting ICT and to determine the challenges experienced in ICT adoption in procurement processes. The population of study comprised of 300 employees of Total Kenya Limited. Stratified random sampling technique was used to select the sample.**

The study used stratified sampling technique; the strata's was derived from the various employment levels that is top, middle and low level management. The study used a proportion of 15% from each stratum to select 45 respondents. The study relied on primary as well as secondary data. Primary data was collected through questionnaires structured to meet the objectives of the study. The questions were both open ended and closed ended. Secondary data was collected from relevant literature review, business magazines, journals, internet and other relevant materials. Responses in the questionnaires were tabulated, coded and processed by use of a computer Statistical Package for Social Science (SPSS) version 20 to analyze the data descriptive statistics such as mean and standard deviation was used. Tables, pie charts, and graphs were also used to present responses and facilitate comparison.

From the study, it was revealed that the impact of ICT adoption on procurement processes mainly refers to time reductions and quality improvements, rather than cost reductions as reported by many authors. The old view that ICT applications are associated with cost reductions is contested in this research. We found that company is likely to realize improvements in cycle time reductions and process quality. In terms of ICT adaptability, this study found that the company had not adopted more complicated e-business applications. From the study it is also clear that the adoption of ICT applications is not exclusively a matter of resources on the contrary, operational compatibility and the level of supply chain collaboration are two of the factors that play a determinant role in increased ICT adoption and impact assessment. The research was limited to a multinational company and thus the researcher recommends for further study in the topic of ICT adoption among the Sme's sector and an analysis of the challenges experienced.

1. INTRODUCTION

1.1 Background of the study

Many organizations have implemented the use of information and communication technology (ICT) in order to develop the products and services they offer to their customers. Owuor (2004) defines Information and Communication Technology (ICT) as the technology which supports activities relating to the design, storage, and transmission of data and voice, jointly with their interrelated methods. Based on this definition, ICT signifies the technological standpoint of an information system (IS) and comprise computing, telecommunications and automation activities. Lucas (1987) defines an information system as a set of structured procedures which, when effected, gives information for decision making. According to Olson and Gordon (1998) an information system is an integrated user-machine system for providing information to support operations, management, analysis and decision making functions in an organization. From these three definitions, ICT can be viewed as the enabling system that facilitate the processing and flow of information as well as the technologies used in the actual processing that goes on to produce a product or to provide a service to customers.

Integrated information systems (IS) have taken center stage in changing organizations. Today, IS are found in several organizational operations e.g. production, marketing, communication, logistics, besides having greatly influenced present living. It is now not easy to visualize life without computers, the internet, e-mail, e-business, e-learning, mobile phones and much more. Modern enterprises largely depend on ICT for gathering and distribution of data and information. Other firms and individuals as well are using ICT to transfer money from one party to another. According to Kitur (2006) several organizations including banks, insurance companies, and service companies have adopted ICT and considers it as a key success factor (KSF) for the reason that it has turned out to be the motivating force that is decisive in the production and delivery of goods and services in those industries. Fishbein &Ajzen (2006) in the theory of reasoned action proposed that, a person's real conduct can be determined by looking at his formal intention together with the beliefs that the person would have for the given behavior .According to Davis, (1985) adoption of ICT in the Kenya oil industry is not only applicable for multinational oil companies (MOCs) in their competitive drive to stay ahead in technological progress, but also has a direct proposition for the small local companies in the industry. Unlike in the 1990's, the majority of oil companies in the industry have developed and have build up substantial financial resources and competence and are determined to compete with the industry major players in the use of ICT (www ipea.co.ke). However, they still have to tackle issues such as the lack of experienced human resources, and the need for improved awareness of cutting - edge technology expertise, and business processes. The coming on of modern internet-based ICTs in the 1990s has increased the attention of oil-sector players in their aspiration to keep pace with their peers.

Procurement process entails the acquiring of goods or services at the best possible price and total cost to meet the needs of the buyer in terms of quality and quantity, time and place. Procurement as a supply chain function has developed considerably over time; at the outset it was a wholly an clerical function until Porter (1980) impelled firms to think of procurement as a strategic function rather than an administrative one in his five forces model where he proved supplier and buyer power as two vital forces for competitive advantage. Technology adoption research explains in almost all cases, particularly in network technologies ICT included, that S-shaped adoption curves can be observed. The diffusion of an innovation starts slowly with a few early adopters.

Information technology makes easy communication between persons or groups who are not physically near the same locality (Raymond, 2005). Systems such as cell phone, telex, radio, television, and video conferencing are included, as well as more modern computer-based technologies, e.g. electronic data interchange and e-mail. According to Lui (2008) the early days of procurement, procuring entities and 3rd party solution providers under-projected the prerequisite resources, time and effort, necessary for e-business among suppliers and clients. Major and big enterprises usually used a combination of supplier enabled approaches. Whose benefits and trade-offs needed to be reviewed

Over the past decade, user adoption has risen at basically the same rate as the increase in suppliers enabled supply chain. With added products and suppliers on the procurement processes, users have fewer motives to try to outwit the system. Still, end users report that quite a few factors continue to seize back user adoption; these include inadequate accounts of spending categories within the system coupled with unpredictable purchase requirements plus bureaucracy procedures and policies to drive adoption, and distorted supply bases (Raymond, 2005). However best Practice firms have been working on user adoption for years, and many supply managers at these ventures have become top "sellers" of the ICT enabled procurement system to end users.

1.2 Profile of Total Kenya

Total Kenya Limited is part of the Total Group, the 4th largest Oil and Gas Company in the world operating in over 100 countries throughout the world. The Group is involved in all aspects of the oil industry from exploration and production to refining and marketing and it is also strong in the chemicals market. Total has been operating in Kenya since its incorporation in 1955 as OZO East Africa Ltd. It began operations as Total Oil Products (E.A) Ltd. In 1991, the company name changed to Total Kenya Limited. It is the only subsidiary of a multinational petroleum company whose shares are quoted on the Nairobi Stock Exchange.

1.3 Statement of the Problem

Kenya's trade liberalization has accelerated since the early 1990s, thus stimulating imports and improving access to alternative and superior technologies. With the advent of globalization and global financial crisis, adopting Information and Communication Technology (ICT) in Kenya companies has become increasingly important. On one hand, more and more companies are venturing abroad and approaching the international marketplace in order to get highly competitive position and maximum profit (Dayasindhu, 2002). Croom (2005) and Aberdeen (2001) affirms that using ICT tools in procurement enables the organizations to save time and money, considerable reduction of travel requirements, and thus increasing the efficiency and effectiveness of companies.

In Kenya at present firms continue to face business linked problems like compilation of well-timed information which is dependable and precise for dispensation, storage as well as retrieval for assessment and decision making for control of the organization (Osmonbekov, Bello and Gilliland, 2002). Comparing the present ICT supported procurement, traditional procurement was paper-based and conversation-based (Bartezzaghi and Ronchi, 2003). Currently, this has changed to

some extent and procurement has become a strategic function: procurement personnel look for suppliers that fit within a company's overall plan and strategy.

According to Stratman (2007) poor records management, long documentation process and questionable filing systems, plus lack of proper procurement plan and in-efficient post award contract execution, irregularity in making obligatory reporting to Public procurement oversight authority and lack of utilization of standard requisitions are an obvious signal of a unsuccessful process. The procurement entities are not contented with what has been accomplished, and aspire to take advantage of more potential for optimization. The main key and universal procurement target set by the entities examined is the reduction of procuring price and the total cost of ownership. Great significance is also attached to the internal process optimization (Caldwell, Roehrich and Davies, 2009). Thus achieving value for money which is very much defined by growing procurement volumes through greater concentration of enterprises with core competences, globalization of sourcing markets, ever changing market dynamics as well as the technology shortened product lifecycle.

Ordinary procurement involves receiving quotes and then authorization, maybe from finance, followed by doing a purchase order, which takes days even weeks. With the coming of information technology, this route has been simplified and speeded up greatly, thanks to synchronized interface with preapproved suppliers and business partners, no matter their location in the world. With online transaction, procurement processes can be approved online and the order fulfilled within minutes; where the required item often arrives in real time (Lewis and Roehrich, 2009).A number of local studies have been done on ICT and procurement processes. For example, Hamada (2012) did a study on influence and challenges of information technology on supply chain management a case of general motor's east Africa she found that a top management support was one of the factors influencing adoption and success of information technology on supply chain management.

Kiburi (2008) did on factors influencing the implementation of e-procurement among firms listed on the Nairobi stock exchange. The study concluded that organization capacity was a determining factor. Katana (2011) studied electronic procurement adoption: the case of Kenya ports authority. The study showed that firms' that acquire extensive IT resources are able to create competitive advantage. Based on these prior researches there is difficult providing evidence on positive relationship between information technology and procurement process and hence the findings suggests that a more in depth analysis is required. It is on the basis of these differences that the study sought to examine the effect of ICT adoption on procurement processes among oil industry in Kenya using Total Kenya Limited case.

1.4 Objectives of the Study

1.4.1 General Objective

The purpose of this study was to establish the effect of ICT adoption on procurement processes at Total Kenya limited.

1.4.2 Specific Objectives

1. To identify ICT applications and their influence on the organizations procurement processes.
2. To examine the influence of individual user factors on ICT adoption in Procurement processes
3. To establish the firms supply chain factors on procurement processes.
4. To determine the challenges experienced in ICT adoption on the procurement processes in Total Kenya limited

1.5 Research Questions

1. What are the ICT applications adopted by the firm in its procurement processes?
2. How do the individual users factors influence ICT adoption in procurement processes?
3. What are the effects of supply chain factors in adopting ICT in procurement processes?
4. What are the challenges of ICT adoption in procurement processes of Total Kenya limited?

1.6 Significance of the study

The findings of this study will benefit a number of interest groups as discussed below:-

1.6.1 Scholars and Researchers

The study will enrich their knowledge of the industry and identify areas for further research. Apart from contributing to the body of knowledge this study will stimulate future scholars and researchers to further research on ICT adoption strategies small indigenous companies in Kenya.

1.6.2 Procurement Managers

Procurement Managers in the oil industry will use the research findings and recommendations to position themselves and compete competitively in the market. It will also provide vital information for decision making.

