



**INFLUENCE OF E-PROCUREMENT PRACTICES ON THE PERFORMANCE OF PROCUREMENT IN PUBLIC UNIVERSITIES IN KENYA**

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## INFLUENCE OF E-PROCUREMENT PRACTICES ON THE PERFORMANCE OF PROCUREMENT IN PUBLIC UNIVERSITIES IN KENYA

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### ABSTRACT

*The purpose of this research was to establish the influence of e-procurement practices on the performance of procurement in public universities in Kenya. A census research design was adopted in this study. The target population in this study was 31 public universities chartered by the Commission on University Education (CUE) as at July 2017. Statistical package for social science (version 20) was used to facilitate data analysis. It was established that e-tendering, e-sourcing and e-ordering positively and significantly affect procurement performance while e-payment has a positive but not significant effect on procurement performance. However, all the four e-procurement practices were adapted to a moderate extent among the public universities in Kenya. The study recommended that since adoption of e-sourcing positively and significantly affected procurement performance among public universities in Kenya, there was need for the public institutions to adopt the least practiced e-sourcing practices such as e-RFX and e-contracting to a great extent in order to reduce the transaction costs and speed up the procurement process. It was also recommended that since adoption of e-tendering positively and significantly affected procurement performance among public universities in Kenya, there was need for the public institutions to adopt the least practiced e-tendering practices such as e-awarding in order to reduce the transaction costs and speed up the procurement process. It was also recommended that since adoption of e-ordering positively and significantly affected procurement performance among public universities in Kenya, there was need for the public institutions to adopt the least practiced e-ordering practices such as e-requisition and e-receipting in order to reduce the transaction costs and speed up the procurement process. The study also recommended that since adoption of e-payment practices such as internet payments and e-cards were not practiced to a great extent in the public sector, there was perhaps a need to adopt those e-payments practices to a great extent and see their effect on procurement performance so as to enhance flexibility in payment options.*

**Key Words:** e-sourcing, e-tendering, e-ordering, e-payments, Procurement Performance

## INTRODUCTION

E-Procurement is considered one of the major reforms in public procurement. Corsi (2006) defined e-procurement as the use of electronic methods over the internet to conduct procurement functions: identification of requirement, tendering process, payment and contract management. The rationale behind e-procurement is to enhance efficiency and effectiveness and transparency and accountability in public procurement (Hardy & Williams, 2011).

E-procurement has gained popularity especially with the advent of technology (Uddin, 2015). Rapid development of e-procurement was reported in early 2000 (Ahlström, 2010). By the end of the same year, it was reported that many public organizations were maintaining web presence in at least some stage of their procurement processes with some participating in online bidding (Reddick, 2004).

Eadie, Perera, Heaney and Carlisle (2007) suggested that, e-procurement was a rapid efficient method of finding and connecting new sources, being a lean channel for communication. A lot of time is spent on paper invoicing in terms of writing, filing and postal communication but while in e-procurement, staff have sufficient time to engage on strategic issues of procurement (Muhammad, 2013). By extension, e-procurement contributed in reducing maverick buying (Uddin, 2015). Rankin (2012) notes that e-procurement result in reduction in paperwork and this leads to lower administration costs.

In the United States of America, Ashlstrom (2010) pointed out that two most important measures for the success of e-procurement processes are cost and time. It is faster to send a document electronically as compared to the manual method of sending tender documents through post office (Kaali, 2017). This contributes to improved order

tracking and tracing, for it is much easier to trace the orders and make necessary corrections in case an error is observed in the previous order (Cusumano and Selby, 2014).

In Africa, the concept of e-procurement is just gaining popularity especially in the public sector to deal with the problems of lack of accountability and transparency in procurement activities in the public sector, e-procurement platforms have scored highly towards influencing efficiency in procurement services (Sijaona, 2010). Tanzania for instance, in large extent the e-procurement systems has allowed e-sharing, e-advertisement, e-submission, e-evaluation, e-contacting, e-payment, e-communication and e-checking and monitoring to ensure all public procurement activities are conducted online (Tanzania PPOA, 2016).

E-procurement has been a key executive requirement among critical government agencies in Kenya (Taaliu, 2017). Traditionally, most public procurement operations were manual; this was deemed to lack transparency, accountability and fair competition (Matunga, Nyanamba, Okibo, 2013). The Kenyan Government's Procurement system was originally contained in the Supplies Manual of 1978, which was supplemented by circulars that were issued from time to time by the treasury (Orina, 2013). The Kenyan government, alongside developmental stakeholders such as the International Trade Center (ITC), the World Bank and the African Development Bank highlighted the importance of e-procurement in sealing of the aforementioned setbacks through accountability and effectiveness (Chesang, 2013; Mutunga et al., 2015).

Public Universities are institutions of higher learning owned and operated by the government. The public universities structure in Kenya puts the Vice-Chancellor as the principal academic and

administration officer assisted by deputy vice-chancellors. There are 31 chartered public universities in Kenya as approved by Commission for University education (CUE, 2017). The expansion in Kenya's university education can be understood within the framework of the general demand for education at all levels due to high population growth (Kamau, 2012). This therefore require the universities to prudently manage their procurement functions to ensure availability of resources that can be used for further expansion of the institutions in order to meet the increased demand of the higher education (Kamau, 2012). However, according to Chesang (2013) study, public universities have been found to manage their procurement function dismally thereby creating doubt on their capacity to expand their facilities to accommodate the ever increasing demand of higher learns by the rapidly growing population.

### **Statement of the problem**

The procurement operations within public Universities have been marred in lack of proper direction, poor coordination, slow with a lot of bureaucracy, lack of competition and transparency, wastages, delay in delivery, poor quality, high levels of corruption and instances of glaring incompetence in managing the procurement function (Daniel, 2010). An audit report published by the Public Procurement and Oversight Authority (2010) estimated that tendered products and services within the institutions of higher learning are inflated by nearly 60%. In the year 2010, about Ksh. 4.1 Billion part of ministry of higher education budget was lost due to malpractices in the procurement function (Daniel, 2010). Auditor General Report after the audit of Multimedia University expenditures for the financial year , 2012 – 2014, revealed an irregularity in the awarding of a consultancy tender worth KSH 157 Million (Auditor General Report, 2014).

Further, a parliamentary inquisition into the public universities financial processes and expenditures revealed numerous universities including; Maseno University, Kisii University, Dedan Kimathi University, Pwani University, Multimedia University and University of Eldoret to be operating in negative working capital (PIC, 2014). In addition, estimates by the Ministry of education showed that the public universities losses more than Sh500 Million annually due to fraudulent manipulations in procurement process (Wanyonyi, 2016).

