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Effects of Technology Adoption on the Procurement Process at Kenya Maritime Authority Mombasa

Oluoch Seth Arende
Student, Jomo Kenyatta University of Agriculture and Technology (JKUAT), Kenya

Abstract:
The main objective of the study was to asses' the impact of technology adoption on procurement process in Kenya Maritime Authority. Organizations today continue to face business related problems like collection of timely reliable and accurate information, processing, storing, and retrieval for decision making and control of the organization. The application of technology on procurement processes will change the way work is performed, the number and skills of contracting personnel, and the procurement organization's structure. Procurement plays a major role in organizations, which can significantly influence a company's success. As a core function it is, however, subjected to the mega trends of the market. Its day to day existence is very much defined by growing procurement volumes due to greater concentration of business on core competences, globalization of procurement markets, growing market dynamics as well as the ever shorter product lifecycle. The specific objective was to examine ICT applications; to establish individual user factors; to examine the information systems. Stratified random sampling method was used. The study targeted all the 225 employees of KMA. The sample size for the study was 68 respondents which represented 30% of all employees working at KMA. A modified Likert scale questionnaire was developed divided into three parts. A pilot study was carried out to refine the instrument. The quality and consistency of the survey was further assessed using Cronbach's alpha. The overall Cronbach's alpha for the four categories which was 0.752. Data analysis was performed on a computer using Statistical Package for Social Science (SPSS Version 22) for Windows. Analysis was done using frequency counts, percentages, means and standard deviation, regression, correlation and the information generated was presented in form of graphs, charts and tables. Out of the 68 questionnaire issued 50 questionnaires were returned.54% of the respondents were in middle level management; 54% of the respondents have bachelor's degree while 38% have worked for between 6-10 years in KMA. Suppliers have a positive attitude towards technology whereas the study showed that there was a close relationship between suppliers and the organization. ICT application was found to be closely related technology adoption as well as individual user factors and information system. The study concluded that technology adoption was the way to go in as far as procurement was concerned and that paper transactions should be modernized. The study recommended that technology should be adopted in procurement processes to reduce both costs in operations and items and services offered.

1. Introduction

1.1. Background

Internet technology has provided organizations with vast opportunities to operate beyond their traditional physical boundaries MacGregor and Vrazalic (2005). More specifically electronic (e)-procurement has provided manufacturing and service firms with more efficient solutions to drive significant value into their business Neef (2001). Indeed in 2001 one of the major advocates of internet-based business strategies, Michael Porter, professed that if firms were intent on remaining competitive they would have to adapt their business models to accommodate more effective and efficient internet based business approaches. Such adaptation has however, produced both positive and negative effects for firms in relation to commercial relationships and e-procurement deployment.

To explain, MacGregor and Vrazalic (2005) have made a general observation and stated that for those organizations that have managed to develop an organization-wide internet-based strategy, the adaptations to business processes can lead to increased efficiencies within and between firms. The knock-on effect has led to a situation where many firms have felt obliged to focus their attention on streamlining inter and intra-organizational procurement functions. The downside is that for those firms that have chosen to ignore the positive impact that e-procurement can provide, or at best, only half-heartedly embraced the technology, much unnecessary and inefficient duplication of work effort remains. This is despite the fact that e-procurement can, among other things streamline business processes, generate more competitive purchasing costs and offer a means of differentiation in the ever intensifying struggle for competitive advantage (Barratt and Rosdahl (2002).

Olhager and Rudberg (2003) affirm that in general, the manufacturing industries, though notably lagging in their use of e-business, are now becoming interested in its benefits. However the practical reality is that despite the strategic necessity and inherent benefits from e-procurement proposed by academic theorists, and in some cases dictated by larger corporations, issues such as level of technical expertise and the extent of competitive pressures may affect the extent of adoption of the internet technologies that facilitate e-procurement. A recent study by Tatsis et al (2006) recognized the gap between theory and practice and also highlighted that much of previous research has ignored the smaller and peripheral economy. They noted that most empirical research in the field of e-procurement has been concentrated in the USA and other large economies such as Germany and Japan. They responded with a study of e-procurement in the Greek food and drink manufacturing industry, focusing specifically on small and medium-sized enterprises (SMEs). Barnes et al (2004) also noted a distinct lack of research in the field of e-procurement, while Raymond et al (2005) publicized the dearth of empirical data in the manufacturing industry.

Thus in an attempt address the notable voids in the knowledge base, the current research locale is based on a study of e-procurement within the Irish information and communication technology (ICT) manufacturing industry. The justification is based on the premise that a better understanding of what drives e-procurement implementation in the small Irish economy, the actual benefits achievable, and the challenges that may have to be overcome, is essential. The ICT manufacturing sector may provide examples of best practice in e-procurement and the knowledge gleaned may help inform future e-procurement research Tatsis*et al.,* (2006).

CIPS Australia in 2005 defined procurement as is the 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.

E-procurement is the business-to-business (B2B) or business-to-consumer (B2C) or business-to-government (B2G) purchase and sale of supplies, work and services through the internet as well as other information and networking systems such as electronic data interchange and enterprise resource planning. 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.

Procurement includes activities and events before and after the signing of a contract as well as the general management activities associated with a range of contracts; Pre-contract activities such as planning, needs identification and analysis, and sourcing,

Post-contract activities such as contract management, supply chain management and disposal, and; General activities such as corporate governance, supplier relationship management, risk management and regulatory compliance.