1.6.3 Government Authorities

To the government authorities and specifically the Kenya economy, the oil industry plays a big role in contribution to the exchequer in terms of taxation. Oil companies are among the top tax payers.

1.7 Scope of the study

Procurement processes varies from one organization to another. This implies that nature of the firm and the nature of the business determine the size and types of procurement processes and techniques to adopt. The study was limited to the effects of ICT in procurement processes and covered Total Kenya Limited which is one of the leading oil company in the country and one of the organizations which has adopted ICT in its procurement processes. The study was conducted within a specified time-period of one semester.

1.8 Limitations of the study

The limitations that hindered the researcher in conducting the study efficiently were: Financial constraints which limit the amount of data and the area to be covered in the study. also confidentiality regarding data to be collected where some of the information was likely to be regarded as confidential by the officers concerned and, therefore, deny the researcher access to it. The researcher did his best to persuade the respondents to allow him access.

2. LITERATURE REVIEW

2.0 Introduction

This section will review studies that have been done in the area of technological innovation, diffusion, adoption and use of ICT by organizations and individuals. The specific areas covered will be theoretical orientation, conceptual framework, the empirical review of past studies and critique of the existing literature

2.1 Theoretical Frame work

Theories are formulated to explain, predict, and understand phenomena and, in many cases to challenge and extend existing knowledge within the limits of the critical bounding assumptions. The theoretical framework introduces and describes the theory which explains why the research problem under study exists. A theoretical framework consists of concepts, together with their definitions, and existing theory/theories that are used for the particular study (Sekaran, 2005).

2.1.1 Theory of Planned Behavior (TPB)

The theory of planned behavior (Azjen, 2011) is an extension of the theory of reasoned action (TRA). Azjen and Fishbein (1998), made necessary by the latter model's inability to deal with behaviors over which individuals have incomplete volitional control .At the heart of TPB is the individual's intention to perform a given behavior (e.g. use of ICT in procurement). For TPB, attitude toward the target behavior and subjective norms about engaging in the behavior are thought to influence intention, and TPB includes perceived behavioral control over engaging in the behavior as a factor influencing intention. TPB has been used in many different studies in the information systems literature (Mathieson, 1991; Taylor and Todd, 1995a, b; Harrison et al., 1997). According to TPB, an individual's performance of a certain behavior is determined by his or her intent to perform that behavior. Intent is itself informed by attitudes toward the behavior, subjective norms about engaging in the behavior, and perceptions about whether the individual will be able to successfully engage in the target behavior. According to Azjen (2001), an attitude toward a behavior is a positive or negative evaluation of performing that behavior. Attitudes are informed by beliefs, norms are informed by normative beliefs and motivation to comply, and perceived behavioral control is informed by beliefs about the individual's possession of the opportunities and resources needed to engage in the behavior (Azjen, 1991). Azjen compares perceived behavioral control to Bandura's concept of perceived self-efficacy (Bandura, 1997).

TPB also includes a direct link between perceived behavioral control and behavioral achievement. Given two individuals with the same level of intention to engage in a behavior, the one with more confidence in his or her abilities is more likely to succeed than the one who has doubts (Azjen, 1991). As a general theory, TPB does not specify the particular beliefs that are associated with any particular behavior, so determining those beliefs is left up to the researcher. An underlying premise of the current study is that beliefs about privacy and trustworthiness of the ICT platform inform attitudes toward Internet purchasing.

TPB provides a robust theoretical basis for testing such a premise, along with a framework for testing whether attitudes are indeed related to intent to engage in a particular behavior, which itself should be related to the actual behavior. Based on the theory, beliefs about how important referent others feel about ICT adoption in procurement, and motivation to comply with the views of important others, should also influence intent to make Internet purchases. Finally, beliefs about having the necessary opportunities and resources to engage ICT in Procurement process should influence intent to purchase as well as directly influence purchasing behavior itself.

2.1.2 Technology Diffusion Theory

Technology diffusion theory is the common lens through which theorists study the adoption and development of new ideas. Diffusion is defined basically as the process by which an innovation is adopted and gains acceptance by individuals or members of a community. The Diffusion theory represents a complex number of sub-theories that collectively study the processes of adoption. The most famous account of diffusion research by Rogers (1995) where the definition of diffusion comprises of four elements which are defined as;

Innovation: an idea, practices or object perceived as new by individuals or group of adopters. Communication channels: means by innovation moves from one individual to the next or group to group. Time: the non-spatial interval through which Diffusion event takes place. The events include: innovation diffusion process, relative span of time for the individual or group to adopt the innovation and social system: a set of interrelated units that are engaged in joint problem solving activities to accomplish the goals.

Rogers (1995) also came up with the perceived attributes theory that assumes that innovation bears the following characteristics: Relative advantage: degree in which an advantage is perceived as better than the idea it supersedes, Compatibility: degree that an innovation is seen to be consistent with existing values and norms, Complexity: the degree in which an innovation is seen to be difficult or easy to understand and use, Trialability: is the degree in which an innovation may be experienced on a limited basis and Observability as the degree to which the results of innovation are visible to others. The easier it is for individuals to see results of an innovation, the more likely they are to adopt it (Rogers, 1995).

Although the process is not limited to these perceived attributes, the elements are helpful in formulating questions for potential adopters in better understanding what factors make adoption possible or desirable. Endogenous growth theory however indicates that the rate of technological progress, and hence the long-run rate of economic growth, can be influenced by economic factors which will curtail technology adoption in procurement as technology is seen as being costly. It starts from the observation that technological progress takes place through innovations, in the form of new products, processes and markets, many of which are the result of economic activities (Lieberth, 2007).

Technology revolution has impacted on purchasing; the drivers for change in purchasing function must include the objectives of eradicating paper transactions to a secure system that facilitates procure to pay as an objective of a world class procurement which is seen to enhance the performance of the procurement function (Lysons & Farrington, 2012). The Technology Diffusion theory is important in guiding the firm to initiate change and adopt technologies in procurement in the shift towards world class procurement.

2.1.3 Resource Based Theory

Resource-based theory aspires to explain the internal sources of a firm's sustained competitive advantage (Kraaijenbrink, Spender, & Groen, 2010). It was Penrose who established the foundations of the resource-based view as a theory (Roos & Roos, 1997). Penrose first provides a logical explanation to the growth rate of the firm by clarifying the causal relationships among firm resources, production capability and performance. The focus was mainly on efficient and innovative use of resources. It was identified that bundles of productive resources controlled by firms could vary significantly by firm, that firms in this sense are fundamentally heterogeneous even if they are in the same industry (Barney & Clark, 2007). Sandholm (2006) took on a resource perspective to analyze the role of procurement in new products development and ultimately organizational performance and believed that "resources and products are two sides of the same coin" and firms diversify based on available resources and continue to accumulate through acquisition behaviors.

Elgar (2002) also uses the resource-based theory to explain performance as well as performance improvements. To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and level of performance describes location in the journey. Current level of performance depends holistically on 6 components: context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. Three variables are proposed for effective performance improvements. These involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice. For performance to increase the following factors must be influenced by the performer these are: Performer's Mindset includes actions that engage positive emotions. Secondly, immersion in a physical, social, and intellectual environment can elevate performance and stimulate personal as well as professional development.

2.2 Conceptual Framework for the study

The main focus of the study was on the effect of ICT adoption on procurement process .These effects were either experienced by the staff as they carried out their duties in the ICT environment or by the organizations' capacity and supply chain factors as they received services provided with the use of ICT. The variable relationship is as shown:

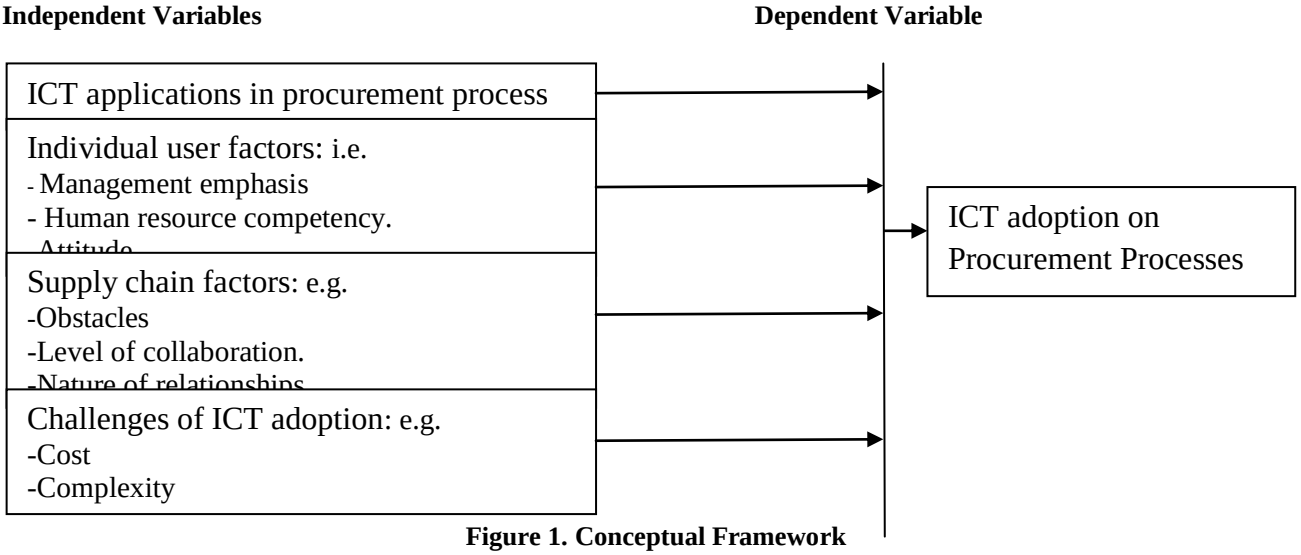


Figure 1. Conceptual Framework

2.3 Review of ICT adoption on procurement Process

This section provides a review of studies which have been done in the past regarding the factors influencing adoption and use of ICT. The empirical review identifies the studies, authors, areas

Of investigation and the findings reported.

2.3.1 ICT Applications

The procurement process has had many loopholes in the recent past due to the long and tiresome processes and lots of paperwork. The chipping in of ICT application in the procurement process has reduced this through the adoption of online methods of carrying out the procurement process. The use of online forms, emails, new software technologies in evaluating and making price comparisons has made this process efficient and at the same time will ensure transparency and accountability as well as reduction in errors and omissions (Caldwell, Roehrich and Davies, 2009).