As a result, a number of approaches such as tender committees, prequalification's, open tendering, auctions and price indices have been tried with little success. According to Muraya (2016) most of these methods have resulted in increased bureaucracy thereby delaying the procurement process. This then call for a strategy with the potential of eliminating delay and enhancing transparency and control. A number of authors have suggested e-procurement as having capacity to provide transparency, efficiency and control thereby increasing procurement performance (Chesang, 2013)

Consequently, a number of public Universities have embraced e-procurement in their operations in effort on attempt to increase performance (Orina, 2013). However, there has been minimum empirical research to ascertain the contribution of e-procurement on the procurement performance of public Universities in Kenya despite huge investment (Orina, 2013). Further, the existing literatures are focused in the developed world, hence the study on the influence of e-procurement on the performance of procurement in the public Universities in Kenya.

### **Objectives of the Study**

The general objective of the study was to establish the influence of e-procurement practices on the

performance of procurement in Public Universities in Kenya. The specific objectives were:-

- To assess the effects of e-sourcing on performance of procurement in Public Universities in Kenya.
- To establish the influence of e-tendering on performance of procurement in Public Universities in Kenya.
- To ascertain the role of e-ordering on performance of procurement in Public Universities in Kenya.
- To examine the impact of e-payments on performance of procurement in Public Universities in Kenya.

## **LITERATURE REVIEW**

### **Theoretical Review**

#### **Actor Network Theory**

The Actor Network Theory abbreviated as ANT was developed in the early 1980's by scholars Michel Callon, Bruno Latours and John Law while working on a publication for the science and technology subject (Tatnall & Gilding, 2009). The Actor-network theory explains that the world is full of hybrid entities containing both human and non-human elements, and was developed to assess situational contexts where identifications of these elements is complex (Tatnall and Gilding, 2009). ANT deals with interactivity between two elements in a network and how various components in the two elements can be identified. In the desire to evaluate all interactive elements in a system both human and nonhuman, the ANT theory is based on the approach to such systems is sustained in a level playing field. The theory highlights that, when consideration for selection is done there has to be a level playing field and the choice settled on must be the best in a the list (Tatmall & Gilding, 2009).

Sourcing in procurement involves identification of product or service suppliers. The organization contracting should create a level playing field for all the suppliers and only identify the best which fits the set requirements. In an integrated electronic system, electronic sourcing (e-sourcing) would inform digital processing of different suppliers based on electronic documentation they present hence identify which can match the set requirements. The ANT theory recognizes the interaction of numerous elements in a level playing field (Cusumano & Selby, 2014). The electronic sourcing platform makes it possible for the interaction with numerous elements, which in procurement can be numerous possible suppliers, and also makes it possible to identify the best who can match the requirements.

In manual systems this is impossible to implement as avenues for abuse are many where the concept of ANT equality can never be realized (Cusumano & Selby, 2014). Technology has enabled procurements systems, operations such as sourcing for potential suppliers is undertaken in a fair and transparent manner. The principles of agnosticism, general symmetry and free association would ensure that all the bidders are evaluated equally and their strengths measured in a level ground. This will eliminate any likelihood or loopholes for the selection to be inclined towards favoritism (Tatmall & Gilding, 2009). Bias proof e-sourcing platform adhering to the ANT theory entailed the definition of standard requirements that shall form as the basic minimum for consideration of the potential selected choices and all the options shall have a fair and equal chance of selection.

#### **Resource Based View Theory**

The Resource Based View theory was rooted in the work of Penrose around 1959 while working on her project, titled 'The Theory of the Growth of the Firm' (Peteraf & Barney, 2012). The RBV theory is

largely based centralized on the resources of the firm. The resource-based view (RBV) emphasizes the firm's resources as the fundamental determinants of competitive advantage and performance. It adopts two assumptions in analyzing sources of competitive advantage (Peteraf & Barney, 2012). First, this model assumes that firms within an industry (or within a strategic group) may be heterogeneous with respect to the bundle of resources that they control. Second, it assumes that resource heterogeneity may persist over time because the resources used to implement firms' strategies are not perfectly mobile across firms (i.e., some of the resources cannot be traded in factor markets and are difficult to accumulate and imitate). Resource heterogeneity (or uniqueness) is considered a necessary condition for a resource bundle to contribute to a competitive advantage. The argument goes "If all firms in a market have the same stock of resources, no strategy is available to one firm that would not also be available to all other firms in the market" (Cool, et al., 2012). Like the Chicago School tradition, the RBV is an efficiency-based explanation of performance differences (Peteraf & Barney, 2013). The RBV theory supports the independent roles undertaken by the organization while preparing for triggering the movement in the organization's supply chain. RBV theory identifies the internal operational processes as vital components of the organizations resources such as integrating electronic platforms in executing operations such as tender invitation. It will be convenient for the organization to adopt industry benchmark standards while seeking suppliers and this can be effectively be implemented by adopting sophisticated tendering process that is executed electronically (Peteraf & Barney, 2003). The organization will be able to evaluate the influence of the platform of the performance of the procurement function for the individual organization. RBV concept ensures that

the organization manages its procurement function with high sensitivity once they understand that they can peg their competitive advantage on the efficiency of the process (Dierickx & Cool, 2009).

### **Business to Business Model**

Business to Business model was pioneered by Peter Drucker in 1994 while working on his project, 'The Theory of Business' (Axelsson et al., 2002). The theory backs the philosophy which states that no single business is an Island in that for business to be business it must be defined by continuous interactions. The theory stresses that trading revolves around interactions with each other; where one party presents a request for goods or services and the other responds by offering to meet the end of the transaction. The interaction involves negotiation on the price, and then followed by the promise to deliver and the transaction is only closed upon the satisfaction of the request party (Axelsson et al., 2002). The business logic was true way back in the Stone Age and still holds true today in the era of electronic commerce. The changes with regard to business transactions between trading partners has been initiated by the dependency of ICT platforms to effect business interactions and to close transactions. The place of ICT in today's business world can never be disputed. Similarly ICT has been central in the supply chain transactions. The concept of business-to-business in supply chain highlights the linkage of businesses in technologically powered network where organizations can rely on the platform to conduct procurement processes (Hakansson, 2012). The electronic platform makes it possible to easily identify potential suppliers by sorting out the offers through consideration of numerous parameters such as prices, quality and speed of delivery (Ahlstrom, 2010). Consequently the organization can then make express electronic orders which the supplier completes the interaction by delivering on the orders. This concept highlights the areas where

business-to-business model is supported in the supply chain by linking together the transacting parties.