Procurement is the acquisition of goods or services. It is important that the goods/services are appropriate and that they are procured at the best possible cost to meet the needs of the purchaser in terms of quality and quantity, time, and location. Purchasing is any activity for which the organization receives an invoice from an outside party while procurement includes all activities in order to get the product from the vendor to its final destination (Van Weele, 2009).

The World Bank (2003), defines procurement as the use of ICT (especially internet) by governments in conducting their procurement relationships with suppliers for the acquisition of goods, work and consultancy services required by the public sector. Why should government agencies like KMA embrace ICT for its procurement process? What is the potential that ICT can offer? In describing the main benefits of using ICT in procurement processes, government, suppliers, and the public in general: the following consideration may give reason enough for government agencies to move their procurement activities online.

The use of ICT is a key component that government catalyzes the development process by stimulating the economy, lowering the digital gap, modernizing the public sector, and improving government performance as it is evident in the use of IFMIS. Bringing together government and private industries in a virtual environment, ICT systems are sustainable only on the condition of a win-win situation. In providing improved transparency and a huge potential of efficiency gains for both, government and suppliers, ICT offers two major benefits that help to create such a situation. Moreover, political return from the public in general due to transparency and efficiency in spending taxpayers' money can contribute to enhancing the image of good governance. In processing and documenting procurement information and transactions online, ICT offers by far more transparency and fairness. To this end, ICT helps reduce opportunities and incentives for fraud (anti-corruption), to improve the quality of government agencies procurement management, including monitoring and decision making, and to encourage the participation of private industries in the public market by increased fairness and competitiveness.

As a second major benefit of ICT, the huge potential of efficiency gains can considerably contribute to reducing/redistributing fiscal expenditures. Although intensive studies and research on detailed benefit in terms of quantity and quality is hardly available, the use of ICT in an increasing number of countries clearly has shown major efficiency gains. The simplification and /or elimination of repetitive tasks in the procurement process by moving them online results in time and cost savings. Given the lengthy timeline of paper-based government procurement, shorter procurement cycles are welcome to KMA.

Cost savings is a strong driving force for ICT mainly resulting from reductions in price and transaction costs. Cheaper prices can be achieved through increased competition, better access to markets, increased purchasing volumes under framework contracts, reduced sales costs for suppliers, and use of e-Reverse Auctioning. Transaction costs can be lowered due to the automation of the procurement process with an ICT system being available at any time and any connected location, accelerating the procurement.

1.1.1. Profile of Kenya Maritime Authority

According to the Kenya Maritime Authority's brochures and website (www.kma.go.ke), the Kenya Maritime Authority (KMA) was set up in June 2004 as the Government agency to take charge of regulatory and oversight functions over the maritime industry. KMA took over from the Merchant Shipping Superintendent (then a department of the Kenya Ports Authority), the mandate for oversight, coordination and regulation of national maritime affairs in line with national legislation and international maritime conventions.

The mandate of Kenya Maritime Authority as provided for in KMA Act 2006 is to regulate, co-ordinate and oversee maritime affairs in the country. Its vision is to be a leading maritime administration transforming Kenya into a globally competitive nation. Its mission is to ensure sustainable safe, secure, clean and efficient water transport for the benefit of stakeholders. (www.kma.go.ke)

The key objectives of the Kenya Maritime Authority are: i)to strengthen maritime administration in Kenya through enhancement of regulatory and institutional capacities, ii) to ensure maritime safety and security, iii) to foster effective implementation of international maritime conventions and other mandatory instruments on safety, security, maritime training, search and rescue, marine pollution prevention and preservation of the marine environment; iv) to co-ordinate the implementation of policies relating to maritime affairs and promote the integration of such policies into the national development projects and finally, v)to create an enabling environment for the development of national capacity in order to maximize benefits both in the supply and use of maritime transport services.(KMA brochures; www.kma.go.ke)

The Kenya Maritime Authority has its head offices in Mombasa and branch offices in Kisumu, Lamu and at the Kenya Ports Authority in Mombasa known as the Regional Maritime Rescue Coordination Centre. Plans are underway to establish another branch office in Turkana County.

The Kenya Maritime Authority is being studied because : i) it is a recently established state corporation seeking to expand its workforce in the country to enable it deliver on its mandate effectively and thus more suitable to inform on the current status of the research problem, ii) state corporations existence within Government depend on their ability to deliver their mandate effectively and efficiently and operate within realms of performance contracts, thus performance is crucial and iii) with five major departments, six sections and three recently created branch offices in Kisumu, Mombasa and Lamu, Kenya Maritime Authority depends majorly on ICT to get work done and deliver on its mandate.

1.2. 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 effects of technology adoption on procurement processes at the Kenya Maritime Authority, Mombasa.

1.3. Objectives

This study was guided by the general and specific objectives as outlined.

1.3.1. General Objective

The general objective of the study the effects of technology on the procurement process at Kenya Maritime Authority.

1.3.2. Specific Objectives

This study was guided by the following specific objectives:

1. To establish the role of ICT applications in procurement processes.
2. To examine the influence of individual user factors in procurement processes
3. To examine the role of information systems used in procurement

1.4. Hypothesis

The objectives of this study will be fulfilled by testing the four hypotheses stated both in terms of null (HO_1) and alternative hypotheses (HA_1).