The adoption of these ICT applications has an overall impact on the organization in that it will reduce costs within the procurement department as well as reduce errors in the procurement process thus ensuring maximum output of the organization at the lowest costs possible.

2.3.2 Individual User Factors

According to Markus, (1990) individual end users and entire business units will naturally resist any change in business processes that poses uncertainty in security and privacy of their transactions. Organizations keep their business information secret as a protective mechanism to ward off competition and remain competitive in the business environment. Private sector organizations on the other have limits to the amount and nature of information to be shared with other third parties.

The balance between transparency, protection against unauthorized data disclosure, ensuring the authenticity of a data source and the impact of disclosure of procurement process remains hazy.

To ensure that all individuals within the organization are well versed with the newly introduced ICT applications in the procurement process, management of the organization should emphasize on employee training and induction to ensure that they (employees) are well equipped with the necessary required skills to handle the new system with accuracy (Amaratunga &Baldry, 2002).

At the same time, competency should be emphasized by the organization when outsourcing for new employees for the new system. Experience and ability to handle the new system as well as to quickly adapt to the new system should be among the factors the human resource department should put into consideration when making their selection (Lewis and Roehrich, 2009). The management should also ensure that employees have a positive attitude towards the new system by emphasizing on its importance to the organization compared to the other systems previously in use.

2.3.3 Supply Chain Factors

These factors take into consideration companies' external environment. Supply chain complexity refers to the number of entities interacting with a particular company. In addition it takes into account the number of suppliers, their proximity as well as the complexity of transactions. Critical mass of users reflects the number and importance of supply chain partners that are using ICT applications (Markus, 1990).The level of collaboration is another important factor, Long term

relationships among firms which are characterized by trust have proved to facilitate electronic integration (Konsynski and McFarlan, 1990).

Trust is a crucial barrier towards the uptake of ICT applications that needs further attention specifically in the case of Oil industry which is characterized by cross-country transactions and exchanges. The nature of relationships includes characteristics such as power and dependence. Many researchers have shown that pressure from a company's environment (e.g. Suppliers-Customers) affects ICT adoption (Premkumar and Roberts, 1999: Mehrtens et al., 2001).

According to Connolly and Olson, (2000), ICT is the one of the largest drivers of change in any industry. Buhalis (1998) attributes this trend to both rapid advances in technology as well as the increasing demands of the customers who look forward to flexible, specialized, accessible and interactive products and communication with principals. As much as e-business technologies have great potential to influence the direction of the productivity in an organization, the willingness to adopt is determined by a number of factors among them, reduction of transaction Costs, improvement of customer service quality, defensive reaction to competitor's adoption, requirement by customers that their suppliers link their system as a condition for doing business, Thong (1999).

On the other hand, the propensity to adopt e-procurement may be hindered by cost of investing in compatible systems, training of personnel, unwillingness to have a more open approach to tendering, perceived barriers to e-procurement among others, (Davilla et al., 2003). Uptake by suppliers will be determined by the suppliers' appetite for change.

The introduction of this new ICT system will have a major impact in the previous procurement process of the organization. Among these are obstacles in the newly adopted process. Most suppliers used to the older system will have difficulties in adapting to the new system because of lack of the necessary skills and training to handle the new system. This means that most suppliers will be kept out of business due to lack of the necessary pre – requisites to use the new system as well as the cost involving the acquiring of the system and training costs as well.

The level of collaboration is also another factor for consideration. Most of the employees will not be in a position to collaborate well with the suppliers using the new system. This is due to the fact that it will be majorly online and indirect as opposed to the previous direct communication using paper work. The nature of relationship is also a major factor as the new ICT system will ensure that transparency is kept in the front.

2.3.4 Challenges

Angeles and Nath (2007) in particular explored the challenges to ICT adoption in procurement and identified three important issues, namely lack of system integration and standardization, immaturity of ICT procurement market services and maverick buying/difficulty of integrating e-commerce with other systems. Other relevant issues to be explored include adoption of the new technologies (Gunasekeran and Ngai, 2008), and the impact on organization and costs (Brun, Corti, and Cozzini. 2004). A number of recent studies have also looked into difficulties faced by firms in launching ICT in procurement. In a recent survey of 102 international active e-marketplaces and procurement service providers, Huber et al. (2004) found that concerns over security and confidentiality of the data needed to be exchanged in electronic environments was perceived as among the barriers to implementation of electronic procurement.

Saeed and Leith (2003) examined buyers' perceptions of ICT adoption in procurement risks and arrived at three dimensions: first transaction risks resulting from wrong products purchased due to incomplete or misleading information; Second security risks resulting from unauthorized penetration of trading platforms and failure to protect transaction related data while being transmitted or stored; and Third privacy risks arising from inappropriate information collection and information transparency. The growth of internet has nevertheless brought serious challenges to business due data hacking, internet fraud, Cyber vandalism, and virus and malware attacks (Huber et al. 2004). Beth et al. (2003) sights lack of employee competency as a challenge in ICT adoption on procurement processes where he affirms that ERP systems perfectly provide the procurement management and the management itself with the opportunity to produce steadfast, consistent, and timely information necessary for attainment of organizational goals. In his study he affirms that procurement staff must be competent enough to use the applications of software that offers the organization management skills to manage their activities for example, distribution chain and value addition in a company.

Among the challenges the organization will face as a result of adoption of the new system will include cost. The organization will incur high costs in the acquisition, installation and training on use of the new system. As well, costs will also extent to outsourcing for skilled personnel for system maintenance as well as continuous upgrade to ensure maximum output. Another major challenge will be system complexity. The complexity of the new system will mean that the organization's employees need to continuously receive training at intervals to ensure that any new developments within the system are passed on to them. Thus, the organization will stretch its costs to these continuous training which will be mainly outsourced.

2.4 Measurement of Procurement Process

Performance measurement practices refer to activities done in efforts to measure performance in an organization. Most performance measurement practices adopt performance measurement systems (Neely et al., 1995). The Procurement

function can hardly be ignored in any business enterprise. Modern organizations thinking highly associate prudent procurement practices to profitability of the enterprise. This is because most financial commitments an organization makes pass through a procurement process. Available literature indicates that the efficiency and effectiveness of the procurement function is the least measured in many enterprises despite its contribution to the profitability of enterprises.
According to Van weele (2006) procurement process measurement is an assessment of the extent to which procurement operations are carried out .Procurement process measurement should be systematic, consistence to promote comparison and yield similar results. Roos, (1997) affirms that Organization performance is closely linked to the performance of procurement it is therefore necessary to assure that procurement performs to the necessary levels so that the organization as a whole achieves high levels of operations.

According to Van Weele (2006) procurement process measurement is considered to be the result of two elements: purchasing effectiveness and purchasing efficiency. Performance provides the basis for an organization to assess how well it is progressing towards its predetermined objectives, identifies areas of strengths and weaknesses and decides on future initiatives with the goal of how to initiate performance improvements. This means that procurement process performance is not an end in itself but a means to effective and efficient control and monitoring of the procurement process (Lardenoije, Van Raaij, & Van Weele, 2005).

Kumar et al. (2005) has comes out with a Balance Scorecard to established a set of generic measurement and perspectives. The balance scorecard is used to monitor procurement performance. The result calculation of the outcomes from the balance scorecard is crucial whether the procurement has performed through the procurement process. The result determined such action and investigation to be carried out in order to prevent such deviation in future process.

2.4.1 Balanced Scorecard2.4.2 Balanced Scorecard for Procurement Processes

The balanced scorecard is a conceptual framework for translating an organization's strategic objectives into a set of performance indicators distributed among four perspectives: Financial, Customer, Internal Business Processes, and Learning and Growth. Some indicators are maintained to measure an organizations progress toward achieving its vision; other indicators are maintained to measure the long term drivers of success." (Procurement Executives' Association, 2005, pg. ix) The four perspectives of the Balanced Scorecard focus on a particular business area and define and answer specific questions as to the level of current performance, yet all four perspectives are interrelated i.e. Financial Perspective emphasis is on cost and the ability to provide the best value to customers and stakeholders it seeks to analyze whether costs are minimized and if the current financial policies the most efficient.

Customer Perspective: The focus is on the agency's overall responsibility to meet the customer's needs in the most efficient and effective manner it seeks to understand the customers and stakeholders and what are their needs and if those need are being met. Internal Business Processes will focus is on performance expectations and ensuring the proper processes and resources are available and implemented to maximize performance. The analysis will disclose on what can be done to add value to the service being provided and which procurement processes add value. Learning and Growth perspective is on the employee's ability and the organizational structure needed to achieve the agency's goals. Are the employees given the right tools to perform effectively, and if sufficient technology systems installed to achieve the goal.

2.4.2 Balanced Scorecard for Procurement Processes

An underlying concept of the Balanced Scorecard is that all four of the perspectives are balanced with each other. If the focus is too great on the financial perspective, service and customer satisfaction and employee morale may decrease. If the focus is too strong on the customer perspective, the financial perspective as well as the growth of the organization may be jeopardized. On the other hand, in order for an agency to achieve its strategic goals, it must invest in its employee's growth and examine internal business processes. By improving performance in the internal business processes and learning and growth perspectives, the procurement function will be able to meet customer and stakeholder needs and improve the financial standing of the agency.

The Balanced Scorecard identifies and provides the needed structure to meet the customers and stakeholders expectations. The scorecard also provides the framework to monitor and evaluate performance from the viewpoint of the procurement functional areas that are impacted and that can impact the performance success of the organization. Essentially, the Balance Scorecard provides a balance between finance and non-finance measures, internal and external customers, ad lagging and lead indicators.

2.5 Critique of the existing Literature

ICT adoption in Procurement functions is understood to benefit businesses by reducing operation costs, helping the improvement of geographically discrete markets and improving synchronization between cooperating parties (Sigala, 2003). These benefits have been evaluated in a number of studies on large and mid-sized firms. However, the mere adoption of ICT in procurement does not ensure superior performance because it is a challenge to translate ICT related

organizational resources into collaborative process capabilities (Ellram, 2001). According to research conducted by Leenders and Fearon (1997) companies realize far less benefits of ICT than expected.