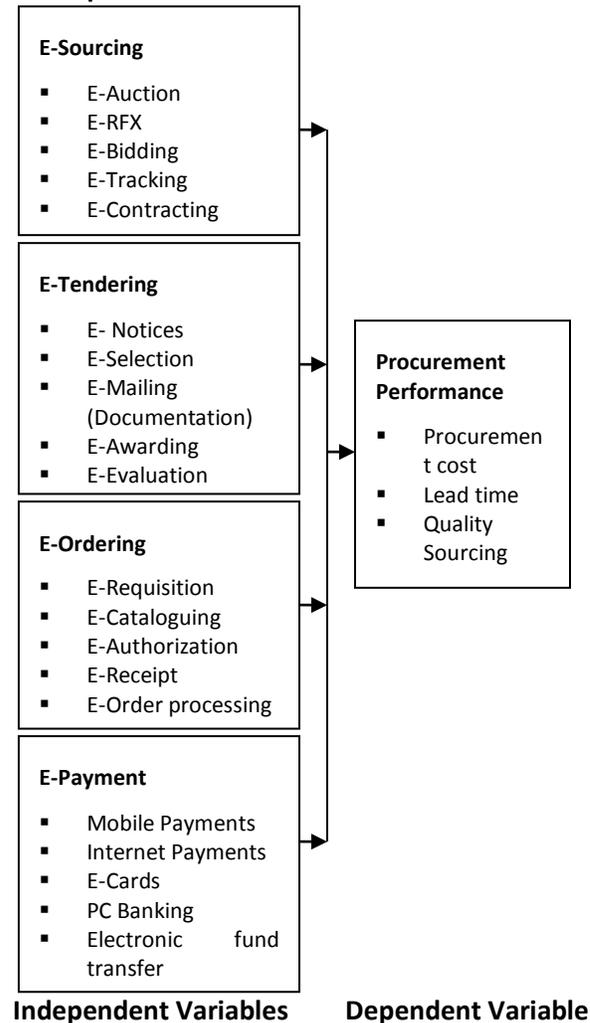
**Michael Porter’s Five Forces of Competitive Model**

The five forces competition model was introduced by Michael Porter while working on his publications in the late 70’s on the competitive strategy (Enz, 2010). The model presents a broad way into analyzing the competitive strength of a firm. The five comparative parameters include; existing competitive rivalry between firms; threat of new market entrants; bargaining power of buyers; power of suppliers; and threat of substitute products (Roy, 2009). This model has great assessment on the business transaction process where the firm is able to gauge its competitiveness and aptly adjust its capacities to stay abreast with other industry players. The bargaining power of buyers is the potential with which buyers will bargain down the prices charged by firms or the power by which they will demand better quality and service of products (Hill & Jones, 2010). When the buyers have a strong bargaining power, they will be few in number. Since they have a high purchasing power, they will purchase in large (bulk) quantities. They are well informed about the product and the market; the cost of switching to a competitor’s product is low; when the product is not differentiated; or when the shipping cost is low. In this way, buyers are identified as a threat to the firm.

The supply chain is influenced by the transaction between two parties after a successful tendering process. The supplier is selected on the merits of ability to deliver on the tender as floated by the organization. The five forces model is supported in the supply chain process among the players who participate in the tendering process. Only the strongest will be selected and this is determined by numerous parameters of key being the pricing and

quality (Roy, 2009). The firms which have perfected the utilization of electronic platforms will be much stronger in terms of probability of selection in the supply chain (Hill & Jones, 2010). The strongest would have an efficient digital platform which makes it possible to carry out operations such as e-payments. The tendering organization will have much easier time in conducting the supply chain process once they select a supplier who replicates the strengths in utilization technological platforms.

**Conceptual Framework**



**Figure 1: Conceptual Framework**

**E-Sourcing**

E-Sourcing commonly refers to the electronic purchase procedures implemented through

different types of web-based tools. Electronic sourcing systems are used to for example to standardize and automate purchasing processes (Gunasekaran, McGaughey, Ngai & Rai, 2009). E-Sourcing refers to internet-enabled applications and decision support tools that facilitate interactions between buyers and sellers through the use of online negotiations, online auctions, reverse auctions and similar tools (Engelbrecht, Wiggans & Katok, 2008). For the purpose of this study e-sourcing is defined as the purchasing process where internet applications are used to execute operations such as; e-auction, E-RFX, E-Bidding, E-Tracking, and E-Business and through which buyers are able to prequalify suppliers (Pressuti, 2013).

Lewis (2014) conducted a study on essentials of e-Sourcing: A Practical Guide for Managing the RFX Process in an “E” Environment. The study revealed that e-sourcing can be used as a tool to reduce process time, generate sourcing savings and to drive incremental revenues. He further found out that implementation of e-sourcing starts with selection of an e-tool (E-auction, e-tracking, e-bidding, e-RFX) to complement an organizational strengths, followed by change management and training of the staff and other stakeholders where possible. Similarly, Vaidya and Callender (2006) conducted a study on the critical factors that influence successful e-procurement practices in the public sector and identified that e-bidding, e-auction, E-RFX and e-business majorly assists an organization in end user uptake, supplier adoption, system integration, security and authentication, re-engineering process, performance measurement, top management performance, change management program and communication systems as the critical factors that determine the success of implementation of e-procurement.

## **E-Tendering**

According to Fasli, (2007) e-tendering is a process of carrying out the entire procurement cycle on internet including submission of price bid such that efficiency, economy, speed of the internet can be harnessed. E-tendering is a process of transmitting requests electronically by use of internet to execute procurement operations (Fasli, 2007). In this study e-tendering is taken to include; e-notices, e-selection, e-mailing and e-awarding to request for information (RFI’s) and response for prices (RFP’s) to suppliers and receiving back their feedback (Davilla & Gupta, 2012).

A research conducted by United Nations in 2011 on E-Tendering: Towards Transparency and Efficiency in Public Service Delivery revealed that e-tendering enabled federal government save over six million dollars by outsourcing the manual duplication and distribution documents. The study showed that e-notices, e-selection and e-awarding were key determinant in implementation of e-procurement success in the procurement operations. For this system to succeed there is need for regulations and policies if the system is to succeed. The study also noted that a number of e-procurement programs needed to be enhanced through improved technology and pro-active leadership. Other factors that where to be provided were to include: awareness, coordination of functions and effective implementation programs. Berlin (2006) in his study on The Impact of E-Procurement on the Number of Suppliers: Where to Move to reported that a lot of empirical literature already exists confirming that e-tendering leads to increased number of suppliers. This study also revealed that different organizations adopt different online strategies such as e-tendering through e-selection, e-mailing, e-awarding for their procurement functions.