Hypotheses

1. Hypothesis One
   HO_1: ICT application has no significant effect on the role of ICT on procurement processes at KMA
   HA_1: ICT application has a significant effect on the role of ICT on procurement processes at KMA
   ICT application has a great influence on how procurement processes at KMA
2. Hypothesis Two
   HO_2: The influence of individual user factors has no significant effect on procurement processes at KMA
   HA_2: The influence of individual user factors has a significant effect on procurement processes at KMA
   Individual user factor has a significant effect on procurement processes at KMA
3. Hypothesis Three
   HO_3: The role of information systems has no significant effect on information system used in procurement processes at KMA
   HA_3: The role of information has a significant effect on information system used in procurement processes at KMA
   Information systems has significant effect on procurement processes at KMA,

1.5. Justification

The challenge of not using ICT in the procurement processes in government institutions has led to loss of tax payer's money. The government needs to be confident that the procurement done by its agencies is carried out honestly, transparently, fairly and competently for the good of every stakeholder. With the sustained amount of interest to reform the public procurement in Kenya. It was therefore important that research should be conducted to establish the role of ICT on procurement processes at KMA.

1.6. Scope of 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 effect of technology adoption in the procurement processes at the KMA a marine operation regulator 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

1.7. Limitation

The limitations that hinder the researcher in conducting the study efficiently was: 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 will do his best to persuade the respondents to allow him access.

2. Literature Review

2.1. Introduction

Reviewing the existing literature around the topic of research interest is vitally important because it helps in understanding not only the body of knowledge that relates to the research topic but also in developing an argument about the relevance of the research (Bryman, 2012). This chapter will systematically review the related literature to guide the reader in understanding what has already been done by other researchers in as far as role of ICT in the procurement process is concerned; what concepts and theories are relevant in this area of research.

2.2. Theoretical Review

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).

2.2.1. Theory of Planned Behavior

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, 2011). 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.

2.2.2. 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 (2005) 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, Trial ability: 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.

2.2.3. Information Systems Success Model

The last most cited theory was the Information Systems Success Model. DeLone and McLean (1992) reviewed prior research and introduced a comprehensive taxonomy of factors contributing to the success of information systems. The authors examined the literature on IS success and categorized success measures into six major categories: system quality, information quality, use, user satisfaction, individual impact, and organizational impact. These categories are interrelated and interdependent and provide a

comprehensive view of IS success. The target of the model is to guide future research efforts. In conclusion, the most cited theories of previous publications showed that the theory of the research area focused on the acceptance and adoption of technology.
The most cited theories were TAM, TRA, DOI, and TPB. Most of the theories focus on the individual level (i.e., TAM, TRA, TPB, and UTAUT), but they may also focus on an organizational level (the Model of the IT Implementation Process) or on the level of a social system (e.g., DOI focuses on a group or an organizational level). In the Information Systems Success Model, the focus of the analysis is on critical success factors in ICT implementation in organizations. These results are mostly in line with earlier research on the most influential theories used in ICT implementation and adoption studies. Gallivan (2001) distinguishes the same four most cited theories, namely TAM, TRA, DOI, and TPB, as the core theoretical frameworks (Jeyaraj et al., 2006). Previous literature has also distinguished TAM as the most influential model (Chuttur, 2009; Jeyaraj et al., 2006; Lee et al., 2003). There is one exception in the results compared with the previous literature, namely that Gallivan (2001) and Jeyaraj et al. (2006) include Social-Cognitive Theory (SCT, e.g., Compeau and Higgins, 1995) among the most influential theories. SCT is a learning theory based on the idea that people learn by observing others (Bandura, 1986). However, SCT was not represented in the most cited theories in this study.

2.3. Conceptual Framework
Mugenda (2008) defines conceptual framework as a concise description of phenomenon under study accompanied by a graphical or visual depiction of the major variables of the study. According to Young (2009), conceptual framework is a diagrammatical representation that shows the relationship between dependent variable and independent variables. A conceptual framework shows the relationship between independent and dependent variable. In this study, the dependent variable is effect of technology on procurement process while the independent are ICT applications on procurement processes, individual user factors, supply chain factors and benefits of ICT in procurement processes. (See Fig.1)