This affirms that most firms merely achieve communication improvements and may even suffer from increased competition from companies in the same industry. Patterson and Grimm, (2003) have analyzed why some companies successfully adopt ICT in procurement while others do not succeed. Achieving ICT fit in procurement relies on planned choices and organizational capabilities (*e.g.*, innovation capability) and market characteristics. However, comparatively little research has been done about ICT adoption extent and success in organizations operating at an industry perspective, particularly the oil industry.

2.6 Summary of the study

ICT adoption in procurement processes is instrumental for a firm's survival. If a firm does not adopt a global procurement strategy and its competitors implement a global procurement strategy, in the long run they may attain a cost-quality based competitive advantage. Conversely, a firm that neglects to select and use the best suppliers of the better price-quality inputs may not survive in the long run.

An additional implication is that competitors will be able to access the firm's traditional suppliers (as long as these are electronically available). In fact, even the firm's competitors can do their purchasing in the firm's domestic market. The conclusion is that it is not enough for a firm to decide about ICT adoption based on potential benefits and impediments that will ensue or influence that adoption. The extent of adoption, advantages and problems ensuing from a no adoption decision need to be assessed.

2.7 Research Gaps

According to Schau, (2003) ICT adoption in procurement has been backed as a new strategic view of supply chain management .The innovation of employing ICT in procurement systems can create value for enterprises through utilizing. ICT enabled resources on supply chain management. Previous studies have focused on the benefits of ICT on supply chain performance e.g. Mose, Njihia, & Magutu, (2013) conducted a study on the Critical Success Factors and Challenges in E-procurement adoption among Large Scale Manufacturers in Nairobi Kenya. They concluded that most of the large scale manufacturing firms have adopted ICT in procurement.

According to Njogu (2003) some organizations have successfully embraced the use of ICT. For instance Nation Media group through their digital platform commonly known as N-Soko enables their clients to purchase products online. Awino (2011) conducted an investigation of selected strategy variables on firm's performance on ICT platform. The study focused on supply chain management in large private manufacturing firms in Kenya. It was established that most of the ICT strategies of large manufacturing firms in Kenya are not owned by individual firms but also other organizations within the SC that provide the required linkages towards the overall corporate performance of the manufacturing industry. Actually most of the studies conducted are general - there is no intensive industry-specific research which has been conducted.

These studies agree that ICT realization is a cross-industry challenge. However, the extent through which ICT adoption in procurement processes and its effects on organization performance is still not clear. For scholars, ICT and its adoption in procurement is an upcoming phenomenon in the business fraternity, and needs to be critically analyzed. For procurement managers, ICT adoption in procurement applications creates a need to understand the impact of information technology on the achievement of competency on a practical level.

3. RESEARCH DESIGN AND METHODOLOGY

3.0 Introduction

This chapter deals with the research design, population of study, methodology that will be used in collection of data, analytical framework of data analysis, which describes the firms and variables included in the study, the distribution patterns of data, and applied statistical techniques in investigating the extent of ICT adoption in procurement processes in the Kenya oil industry.

3.1 Research Design

This study used a descriptive research design. This design was appropriate because it is considered suitable for gathering qualitative information and generating appropriate conclusions with respect to the research questions (Mugenda & Mugenda, 2003). This is the most suitable design because data was collected from one organization and hence its adoption for this study.

3.2 Target Population

A population is the total collection of elements about which we wish to make inferences (Cooper& Schindler, 2003).

The target population were the staff of Total Kenya Limited who comprised 300 staff; this made it easier to get adequate and accurate information necessary for the research. The population selected was considered to have a higher level of information disclosure.

Table 3.2.1 Target population

Category	Target Population	Percentage
Senior managers	20	7%
Middle managers	25	13%
Supervisors	45	25%
Low level staff	210	55%
Total	**300**	**100%**

3.3 Sampling and Sample Size

A sample size is a set of entities drawn from a population with the aim of estimating characteristics of the population (Kothari, 2004). The sample size for this study was 45 respondents which was equivalent to 15% staff working at Total Kenya limited. According to Mugenda & Mugenda, (2003), a representative sample is one that is at least 10%-20% of the total population.

Table 3.3 Sample Design

Category		Target Population	15 %	Sample
Senior managers	2	20	7%	3
Middle managers	5	25	13%	4
Supervisors		45	25%	12
	8	210		26
Support staff			55%	
Total		**300**	**100**	**45**

3.4 Sampling Technique

Stratified sampling method was used to obtain a sample of the respondents. This technique was ideal because it gave the respondents at all levels in the organization an equal opportunity to participate in the study without bias (Kothari, 2004).This method was justifiable for this research because it allowed equal chance for all staff members from all levels within the department to participate equally as they were selected randomly from each sub – department within the whole Organization. Neuman (2003) argues that the main factor considered in determining the sample size is the need to keep it manageable enough. The choices for this technique enable the researcher to derive detailed data at an affordable cost in terms of time, finances and human resource (Mugenda and Mugenda (2003).

3.5 Data Collection Method

3.5.1 Primary Data Collection

The study used questionnaires to collect the required data. The questionnaires consisted of a list of structured questions, un-structured questions and Likert rating scales relating to the field of inquiry with space provided for selection of choices. Close ended questions have the advantage of collecting viable quantitative data while open-ended questions allowed the respondents freedom of answering questions and the chance to providing in-depth responses (Mugenda & Mugenda, 2003). Questionnaire was preferred because it is efficient, cheap and easy to be administered. The questionnaires were administered through drop and pick method to identify respondents with a brief explanation on their purpose and importance.

3.5.2 Secondary Data Collection

Secondary data was obtained from relevant literature review from studies, Academic journals, magazines, books, periodicals, brochures, and the company website.

3.6 Pilot Study

According to Sekeran (2003) a pilot test is necessary for testing the reliability of data collection instruments. Pilot study is thus conducted to test weaknesses in design and instrumentation to provide proxy data for selection of a sample. Reliability refers to the consistency of a measure. A test is considered reliable if the same result is got repeatedly (Cooper

and Schindler, 2003). The pilot study was done by selecting five respondents from the population and issuing them with the questionnaire. The data obtained was evaluated to ensure that questions were properly answered. However the findings from the pilot test were not included in the final results.

3.6. 1 Validity

Validity of an instrument is how accurate the instrument is in obtaining the data it intends to collect (Mugenda & Mugenda 2003). Validity indicates the degree to which the instrument measures what it is supposed to measure (Kothari, 2004). To ensure precision, relevance and content validity of the instrument, the questionnaire was subjected to critical evaluation by the researcher and the supervisor. Discussions were held with peers and professional experts in procurement department, who will went through the instruments to evaluate if it contained representative sample.

3.6.2 Reliability

To measure the consistency of the scores obtained, and how consistent they were for each individual from one administration of an instrument to another and from one set of items to another, the study used Cronbach's alpha (a measure of the internal consistency of the questionnaire items) using data from all the respondents. Separate reliability tests for each of the variables were computed. The key statistic in interpreting the reliability of the scale was the alpha listed under the reliability co-efficient section at the end of the output. The value of coefficient alpha ranges from zero (no internal consistency) to one (complete internal consistency). As to how large the coefficient should be, a value of no less than 0.70 as a quick rule was used. As shown, all the measurements of the instrument attained a high degree of reliability since they were above 0.70.The study used multiple items in all constructs and so the internal consistency method was applied in the study. Hair et al. (2007) mentioned that the rationale for internal consistency is that the individual items or indicators of the scale should all be measuring the same construct and thus be highly inter- correlated. The measurement scales for the variables in this study were based on a 5-point Likert scale ranging from "strongly agree" to "Strongly disagree".

3.6 Data Analysis

According to Marshall and Ross man (1999), data analysis is the process of bringing order, structure and interpretation to the mass of collected data. It involves the coding, editing and cleaning of data in preparation for processing. The completed questionnaires were received,

Checked for completeness and edited for correctness. Descriptive statistics was used to analyze the data in this study with SPSS version 20 as the main tool for data analysis and presentation.

3.6.1 Qualitative Analysis

The qualitative data generated from the study guide were categorized in themes in accordance with research objectives and reported in narrative form along with quantitative presentation. The qualitative data were used to reinforce the quantitative data.

3.6.2 Quantitative Analysis

Quantitative data was analyzed through the use of frequency distribution, mean scores and standard deviations. These analyses were used to address specific objectives I to IV. With the help of Statistical Package for Social Science (SPSS) version 20 the findings were presented in form of frequency distribution tables, bar charts and pie charts. The data was summarized according to the study's specific objectives.

4. DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.0 Introduction

This chapter covers data analysis, discussions and findings of the research. The aim of the study was to investigate the effects of information communication technology adoption in the procurement processes in the Kenya oil industry. The study achieved a 73% response rate with 33 respondents out of the 45 respondents which were targeted responding.

The questionnaires handed to respondents were 45 out of which 73% were returned when fully filled and 27% included questionnaires that were returned unfilled and those that were not returned. According to Gay (1995) a response rate of 50% is adequate and therefore that of 73% was also adequate for data to be analyzed and interpreted.