## **E-Ordering**

Raghavan and Prabhu (2014) defined e-ordering as “the formal electronic request of goods and services including all processes from the identification of a need to purchase of products, to the payment for these purchases, including post-contract/payment activities such as contract management, supplier management and development”. E-ordering in this study is defined as the process of creating and approving purchasing requisitions, placing purchase orders as well as receiving goods and services ordered using internet based platform to execute electronic commands such as, e-requisitions, e-cataloguing, e-authorization, e-receipt, and e-inspection (Ghazaly, 2010).

E- Ordering is driven by automated procurement process, integrating the functional processes and purchase management (Son & Benbasat 2007). The emergence of Web-based e-procurement; e-requisitions, e-cataloguing, e-authorization, e-receipt, and e-inspection is expected to reduce the order fulfillment cycle time, lower the inventory levels, reduce the administrative cost of procurement, cost of procurement, and enhance the order fulfillment and performance of suppliers (Subramaniam & Shaw 2009). The benefits of e-procurement have been verified by many leading companies worldwide and e-ordering is a significant tactic in most companies’ e-requisitions, e-cataloguing, e-authorization, e-receipt, and e-inspection strategies (Croom, 2010). The consensus is that e-procurement benefits organizations with respect to procurement cost and process efficiency associated with procurement activities (Choudhury & Hartzel, 2008). This is because web-based e-procurement solutions can support procurement performance in organizations (Croom, 2010).

## **E-Payments**

Dennis (2009) defines e-payment system as a form of financial commitment that involves the buyer

and the seller facilitated via the use of electronic communications. E-payment is a monetary transaction between the buyer and seller by use of electronic platform to perform transactions including mobile payments, internet payments, e-cards, PC Banking and E-cash in the supply chain (Malhotra & Galletta, 2013).

Chan et al, (2007) e-cash enables payment over the internet in much more transparent and efficient manner, therefore there is security and audit trail. According to Jupiter Media Matrix Research Survey, consumers would prefer to use e-payment systems which are more convenient to them, such as e-cash, mobile payment, internet payment, debit cards and e-chequing. Only 50 % of consumers outside the US use credit cards for online purchase (Landon & Traver, 2009). According to the “Banking on the Internet Report”, Australia has a strong platform for e-payment growth, with 37.7 per cent of the population willing to engage in online payment. In Europe (especially in UK) and other countries of developed world like Canada, New Zealand, and in some of the Asian Developing Countries like China. Thailand, Japan and Singapore, smart cards based electronic payment system is popular. Most of the developing countries like India rely much more on electronic funds transfer and smart cards based electronic payment system (Sumanjeet, 2009).

## **Procurement performance**

Procurement 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 goals (Van Weele, 2016). Procurement performance is the outcome realized in customer satisfaction and cost saving on the supply chain by the use of electronic procurement process to automate functions including; e-sourcing, e-tendering, e-ordering and e-payments (Chesang, 2013; Uddin, 2015; Muraya, 2016). E-

procurement systems help in cutting down numerous operational costs and also contributing to customer satisfaction through enhancing organization-supplier relations.

According to Shakir *et al* (2007), every part of an organization procurement performance contributes to external customer satisfaction and reduction in cost by satisfying its own internal customers. This entails that whatever the effects on procurement performance brought about by e-procurement such as customer satisfaction and cost reduction on procurement department will inevitably affect other departments because they rely on procurement to bring in materials at the right time, price, and quality and from the right source which are used to produce goods for the end customer. (Olhager & Selldin, 2011).

## **Empirical Review**

### **E-sourcing**

E-Sourcing tools are used to manage the flow of different types of documents for example by either automating the document creation process or electronically transmitting documents to the suppliers. (Monczka et al. 2015) Furthermore, B2B e-sourcing systems such as e-RFXs, e-Auctions and market exchanges aim to automate workflows and leverage organizational spending power. (Davila, Gupta & Palmer, 2013) e-sourcing tools can be buy-side applications of B2B e-business. E-Sourcing system is an online trading and processing platform to support electronic acquisition of product and materials, plant and equipment, labor and services (Pop Sitar 2011).

Hashim , Said & Idris (2013) investigated resource and capabilities affecting e-sourcing value in Malaysian construction firms. This study took resource base view (RBV) as well as capabilities based on framework of technology- organization-environment (TOE). RBV theory explained

technological, organization resource and capabilities with competitive advantages. The study found that two factors which are very important in e-procurement value in the construction sector in Malaysia were Information Technology competencies and the trading partner relationship.

Kamotho (2014) conducted a study in Kenya to examine the role of e-sourcing and procurement performance among the state corporations in Kenya. 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. Findings indicated that a strong positive relationship between e-sourcing and performance.

### **E-tendering**

E-tendering is the dissemination and receipt of tender information indication of interest in tendering and receipt of tender digitally relying on technological interconnected network (Oyediran & Akintola, 2011). Tendering is one of vital procurement components where technology use can enhance its effectiveness. E-tendering enables the procurement professionals to take control over the elements of tendering ensuring improved and secure access to tender information (Davila & Gupta, 2012; Henriksen et al., 2014). These tendering components which are executed within the digital platform include; e-notices, e-selection, e-mailing and e-awarding. Electronic procurement has been labeled as a tool that can improve competence and performance while enabling simplicity and automation (Henriksen & Mahnke, 2015). Davila and Gupta (2002) explained e-tendering as any technology that facilitates the acquisition of goods and services by a private or public organization over the internet, a view that is substantiated by Parida & Parida, (2015).

Munezero (2015) conducted a study on e-tendering and performance of public corporations in Rwanda

Revenue Authority. The research adopted a descriptive research design where the population of interest was employees of Rwanda Revenue Authority. A multivariate regression model was applied to determine the relative importance of e-tendering with respect to performance. It was established that e-tendering allows selection of a suitable contractor at a time appropriate to the circumstances and hence enhances the performance of organizations.

### **E-ordering**

Traditionally, ordering process between various parties was organized through mail, phone, fax and electronic data interchange (EDI) and more recently internet. E-ordering has evolved into the use of electronic technologies to streamline and enable the ordering activities of an organization (Hawking et al., 2014). The benefit of e-ordering has contributed great saving in bottom line procurement costs of many companies worldwide and hence technology use is a significant tactic in most companies e-business strategies. It is claimed that a company engaging in e-ordering can cut procurement cost by 8 to 15% (Ghazaly, 2010).