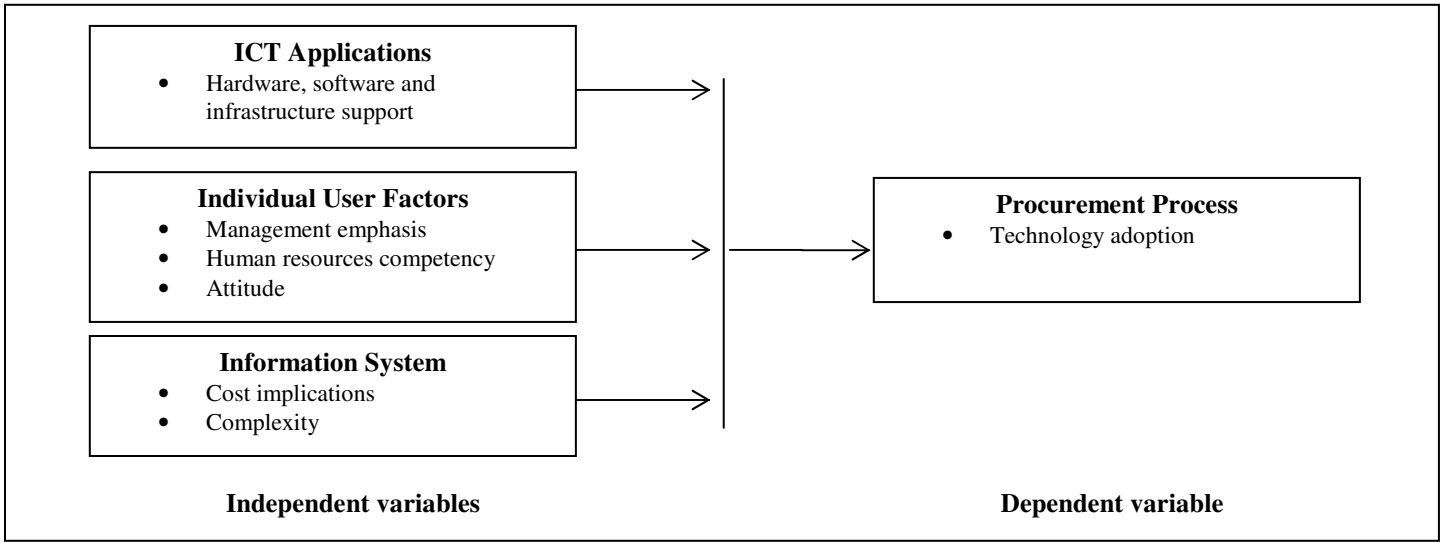

Figure 1

2.4. The Effects of Technology adoption on Procurement process
Technology adoption has played a significant role in procurement process as discussed below;

2.4.1. ICT Application
The procurement process has had many loopholes in the recent past due to the lengthy processes and lots of paperwork. The adoption of ICT application in the procurement process has reduced this through the online methods of carrying out the procurement process. The use of online forms, orders, 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.

2.4.2. 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.

2.4.3. Information Systems

Enterprise resource planning (ERP) integrates internal and external management information across an entire organization, embracing finance/accounting, manufacturing, sales and service and CRM. ERP systems automate this activity with an integrated software application. Its purpose is to facilitate the flow of information between all business functions inside the boundaries of the organization and manage the connections to outside stakeholders (Telgen, Zomer, & de Boer, 1997). Enterprise resource planning (ERP) as an extension of material requirements planning (MRP), later accounting resource planning and computer-integrated accounting. Without supplanting these terms, ERP came to represent a larger whole, reflecting the evolution of application integration beyond accounting (Raymond, 2005).

ERP is a business management system made up from a collection of applications or modules that integrates company functions such as marketing, finance, manufacturing and logistics (Helo and Szekely, 2005). ERP uses database technology to control and integrate information related to a company's business including data related to customers, suppliers, employees and finance. All business transactions, such as inventory management, production planning and distribution are entered, recorded, processed, monitored and reported (Helo et al., 2008).

An information technology (IT) specification is a description of a technology product or service a customer seeks to procure and is also a description of what a supplier must be prepared to offer to be considered for an award. International studies reveal that in spite of a growing proportion of purchased services, the management of these costs and processes is not yet very advanced compared with cost management of direct and indirect goods(Caldwell, et. al, 2009).

2.5. 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, *et.al*, 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.

2.5.1. Balanced Score Card

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.

2.5.2. Balanced Scorecard for Procurement Process

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.

2.6. Critique of the Existing Literature

Role of ICT 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 role 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 use 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. Little research has been done on the role of ICT in procurement processes.

2.7. Summary

The role ICT 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 the role 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.

2.8. Research Gaps

According to Schau, (2003) the role of ICT 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 the role of ICT 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, the role of 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 Methodology

3.1. Introduction

This chapter outlines the research design and methodology that was used to carry out the study. The chapter also deals with the target population, type of data collected, sampling frame, sample and sampling technique, the sample size, data collection procedures, pilot test, validity and reliability of the instrument as well as the data analysis techniques and how eventually data was presented.

3.2. Research Design

The researcher used descriptive research design. Descriptive study was concerned with finding out who, what, where and how much of a phenomenon, which is the concern of the study. Sekaram (2006) observes that the goal of descriptive research was to offer the researcher a profile or describe relevant aspects of the phenomena of interest from the individual, organization, industry or other perspective. In addition the design best fit in the ascertainment and description of characteristics of variable in this research study and allows for use of questionnaires, interviews and descriptive statistics such as frequencies and percentages. In addition a descriptive design was appropriate since it was enable the researcher to collect enough information necessary for generalization.

3.3. Target Population

The study targeted 225 employees of KMA in the top management and middle level management in procurement and finance departments and other stakeholders like suppliers. Mombasa branch was selected as a case study because of proximity to the researcher, time availability for research and budgetary constraints.

3.4. Sample Size

Mugenda and Mugenda (2003) asserts that sampling is that part of the statistical practice concerned with the selection of individual or observations intended to yield some knowledge about a population of concern, especially for the purpose of statistical inferences. They advise that a researcher would have to use 30% of the total target population as a sample for it to be accepted as a good representative sample.

Management Level	Target Population	Percentage of Sample size	Sample Size__
Top Management	70	30%	21
Middle Managers	105	30%	32
Suppliers'	50	30%	15
TOTAL	**225**	**30%**	**68___**

Table 1: Sample size

3.5. Sampling and Sampling Technique

Sampling is the process of selecting a number of individuals or objects from a population such that the selected group contains elements representative of the characteristics found in the entire population. Sample is a small group of objects or individuals selected or drawn from a population in such a manner that its characteristics represent population characteristics (Orodho, 2009).

