EFFECT OF E-PROCUREMENT ON SUPPLY CHAIN PERFORMANCE AS PERCIEVED BY EMPLOYEEES OF KENYA MEDICAL RESEARCH INSTITUTE, KENYA

BY

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A RESEARCH THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF A MASTERS DEGREE IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

MOI UNIVERSITY

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DECLARATION

Declaration by the Candidate

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DEDICATION

This thesis is dedicated to all my family members for their moral financial support and encouragement and finally their understanding when I was not there for them during this demanding period.

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I appreciate and acknowledge my research supervisors; Dr. Yusuf Kibet and Dr. Robert Odunga for their invaluable advice, guidance, patience and encouragement throughout the period of thesis writing. I'm indebted to my colleagues, friends, lecturers and staff of Moi University for their guidance and/or support.

I would wish to thank my family for their moral financial support and encouragement and finally their understanding when I was not there for them during this demanding period, I was robustly involved with coming up with this thesis. I would like to thank God almighty who has brought me this far and provided me with the strength and endurance, knowledge and vitality that has helped me to finally come up with this thesis. Lastly, many thanks go to all other people out there who contributed directly or indirectly towards the accomplishment of this thesis. God bless you all.

ABSTRACT

Procurement function is considered the most significant in organizational performance as well as supply chain performance. Procurement involves different firms or a specific firm through procurement department, purchasing goods and services at the right place, right time, right quality and right price for user departments. The objective of the study was to establish effect of e-Procurement on supply chain performance of Kenya Medical Research Institute. The specific objectives of the study were to; establish influence of e-tendering, e-sourcing, e-invoicing and e-payment on supply chain performance of Kenya Medical Research Institute. The study was guided by four theories; Technological Acceptance theory, Resource Based theory, Innovation Diffusion theory and Transaction Cost theory. The study used explanatory research design. The target population comprised of 126 supply chain managers and 355 users of the e-procurement systems. Stratified random sampling was used to select a sample size of 281. The study used stratified, purposive and simple random sampling to select respondents. Data was collected using questionnaires and interview schedule. Descriptive and inferential statistics was used to analyze data and presented in form of tables. Linear regression was used to test hypotheses. The study findings depicted that there was a positive significant influence of e-tendering (β=0.595), e-ordering (β=0.240), e-sourcing (β =0.334). E-invoicing (β =0.321). E-payment (β=0.295 and p value<0.05) on Supply chain performance. The study concluded that -tendering, e-sourcing, e-invoicing and e-payment had a significant influence on supply chain performance. The study recommends that Kenya medical research institute management should adopt and utilize e-tendering to streamline the process of procurement and reduce the costs involved. Findings of this study shall enable policy-makers, government, regulatory bodies and other users to model policies and programs that significantly enhance e-procurement and sustainability of supply chain performance.

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OPERATIONAL DEFINITION OF TERMS

E-ordering: Refers to creating and approving purchasing requisition, placing purchase orders and receiving goods and services using a software system

E-Invoicing: Refers to billing electronically allowing trading partners to engage and monitor transactional documents among them.

E-Payment: **Is** whereby payments are done and processed electronically

E-Procurement: This refers to use of IT to make procurement.

E-Sourcing: Is a process of identifying suppliers via internet.

E-Tendering: An internet-based process wherein the complete tendering process is done online.

Supply chain performance: It refers to supply chain's activities to meet end-customer requirements, including product availability, on-time delivery in a supply chain to deliver performance.

Supply chain: It refers to a network of individuals, organizations, resources, activities and technology involved in the creation and sale product,

ABBREVIATIONS

B2B	Business to Business
DOI	Diffusion of Innovation
G2B	Government to Business
GDP	Gross Domestic Product
ICT	Information and Communication Technologies
ICT	Information, Communication and Technologies
ITS	Information Technology
KAM	Kenya Association of Manufacturers
KNBS	Kenya National Bureau of Statistics
SCM	Supply Chain Management
SPSS	Statistical Package for Social Sciences
TAM	Technology Adoption Model
USA	United States of America

CHAPTER ONE

INTRODUCTION

1.1 Overview

This section of the study introduces the following sub-sections in the following order, background of the study, statement of the problem, research objectives, research questions, research hypotheses, and significance of the study, justification of the study, scope and limitations of the study.

