



**INFLUENCE OF INFORMATION COMMUNICATION AND TECHNOLOGY ON PROCUREMENT PERFORMANCE
IN COMMERCIAL STATE CORPORATIONS IN KENYA**

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ABSTRACT

The study sought to examine the influence of information communication and technology on procurement performance in the commercial state corporations in Kenya. The study used 195 respondents who were involved in the procurement related activities in the organization. The study used a structured questionnaire to collect data from the key informants in the organizations. The collected data was analyzed using both quantitative and qualitative data analysis methods. The study applied the statistical package for social sciences (SPSS V. 22) to compute the measurements of the multiple regressions for the study. From the study results it was established that there existed strong positive relationship between the independent variables and dependent variable. The study identified the variables as critical factors of inventory management systems to enhance procurement performance in the commercial state corporations in Kenya. The study recommended for firms to put in place ERP systems to ensure that there was planning for inventory to improve decision making for the timely delivery of goods. The connectivity with the suppliers of the firms is important as it enhances reduction of stock out costs and inventory accuracy facilitates flow of information for timely delivery of goods. The study recommended E-procurement in the public organizations is an important element in its supply chain. The E-procurement can be done through digitalization of information and data, rationalization to improve efficiency in administration process. The success of E-procurement depends on the increase of bidders (suppliers) that participate to procurement auctions to enhance service delivery in the public organizations in Kenya. The study recommended for the Vendor Managed Inventory systems in the organizations that has a stock management system to minimize the total holding and ordering costs annually thus leading reduction of stock out costs. The study recommended for a Radio Frequency Identification system which ensure that there is a reduced machine setup time for the reduction of stock out costs.

Keywords: E-procurement, Vendor Managed Inventory systems, Enterprise Resource Planning Systems, Radio Frequency Identification, Procurement Performance

INTRODUCTION

In the world today, every organization wants not only to mitigate the system wide cost, but also to maintain minimum inventories along the supply chain while maximizing the service level requirements of the customer (Sexton, 2007). This has led to reduced costs, increased efficiency and thus boosted performance of organizations. In some organizations it has led to demand variability and thus strengthened the need to maintain proper inventory for improved supply chain performance. Dryden and Brownell (2012) posit excess inventory in the supply chain blocks the cash flow and this might negatively affect organizational performance.

Organizations strive to minimize costs and thereby improving on their returns. This is achieved through procurement by sourcing for the best goods and services from suppliers at the right price, quantity, quality and delivered at the right time (Baily, Jessop & Jones, 2014). Information and Communication Technology (ICT) has helped organizations to broaden their markets through the concept of globalization. Through globalization the division created by diversity in locations is bridged mainly through internet technologies. As a result, people world over are able to communicate irrespective of physical locations. This idea can be very critical in procurement since it would help organizations broaden their markets hence bring forth competition. Ombaka (2009) depict procurement as a multifaceted range of operational, business, ICT, safety, risk management and legal systems that serve to fulfil the needs of organizations.

Many governments in the world now appreciate the important role played by ICT. The advent of internet technology has made it possible for governments to offer some key traditional processes online. By promoting information sharing; Maniam, Halimah and Hazman (2016) argue that the governments have

been able to improve service delivery. In Kenya, for example, all government ministries have websites which contain very critical information which in the past could only be accessed by physically walking into the government offices and the process was not only tedious but also marred by corruption. Maniam et al.(2016) claim that some governments have moved to use ICT in an effort to streamline the procurement process within the public sector. The key processes could range from identification of requirements, through payments to contract management.

In all countries in the world, the financial activities of government procurement managers accounts for 10% – 30 % of GNP (Amemba, et al, 2013; Callender & Mathews, 2000). Similarly, studies reveal that state corporations usually spend up to 70% of their revenue/operational budget on purchasing goods and services (Rahim, 2008). Despite such significance, procurement function in the public sector still suffers from four protracted hitches: First, traditional procurement process permits infamous maverick buying practice which represents a situation where employees make unplanned purchases from non-preferred suppliers at a higher price (Rahim, 2008; Turban,et al, 2008); second, procurement policies are not well developed and hence adopting the same becomes a serious challenge; third, series of bureaucracy in the procurement process giving rise to poor service delivery; and finally, procurement is traditionally a labor-intensive activity and, as such, managers spend considerable time on ‘non-value-added activities’ (Rahim, 2008;Croom & Brandon, 2005; Roche, 2001).

In Africa, the current phase in the development of public procurement has seen the establishment of special public procurement bodies, whose task is to implement the new regulations. These bodies aim not just to bring domestic legislation, but to play a key role in the efficient implementation of the regulations. These bodies have also been given

increasing responsibility for monitoring of public procurement procedures. In this phase the regulatory frameworks have completed by the adoption of all necessary secondary legislation, intensive training programs have been organized and needed manuals and instructions have been published aimed to inform widest range of procuring entities and potential bidders on how to implement the law provisions properly (Nicola, Missikoff & Fabrizio, 2011).