Lewis (2014) conducted a study on performance of the electronic procurement platforms by evaluating the effectiveness of e-ordering module. The study revealed that e-ordering can be used as a tool to reduce process time, generate ordering savings and to drive incremental revenues. He further found out that the use of e-ordering starts with selection of an e-tool to complement an organizational strengths, followed by change management and training of the staff and other stakeholders where possible. Similarly, Vaidya and Callender (2012) conducted a study on the critical factors that influence successful utilization of e-ordering in the public sector and identified end user uptake and training, supplier system integration, security and authentication, re-engineering process, performance measurement,

top management performance, change management program and communication systems as the critical factors that determine the success of utilization of e-procurement platforms.

### **E-payment**

Electronic payments has been a revered topic of discussion among numerous scholars in field of management and ICT for the past two decades, which has seen numerous perspectives of e-payments pitched on different contexts (Kabir et al., 2015). Subsequently, with the introduction of e-payment system, the world payment system turned out to align with the current trend of cashless transactions among individuals, businesses and governments (Odi & Richard, 2013). As a result of this, the world payments system is gradually changing from coins and paper based money to electronic forms that provide more convenient, fast and secured process of making payments among individual and organizations (Premchand & Choudhry, 2015). E-Payments component of e-procurement, from an economic stand point, enhances efficiency through transaction cost savings and reduced direct procurement costs (Davila and Gupta, 2012; Henriksen & Mahnke, 2015).

Vaidya, Sajeev & Callender (2014) conducted a study on Critical Factors central to the realization of optimal use of e-payment utilization success in the Public Sector. They found out that despite the efforts put by the governments through reforms towards the use of e-procurement, utilization of e-payment still remains a major challenge for many procurement functions. The findings further revealed that successful e-procurement practices established systems and feedback mechanism. They associated e-payment with improved procurement performance. Findings of study done by Roma and McCue (2012) on e-procurement revealed that e-payment facilitates the bidding process which in

turn enhances transparency and accountancy especially in public procurement. The research further revealed that e-payment is associated with improved efficiency and enhanced procurement operations.

## METHODOLOGY

This study adopted a census research design. According Farooq (2013), census design is a research process that involves a complete enumeration of all data sets to be observed. The target population comprised the entire public universities in Kenya chartered by the Commission for University Education as at July 2017. The unit of analysis was the public universities whereas the unit of observation was the procurement staff. There are 31 institutions accredited as fully fledged public universities in Kenya (CUE, 2017). Multivariate Regression Analysis was used to determine the relationships and significance between independent and dependent variable. The model used the following equation;

$$Y = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$

Where,

Y = Procurement Performance

$\beta_0$  = constant (coefficient of intercept)

X1 = Electronic Sourcing

X2 = Electronic Tendering

X3 = Electronic Ordering

X4 = Electronic Payment

e = error term

## RESULTS AND DISCUSSIONS

### E-Sourcing

The first objective of the study was to assess the effects of e-sourcing on performance of procurement in Public Universities in Kenya. The respondents were asked to rate the extent of adoption of e-sourcing practices in their organizations on a scale of 1 to 5 where 1= very small extent, 2 = small extent, 3 = moderate extent, 4 = High extent, 5 = very high extent. The findings indicated that e-auction has been implemented to a very small extent as shown by majority response of 40% while those who indicated high extent were 26.7%. It also revealed that E-RFX has been implemented to a small extent as shown by 53.3% of the respondents while e-bidding has been implemented to a high extent as shown by a response rate of 66.7%. Furthermore, it was established that e-tracking has been implemented to a high extent among the public universities as shown by a response rate of 66 %. It was further revealed that e-contracting has been implemented to a small extent as shown by a response rate of 46.7%.

On average, a mean score of 3.00 indicated that e-sourcing has been adopted to a moderate extent among the public universities in Kenya. However, e-bidding and e-tracking has been adopted to a high extent while e-auction, e-RFX and e-contracting has been adopted to a small extent among public universities in Kenya. The findings are consistent with Lewis (2014) who conducted a study on essentials of e-Sourcing and established that some of the commonly practiced e-sourcing practices in the public sector are e-bidding and e-tracking.

**Table 1: E-sourcing**

E-sourcing	Very	Small	Moderate	High	Very	Mean	Std Dev
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Practices	Small Extent	Extent	Extent	Extent	High Extent		
E-auction	40.00%	20.00%	13.30%	20.00%	6.70%	2.33	1.37
E-RFX	33.30%	20.00%	13.30%	20.00%	13.30%	2.60	1.48
E-bidding	13.30%	13.30%	6.70%	46.70%	20.00%	3.47	1.33
E-tracking	0.00%	13.30%	20.00%	46.70%	20.00%	3.73	0.94
E-contracting	6.70%	40.00%	26.70%	13.30%	13.30%	2.87	1.17
<b>Average</b>						<b>3.00</b>	<b>1.26</b>

### E-tendering

The second objective of the study was to establish the influence of e-tendering on performance of procurement in Public Universities in Kenya. The respondents were asked to rate the extent of adoption of e-tendering practices in their organizations on a scale of 1 to 5 where 1= very small extent, 2 = small extent, 3 = moderate extent, 4 = High extent, 5 = very high extent. The findings revealed that e-notices, e-selection and has been adopted to a high extent as shown by a response rate of 60% across the three indicators. Furthermore, e-evaluation has been adopted to a high extent among the public universities as shown

by a response of 66.6% while e-awarding has been adopted to a small extent as shown by a response of 40%.

On average, a mean response of 3.32 revealed that e-tendering has been adopted to a moderate extent among public universities although e-notices, e-selection, e-mailing and e-evaluation has been adopted to a high extent. Only e-awarding has been adopted to a small extent. The findings are consistent with the findings of a study by Berlin (2006) which established that different organizations adopt different online strategies such as e-tendering through e-selection, e-mailing, e-awarding for their procurement functions.