1.2 Background of the Study

Procurement performance is the backbone of an organization as it contributes to competitive purchase and acquisition of quality goods to create competiveness in the market. (Migai, 2010) asserts that poor procurement performance is a major hindrance to growth of organizations it causes delivery delay, increase of defects, delivery of low-quality goods. When procurement performance is poor, both private and public sectors suffer losses due to delivery of poor-quality work materials, loss of value for money and inflated prices.

Supply chain function is a critical element in every organization. The main elements include the process and people that has to be managed in order to fulfill customer's requirements. Supply chain involves all the activities that concern the transformation of raw materials into finished goods, flow to the end user and flow of information (Nyagah & Mwangangi, 2015). Mwongela (2014) asserts that for organizations to maximize competitive advantage, they must have comprehensive visibility into supply chain performance. Supply chain performance enables firms to drive rapid change in all activities, effective supply chain mastery is important factor to achieve high performance.

Srinivasan et al. (2016) defined supply chain performance as the performance of the various processes in a supply chain function. Supply chain performance is the ability to meet end-customer needs through product availability and responsive, on-time delivery. Supply chain performance is the process of quantifying the effectiveness and efficiency to achieve excellence in operation in order to achieve a customer experience. Chirchir, Ngeno and Chepkwony (2015) assert that to manage the overall performance of a supply chains, we need to manage inventory positions, deliveries dates, and fill rates. And then, understand the effect of supply chain changes on the overall cost. To improve the supply chain performance, we need to make it more agile to react to short term changes faster.

Supply chain performance can be achieved with efficiency in flow of product, delivery performance, order fulfillment lead time, supply chain responsiveness, production flexibility, and inventory cost, better discounts that results to improved quality, cost reduction and shorter lead time (Nyagah & Mwangangi, 2015). A study by Kituzi (2016) found that e-procurement has a significant influence to suppliers and buyers. Firms benefit from shorter procurement cycles, reduced inventory levels, lower transaction costs, higher degree of transparency and increased communication between suppliers and buyers organizations. When a procurement function does not adopt electronic procurement, and or uses the procurement procedures that are traditional, it will lead poor procurement performance hence inefficiencies and wastage of cost will be high.

E-procurement is the application of electronic systems using the internet to transact purchasing duties: need identification, tendering procedure, compensation and contract management (Barngetuny & Kimutai, 2015). Electronic procurement involves

technology supporting the procuring solutions and intended to simplify business transactions within firms as well as information technology solutions supporting logistics, handling and payment platforms (Corina, 2011). It also relates to the utilization of the integrated communication structures in the performance of procurement activities and include all the stages starting from need identification, searching, exploring, ordering, concession, delivery and post procurement evaluation (Sitar, 2011).

E-procurement is the business-to-business or business-to-consumer or business-to-government purchase and sale of goods, works and or services via the Internet and other information and networking systems, such as electronic data interchange and enterprise resource planning (Yossuf *et al*., 2011). Electronic procurement framework creates a an avenue in which government agencies procure goods and or services by browsing catalogues suppliers advertise making it a one-stop Portal for public sector procurement. The main aim of the electronic procurement is to use Internet technologies to bring government agencies in the country and suppliers around the world together into a virtual trading environment. Organizational characteristics and mainly the organizational influences are significant motivators to the use of electronic -procurement (Van Weele, 2015). As it represents a significant part of electronic business in the Supply Chain Management.

There are various forms of electronic Procurement that operate on one or many stages of the procurement process such as electronic Tendering, electronic Marketplace, electronic –Auction or Reverse Auction, and electronic Catalogue or Purchasing, electronic Procurement is seen as an end-to-end solution that integrates and streamlines all the procurement processes throughout the firm. However the term end-to-end

electronic Procurement is common, the industry and academicians indicate an ideal model is rarely achieved and that electronic Procurement implementations involves a mixture of different models (Xu et al., 2015).