Public procurement is considered to be very instrumental in the development of the Kenyan economy. Its importance has been on the increase since the year 2004 and 2014, where it accounted for 9% and 11% of the GDP, respectively (Kamotho, 2014; Malela, 2010; PPOA, 2007). Before then, there was overwhelming concern that this area was neglected for long and as such, the government was not realizing value for money amongst its state corporations. This saw the need to revamp public procurement in Kenya by instituting a number of reforms aimed at enhancing efficiency in the procurement process. Major reforms in the procurement system in Kenya started with the establishment of the legal framework within which public procurement could be carried out (Miheho, 2013).

State Corporations in Kenya are formed by the government to meet both commercial and social goals. They exist for various reasons including: to correct market failures, to exploit social and political objectives, provide education, health, redistribute income or develop marginal areas. In 2013, the Presidential Task Force on Parastatal Reforms (PTFPR) published a list of all state-owned enterprises (SOEs) and recommended proposals to reduce the number of State Corporations from 262 to 187 in order to eliminate redundant functions between parastatals, close or dispose of non-performing organizations,

consolidate functions wherever possible, and reduce the workforce. However, progress is slow.

Statement of the Problem

State corporations play a major role in the development of the country through provision of public services and have become a strong entity in Kenya and very useful engines to promoting development. On the international scenes the global economy recorded a growth of 5.1% in 2006 compared to 4.5% (World Bank, 2003). In Kenya state corporations accounted for 20% of the country's Gross Domestic Product (GDP), provided employment opportunities to about 300,000 people in the formal sector and 3.7 million persons in the informal sectors of the economy (GoK, 2014).

However, state corporations in Kenya have been experiencing a myriad of problems including corruption, nepotism and mismanagement (R.o.K, 2014). For example a world bank report (2013) stated that a key area for corruption busting reform is the parastatal sector which when compared to similar economies are a drain on public resources and are locus of corruption that thrives in public monopolies especially when coupled with lax oversight, mismanagement and fiduciary control procedures. An area of State Corporations dominance that cries out for reforms is the financial sector and other support and service provision sectors. The public investment committee reports out of 130 reports examined by the Auditor General, only 23 Corporations managed a clean bill of health (R.o.K, 2014). The general story is one of loss, fraud, theft and gross mismanagement which are hampering improved and sustained performance and service delivery (Shale, 2014).

State Corporations' operations had become inefficient and non-profitable, partly due to multiplicity of objectives, stifled private sector initiatives and failing of joint ventures requiring the government to shoulder major procurement burdens (McCrudden, 2004). 31% of state corporations rely on

old records in selecting their suppliers, while 69% search through internet catalogue in selecting suppliers (Chau et al 2007). A study by (Chan & Lu, (2004) found that organizations which adopted ICT in procurement have reduced costs through transactional and process efficiencies and thereby promoting their procurement performance. However, in Singapore, previous research by (Lai & Li, 2005) on the survey of the role of ICT especially e-procurement adoption strategy shows that global state corporation use of the internet is high, while in Kenya, previous research by (Kim et al, 2008) on usage, obstacles and policies on e-procurement show that only 33% of state corporations have implemented e-procurement as a strategy to improving services. The study question is the use of ICT as a strategy to enhance or deteriorate the performance of the procurement function, but none of the existing study explored further how ICT influence procurement performance in commercial state corporations in Kenya. This study therefore examined the influence of information communication and technology in enhancing procurement performance in commercial State Corporations in Kenya.

Objectives of the Study

The purpose of the study was to establish the influence of information communication and technology on procurement performance in the commercial state corporations in Kenya. The specific objectives were:-

- To examine how E-procurement influence procurement performance in the commercial state corporations in Kenya
- To determine how Vendor Managed Inventory influence procurement performance in the commercial state corporations in Kenya
- To find out how Enterprise Resource Planning influence service delivery in public organizations in Nairobi City County, Kenya

- To establish how Radio Frequency Identification influence procurement performance in the commercial state corporations in Kenya

LITERATURE REVIEW

Theoretical Review

Diffusion Innovation Theory

Diffusion of Innovation (DOI) hypothesis by Rogers (2003) portrays the way of spreading advancement through communication lines after sometime among the individuals from a social framework. Roger's explanation points interest on development choice process into learning, influence, judgment, execution, and affirmation. The ultimate result of this diffusion is that people, as a noteworthy of social structure, grasp another idea, conduct, or thing. Choice of another idea, lead, or thing does not happen at the same time in a social system; rather it is a strategy whereby a couple of people are more skilled to grasp the headway than others (Hager, 2006).