Stratified random sampling method was used to select relevant respondents from various departments of KMA. Mugenda and Mugenda (2003) argue that stratified random sampling is where a given number of cases are randomly selected from each population sub-group. It thus ensures inclusion in the sample of subgroup which otherwise could be omitted entirely by other sampling methods. In this case stratification will be based on department from which employees come from.

Stratified sampling enables the population to be divided into five segments (relevant departments within KMA) called strata. Simple random sample is then drawn from each stratum, and then those sub-samples joined to form complete stratified samples. In addition proportional allocation is done, where each stratum contributed to the sample a number that is proportional to its size in the population.

3.6. Data Collection Instruments

The researcher used structured questionnaires to collect data from KMA respondents. A questionnaire with high reliability would receive similar answers if it is done again and again or by other researchers (Bryman & Bell, 2007; Saunders et al., 2007). In addition the questionnaires are convenient for the task in that they can be easily and conveniently administered with the study sample. The use of questionnaire is cost effective, less time consuming as compared to the use of interview. Data collected through the use of well-structured questionnaire was easy to analyze. The questionnaire used Likert scale because it requires respondents to respond to a series of statements by indicating whether he or she agrees to a great extent or no extent. Likert scale is used because it is easy to understand and responses are easily quantifiable and subjective to computation of mathematical analysis (Allen *et.al*, 2011).

3.7. Data Collection Procedure

The researcher used primary and secondary data. Structured questionnaires are used to collect primary data from respondents. The questionnaire will be self-administered to the respondents and collected after will be collected after three days. Secondary data will be obtained from related materials in the internet, procurement journals, white papers, periodicals and books relevant to the study.

3.8. Pilot Testing

The questionnaire was pilot tested before the actual data collection. This involved a few respondents from KMA to ascertain its effectiveness. The researcher was interested in testing the reliability of the research instruments, the questionnaire hence validity of data collected. Validity is the accuracy and meaningfulness of inferences which are based on the research results (Mugenda&Mugenda, 2003) asserts that reliability is done using Cronbach's Alpha Model on SPSS. Mugenda and Mugenda (2003)

assert that reliability is the measure of the degree to which research instrument yields consistent results or data after repeated trials. The researcher will do a pilot with 10 % of respondents before distributing the questionnaire. The researcher used 7 respondents for the pilot process. The purpose is to ensure that those items in the questionnaire are clearly stated and have the same meaning to all respondents. At the same time it helped to determine how much time is required to administer the questionnaire. Respondents for pre-testing will not form part of the sample.

3.9. Data Processing, Analysis and Presentation

Kothari (2009) argues that data collected has to be processed, analyzed and presented in accordance with the outlines laid down for the purpose at the time of developing the research plan. Data analysis involves the transformation of data into meaningful information for decision making. It involved editing, error correction, rectification of omission and finally putting together or consolidating information gathered. The collected data was analyzed quantitatively and qualitatively. Descriptive and inferential statistics was done using SPSS version 22 and specifically multiple regression model was applied. Set of data was described using percentage, mean standard deviation and coefficient of variation and presented using tables, charts and graphs. Fraenkel and Wallen (2000) argue that regression is the working out of a statistical relationship between one or more variables. The researcher used a multiple regression analysis to show the effect and influence of the independent variables on the dependent variables.

The relationship is as follows;

$\mathbf{Y=\alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon}$

Y = Represents the dependent variable, the effect of technology adoption on procurement process

α= Constant

$\mathbf{\beta_1, \beta_2, \beta_3}$ = Partial regression coefficient

$\mathbf{X_1}$ = ICT Application

$\mathbf{X_2}$= Individual user factors

$\mathbf{X_3}$= Information systems

ε = error term or stochastic term

4. Data Analysis Results and Discussion

4.1. Introduction

This chapter presents analysis of the data on the effects of technology adoption on the procurement process at Kenya Maritime Authority, Mombasa, Kenya. The chapter also provides the major findings and results of the study and discusses those findings and results against the literature reviewed and study objectives. The data is mainly presented in frequency tables, means and standard deviation.

4.1.1. Response Rate

The study targeted 68 employees and suppliers of Kenya Maritime Authority in Mombasa County, Kenya. From the study, 50 out of the 68 sample respondents filled-in and returned the questionnaires making a response rate of 73.5% as per Table 2 below.

	Frequency	Percentage
Respondent	50	73.5
Non-respondent	18	26.5
Total	**68**	**100**

Table 2: Questionnaire Return Rate

According to Mugenda and Mugenda (1999) a response rate of 50% is adequate for analysis and reporting; a rate of 60% is good and a response rate of 70% and over is excellent; therefore, this response rate of 73.5% was adequate for analysis and reporting.

4.1.2. Data Validity

The researcher asked experts, three academicians, to assess the scales' content validity. Accordingly, the researcher made changes on the first draft in terms of eliminating, adding or rewording some of the items included in that draft**.**

4.1.3. Reliability Analysis

Prior to the actual study, the researcher carried out a pilot study to pre-test the validity and reliability of data collected using the questionnaire. The pilot study allowed for pre-testing of the research instrument. The results on reliability of the research instruments are presented in Table 3 below.