Electronic procurement is significant especially because its implementation overcomes many institutional hurdles. It involves new and dynamic trends that bring about efficient practice in procurement management and improves interaction between suppliers and the organization (Adero, 2014). Electronic procurement offers a lot of cost savings and ensures operational efficiency in organizations. Accountability and transparency are significant benefits of the e-procurement systems (Boudijilda & Pannetto, 2013). Electronic procurement benefits are rooted in; reduction of spending outside the contract by as technology raises awareness of the available and accessible products and services and make the process easy and seamless when placing an order. It also reduces the transaction costs by automating procedures and simplifying the regulation processes and records management.

For any organizations to achieve successful implementation of any IT-system and achieve its benefits, it requires the top management support, organizational adaptation, and training of employees enacted. Moreover, the adoption of electronic procurement by many firms in attempting to achieve the benefits of lower costs and improved efficiency, the use of electronic procurement does not guarantee positive outcomes for both buyers and suppliers (Kioko & Mwangangi, 2017). However, technology introduction has promoted global implementation of Electronic procurement. The United Nations Expert Group (2011) showed that E-procurement has become a common phenomenon in many organizations in the promotion of transparency and good governance in procurement to many developed and developing nations.

Globally, e-procurement has gained popularity especially with the advent of technology. Through the internet, organizations today can establish long term and good working relationship with buyers and the suppliers. The advancement in technology has brought about many new changes in the field of procurement (Van Weele, 2015). The rapid advancement in technology has enabled organizations to adopt electronic procurement practices. Electronic procurement has emerged therefore as a key enabler in supply chain processes (Handfield, Monczka, Giunipero & Patterson, 2019). In United States of America rapid development of e-procurement started in early 2000.

In Europe, Pateli, Mikalef, Watering and Batenburg (2013) looked at the influence of procurement practices on supply chain management performance. Their findings were that procurement alignment brought about increased performance over time. In Korea, Oh, Yang and Kim (2014) looked at how e-procurement systems on the correlate with information technology on the performance of companies in Korea. The findings were that there was a relationship between profitability and information communication technology. In Malaysia, the government requested upon the suppliers adopt the use of electronic procurement system. Awang, Kaliannan and Raman (2014) found out that Malaysian public sector was changing fast as far as the adoption of ICT technology.

Nanjundeswaraswamy Swamy and Nalini, (2014) looked at the influence of e-procurement on sourcing and ordering by different companies in diverse economic sectors in India. They found out that adoption of Electronic procurement technologies offers the businesses brought a lot of benefits especially in terms of cost saving in the sourcing and ordering processes. Twawinyinyu and Laptane (2012) carried out a study in Thailand on the impact of strategic sourcing and electronic procurement on supply chain performance management. The study results indicated that e-sourcing and e-

procurement was found not to be very effective in improving flexibility and performance while advanced technologies brought about remarkable difference.

A report by OECD (2017) of a study carried out on OECD countries indicated that by countries expanding their e-procurement systems through implementation of many functions on the technology platforms and system integration with other e-government technologies brought about many benefits when digitalizing the public procurement thus more than 29 countries advertise their tenders and announce the awards of contracts to winners through their national central electronic -procurement systems. Further to that all the tender documentations are released through the national central electronic procurement system in all those countries

The OECD report indicated further that more than half of the OECD countries, authorities in the purchasing departments at the sub central level use central e-procurement systems while at the national central e-procurement platforms in 21 countries offer electronic submission of bids, while less countries do so for e-reverse auctions (11 countries). However, only 10 OECD countries (33%), including Finland , Portugal Estonia and Korea measured efficiencies brought about by using electronic -procurement system, and focused on diverse sources of efficiency, including savings in particular of time and transaction costs. The government of Kenya introduced electronic -procurement system in 2014 with the aim of promoting openness and accountability of public funds.