Li and Atuagene-Gima (2011) noticed that diffusion hypothesis of innovation looks to clarify how new thoughts or developments were embraced and this theory recommends that there are five qualities of a development that influence reception; relative advantage, similarity, complexity, trial capacity and observe position. The hypothesis proposes that advancements that have a reasonable, unambiguous favorable position over the past approach will be all the more embraced and executed. When leading players understand innovation as being simple to apply, the advancements will be adopted with a lot of ease (Greenhalgh et al., 2004). Given that new developments resources like time and energy, innovations that had been tried before being fully implemented are more readily adopted. Observe-capacity is the level of which the outcomes of innovation are openly seen by those adopting. In case visible positive results from the implementation of

the advancements then the development is readily embraced.

Technology–Organization–Environment Theory

The technology–organization–environment framework was progressed by Tornatzky and Fleischer (1990) and clarifies the selection of mechanical developments and recognizes three parts of an association's setting that can impact the procedure by which organizations embrace innovative advancements: the technological setting, the original background, and the green setting. The organizational environment is characterized as far as a few engaging measures: fixed size; the centralization, formalization, and many-sided quality of the firm's administrative structure; the nature of organization's setting depicts both the personal and outside advancements significant to the business. This incorporates improvements existing inside the company, and the pool of available innovations in the market. The ecological setting is the field in which a firm leads its business its industry, its rivals, its entrance to assets provided by others, and the company's involvement with the administration.

The hypothesis also opines that because of coercive pressures, whether formal or casual powers, applied on associations by different organizations after that the past relationships depend on. For example, a client firm, a mother organization and an administrative body might be wellsprings of coercive weights. It is clear that a leading company, which commands the market, may impose to those who depend on to them reception of programs, structures, or innovations. Regularizing pressures originate from dyadic relations where organizations share some data, tenets or rules, and standards. Sharing these standards through social channels among individuals from a system encourages accord, which, thus, expands the quality of these standards and their potential impact on organizational conduct.

Technology Acceptance Model (TAM)

Davis (1986; 1989; 1993) developed and validated the technology acceptance model (TAM) to explain the mechanisms that influence and shape users' acceptance of new information technology. According to TAM, there are two specific variables that are fundamental determinants of users' attitude toward using information technology and actual use of the system: perceived usefulness and perceived ease of use relatively to new information system design features. Usefulness is defined as the degree to which someone believes that using a system will enhance his performance; and ease of use is defined as the degree to which user believes that benefits of systems' use are outweighed by the efforts for using it (Davis, 1993).

E-procurement adoption entails changes that includes reengineering the existing system within the organization that will ultimately impact on the way tasks are conducted (Kaliannan et al, 2008). Major procurement operations carried out within a state corporation that can be greatly changed as a result of e-procurement adoption include the ordering process which involves tasks like: order preparation, order approval and order transmission to the supplier. As such, the perception of employees and suppliers on the usefulness and ease of use of e-procurement system is very critical in realizing full benefits of e-procurement adoption; especially in the implementation of e-ordering. Thus, this model was employed in answering all research questions pertaining to the effect of ICT on procurement performance in state corporations in Kenya.

Balanced Score Card

This study was guided by Balanced score card by Kaplan & Norton (1995). Balanced Score Card (BSC) suggests managers to view organization's

performance from four dimensions, customer perspective, internal perspective, innovation & learning perspective, financial perspective (Kaplan & Norton, 1995). BSC incorporates financial and non-financial measures in one measurement system. The objectives and measures of BSC are derived from an organization's vision and strategy. The Balanced Scorecard provides executives with a comprehensive framework that translates a company's vision and strategy into a coherent set of performance measures.

According to Kaplan and Norton (1995) the balanced scorecard not only allows the monitoring of present performance, but also tries to capture information about how well the organization is positioned to perform in the future. Furthermore, the Balanced Scorecard has evolved to become a core management tool, in that it helps CEOs not only to clarify and communicate strategy, but also to manage strategy. In practice, companies use the BSC approach to accomplish four critical management processes, clarify and translate vision and strategy, communicate and link strategic objectives and measures, plan, set targets, and align strategic initiatives and enhance strategic feedback and learning.

The Balanced Score Card (BSC) is a management system used to align business activities to the vision and strategy of the organization, improve internal and external communication and monitor organizational performance against strategic goals. It is a performance measurement tool that considers not only financial measures but also customer satisfaction, business process and learning measures (Johnson et al., 2008). Organizations primarily uses balanced score card as a performance measurement tool and recommends that the company should provide enough resources especially for funding further comprehensive sensitization on the importance of balanced score card.