**Table 2: E-tendering**

E-tendering Practices	Very Extent	Small Extent	Small Extent	Moderate Extent	High Extent	Very Extent	High Extent	Mean	Std Dev
E-notices	13.30%		20.00%	6.70%	40.00%	20.00%		3.33	1.37

E-selection	13.30%	20.00%	6.70%	40.00%	20.00%	3.33	1.37
E-mailing	6.70%	13.30%	20.00%	26.70%	33.30%	3.67	1.27
E-awarding	20.00%	20.00%	26.70%	26.70%	6.70%	2.80	1.24
E-evaluation	6.70%	20.00%	6.70%	53.30%	13.30%	3.47	1.17
<b>Average</b>						<b>3.32</b>	<b>1.28</b>

**E-ordering**

The third objective of the study was to ascertain the role of e-ordering on performance of procurement in Public Universities in Kenya. The respondents were asked to rate the extent of adoption of e-ordering practices in their organizations on a scale of 1 to 5 where 1= very small extent, 2 = small extent, 3 = moderate extent, 4 = High extent, 5 = very high extent. The findings revealed that e-requisition and e-receipting has been adopted to a small extent as shown by a response rate of 60% and 40% respectively. However, e-cataloguing, e-authorization and e-order processing has been

adopted to a high extent as shown by response rate of 73.4%, 53.3% and 66.6% respectively.

On average, a mean response rate of 3.21 revealed that e-ordering has been adopted to a moderate extent among public universities in Kenya although e-cataloguing, e-authorization and e-order processing has been adopted to a high extent while e-requisition and e-receipting has been adopted to a small extent. The findings are consistent with Subramaniam and Shaw (2009) who argued that some of the e-ordering practices that are expected to reduce transaction costs are e-requisitions, e-cataloguing, e-authorization, e-receipt, and e-inspection.

**Table 3: E-ordering**

<b>E-ordering Practices</b>	<b>Very Extent</b>	<b>Small Extent</b>	<b>Small Extent</b>	<b>Moderate Extent</b>	<b>High Extent</b>	<b>Very Extent</b>	<b>High Extent</b>	<b>Mean</b>	<b>Std Dev</b>
E-requisition	40.00%	20.00%	6.70%	26.70%	6.70%	2.40	1.43		
E-cataloguing	0.00%	13.30%	13.30%	46.70%	26.70%	3.87	0.97		
E-authorization	13.30%	20.00%	13.30%	33.30%	20.00%	3.27	1.36		

E-receipt	13.30%	26.70%	26.70%	26.70%	6.70%	2.87	1.17
E-order processing	6.70%	20.00%	6.70%	33.30%	33.30%	3.67	1.32
<b>Average</b>						<b>3.21</b>	<b>1.25</b>

**E-payment**

The fourth objective of the study was to examine the impact of e-payments on performance of procurement in Public Universities in Kenya. The respondents were asked to rate the extent of adoption of e-payment practices in their organizations on a scale of 1 to 5 where 1= very small extent, 2 = small extent, 3 = moderate extent, 4 = High extent, 5 = very high extent. It was revealed mobile payments, PC banking and electronic funds transfer have been implemented to a high extent among public universities as shown by a response rate of 46.6%, 53.3% and 66.6% respectively. On the other hand, internet payments and e-cards have been adopted to a small extent as

shown by response of 26.7% and 33.3% respectively.

On average, it was revealed that e-payment has been adopted to a moderate extent among public universities in Kenya (Mean = 3.08). However, internet payments and e-cards have been adopted to a small extent while mobile payments, PC banking and electronic funds transfer have been adopted to a high extent. The findings are consistent with Malhotra and Galletta (2013) who argued that some of the most used electronic platforms to perform payment transactions including mobile payments, internet payments, e-cards, PC Banking and E-cash in the supply chain reduce transaction costs.

**Table 4: E-Payment**

E-ordering Practices	Very Extent	Small Extent	Small Extent	Moderate Extent	High Extent	Very Extent	High Extent	Mean	Std Dev
Mobile Payments	13.30%		26.70%	13.30%	33.30%	13.30%		3.07	1.31
Internet Payments	30.00%		30.00%	13.30%	20.00%	6.70%		2.43	1.30
E-cards	20.00%		33.30%	13.30%	20.00%	13.30%		2.73	1.36
PC banking	0.00%		26.70%	20.00%	23.30%	30.00%		3.57	1.19
Electronic Funds	20.00%		0.00%	13.30%	33.30%	33.30%			

Transfer	3.60	1.48
<b>Average</b>	<b>3.08</b>	<b>1.33</b>

**Procurement Performance**

The study sought to establish the approximate time taken (Days) to successfully complete procurement of goods and services in the institutions under the study for the last 5 years. The lead time had been decreasing since the year 2015 to date. This improved trends in lead time (reduction in lead time) could be linked to the adoption of e-procurement especially after the year 2015.

The study also sought to establish whether there was quality sourcing by looking at the counterfeit goods purchased for the last five years. They were asked to indicate the frequency of return outwards (the number of times goods have been returned to the suppliers) as a result of quality issues (purchasing counterfeits goods) for the last 5 years. The findings indicate a decrease in return outwards (due to counterfeit) for the last five years from an average of 4 times to an average of 2 times. This improved trend in quality sourcing (reduction in the number of counterfeits) can be linked to the adoption of e-procurement in the public sector.

The study also sought to establish the percentage changes in procurement costs for the last 5 years. The results also revealed decreasing trends in the procurement costs from the year 2014. This

improvement, although slightly, can be attributed to the implementation of e-procurement in the public universities. Although the costs are still high at 22% thus confirming the argument by Chesang (2013) that procurement in Kenyan public universities face challenges leading to high procurement costs.

The respondents were also asked to rate statements on procurement performance in their organizations on a scale of 1 to 5 where 1= Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. The findings revealed that majority of the respondents disagreed that adoption of e-procurement has led to a reduction in procurement costs (40%), improvement in client-supplier relationship (53.3%) and enhanced transparency in procurement (46.7%). However, those who agreed that adoption of e-procurement has led to a reduction in procurement time as well as reduction in procurement of Counterfeits were 66.6% and 66.7%. The findings confirm that procurement performance in terms of reduction in procurement costs, improvement in client-supplier relationships and enhanced transparency is still low. This confirms the Auditor General Report (2014) report of poor procurement performance in the public sector.