Scale	Cronbach's Alpha	Number of Items
ICT application in Procurement Process	0.764	12
Individual user factors	0.809	4
Information Systems	0.723	4

Table 3: Reliability Coefficients

The overall Cronbach's alpha for the three categories which is 0.752. The findings of the pilot study shows that all the three scales were reliable as their reliability values exceeded the prescribed threshold of 0.7 (Mugenda and Mugenda, 2003).

4.2. Background Information

The background information was gathered based on position held, level of education, period worked in organization, extent of use of IT devices and attitude of suppliers on technology.

4.2.1. Demographic Characteristics of Respondents

Characteristics	Frequency	Percentage %
Top Management	9	18
Middle Management	27	54
Suppliers'	14	28
TOTAL	**50**	**100**

Table 4: Respondents Position

Majority of respondents were in middle level management at 54% while the suppliers' and top management were 28% and 14% respectively. This implies that middle level management is significant in both knowledge and skills in the procurement processes at Kenya Maritime Authority.

Characteristics	Frequency	Percentage %
PHD	3	6
Master degree	11	22
Bachelor's degree	29	58
Others	7	14
TOTAL	**50**	**100**

Table 5: Respondents Education

Majority of the respondents had a bachelor's degree at 58%. Respondents who had master degree were 22%, those with PHD were 6% and those who had other forms of academic qualification were 14%. This is an indication that staff of KMA has the right academic skills.

Years Worked	Frequency	Percentage %
0 – 5	16	32
6 – 10	19	38
11 – 15	8	16
Over 15	7	14
TOTAL	**50**	**100**

Table 6: Period worked in organization

Respondents who had worked for between 6 – 10 years were the majority standing at 38%, those who had worked for between 0 – 5 years were 32%, 11 – 15 years were 16% and those who have worked for over 15 years were 14%. This is an indication that KMA has experienced staff in the procurement process.

Figure 2

Level of Extent	Frequency	Percentage %
No extent	4	8
Low extent	3	6
Neutral	11	22
Moderate extent	25	50
Great extent	7	14
TOTAL	**50**	**100**

Table 7: Extent of use of IT devices

From the study it was revealed that 50% of respondents used IT device moderately while 22% of the respondents were neutral. 14% of the respondents used IT devices to a great extent whereas those that used IT devices in a low extent and no extent were 6% and 8% respectively. The results indicate that majority use IT devices at Kenya Maritime Authority.

Type of Attitude	Frequency	Percentage %
Positive	33	66
Negative	17	34
TOTAL	**50**	**100**

Table 8: Attitude of Suppliers

From the study, it was established that suppliers that had a positive attitude were 66% and suppliers that had negative attitude were 34% indicating that suppliers are embracing the use of information technology in KMA.

Type of Relationship	Frequency	Percentage %
Close	28	56
Moderate Distant	8	16
Distant	6	12
No Relation	8	16
TOTAL	**50**	**100**

Table 9: Relationship with suppliers

The results showed that KMA has a close relationship with its suppliers at 56%. Respondents who thought that the relationship were moderate distant, distant and no relation were 16%, 12% and 16% respectively. Close relationship indicates that KMA can implement procurement processes on the IT platform without much resistance.

4.3. Effects of Technology on Procurement Processes

In the research analysis the researcher used a tool rating scale of 1 to 5; where 5 were the highest and 1 the lowest. Opinions given by the respondents were rated as follows, 1 = No extent, 2 = Low extent, 3 = Neutral, 4 = Moderate extent and 5= Great extent. The analysis for mean, standard deviation and coefficient of variation were based on this rating scale.

4.3.1. Information Communication and Technology application

	Information Communication & Technology application			
	Statements	**Mean**	**Standard Deviation**	**Coefficient of Variation**
B1	Assessing the needs of procurement	3.88	1.319	0.3399
B2	Risk assessment in procurement	4.00	1.385	0.3463
B3	Specification	3.96	1.414	0.3571
B4	Approval Mechanism	3.96	1.160	0.2929
B5	Selection Method of Procurement	3.96	1.355	0.3422
B6	Prequalification of bidders	4.12	1.189	0.2885
B7	Bidding document preparation	4.22	1.112	0.2635
B8	Invitation to bid	3.42	1.372	0.4012
B9	Issue of Bid documents & opening bids	1.86	1.212	0.6516
B10	Evaluation of Bids	2.44	1.312	0.5377
B11	Award & Signing of contract	3.30	1.359	0.4118
B12	Contract administration	3.5	0.974	0.2783

Table 10: ICT Application

The first objective was to establish the effect of information communication technology on procurement processes at KMA. Respondents were required to respond to set questions related to ICT application and give their opinions. From the descriptive statistics in the Table 10 shown above, the extent to which ICT is used in procurement process in the organization. The results show that information communication and technology was mainly used to a great extent in the following areas: Bidding Document Preparation, Prequalification of bidders, Risk assessment in procurement, Specification, Approval mechanism, Selection Method of procurement, Assessing the needs the needs of procurement, contract administration, Invitation to bid and award and signing of contracts. They were represented by means of 4.22, 4.12, 4.00, 3.96, 3.96, 3.96, 3.88, 3.50, 3.42 and 3.30 respectively. They were represented by standard deviations of 1.112, 1.189, 1.385, 1.414, 1.160, 1.355, 1.319, 0.974, 1.372 and 1.259 respectively. The processes indicated to have been used at a moderate extent include: Evaluation of bid and issuance of Bid documents and opening bids. The means are as follows: 2.44 and 1.86 respectively whereas their standard deviations were 1.312 and 1.212 respectively.
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 4.22, 3.42, and 3.96 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.