Table 4.1 Response rate

Questionnaires	**Frequency**	**Percentage**
Not Returned	12	27
Returned and Filled	33	73
Total	**45**	**100**

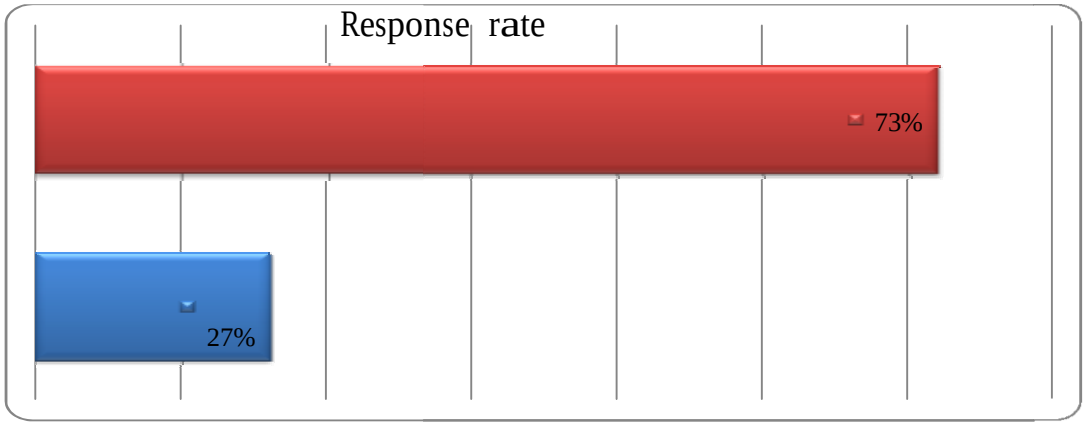


Figure 4.1 Response rate

4.2 Demographic Characteristics

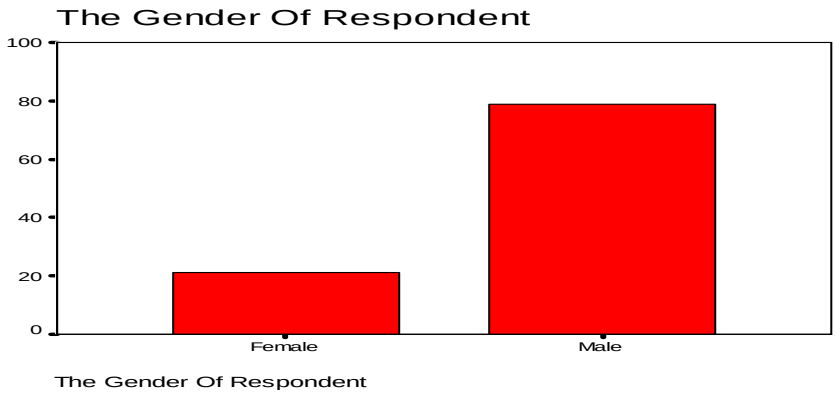


Figure 4.2 Gender Representation

The respondents were asked to show their gender, this was expected to guide the researcher on the conclusions regarding the degree of congruence of responses with the gender characteristics on the effect of information technology adoption on procurement process. The results as shown in the figure 4.1 show that majority of the respondents were male at 80% while female were 20%. This indicates that majority of the staff working in the organization were male. More men have specialized in the field of procurement and information technology in most firms than women.

4.3 Terms of Employment

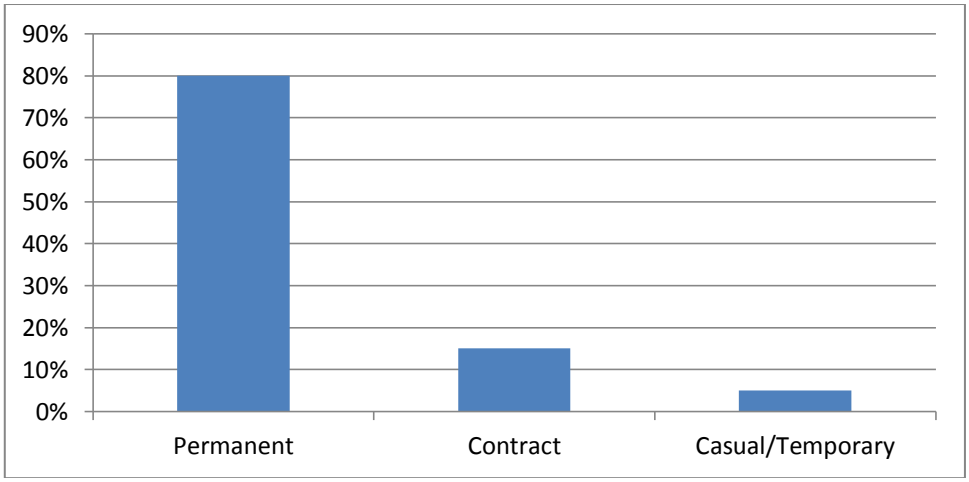


Figure 4.3 Terms of Employment

From figure 4.3.shown above, 80% of the respondents were in permanent employment, 15% had been employed in contract while 5% had been employed on temporary basis. These findings indicate that majority of the respondents had

been employed on permanent basis in the firm therefore they were in the best position to understand the need of the study and were in a position to give appropriate information for the study.

4.4 Highest Attained Educational level

The respondents were asked to show their highest attained education level. Figure 4.3 shows that majority of the respondents 58% working in firm had attained their education up to degree level while 25% had attained their education up to post graduate,17% of the respondents had achieved diploma level. This means that majority of those working in the organization had attained education up to university level and had gained rich information and they were conversant with the process, therefore they were appropriate for responding to our study questions.

Table 4.2 Highest Attained Educational level

Level	Percent
Diploma	17
Degree Level	58
Post Graduate Level	25
Total	**100.0**

4.5 Position of respondents

The distribution of the respondents in regards to positions held was such that there were 9%
Top Managers, 12% Middle level managers, 25% supervisors, 54% were operatives while 2% of the respondents did not disclose their job levels in the organization.

Table 4.3 Respondents Job level

Level	Percent
Top Managers	10
Middle Level Managers	15
Supervisory Level	23
Operatives	50
Missing Values	2
Total	**100.0**

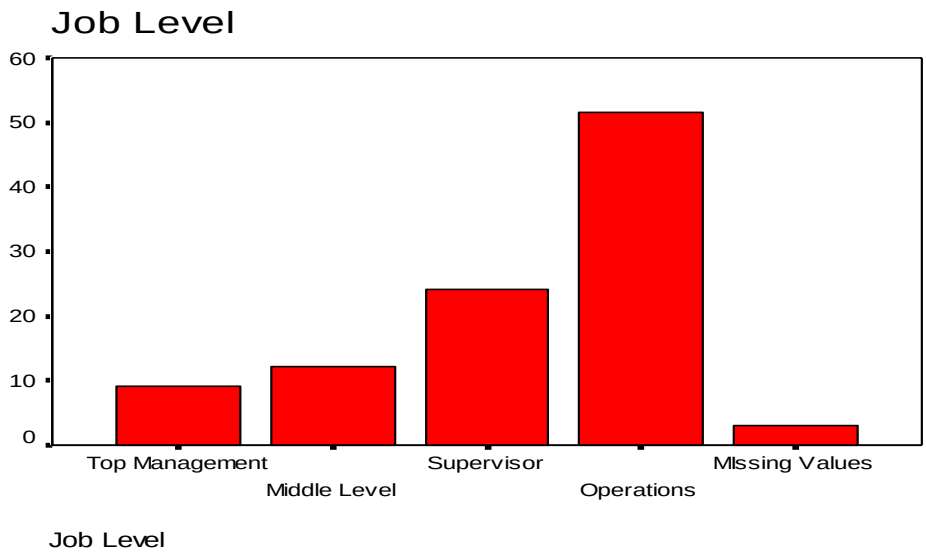


Figure 4.4 Position of respondents

4.6 ICT Training

Table 4.4 ICT Training

Response	Frequency	Percent
Yes	27	82
No	6	18
Total	**33**	**100.0**

The majority of the respondents reported having been formally trained on ICT applications (82%) while 18% indicated they did not have any formal training on ICT. This means that majority of the respondents have the relevant this means that majority of the respondents have the relevant system knowledge to handle e-transactions.

4.7 Extent of work involving use of ICT Devices

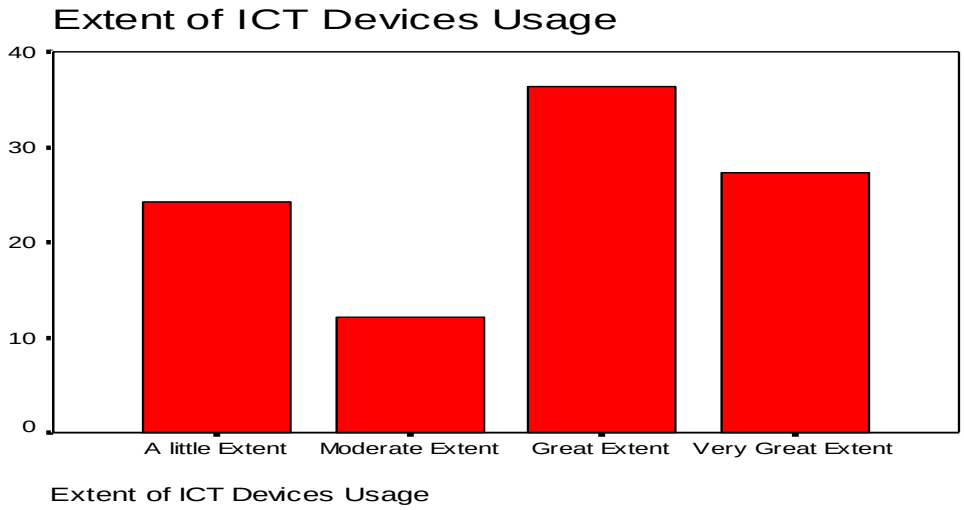


Figure 4.5 Extent of work involving use of ICT Devices

The majority of the respondents reported having a great extent in use of ICT devices in their work with 38%, while 28% indicated they very Great extent in use of ICT in their job assignments ,25% and 12% respectively reported to have a little and moderate extent in ICT devices usage in their work. The Extent of use of ICT devises in the organization respondents in this case will influence the responses to the questionnaire. Whereby respondents who have Very Great and Great extent in ICT devises usage will have better responses in regards to the capacity of the organization.

4.8 Extent to Which IT is employed in procurement process in the organization

The respondents were asked to indicate the extent to which IT was employed in the procurement process in their organization. The table below shows the study results.