Conceptual Framework

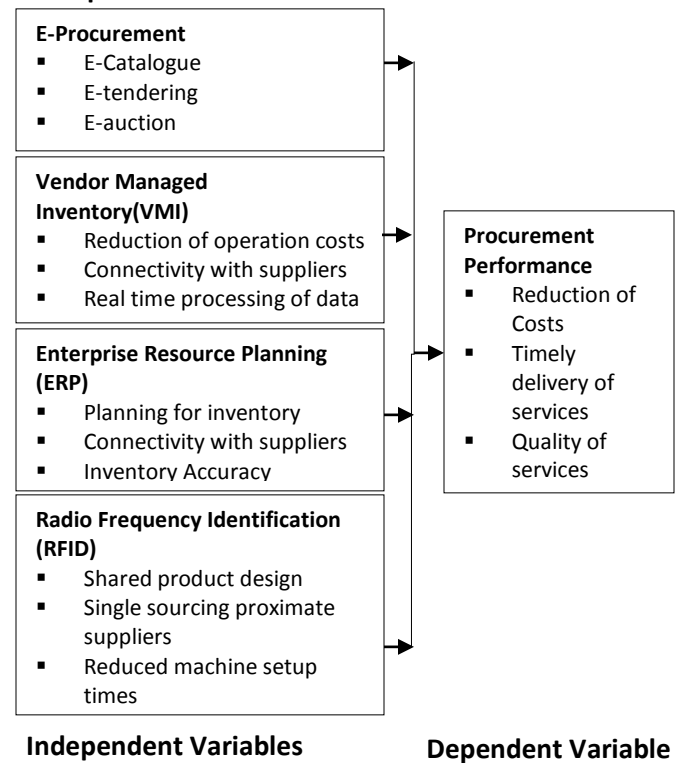


Figure 1: Conceptual Framework

E-Procurement

The E-procurement is the ability to use the Internet in the purchasing (Boer et al., 2008). The electronic procurement is the integrated information technology that is based the purchasing system that is used at the input end of the chain off. Hence e-procurement rests on the sale and procurement of goods and services by making use of Internet and other networking using information systems, such as interchange of the electronic data and resource planning enterprise. The electronic Procurement has increased its popularity because of benefits associated with its adoption. These benefits include the reduction in the cost of supply and lead time as well as enhanced transparency (Bof & Previtali, 2010).

From the organization's strategic point of view, e-procurement will help in fraud prevention and company reputation. Further, it is appreciated that

firms" information systems have become continuously connected with other infrastructures that have led to the growth of enterprises (Vaast & Walsham, 2012). Therefore, the increased use of new technology in the system of e-procurement is considered to be a great innovation and strategic action that has enabled purchasers to buy goods and services through the use of various internet facilities.

Vendor Managed Inventory (VMI)

This is a new concept that has been made popular by the Bose Corporation. It is now widely used in the industry with encouraging results. In VMI, the supplier takes charge of the inventory management of products and manages the replenishment process based on the consumption pattern of the consumer (Sople, 2010). They use EDI or other inter-organizational software packages or place the supplier's representative at the customer's place. Therefore in VMI, the manufacturer is given the responsibility for monitoring and controlling inventory at the retailer's distribution centre and in some instances at the retail store level as well. Specific inventory targets are agreed and it is the responsibility of the manufacturer to ensure that suitable inventory is always available. Such arrangements depend on accurate and timely information, and suitable computerized systems have only become available in recent years. The main advantage for the retailer lies in the reduction of the operating costs and also the delay in the payment for the products in question (Lysons & Farrington, 2006).

Enterprise Resource Planning (ERP)

Tadger (2010) emphasizes that ERP systems are one database, one application and a unified interface across the entire enterprise". ERP systems offer unique benefits to the organizations implementing them. This they do by improving the decision making

process of the organizations through the provision of appropriate and timely information (Hunton et al., 2012). Globalization has necessitated most companies to standardize processes and learn the best practices embedded in ERP systems, which ensure quality and predictability in their global business interests by reducing cycle time from order to delivery (Ross, 2013). With the evolution of ERP systems, the interest in the impact that these systems have on organizational performance has risen.

Lambert (2011) puts forth that enterprise resources planning (ERP) system is part of the integrated supply chain management system of an organization that integrates all the supply chain partners. Watson and Zhang (2005) argue that an enterprise resources planning package is a database allowing a company to develop data to be used in all the applications. Such data base together with equipment for developing and extracting can ensure effective information movement in the organization. This improves decision making process since the supply chain partners can share information. This minimizes communication costs in the supply chain leading to supply chain performance (Song & Zipkin, 2011).

Radio Frequency Identification (RFID)

The RFID systems provide a powerful technology for tracking the movement of goods throughout the supply chain. RFID systems use tiny tags with embedded microchips containing data about an item and its location to transmit radio signals over a short distance to special RFID readers then pass the data over a network to a computer for processing. The RFID tag is electronically programmed with information that can uniquely identify an item plus other information about the item such as its location, where and when it was made and its status during production. Embedded in the tag is a microchip for

storing the data. The rest of the tag is an antenna that transmits data to the reader (Ken et al, 2010).