4.3.2. Individual User Factors

	Individual User Factors			
	Statements	**Mean**	**Standard Deviation**	**Coefficient of Variation**
C1	Assessing the staff ICT competencies	3.68	1.347	0.3660
C2	Assessing staff attitude on ICT adoption	3.92	1.007	0.2569
C3	Management Support	3.40	1.309	0.3850
C4	Assessing suppliers' attitude on ICT adoption	3.52	0.886	0.2517
C5	Assessing challenges of implementing ICT For procurement processes	3.22	1.314	0.4080
C6	Management solution to challenges implementing Procurement processes	3.98	1.317	0.3309

Table 11: Individual Users Factors

The second objective was to determine the effect of individual user factor on procurement processes at KMA. Respondents were asked questions related to individual user factors and give their opinions related to the issue. From the findings all the means were above 3.2 indicating majority of the respondents agreed to the statements on individual user factors on procurement process in the organization.

4.3.3. Information System

	Information System			
	Statements	**Mean**	**Standard Deviation**	**Coefficient of Variation**
D1	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 Procurement function	2.35	1.352	0.5753
D2	Measuring performance of procurement function Yields benefits to organization such as costs	3.88	1.189	0.3064
D3	Important steps toward risk reduction and mitigate Of those that are most likely to occur	3.68	1.332	0.3619
D4	Placing and tracking orders online	3.90	1.165	0.2987
D5	Quick response and JIT replenishment	3.86	1.178	0.3052

Table 12: Information System

On the descriptive statistics on Table 11 shows that respondents were interviewed on effects of information system on procurement processes at KMA. 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 3.88 and 368. 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= 2.35.

4.3.4. Effects of Technology adoption on Procurement Process

	Effects of Technology adoption on Procurement Process			
	Statements	Mean	Standard Deviation	Coefficient of Variation
E1	Your business benefits through e-procurement	3.96	1.428	0.3606
E2	Increased efficiencies'	3.74	1.426	0.3813
E3	IT procurement process reduces operational costs	3.72	1.443	0.3879
E4	IT procurement brings closer relations with supplier	3.80	1.278	0.3363
E5	Creates opportunity to negotiate better terms	4.10	1.182	0.2882

Table 13: Effects of Technology adoption on Procurement Process

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.

4.4. Multiple Regressions

Coefficients[a]								
Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
	B	Std. Error	Beta			Zero-order	Partial	Part
(Constant)	.658	.136		5.511	.000			
ICT application	.483	.137	.232	3.294	0.01	.798	.110	.015
Individual User factors	.457	.015	.109	2.350	0.04	.646	.089	.025
Information System	.596	.121	.375	4.511	.005	.876	.594	.121

Table 14: Multiple Regression Analysis Coefficients

Dependent variable: Effects of technology adoption on procurement processes

The correlation analysis Table 14 shows the relationship between the independent variables, ICT application, individual user factor and information system KMA. The analysis indicates the coefficient of correlation, r equal to 0.798, 0.646 and 0.876 for ICT application, individual user factor and information system respectively. This indicates a very strong positive relationship between the independent variables, ICT application, individual user factor and information system and the dependent effect of technology on procurement process at KMA.

→ Hypothesis 1

H_0: There is no significant effect of ICT on procurement processes at KMA

$\beta_1=0$,

H_1: There is a significant effect of ICT on procurement processes at KMA

$\beta_1\neq0$,

In relation to the variable documentation process, the results in Table 12 above indicate ICT application has a significant influence on procurement process at KMA. This is supported by regression analysis t-value of 3.294 which is greater than the critical value 2.0 and a p-value of 0.01 at 95% level of significance which is less than 0.05.

After testing the hypothesis by comparing the scores of calculated t-value and critical t ; Calculated t-values was, 3.294 for ICT application, which is greater than the critical t_{36-1} (0.05) = 2.0, the study rejected the null hypothesis that there is no significant effect of ICT on procurement processes at KMA. Therefore the study accepted the alternative hypothesis that there is a significant effect of ICT application on procurement processes at KMA.

→ Hypothesis 2

H_0: There is no significant effect of individual user factor on procurement processes at KMA

$\beta_1=0$,

H_1: There is a significant effect of individual user factor on procurement processes at KMA

$\beta_1\neq0$,

In relation to the variable individual user factor, the results in Table 12 above indicate that individual user factor has a significant influence on procurement processes at KMA. This is supported by regression analysis t-value of 2.35 which is greater than the critical value 2.0 and a p-value of 0.04 at 95% level of significance which is less than 0.05.

After testing the hypothesis by comparing the scores of calculated t-value and critical t ; Calculated t-values was, 2.35 for individual user factor, which is greater than the critical t_{36-1} (0.05) = 2.0, the study rejected the null hypothesis that there is no significant effect of individual user factor on procurement processes at KMA. Therefore the study accepted the alternative hypothesis that there is a significant effect of individual user factor on procurement processes at KMA.