Table 4.5 Procurement Process

Description	N	Min	Max	Mean	Variation	Standard deviation
Bidding Document Preparation	33	1	4	3.8714	1.0718	0.3779
Invitation to bid	33	1	4	3.8001	1.0005	0.3124
Approval mechanism	33	1	4	3.5471	0.7475	0.8574
Specification	33	1	4	3.2658	0.4662	0.5685
Selection of Method of procurement	33	1	4	3.2158	0.4162	0.6985
Assessing the needs of procurement	33	1	4	3.0625	0.2629	0.9685
Contract Administration	33	1	4	2.9487	0.1491	0.527
Prequalification of bidders	33	1	4	2.6581	-0.1415	0.6372
Issue of Bid Documents and opening of Bids	33	1	4	2.0235	-0.7761	0.9961
Evaluation of bids	33	1	4	1.9658	-0.8338	0.6875
Award and Signing of contract	33	1	4	1.6256	-1.174	0.6208
Risk assessment in procurement	33	1	4	1.5624	-1.2372	0.3265
Average score				**2.7996**		**0.6315**

From the descriptive statistics in the table shown above, the extent to which ICT is used in procurement process in the organization. The results show that information and technology was mainly used to a great extent in the following areas: Bidding Document Preparation, Invitation to bid and Approval mechanism. They were represented by means of 3.8714, 3.8001, and 3.5471 respectively. The processes indicated to have been used at a moderate extent include: Specification, Selection of Method of procurement, assessing the needs of procurement, Contract Administration and Prequalification of bidders. The means are as follows: 3.2658, 3.2158, 3.0625, 2.9487 and 2.6581. Technology was used on Issue of Bid

Documents and opening of Bids, Evaluation of bids and Risk assessment in procurement and awarding and signing of contracts at a low extent. The standard deviation show the spread of ideas of the respondents and from the table the standard deviation ranges from 0.3265 to 0.9685 indicating that it is a small value thus respondents were agreeing to the same idea.

The process of Bidding Document Preparation, Invitation to bid and approval mechanism were rated highest because they enable the procurement process to unfold in a faster, more efficient and effective manner, with fewer errors and helps in cost saving. This cost reduction is associated with less paperwork, which translates into fewer mistakes and a more efficient purchasing process. The purchasing process is simplified and also has a favorable impact on the purchasing cycle time. Faster cycle time provides increased flexibility and more up-to-date information at the time of placing a purchasing order. The use of IT in Bidding Document Preparation, Invitation to bid, Approval mechanism were represented by means of 3.8714, 3.8001, and 3.5471 respectively, most listed organizations highly rate this activities in order to maximize the use of IT, use of paperless process in procurement process, puts up strong control in purchases. Use of IT in Bidding Document Preparation, Invitation to bid, Approval mechanism introduce new central controls to ensure greater consistency, improve procurement efficiency and creates integration with other departments.

4.9 Procurement Performance

On the descriptive statistics on table 4.3 shows that 33 respondents were interviewed on procurement performance in relation to information system. Majority of the respondents agreed to a high extent that measuring the performance of the purchasing function yields benefits to organizations such as cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage and an important step towards reducing these risks is to make a realistic assessment of those that are most likely to occur in any procurement with means of 3.7894 and 3.7146. Improving quality of services while its absence or use of inappropriate means can act as a barrier to change and may lead to deterioration of the purchasing function was indicated as to affect performance at a low extent m= 2.3564.

Table4.6 Procurement Performance

Description	N	Min	Max	Mean	Variation	Standard deviation
Improving quality of services while its absence or use of inappropriate means can act as a barrier to change and may lead to deterioration of the purchasing function.	33	1	5	2.3564	-0.9304	0.3004
Measuring the performance of the purchasing function yields benefits to organizations such as cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage.	33	1	5	3.7146	0.4278	1.2365
An important step towards reducing these risks is to make a realistic assessment of those that are most Likely to occur.	33	1	5	3.7894	0.5026	0.9874
Average score				**3.2868**		**0.8414**

4.9.1 Procurement Practice in use of ICT

The respondents were asked to indicate the current state concerning Information Systems used in the Procurement Process in their organization and to explain how they have eased the process. Some of the listed systems include:

Table4.7 Procurement Practice in ICT

Values	Mean	Std. Deviation
Transfer of Data	1.97	.178
Placing and Tracking orders Online	1.97	.178
Quick Response and JIT Replenishment	1.97	.178
Suppliers Access to Internal Data	1.97	.178
Composite score	**1.97**	

Out of the four values given for the question on the emphasized values in the organizations in relation to use of ICT practice in procurement , majority of the responses were either very great extent or great extent giving a composite score of 1.97 that inclines to the great extent response. This shows that the organization value transfer of data, Placing and tracking orders online, quick response and just in time replenishment together with having suppliers access to internal data like stock levels at almost the same level.

4.9.2 ICT Procurement Process in the Organizations

The respondents were asked to indicate their level of agreement with the following statements regarding IT Procurement Process. From the findings all the means were above 3.5 indicating majority of the respondents agreed to the statements on IT procurement process in the organization. This indicates that IT in procurement is of great benefit to the organizations. Information technology makes a very significant or fairly significant contribution to carrying out the procurement functions successfully. This seems to provide a good foundation for its use in assisting further developments in most procurement processes in the organizations. A properly implemented e- enabled procurement system connects to a company's internal systems, such as accounts payable, as well as directly to their vendors and suppliers, allowing system-to-system integration and automation of much of the purchasing process. The table below shows the study results.

Table 4.8 ICT Procurement Process in the Organizations

Description	N	Min	Max	Mean	Variance	Standard deviation
Your Business benefits through e-procurement initiatives e.g. cost reductions, closer relationships, improved information, increased efficiencies and the strategic use of purchasing staff	33	1	5	3.7968	0.0915	0.8745
IT procurement process enhances cost reductions in companies, can realize significant reductions in both the cost of purchased items and the actual cost of processing a purchase order	33	1	5	3.6259	-0.0794	0.8754
IT procurement process brings closer Relationships with suppliers	33	1	5	3.8658	0.1605	0.3758
Leveraging Information in electronic procurement enables visibility of organizational purchasing data, creating the opportunity to negotiate better terms with suppliers based on volumes, price & quality	33	1	5	3.5326	-0.1727	0.5647
Average score				3.7053		0.6726

4.9 Individual user Factors in Procurement Performance

Table4.9: Response rate on Individual user factors in Procurement performance

Response	**Frequency**	**Percent**
Yes	33	100.0
No	0	0
Total	**33**	**100.0**

The data collected above indicates a situation where 100% of the respondents indicated the organization was highly committed in providing staff with the necessary competencies and skills to ensure success of e enabled procurement. This means that the organization has guiding policies on employee skills development and that majority of employees are aware of the policies and therefore the e procurement process is likely to improve.

4.9.1 Staff Competencies in ICT adoption

On the descriptive statistics on table 4.7 shows that 33 respondents were interviewed on staff competencies as a factor in ICT Adoption in procurement processes in the organization. Majority of the respondents agreed to Great extent that

Employee competency is a major contributor to Adopting ICT in procurement with a 42%.

Table 4.10 Organization commitment to Improving staff Competency and skills in E enabled Procurement

		Frequency	Percent	Valid Percent	Cumulative Percent
Values	Low Extent	4	12.1	12.1	12.1
	Moderate Extent	6	18.2	18.2	30.3
	Great Extent	14	42.4	42.4	72.7
	Very Great	8	24.2	24.2	97.0
	Missing Values	1	3.0	3.0	100.0
	Total	**33**	**100.0**	**100.0**	

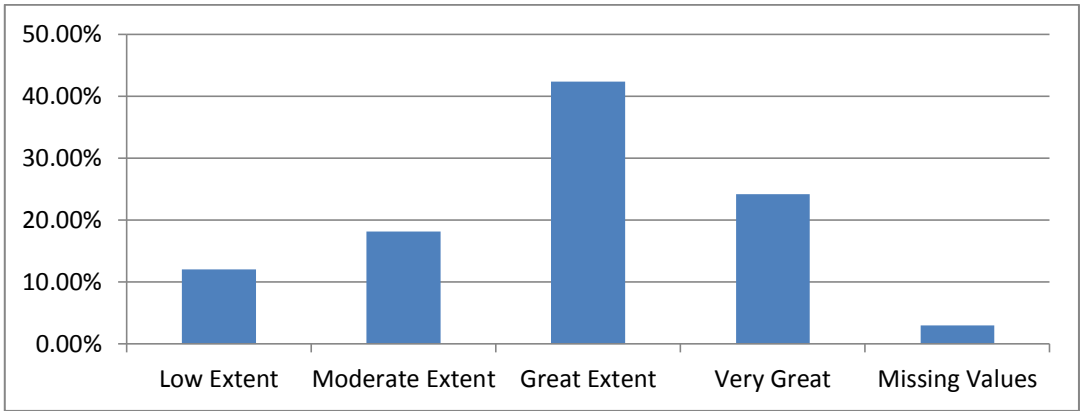


Figure 4.6 Organization commitment to Improving staff Competency and skills in E enabled Procurement

4.9.2 Challenges Faced in Implementing IT for Procurement Processes

The respondents indicated the challenges as follows: High introduction costs for new solutions (3.2614), Suppliers were slow to link up with the procurement system (3.1547), Difficulty in judging usefulness and potential of new IT solutions (2.5214), Lack of user-friendliness and user-acceptance of solutions (3.3322), Solutions only address some of the procurement processes and do not address the complexity of the processes (3.5610), Lack of qualified staff who can work with modern procurement system (2.4215), Consultant expertise is lacking in IT projects for procurement (3.6211). The technology is available to permit technology procurement at all phases of the procurement transaction but the technological solutions may be costly and some are not so good at dealing with certain phases of the procurement.

Where use of ICT in procurement is not mandated, and then take up by contracting authorities appears to have been slow. This can be attributed to the costs of re-organizing internal systems and low awareness of the advantages. There are concerns about the perceived risks of investing in e enabled procurement including technology risks and integration with existing information systems as well as security and control mechanisms. Suppliers are faced with different e-procurement platforms, arrangements and problems with the functionality of the systems.

Table 4.11 Challenges Faced in Implementing IT for Procurement Processes

Description	N	Min	Max	Mean	Variance	Standard deviation
High introduction costs for new solutions.	33	1	5	3.2614	0.1366	0.8881
Suppliers were slow to link up with the procurement system.	33	1	5	3.1547	0.0299	0.3010
Difficulty in judging usefulness and potential of new IT solutions.	33	1	5	2.5214	-0.6034	0.6221
Lack of user-friendliness and user-acceptance of solutions	33	1	5	3.3322	0.2074	0.9517
Solutions only address some of the procurement processes and do not address the complexity of the processes	33	1	5	3.5610	0.4362	0.8716

Lack of qualified staff who can work with modern procurement system.	30	1	4	2.4215	-0.7033	0.4625
Consultant expertise is lacking in IT projects for procurement.	30	1	4	3.6211	0.4963	0.8854
Average score				3.1248		0.7118

4.9.3 Possible Solutions to Challenges Faced in Implementing IT for Procurement Processes

The data collected above indicates a composite mean score of 2.51 with standard deviation of 0.766 across the means for the possible solutions to the challenges faced on implementation of IT in procurement. The data shows that majority of the respondents agreed to the variables relating to possible solutions that the company may adopt to cope with the challenges. With the inclination towards the agree and strongly agree response the research can conclude that the respondents showed all the variables were positive and pre requisite to cushion the challenges eminent in ICT Implementation in the organization.