**Table 5: Procurement Performance**

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Adoption of e-procurement has led to a reduction in procurement costs	20.00%	20.00%	26.70%	26.70%	6.70%	2.80	1.24

Adoption of e-procurement has led to a reduction in procurement time	0.00%	6.70%	26.70%	53.30%	13.30%	3.73	0.78
Adoption of e-procurement has led to an improvement in client-supplier relationship	13.30%	40.00%	20.00%	20.00%	6.70%	2.67	1.15
Adoption of e-procurement has led to a reduction in procurement of Counterfeits	0.00%	13.30%	20.00%	46.70%	20.00%	3.73	0.94
Adoption of e-procurement has enhanced transparency in procurement	6.70%	40.00%	26.70%	13.30%	13.30%	2.87	1.17
Average						3.16	1.06

### Correlation Analysis

**Table 6: Correlation Analysis**

		e-sourcing	e-tendering	e-ordering	e-payments	Procurement Performance
e-sourcing	Pearson Correlation	1				
	Sig. (2-tailed)					
e-tendering	Pearson Correlation	.445**	1			
	Sig. (2-tailed)	0.000				
e-ordering	Pearson Correlation	.359**	.523**	1		
	Sig. (2-tailed)	0.000	0.000			
e-payments	Pearson Correlation	.280**	.302**	.519**	1	
	Sig. (2-tailed)	0.000	0.000	0.000		
Procurement Performance	Pearson Correlation	.380**	.474**	.413**	.336**	1
	Sig. (2-tailed)	0.000	0.000	0.000	0.000	
	N	30	30	30	30	30

\*\* Correlation is significant at the 0.01 level (2-tailed).

The findings indicated that adoption of e-sourcing positively and significantly affects procurement performance among public universities in Kenya (Pearson coefficient = 0.380, Sig = 0.000). This implied that an increase in adoption of E-auction, E-RFX, E-bidding, E-tracking and E-contracting leads to a positive and significant improvement in procurement performance among public universities. The findings were consistent with Kamotho (2014) who conducted a study in Kenya to examine the role of e-sourcing and procurement performance among the state corporations in Kenya and established a strong positive relationship between e-sourcing and performance.

It was also established that adoption of e-tendering positively and significantly affects procurement performance among public universities in Kenya (Pearson coefficient = 0.474, Sig = 0.000). This implies that an increase in adoption of E-notices, E-selection, E-mailing, E-awarding and E-evaluation leads to a positive and significant improvement in procurement performance among public universities. The findings are consistent with Munezero (2015) who conducted a study on e-tendering and performance of public corporations in Rwanda Revenue Authority and established that e-tendering allows selection of a suitable contractor at a time appropriate to the circumstances and hence enhances the performance of organizations.

It was also established that adoption of e-ordering positively and significantly affects procurement performance among public universities in Kenya (Pearson coefficient = 0.413, Sig = 0.000). This implies that an increase in adoption of E-requisition, E-cataloguing, E-authorization, E-receipt and E-

order processing leads to a positive and significant improvement in procurement performance among public universities. The findings are consistent with the findings of a study by Lewis (2014) which focused on performance of the electronic procurement platforms by evaluating the effectiveness of e-ordering module and revealed that e-ordering can be used as a tool to reduce process time, generate ordering savings and to drive incremental revenues.

The correlation findings also showed that adoption of e-payments positively and significantly affects procurement performance among public universities in Kenya (Pearson coefficient = 0.336, Sig = 0.000). This implies that an increase in adoption of Mobile Payments, Internet Payments, E-cards, PC banking and Electronic Funds Transfer leads to a positive and significant improvement in procurement performance among public universities. The findings of the study are consistent with the findings of a study conducted by Vaidya, Sajeev & Callender (2014) on Critical Factors central to the realization of optimal use of e-payment utilization success in the Public Sector and associated e-payment with improved procurement performance.

### Regression Analysis

The study used a multivariate ordinary least square regression model of the following form.

$Y = \beta_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4$  Where; Y = Procurement Performance,  $\beta_0$  = constant (coefficient of intercept), X1 = Electronic Sourcing, X2 = Electronic Tendering, X3 = Electronic Ordering and X4 = Electronic Payment. The findings in Table 7 indicated the model summary.

**Table 7: Model Summary**

R	R Square	Adjusted R Square	Std. Error of the Estimate
.775	0.601	0.584	0.672829

The regression results show that R was 0.775 which shows that the correlation between the joint predictor variables (Electronic Sourcing, Electronic Tendering, Electronic Ordering and Electronic Payment) and dependent variable (procurement performance) is positive. The coefficient of determination ( $R^2$ ) explains the percentage of variation in the dependent variable (procurement performance) that is explained by e-procurement that is Electronic Sourcing, Electronic Tendering, Electronic Ordering and Electronic Payment. The coefficient of determination was 0.601.

This means that the combined effect of e-procurement that is Electronic Sourcing, Electronic

**Table 8: Analysis of Variance (Overall Model Significance)**

	Sum of Squares	df	Mean Square	F	Sig.
Regression	22.537	4	5.634	22.409	0.000
Residual	51.291	25	0.251		
Total	73.828	29			

The findings indicated that the F value of 22.409 is significant at a significance value of 0.000 which is less than 0.05 at 5% level of significance. This shows that the overall model linking e-procurement to procurement performance among public universities was significant. This implies that the combined effect of Electronic Sourcing, Electronic Tendering, Electronic Ordering and Electronic Payment were statistically significant in explaining procurement performance among public universities in Kenya. The findings for the regression coefficients are presented in Table 9.

The findings revealed that adoption of e-sourcing positively and significantly affects procurement performance among public universities in Kenya (Beta = 0.223, Sig = 0.002). It implies that a unit increase in adoption of e-sourcing leads to a 0.223 unit improvement in procurement performance. It further implies that an increase in adoption of E-auction, E-RFX, E-bidding, E-tracking and E-

Tendering, Electronic Ordering and Electronic Payment explains 60.1% of procurement performance among public universities in Kenya. This therefore means that other factors not studied in this research contribute 39.9% of procurement performance in public universities in Kenya. This opens up an area for further study on the topic. The findings are consistent with a report by KPMG (2014) which stated that the use of e-procurement yields savings of not less than 30 percent. The regression results also presented the model summary presented in Table 8.

contracting leads to a positive and significant improvement in procurement performance among public universities. The findings are consistent with Kamotho (2014) who conducted a study in Kenya to examine the role of e-sourcing and procurement performance among the state corporations in Kenya and established a strong positive relationship between e-sourcing and performance.

It was also established that adoption of e-tendering positively and significantly affects procurement performance among public universities in Kenya (Beta = 0.249, Sig = 0.000). It implies that a unit increase in adoption of e-tendering leads to a 0.249 unit improvement in procurement performance. It further implies that an increase in adoption of E-notices, E-selection, E-mailing, E-awarding and E-evaluation leads to a positive and significant improvement in procurement performance among public universities. The findings are consistent with Henriksen and Mahnke (2015) who argued that e-

tendering can improve competence and performance while enabling simplicity and automation thus enhancing procurement performance.