Empirical Review

E-Procurement

Kamotho (2014) study focused on E-procurement practices and performance in state corporations and the study objectives were to establish the extent of e-procurement adoption among state corporations in Kenya, the challenges facing the adoption of e-procurement among state corporations in Kenya and the relationship between e-procurement and procurement performance among state corporations in Kenya. The target population of the study was all the state corporations in Kenya totaling two hundred and ten (210). A sample of 42 state corporations was taken out of this sampling frame. Data was collected through questionnaires. Analysis of the data was done using frequency and percentage tables to analyze the demographic information provided regarding the respondents and the organization, mean and standard deviation was used to analyze the various e-procurement practices adopted by the state corporations, data on challenges facing adoption of e-procurement was analyzed using means, standard deviation and factor analysis, whereas regression, means and standard deviation was used to analyze relationship between e-procurement and procurement performance among state corporations. The study found out that state corporations have adopted various e-procurement procurement practices to enhance their procurement performance.

Vendor Managed Inventory (VMI)

Leading supermarkets in Kenya have moved towards the use of more centralized procurement systems for FFV. More recently, however, Kenyan supermarkets are focusing on offering a one stop shopping service by providing everything that a customer wants, all under one roof and it is quite difficult to achieve this

using manual inventory management systems (Neven and Reardon, 2004). However, the use of automated inventory management systems has had little application in most organizations. This has resulted in problems that come as a result of stock-outs and stoppage in inventory flow. This in turn leads to dead inventory and the firms end up incurring huge losses in terms of opportunity costs associated with holding inventory (Wolcott, 2000).

Enterprise Resource Planning (ERP)

Momanyi and Lelei (2014) did a study on the Enterprise Resource Planning System and adoption and organizational performance of manufacturing firms in Kenya This study had two objectives. First to determine drivers for ERP adoption by manufacturing firms in Kenya. Second was to determine the relationship between ERP system adoption and organizational performance for manufacturing firms in Kenya. This was largely motivated by the need to understand the relationship between adopting the system and organizational performance by manufacturing firms in Kenya where no conclusive research has been done before. In undertaking the study, manufacturing firms in Kenya were targeted. The primary data was collected using questionnaire from Finance, ICT team, supply chain, Factory and production team and top management. The analysis was done by using frequencies average, standard deviations and regression analysis and the findings were presented using tables, frequencies, charts and narratives. Through the study, the findings stipulated that the majority of the respondents agreed to a very great extent that the firm's competition from other companies; cost saving and other financial reasons, business innovations, business strategic positioning were the major drivers that motivated the organization to adopt the ERP system as indicated by scores. The findings on organizational performance

also deduced that the majority of the respondents agreed to a very great extent that the firms have better return on investment, improved data security, improved decision making process and reduced cost of production. The study also concludes on adoption of the system, the study concludes that most manufacturing Firms have adopted the ERP System with virtually all modules implemented.

Radio Frequency Identification (RFID)

Khaliq and Rehman (2014) did a study on the effect of RFID on organizational performance: The mediating role of supply chain performance. The aim of this paper is to examine the influence of radio frequency identification (RFID) deployment on firms manufacturing effectiveness and efficiency, and ultimately its impact on organizational performance via supply chain performance. The data was collected from 104 middle level and front-line managerial employees of three organizations. Structural Equation Modeling (SEM) technique was used to analyze the data in order to test the hypotheses. Findings point out that deployment of RFID leads toward enhanced manufacturing effectiveness and efficiency, enhancement in effectiveness lead the organization toward better supply chain. Findings suggest that firms can adopt RFID technology to boost up their performance in terms of manufacturing effectiveness and efficiency and supply.

Procurement Performance

Gathumbi (2013) research aimed at establishing the extent to which NCWSC used ICT in procurement system and the strengths and weaknesses of the system. Data was mainly collected through questionnaires and also using secondary data. It was established that whereas response from open ended questions was appealing, the level of neutral responses for closed ended questions was very high. The data was analyzed using the statistical Package

for Social Sciences (SPSS) and Microsoft Excel. The study revealed gaps such as lack of enough procurement professionals, problems adhering to the annual budget since the budget module in SPMS is inactive and also underutilization of Oracle Financials. To utilize the good knowledge base of Information and Communication Technology (ICT) in the company, the research recommended the implementation of the basics of ICT in procurement such as advertisement of tenders via websites. This concept was used by government ministries in Kenya, according to Nyandimo (2011).