Table 4.12 Possible Solutions to Challenges Faced.

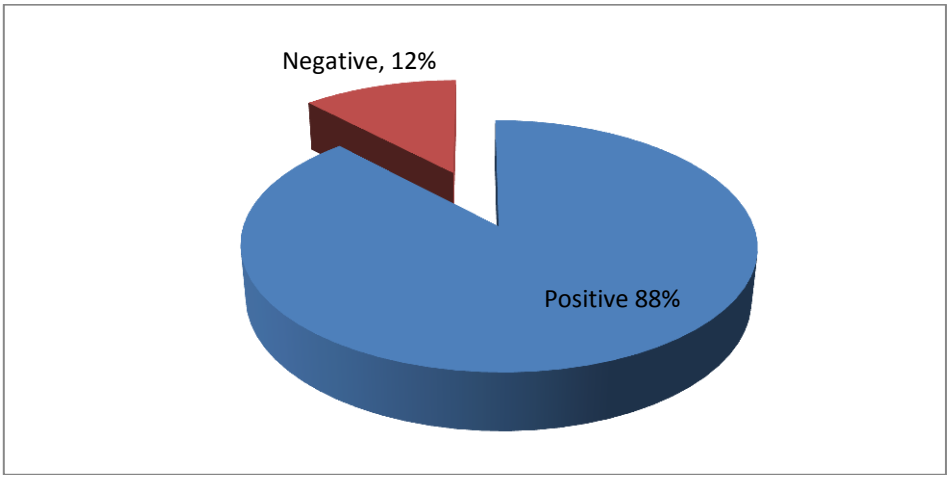
Description	N	Min	Max	Mean	Standard deviation
Capital Investment on Technology	33	1	5	1.65	.791
Early Supplier Involvement and Capability Development	33	1	5	2.98	.859
Employee Training	33	1	5	2.40	.999
Encourage User Acceptance and readiness	33	1	5	1.66	.548
Senior Management Commitment	33	1	5	2.18	.820
Efficiency Supply Chain Risk Management	33	1	5	4.16	.578
Average score				2.505	.766

4.9.4 Attitude of Suppliers on ICT Adoption.

The data collected above shows a positive supplier attitude among the suppliers on the company ICT adoption with 88% of the respondents agreeing to Positive attitude while 12% were on the view that the relation was negative. This means that the company needs to do a supplier survey to ascertain what the suppliers feel and where to do improvement.

Table 4.13 Attitude of suppliers on ICT Adoption in Procurement

Response	**Frequency**	**Percent**
positive	29	88
Negative	4	12
Total	**33**	**100.0**



4.9.5 ICT Systems used in Procurement Process

The respondents were asked to indicate the Information Systems used in the Procurement Process in their organization and to explain how they have eased the process. Some of the listed systems include:

Table 4.14: ICT Systems in Procurement Process

Description	Frequency
Electronic procurement system (E-procurement	10
Electronic Data Interchange systems (EDI	3
Electronic Mail	9
Networks	6

Electronic procurement system (E-procurement)

This is software that allows purchasers to access supplier's catalogs via the Internet, as well as accepting electronic invoices. The purchasers select their materials, indicate the accounts to be charged for the purchase, and create a purchase order in the accounting system. All procurement related activity is completed in the electronic system, reducing paperwork and increasing efficiency.

Electronic Data Interchange systems (EDI)

EDI deals more with the way information is communicated during procurement than it does with the act of linking buyers and suppliers. By definition, EDI is the electronic exchange of business information, purchase orders, invoices, bills of lading, inventory data, and various types of confirmations between organizations or trading partners in standardized formats. EDI also is used within individual organizations to transfer data between different divisions or departments, such as finance, purchasing, and shipping. Two characteristics set EDI apart from other ways of exchanging information. First, EDI only involves business-to- business transactions; individual consumers do not directly use EDI to purchase goods or services. Secondly, EDI involves transactions between computers or databases, not individuals. Therefore, individuals sending e-mail messages or sharing files over a network does not constitute EDI.

Electronic Mail

E-mail messages can request input or advice or distribute documents by broadcasted messages for IT Procurement Process in the organization. In procurement, E-mail messages can disseminate draft procurement plans for comment or be used to obtain staff legal counsel or advice from small business specialists.

Data Bases

Procurement automation is the combination of these mass storage devices with relational data bases using fourth generation languages. Such combinations permit relatively easy access by users to almost unlimited amounts of information. Data bases available on computers situated at remote locations are easily accessible today.

Networks

Networks use electrical or optical connections to tie together computer work stations, terminals, small computers, and mainframe computers. Advanced technology is now revolutionizing data communications so that a buyer can electronically obtain volumes of information wherever it resides.

5. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summary of findings as discussed in chapter four and Interpretations of the data analysis, conclusions and recommendations based on the findings.

5.2 Summary of Findings

5.2.1 ICT applications and their influence on the Organizations Procurement Processes

In respect to establishing the ICT application and their influence on procurement process The study found that majority of the respondents acknowledged that ICT applications like e –procurement, EDI, email were in use in the organization and had influenced the procurement process. This means that use of e-procurement is widely accepted and can be easily adopted in line with Thong (1999) view that positive perceptions regarding ICT benefits provide an incentive to adopt ICT in business transactions. Since technology is changing regularly, the respondents also noted that it was important to keep with emerging trends especially if it leads to improved efficiency and a better sourcing process. The findings coincide with findings by Min & Galle (2003) that indicate that perceptions regarding the benefits, costs and risks of e-enabled procurement systems significantly affect its adoption.

5.2.2 Influence of Individual user Factors on ICT adoption in Procurement Processes

In regards to finding out the individual user factors to adopt ICT in procurement the study finds that majority of the respondents are willing and are in support of ICT adoption in procurement systems. This is shown by a 100% score for responses on their willingness, intention, love, ability and readiness to adopt e-procurement. This means that the respondents were more in agreement than disagreement with the statements that indicated the individual willingness to adopt ICT in procurement process.

5.2.3 Supply chain Factors effects on Procurement processes

The analysis has shown that operational compatibility and the level of collaboration are two of the factors that play a determinant role in the adoption of e-business and its impact. Finally, the role of some factors such as cost, application complexity, does not seem to be important. The study found that a large percentage of the suppliers have positive attitudes towards the adoption of ICT in procurement in relation to supporting it adoption in their companies and the awareness of the advantages that include improving efficiency, easing the sourcing process and keeping up with emerging trends. Majority of the respondents indicated that they agreed or strongly agreed that adoption of ICT in procurement was made easier with incentives such as ready information systems in regards to supply chain and the passion for technology in the firm.

5.2.4 Challenges experienced in ICT adoption on the procurement processes

The study aimed at establishing the challenges present to the firm while adopting ICT in procurement. The study found that for ICT to be easily adopted, information systems have to be set up by all players in the supply chain, structures will have to be invested on and processes standardized. The major challenge found in the study was that of High introduction costs for new solutions such as access to bandwidth and enterprise resource management systems that are key to adopting e-business. Organizations willing to adopt e-procurement should therefore invest into structures and processes necessary for e-procurement adoption.

5.3 Conclusion

The literature review pertaining to ICT adoption revealed that e- enabled procurement in business is often wrongly considered as one single application and its adoption nothing but an internal issue for companies. Also, past studies of ICT adoption have focused more on identifying the expected benefits, rather than on assessing the exact impact of the adoption. Against this background, the first step of this research was to operationalize the ICT concept so as to facilitate assessing its impact. In particular, specific procurement activities and also a specific business sector were selected so as to avoid generalizations. The factors associated with ICT adoption and impacts were identified from the literature, and their role was assessed by using case study research.

An important research finding is that the impact of ICT adoption on procurement processes mainly refers to time reductions and quality improvements, rather than cost reductions as reported by many authors (Croom 2000, De Boer et al. 2002). The old view that ICT applications are associated with cost reductions is contested in this research. We found that company is likely to realize improvements in cycle time reductions and process quality. In terms of ICT adaptability, this study found that the company has not adopted more complicated e-business applications .From the study it is also clear that the adoption of ICT applications is not exclusively a matter of resources. On the contrary, operational compatibility and the level of collaboration are two of the factors that play a determinant role in increased ICT adoption and impact.

Subsequently, managers and practitioners should be prepared to put emphasis on developing their relationships with their suppliers/customers preparatory to implementing common ICT investments. In addition, they should try to increase partners' commitment to using these applications. As the study revealed, increased impact on procurement processes results from higher intensity of use and not necessarily from the adoption of more complex applications. Managers should therefore try to integrate ICT applications in their daily operations, making e-business part of their "modus operandi".

5.4 Recommendations

Procurement regulations that refer to paper documents and processes need to be modernized. Established procedures and procurement regulations must recognize information and technology techniques if system developers are not to be constrained when re-engineering work processes. Procurement management and executive courses and seminars should be held to address the effect of automation on the procurement function. Basic procurement courses should be revised to present automated contracting processes and techniques. Business and political representatives need to be educated on the dynamic changes that information technology will bring to procurement and markets.

5.5 Suggestion for Further Studies

There is scope for further development of this analysis. The study was limited to multinational company. The researcher would thus recommend for further study in the topic of ICT adoption among the Sme's sector and an analysis of the challenges experienced.

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Appendix -1

Daniel Kinuthia Wanjiru.
Jomo Kenyatta University of Agriculture and Technology
P.O Box 81310-80100
Mombasa

I am a postgraduate student at Jomo Kenyatta University of Agriculture and Technology, School of human resource development. I am undertaking a research project Titled **"Effect of Information Communication Technology adoption on procurement process in Kenya oil industry".** This is to kindly request you to assist me collect the data by filling out the accompanying questionnaire. The information provided will be used exclusively for academic purposes. My supervisor and I assure you that the information you give will be treated with strict confidence. The findings of this research can be availed to you upon completion of the research on request. In case of any questions pertaining to this project please do not hesitate to contact me on the above address.
Regards,

Daniel Kinuthia.