→ Hypothesis 3

H_0: There is no significant effect of information system on procurement processes at KMA

$\beta_1=0$,

H_1: There is a significant effect of information system on procurement processes at KMA

$\beta_1\neq0$,

In relation to the third variable, the results in Table 12 above indicate that information system has a significant influence on procurement processes at KMA. This is supported by regression analysis t-value of 4.511 which is greater than the critical value 2.0 and a p-value of 0.00 at 95% level of significance which is less than 0.05.

After testing the hypothesis by comparing the scores of calculated t-value and critical t ; Calculated t-values was, 4.511 for information system , which is greater than the critical t_{36-1} (0.05) = 2.0, the study rejected the null hypothesis that there is no significant effect of information system on procurement processes at KMA. Therefore the study accepted the alternative hypothesis that there is a significant effect of information system on procurement processes at KMA.

The regression model was:

$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \varepsilon$

$Y = 0.658 + 0.483X1 + 0.457X2 + 0.596X3 + 0.005$

Where

Y = Dependent variable (Technology adoption Procurement processes)

X_1 = ICT application

X_2 = Individual user factor

X_3 = Information System

The regression equation above has established constant at procurement processes will be 0.251. The findings presented also shows that taking all other independent variables at zero, a unit increase in ICT application will lead to a 0.483 increase in the procurement process at KMA; a unit increase in individual user factor will lead to a 0.457 increase in procurement processes at KMA, a unit information system will lead to a 0.596 increase in the scores of procurement processes at KMA. This therefore implies that all the three variables have a positive relationship with procurement processes at KMA.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.886[a]	.784	.780	.15625	.780	179.329	4	46	.000

a. Predictors: (Constant), ICT application, individual user factor, information system

Table 15: Regression Analysis Summary

Table 14 above indicates an overall P-value of 0.000 which is less than 0.05 (5%). This shows that the overall regression model is significant at the calculated 95% level of significance. It further implies that the studied independent variables namely ICT application, individual user factor and information system have a significant effect on procurement processes at KMA.
Table 15 shows the regression model summary indicating the coefficient of determination R Square as 0.780. This means that 78.0% of the relationship is explained by the identified three factors namely ICT application, individual user factor and information system. The rest 22.0% is explained by other factors in KMA not studied in this research.
In summary the four factors studied namely ICT application, individual user factor and information system explains or determines 78.0% of the relationship while the rest 22.0% is explained or determined by other factors.

4.5. ANOVA
The study used ANOVA to establish the significance of the regression model. In testing the significance level, the statistical significance was considered significant if the p-value was less or equal to 0.05. The significance of the regression model is as per Table 16 below with P-value of 0.00 which is less than 0.05. This indicates that the regression model is statistically significant in predicting factors affecting procurement processes at KMA.
Basing the confidence level at 95% the analysis indicates high reliability of the results obtained. The overall Anova results indicates that the model was significant at F = 259.029, p = 0.000

ANOVA[a]						
Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	34.909	4	8.477	259.029	.000[b]
	Residual	17.763	46	.032		
	Total	52.672	50			
a. Dependent Variable: Technology adoption on Procurement processes at KMA						
b. Predictors: (Constant), ICT application, Individual user factor, information system						

Table 16: ANOVA

5. Summary of the Findings Conclusion and Recommendations

5.1. Introduction
The chapter provides the summary of the findings from chapter four, and it also gives the conclusions and recommendations of the study based on the objectives of the study. The chapter finally presents the limitations of the study and suggestions for further studies and research.

5.2. Summary of Findings
Out of the 68 questionnaires issued 50 were returned making a response rate of 73.5%. A general Cronbach alpha of 0.752 was achieved for the validity of the questionnaire. From the study, it was established that 54% of the respondents worked in the middle level management. It was also established that 58% of the respondents were holders of bachelor's degree and 38% were respondents who had worked for between 6 – 10 years. 50% of respondents indicated that they can use any kind of IT device to a moderate extent. From the study, respondents indicated that suppliers' had a positive attitude at 66% and 56% of the respondents indicated there was a close relationship between KMA and suppliers'.
The study revealed a positive correlation between independent variables namely ICT application, individual user factor and information system with dependent variable technology adoption on procurement processes; 0.798, 0.646, and 0.876 respectively. After testing the three hypothesis by comparing the scores of calculated t-value and critical t ; Calculated t-values were above 2.0 for all the independent variables studied , which is greater than the critical t_{36-1} (0.05) = 2.0, the study rejected all three null hypothesis and accepted all the three alternative hypothesis.
This implies that the studied independent variables namely ICT application, individual user factor and information system have significant effect on technology adoption on procurement processes at KMA.

5.2.1. ICT Application on Procurement Processes at KMA
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 Factor on Technology Adoption in Procurement Process

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 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. Information System Influence on Technology Adoption in Procurement Process

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. 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 procurement process and the passion for technology in the firm.

5.3. Conclusion

The literature review pertaining to technology 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 technology 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 technological 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 technology 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 technology 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 technology 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 technology 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 technology 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 technology 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 technology 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 technology applications in their daily operations, making e-business part of their "modus operandi".

5.4. Recommendation

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. Limitations

The researcher faced constraint of access to valuable data due to bureaucracy and this proved time consuming. Time and financial resources constrains ware met and dealt with through proper planning allocation.

5.6. Suggestion for Further Research

There is scope for further development of this analysis. The study was limited to state corporation. 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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