METHODOLOGY

Research design is a systematic model that enables the researcher to draw conclusions concerning causal relationships amongst the variables under investigation (Kothari, 2004). The researcher used descriptive research design to determine the influence of ICT on procurement performance in the commercial state corporations in Kenya. The target population in this study was 195 employees drawn from each division that was involved in the procurement process at the Kenya Ports Authority head offices. The study adopted a census to collect primary data. It is recommended that a census is used when the population (195) is small that is less than 200 and manageable to collect information for the study (Yin, 2013). The study utilized a quantitative questionnaire that was developed for generating information on key variables of interest from the targeted respondents. The Multiple Regression model that was developed on the analysis of the variable relationships was as follows: $Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$,

Where,

Y_i = Procurement performance;

β_0 = constant (coefficient of intercept), $\beta_1... \beta_4$ = regression coefficient of four variables.

X_1 = E-procurement;

X_2 = Vendor Managed Inventory;

X_3 = Enterprise Resource Planning;

X_4 = Radio Frequency Identification Systems;

ϵ = Error term;

RESULTS

E-Procurement

The study findings indicated that the organizations have adopted connectivity with suppliers as an important element in its supply chain. The

Table 1: E-Procurement Descriptive Statistics

Statements	Mean	Std. Dev
The organization has adopted connectivity with suppliers as an important element in its supply chain	3.112	.436
The organization incorporates tracking systems as a key factor in its operations	2.678	.458
The organization takes into account the use of emergence of internet technologies	3.218	.354
There is digitalization of information and data, rationalization and improved efficiency in administration process	2.776	.274
The traditional paper documents disappear and are replaced by digital information that easily can be stolen(copied), changed, deleted among others	3.218	.462
For procurement officers, development will mean the need for further training, amended procurement methods & IT based in procurement tools	3.084	.572
The success of connectivity to suppliers mostly depends on the increase of bidders(suppliers) that participate to procurement auctions	2.871	.638
Composite mean	2.438	

Vendor Managed Inventory (VMI)

The study results revealed that majority of the respondents indicated that majority particularly indicated that the inventory management system in the organization minimized the total holding and

organization incorporates tracking systems as a key factor in its operations. The organization takes into account the use of emergence of internet technologies. There is digitalization of information and data, rationalization and improved efficiency in administration process. The traditional paper documents disappear and are replaced by digital information that easily can be stolen (copied), changed, deleted among others. For procurement officers, development will mean the need for further training, amended procurement methods & IT based in procurement tools. For procurement officers, development will mean the need for further training, amended procurement methods & IT based in procurement tools. The success of connectivity to suppliers mostly depends on the increase of bidders (suppliers) that participate to procurement auctions.

ordering costs annually thus leading reduction of stock out costs. The organization ensured that there were optimal stock levels to reduce stock out costs. The employees were involved in the quality planning and labour requirements planning. The organization ensured that the replenishment of inventory

minimized the lead time for the timely delivery of goods. The organization ensured that there was a working stock management system to reduce lead cycle time for effective reduction of wastes .The firms ensured that there was adequate optimal stock levels

for the reduction of wastes and the stock management system in the firm minimizes the total holding and ordering costs annually thus leading reduction of stock out costs.

Table 2: Vendor Managed Inventory Descriptive Statistics

Statements	Mean	Std. Dev
The stock management system in the organization minimizes the total holding and ordering costs annually thus leading reduction of stock out costs	2.897	.875
ganization ensures that there is optimal stock levels to reduce stock out costs	2.543	.654
The organization ensures that the replenishment of inventory minimizes the lead time for the timely delivery of goods	2.876	.368
The organization ensures that there is a working stock management system to reduce lead cycle time for effective reduction of wastes	2.652	.632
The organization ensures that there is adequate optimal stock levels for the reduction of wastes	2.671	.432
The stock management system in the organization minimizes the total holding and ordering costs annually thus leading to reduction of stock out costs	2.658	.562
Composite mean	3.218	

Enterprise Resource Planning (ERP)

The study results showed that the respondents stated that organization ensured that there was planning for inventory to improve decision making for the timely delivery of goods. The connectivity with the suppliers of the organization enhanced reduction of stock out costs and inventory accuracy facilitated flow of

information for timely delivery of goods. Further, the organization ensured that there was planning of inventory that coordinated all resources and activities for the reduction of wastes. The ERP systems assisted in managing the connections with the outside stakeholders as well as enhancing reduction of stock out costs.

Table 3: Enterprise Resource Planning (ERP) Descriptive Statistics

Statements	Mean	Std. Dev
The organization ensures that there is planning for inventory to improve decision making for the timely delivery of goods	2.876	.465
The connectivity with the suppliers of the firms enhances reduction of stock out costs	2.698	.672
Inventory accuracy facilitates flow of information for timely delivery of goods	2.488	.870
The organization ensures that there is planning of inventory that coordinates all resources and activities for the reduction of wastes	2.908	.752
The ERP systems assists in managing the connections with the outside stakeholders as well as enhancing reduction of stock out costs	2.486	.098
Composite mean	2.456	

Radio Frequency Identification (RFID)

The respondents stated that organization ensured that there was shared product design with the suppliers and customers to enhance timely delivery of goods. The organization ensured that there was movement towards single sourcing proximate suppliers to enhance timely delivery of goods. The organization had ensured that there was a reduced machine setup time for the reduction of stock out costs. The RFID system had led to dramatic

improvements in the firms return on investments, quality and efficiency. The organization had ensured that there was total preventive maintenance that emphasizes that production create items that arrive when needed to reduce wastes. The implementation of RFID system had yielded minimum inventories. The implementation of RFID system had led to improved quality, least amount of resources and provided maximum motivation to solve problems as soon as they occur.