Student

SAMPLE QUESTIONNAIRE

SECTION A: PERSONAL INFORMATION (Please tick where appropriate)

1. Gender:

- ❖ Female [ ]
- ❖ Male [ ]

2. Terms of employment:

Temporary [ ] Permanent [ ] Contract [ ]

3. Highest Attained Educational level:

Secondary [ ] Diploma [ ] Degree [ ] Post graduate [ ]

4. What is your job Level?

Top Management [ ] Middle level [ ] Supervisor [ ] Operative [ ]

5. Do you have any formal training in ICT? Yes [ ] No [ ]

6. To what extent does your work involve the use of ICT devices?

No extent [ ] A little extent [ ] Moderate extent [ ] Great extent [ ] Very Great extent [ ]

SECTION B: ICT APPLICATIONS IN PROCUREMENT PROCESS (Please Rank by placing a tick in the appropriate place.)

1= No extent, 2= Low extent, 3= Moderate extent and 4= Great extent

1. Rate the extent to which IT is employed in the following procurement process in your organization?

	Description	No extent	Low extent	Moderate extent	Great extent	Very Great extent
A1	Assessing the needs of procurement					
A2	Risk assessment in procurement					
A3	Specification					
A4	Approval mechanism					
A5	Selection of Method of procurement					
A6	Prequalification of bidders					
A7	Bidding Document Preparation					
A8	Invitation to bid					
A9	Issue of Bid Documents and opening of Bids					
A10	Evaluation of bids					
A11	Award and Signing of contract					
A12	Contract Administration					

2. To what extent do you agree with the procurement performance in relation to information system application?

1= No extent, 2= Low extent, 3= Moderate extent and 4= Great extent

	Description	No extent	Low extent	Moderate extent	Great extent	Very Great
B1	Improves quality of services while its absence or use of inappropriate means can act as a barrier to change and may lead to deterioration of the procurement function					
B2	Measuring the performance of the procurement function yields benefits to organizations such as cost reduction, enhanced profitability, assured supplies, quality improvements and competitive advantage					
B3	important step towards risk reduction and mitigate of those that are most likely to occur					

SECTION C: ICT AND PROCUREMENT PROCESS.

3. **What is the current state of the practice in Procurement concerning the use of ICT in general and the Internet in particular in your department and within the organisation?** 1= No extent, 2= Low extent, 3= Moderate extent and 4= Great extent

	Description	No extent	Low extent	Moderate extent	Great extent	Very Great
C1	Transfer of data					
C2	Placing and Tracking orders online					
C4	Quick Response and JIT Replenishment					
C5	Suppliers access to Internal Data					

4. **To what extent do you agree with the following ICT Procurement Process in your organization?**
1= No extent, 2= Low extent, 3= Moderate extent and 4= Great extent

	Description	No extent	Low extent	Moderate extent	Great extent	Very Great
D1	Your Business benefits through e-procurement initiatives like closer Supply chain relationships, improved information flow.					
D2	Increased efficiencies and the strategic use of purchasing staff					
D3	IT procurement process helps realize significant reductions in both the cost of purchased items and the actual cost of processing a purchase order in the organization.					
D4	IT procurement process brings closer Relationships with suppliers					
D5	Leveraging Information in electronic procurement enables visibility of organizational purchasing data, creating the opportunity to negotiate better terms with suppliers based on volumes, price & quality.					

INDIVIDUAL USER FACTORS IN PROCUREMENT PERFORMANCE

5. Would you say that this Organization is committed to providing its staff with the necessary competencies and skills to ensure the success of e enabled procurement?

Yes [ ] No [ ]

6. To what extent do you rate staff competencies as a Factor in ICT adoption in procurement process by this organization?

No extent [ ] Small extent [ ] Moderate extent [ ] Great extent [ ] Very Great extent [ ]

ICT AND PROCUREMENT PROCESS CHALLEGES

7. What challenges does your company face in implementing ICT in Procurement Processes?

1= Very Great extent, 2= Great extent, 3= Moderate extent 4= Small extent 5=Not at all

Description	Very Great extent	Great extent	Moderate extent	Small extent	Not at all
High introduction costs for new solutions					
Suppliers were slow to link up with the procurement system					
Difficulty in judging usefulness and potential of new IT solutions					
Lack of user-friendliness and user-acceptance of solutions					
Lack of qualified staff who can work with modern procurement system					
Consultant expertise is lacking in IT projects for procurement					

8. In your opinion what are the possible solutions to challenges faced by your company in implementing IT for Procurement Processes?

1= Very Great extent, 2= Great extent, 3= Moderate extent 4= Small extent 5=Not at all

Description	Very Great extent	Great extent	Moderate extent	Small extent	Not at all
Capital investment on Technology					
Early supplier involvement and capability development					
Employee training					
Encourage user acceptance and readiness					
Senior management Commitment					
Efficiency supply chain Risk management					

9. What is the attitude of your Suppliers on ICT adoption on Procurement Processes?

1. Positive ( ) 2. Negative ( )

10. What type of relationships does your organization currently have with its suppliers?

1. Close ( ) 2. Moderate distant ( ) 3. Distant ( ) 4. No Relation ( )

11. What are the Information Systems used in the Procurement Process in your Organization? Explain how they have eased the process.

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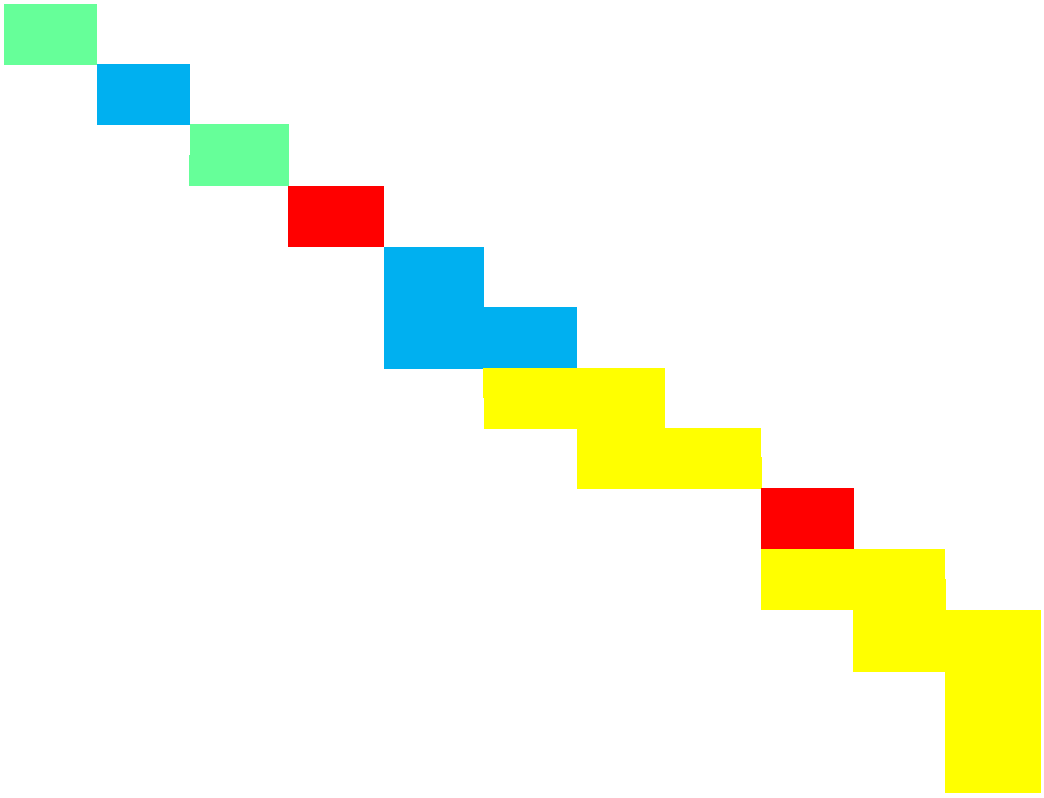
Thank you for your cooperation

Appendix 2: Gantt chart

Table 1: GANTT CHART FOR PROJECT
The research schedule to take Nine months and this is how the researcher has budgeted for the time to be spent.

YEAR 2014

Months	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14
Choose research Area											
Preliminary Research											
Decide on Research Topic											
Decide on Research Methodology											
Proposal Writing											
Submit/Present Proposal											
Proposal correction											
Data collection											
Data analysis											
Drafting the Research findings											
Drafting the Research discussion											
Editing work											
Final tidying up and handing in											



DEFINITION OF TERMS

Application: A software program that runs on a computer e.g. Web browsers, e-mail programs, word processors (Rogers, 1995).

Complexity: Difficulties that one is expected to face in understanding and using the applications (Van der Veen, 2004).

Cost: Is linked to the perceptions of the persons interviewed regarding the capital needed for investments (Locket, 1997).

Goods: A commodity, or a physical, tangible item that satisfies some human want or need, or something that people find useful or desirable and make an effort to acquire it (Chopra, 2011)

ICT: (information and communications technology) refers to technologies that provide access to information through telecommunications this includes the Internet, wireless networks, and other communication mediums (Sweeney, 2005).

Influence: The capacity or power of persons or things to be a compelling force on or produce effects on the actions, behavior, opinions (The Public Procurement and Disposal Act, 2005).

Procurement: Business management function that ensures identification, sourcing, access and management of the external resources that an organization needs or may need to fulfill its strategic objectives (CIPS, 2005)

Purchasing: Process of ordering and receiving goods and services. It is a subset of the wider procurement process (Cavinato, 1994)

Records: A thing constituting a piece of evidence about the past (Lysons, 1996).

LIST OF ACRONYMS AND ABBREVIATIONS

B2B Business to Business
B2C Business to Consumer
EDI Electronic Data Interchange
ERP Enterprise Resource Planning
ICT Information and Computer Technology
KSF Key success factors
MRP Material Resource Planning
MOC Multi National Oil Company
PPOA Public procurement over site authority
RFI Request for Information
RFP Request for Price
RFQ Request for Quotation
SCM Supply Chain Management
SPSS Statistical Package of Social Sciences
TRA Theory of Reasoned Action
TAM Technology Acceptance Model
UTAUT Unified Theory of Acceptance and Use of Technology