The findings also showed that adoption of e-ordering positively and significantly affects procurement performance among public universities in Kenya (Beta = 0.224, Sig = 0.004). It implies that a unit increase in adoption of e-ordering leads to a 0.224 unit improvement in procurement performance.

It further implies that an increase in adoption of E-requisition, E-cataloguing, E-authorization, E-receipt and E-order processing leads to a positive and significant improvement in procurement performance among public universities. The findings are consistent with Ghazaly (2010) who argued that the benefit of e-ordering has contributed great saving in bottom line procurement costs of many organizations and that

an organization engaging in e-ordering can cut procurement cost by 8 to 15%.

In regard to e-payment, it was established that e-payment positively but not significantly affects procurement performance among public universities in Kenya (Beta = 0.028, Sig = 0.589). It implies that a unit increase in adoption of e-payment leads to a 0.028 unit insignificant improvement in procurement performance. It further implies that an increase in adoption of Mobile Payments, Internet Payments, E-cards, PC banking and Electronic Funds Transfer leads to a positive but not significant improvement in procurement performance among public universities. The findings are consistent with the argument by Davila and Gupta (2012) who argued that e-Payments component of e-procurement, from an economic stand point, enhances efficiency through transaction cost savings and reduced direct procurement costs.

**Table 9: Regression coefficients**

Predictor variables	Unstandardized		Standardized		
	B	Std. Error	Beta	t	Sig.
Constant	1.209	0.315		3.838	0.000
E-sourcing	0.223	0.071	0.208	3.141	0.002
E-tendering	0.249	0.07	0.274	3.557	0.000
E-ordering	0.224	0.077	0.201	2.909	0.004
E-payment	0.028	0.052	0.039	0.538	0.589

**Dependent Variable: Procurement Performance**

The final tested regression model of the study is as presented:

$$\text{Procurement Performance} = 1.209 + 0.249 (\text{E-tendering}) + 0.223 (\text{E-sourcing}) + 0.224 (\text{E-ordering})$$

The equation indicates that the most significant e-procurement practice is e-tendering ( $t = 3.557$ ), followed by e-sourcing ( $t = 3.141$ ) and lastly e-ordering ( $t = 2.909$ ). However, e-payment was not included in the final regression model since its effect is not significant.

## CONCLUSION AND RECOMMENDATIONS

The descriptive findings showed that e-sourcing has been adopted to a moderate extent among the public universities in Kenya. However, e-bidding and e-tracking has been adopted to a high extent while e-auction, e-RFX and e-contracting has been adopted to a small extent among public universities in Kenya.

The inferential results showed that adoption of e-sourcing positively and significantly affects procurement performance among public universities in Kenya implying that an increase in adoption of E-auction, E-RFX, E-bidding, E-tracking and E-contracting leads to a positive and significant improvement in procurement performance among public universities.

The descriptive results showed that e-tendering has been adopted to a moderate extent among public universities although e-notices, e-selection, e-mailing and e-evaluation has been adopted to a high extent. Only e-awarding has been adopted to a small extent. The inferential findings indicated that e-tendering positively and significantly affects procurement performance among public universities in Kenya implying that an increase in adoption of E-notices, E-selection, E-mailing, E-awarding and E-evaluation leads to a positive and significant improvement in procurement performance among public universities.

The descriptive findings showed that e-ordering has been adopted to a moderate extent among public universities in Kenya although e-cataloguing, e-

authorization and e-order processing has been adopted to a high extent while e-requisition and e-receipting has been adopted to a small extent.

The inferential findings showed that e-ordering positively and significantly affects procurement performance among public universities in Kenya implying that an increase in adoption of E-requisition, E-cataloguing, E-authorization, E-receipt and E-order processing leads to a positive and significant improvement in procurement performance among public universities.

The descriptive findings showed that e-payment has been adopted to a moderate extent among public universities in Kenya. However, internet payments and e-cards have been adopted to a small extent while mobile payments, PC banking and electronic funds transfer have been adopted to a high extent.

The inferential findings showed that e-payment positively but not significantly affect procurement performance among public universities in Kenya implying that an increase in adoption of Mobile Payments, Internet Payments, E-cards, PC banking and Electronic Funds Transfer leads to a positive but not significant improvement in procurement performance among public universities.

## Conclusions

The study concluded that adoption of e-sourcing practices such as E-auction, E-RFX, E-bidding, E-tracking and E-contracting leads to a positive and significant improvement in procurement performance among public universities. Furthermore, adoption of e-tendering practices such as E-notices, E-selection, E-mailing, E-awarding and E-evaluation leads to a positive and significant improvement in procurement performance among public universities.

It was further concluded that adoption of e-ordering practices such as E-requisition, E-cataloguing, E-authorization, E-receipt and E-order

processing leads to a positive and significant improvement in procurement performance among public universities. However, the study concluded that adoption of e-payment practices such as Mobile Payments, Internet Payments, E-cards, PC banking and Electronic Funds Transfer leads to a positive but not significant improvement in procurement performance among public universities.

### **Recommendations of the study**

The study recommends that since adoption of e-sourcing positively and significantly affects procurement performance among public universities in Kenya, there is a need for the public institutions to adopt the least practiced e-sourcing practices such as e-RFX and e-contracting to a great extent in order to reduce the transaction costs and speed up the procurement process.

It is also recommended that since adoption of e-tendering positively and significantly affects procurement performance among public universities in Kenya, there is a need for the public institutions to adopt the least practiced e-tendering practices such as e-awarding in order to reduce the transaction costs and speed up the procurement process.

It is also recommended that since adoption of e-ordering positively and significantly affects

procurement performance among public universities in Kenya, there is a need for the public institutions to adopt the least practiced e-ordering practices such as e-requisition and e-receipting in order to reduce the transaction costs and speed up the procurement process.

The study recommends that since adoption of e-payment practices such as internet payments and e-cards are not practiced to a great extent in the public sector, there is perhaps a need to adopt those e-payments practices to a great extent and see their effect on procurement performance so as to enhance flexibility in payment options.

### **Areas for further Research**

The study recommends future research to focus on other factors not studied in this research contributing 39.9% of procurement performance in public universities in Kenya since e-procurement contributes 60.1%. These factors can range from internal and external factors. The study also focused on public universities only. Even though the sample was considered representative enough, there is a need to widen the scope to also look at other Parastatals which represent the public sector. This is because the rules and internal governance structures of firms is different. Furthermore, other studies can focus on a different context other than the public sector. Such a context can be the private sector of the non-governmental organizations.

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