Table 4: Radio Frequency Identification (RFID) Systems

Statements	Mean	Std. Dev
The organization ensures that there is shared product design with the suppliers and customers to enhance timely delivery of goods	2.765	.568
The organization ensures that there is movement towards single sourcing proximate suppliers to enhance timely delivery of goods	2.453	.432
The organization has ensured that there is reduced machine setup times for the reduction of stock out costs	2.226	.769
The RFID system has led to dramatic improvements in the firms return on investments, quality and efficiency	3.218	.218
The organization has ensured that there is total preventive maintenance that emphasizes that production create items that arrive when needed to reduce wastes	3.215	.431
The implementation of RFID system has yielded minimum inventories	2.988	.765
The implementation of RFID system has led to improved quality, least amount of resources and provided maximum motivation to supply chain solve problems as soon as they occur	2.864	.453
Composite mean	2.654	

Procurement Performance

The study sought to determine the influence of inventory management systems on the procurement performance in the commercial state corporations, attributed to the influence of VMI, ERP, RFID and E-procurement. The study was particularly interested in three key indicators, namely reduction of costs, timely delivery and quality of services, with all the

three studied over a 5 year period, running from 2013 to 2017. Table 5 below presented the findings.

Findings revealed improved increase of profits across the 5 year period running from the year 2013 to 2017. Cost of reduction recorded positive improvement with a majority affirming to less than 10% in 2013 (42.3%) and 2014 (37.7%), to 10% in 2015 (36.1%) then more than 10% in 2016 (41.1%)

and 2017 (37.5%). A similar trend was recorded in timely delivery of services, improving from less than 10% (44.1%) in 2013, to more than 10% in 2014 (36.4%), 2015 (40.4%) and 2016 (37.3%). Quality of services further recorded positive improvement with a majority affirming to less than 10% in 2013 (37.9%) and 2014 (35.9%), to 10% in 2015 (35.9%) and 2016 (35.3%) then by more than 10% in 2017 (36.2%).

It was deduced from the findings that key service delivery indicators had considerably improved as influenced by among other inventory management systems on procurement performance in the commercial state corporations in Kenya the influence of VMI, ERP, RFID and E-procurement. Quality and Timely delivery of services had particularly improved by at least 10 percent across the public organizations pointing to the significance of ICT in the supply chain process in the organizations in Kenya.

Table 5: Procurement Performance

Reduction of Costs	2013	2014	2015	2016	2017
Improved by less than 10%	42.3	37.7	31.6	30.7	29.5
Improved by 10%	31.8	32.9	36.1	28.2	33
Improved by more than 10%	25.9	29.4	32.3	41.1	37.5
Timely Delivery of Services	2013	2014	2015	2016	2017
Improved by less than 10%	44.1	35.2	33.4	25.7	27.1
Improved by 10%	31.7	32.6	30.2	33.9	35.6
Improved by more than 10%	23.5	32.2	36.4	40.4	37.3
Quality of Services	2013	2014	2015	2016	2017
Improved by less than 10%	37.9	35.9	31.2	25.7	33.1
Improved by 10%	36.2	31.3	35.9	35.3	30.7
Improved by more than 10%	25.9	32.8	32.9	39	36.2

Multiple Regression Analysis

The results means that other factors not studied in this research contributed 30.70% to the procurement performance in the commercial state corporations in Kenya. This implied that these variables are very significant therefore need to be considered in any

effort to boost procurement performance in the commercial state corporations in Kenya The study therefore identified the variables as critical factors of inventory management systems to enhance procurement performance in the commercial state corporations in Kenya.

Table 6: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.833	.693	.673	.007

Table 7: ANOVA

Model		Sum of Squares	d.f	Mean Square	F	Sig.
1	Regression	74.140	4	18.535	56.908	.001
	Residual	44.227	145	.3257		
	Total	118.367	149			

NB: F-critical Value = 12.876; **Predictors: (Constant):** VMI, ERP, RFID, E-procurement

Multiple regression analysis was conducted as to determine the relationship between the procurement performance in the commercial state corporations in Kenya and the four independent variables. As per the SPSS generated, the model equation ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \epsilon$) becomes: $Y = 12.175 + 0.998X_1 + 0.857X_2 + 0.870X_3 + 0.805X_4$. This indicated that procurement performance in the commercial state corporations in Kenya = $12.175 + 0.998(\text{E-procurement}) + 0.857(\text{VMI}) + 0.870(\text{ERP}) + 0.805(\text{RFID})$.

According to the regression equation established, taking all factors into account (E-procurement, VMI, ERP, RFID) constant at zero the procurement performance in the commercial state corporations in Kenya was 12.175. The data findings analyzed also showed that taking all other independent variables at

zero, a unit increase in E-procurement led to a 0.998 increase in the procurement performance in the commercial state corporations in Kenya.; a unit increase in VMI would lead to a 0.857 increase in the procurement performance in the commercial state corporations in Kenya, a unit increase in ERP led to 0.870 increase in procurement performance in the commercial state corporations in Kenya and a unit increase in RFID led to 0.085 increase in the procurement performance in the commercial state corporations in Kenya. This infers that E-procurement contributed most to the procurement performance in the commercial state corporations in Kenya At 5% level of significance, E-procurement had a 0.000 level of significance; ERP showed a 0.003 level of significance, RFID showed a 0.007 level of significance and RFID showed a 0.013 level of significance hence the most significant factor was VMI.

Table 8: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	β	Std. Error	β		
1 (Constant)	12.175	2.497		4.876	.001
E-Procurement	.998	.219	.502	4.560	.000
VMI	.857	.265	.455	3.235	.003
ERP	.870	.279	.305	3.121	.007
RFID	.805	.312	.259	2.508	.013

CONCLUSIONS AND RECOMMENDATIONS

Based on the study findings, the study concluded that procurement performance in the commercial state corporations in Kenya is influenced by Vendor Managed Inventory (VMI) systems, Radio Frequency Identification (RFID) systems, Enterprise Resource Planning (ERP) systems and JIT Systems. The study concluded that E-procurement is an important factor which can enhance procurement performance in the commercial state corporations in Kenya. The

regression coefficients of the study showed that E-procurement has a significant and positive influence on procurement performance in the commercial state corporations in Kenya.

The study results concluded that Vendor Managed Inventory (VMI) systems are an important factor which can procurement performance in the commercial state corporations in Kenya. The regression coefficients of the study showed that a Vendor Managed Inventory (VMI) system has a

significant and positive influence on procurement performance in the commercial state corporations in Kenya. The study concluded that a Radio Frequency Identification (RFID) system also is an important factor which can procurement performance in the commercial state corporations in Kenya. The regression coefficients of the study show that a Radio Frequency Identification (RFID) system has a significant and positive influence on procurement performance in the commercial state corporations in Kenya.

Further, the study concluded that Enterprise Resource Planning (RFID) system is an important factor which can enhance procurement performance in the commercial state corporations in Kenya. The regression coefficients of the study showed that Enterprise Resource Planning (RFID) system has a significant and positive influence on procurement performance in the commercial state corporations in Kenya.

Recommendations

The study recommended for firms to put in place ERP systems to ensure that there is planning for inventory to improve decision making for the timely delivery of goods. The connectivity with the suppliers of the firms is important as it enhances reduction of stock out costs and inventory accuracy facilitates flow of information for timely delivery of goods. Further, the firm should ensure that there is planning of inventory that coordinates all resources and activities for the reduction of wastes and connections with the outside stakeholders to reduce of stock out costs.

The study recommended E-procurement in the public organizations is an important element in its supply chain. The E-procurement can be done through digitalization of information and data, rationalization to improve efficiency in administration process. The

success of E-procurement depend on the increase of bidders (suppliers) that participate to procurement auctions to enhance service delivery in the public organizations in Kenya. The study recommended for the Vendor Managed Inventory (VMI) systems in the organizations that has a stock management system to minimize the total holding and ordering costs annually thus leading reduction of stock out costs. The organizations should have optimal stock levels; the employees get involved in the quality planning and labour requirements planning. The organizations should also ensure that the replenishment of inventory minimizes the lead time for the timely delivery of goods. The study recommended for a Radio Frequency Identification (RFID) system which ensure that there is a reduced machine setup time for the reduction of stock out costs. The RFID system can lead to the firms return on investments, quality and efficiency. The firms should ensure that they have a total preventive maintenance that emphasizes that production creates items that arrive when needed to reduce wastes, yielded minimum inventories, lead to improved quality, and least amount of resources and provide maximum motivation to source problems as soon as they occur.

Areas for Further Research

The findings of this study served as a basis for future studies on procurement performance in commercial state corporations in Kenya. The four independent variables that were studied explained 69.30% of the procurement performance in commercial state corporations in Kenya. This therefore means that other factors not studied in this study contributed 30.70% to the procurement performance in commercial state corporations in Kenya. There is need to carry out further study on other factors influencing procurement performance in commercial state corporations in Kenya.

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