According to Gopinath et al, (2016), found out in his studies that India Firms are more increasingly using e-procurement solutions to increase flexibility in procurement operations, to enhance customer satisfaction, to increase delivery, and to manage their inventory in the most effective manner. Gopinath et al (2016), further suggested that

adopting e-procurement solutions helped a lot the businesses to gain and sustain competitiveness thus brought about greater transparency and eliminated unethical practices in their procurement framework. Further, in Malaysia, many companies have adopted electronic procurement so that they can streamline their procurement operations. Tiwari et al, (2019), assert that a big number of SMEs use the electronic tendering, electronic sourcing, electronic invoicing and electronic ordering, to improve their procurement operations. These technologies enabled their businesses to effectively communicate with suppliers and customers, to check for goods prices, to confirm the availability of services and goods, and to share purchase information with all the business partners. However the rate and the level of adoption technologies is lower in comparison to that in Europe and Asia, many of the firms in Africa are striving to utilize the technologies to spur their procurement practices. In Africa, adoption of electronic procurement has become one of the most effective tools organizations use to bring about good governance, transparency and achieve improvement in the procurement operations.

While in Africa, the concept of e-procurement has started gaining popularity among firms in the public sector. To solve the challenges of lack of accountability and transparency in procurement operations in public domain, majority of the African countries have moved to legal reforms and adoption of electronic procurement. As reported by Aduwo et al, (2016), in Nigeria, many firms are now integrating e-procurement so that they can maximize the technology benefits when dealing with the purchasing of goods and services, further when dealing with in management of inventory also in improving communication between the suppliers and the consumers. This led to enhanced performance of the businesses activities in the country.

In Ghana Adams (2014) studied the importance electronic procurement in public sector, the study results were that the manual procurement practices was facing many challenges as far as the Technology, process, People, and compliance was concerned. Therefore, the developing world countries have to incorporate e-procurement systems framework in government procurement.

In South Africa, Sithole (2017) found out that many companies are increasingly using electronic procurement technologies to improve their operations. The main strategies include electronic tendering, electronic -notification, electronic contract management e-contract awarding and e-invoicing. These technologies have revolutionized the procurement practices in order to enhance the performance of their businesses.

Ruzindana and Kalaskar (2016) in his studies on the impact of e-procurement in performance of procurement sector telecommunication companies in Rwanda. The results showed a positive correlation between the adoption of e-procurement and the general procurement performance. In Tanzania, the firms adopted e-procurement systems to manage electronic advertisement, electronic submission, e-evaluation, e-contacting, e-payment, and e-communication and e-checking and monitoring manage online all their all public procurement operations (Sijaona, 2010). According to Kayungi (2013) in Tanzania, the manual procurement system was inadequate in the construction industry as there was no transparency in the management of public funds and time of the project.

Rotich and Okello (2015) in his study found out that Kenya government introduced integrated financial management information system (IFMIS) to improve governance by providing real time financial information and effectively programs. Barngetuny and Kimutai (2015) in their study on counties on the impact of e-procurement on the supply

chain performance found out that e-tendering and e-invoicing positively affected the supply chain performance. Ng'ang'a (2017) examined also the effect of e-procurement on supply chain performance and found a relationship between e-procurement and supply chain performance, but the context of the study was parastatals in Kenya.

Ndunge (2016) did a study on e-procurement and performance of government ministries in Kenya. The study found out that adoption of e-procurement practices encounter many challenges that hinder the effectiveness implementation and adoption process. Barngetuny and Kimutai (2015) did a study on the effects of e-procurement on supply chain management performance in Elgeyo Marakwet county government. The results showed that absence of an E-procurement system led to delay in payments. Ng'ang'a (2017) studied e-procurement impact on the operational performance of parastatals in the ministry of energy and petroleum and reported that all parastatals have adopted e-procurement in their operations.

Electronic procurement system in Kenya was launched by the president of the Republic of Kenya on 13th August 2014 in order to increase transparency, accountability and to enhance prudent use of public resources that results to quality services and money value. But still public procurement is still vulnerable to corruption which affects the overall performance of a firm.

Public hospitals in Kenya are least performing State institutions in terms of technology access and use. In comparison to other government bodies, public hospitals have the lowest levels of internet access, 36.7 per cent of public hospitals do not have internet access. According to the study, 11.2 per cent of public hospitals have a mobile payment account, the lack of technology in the procurement practices standing at only 20.3 per cent of the hospitals are using e-procurement platforms. The medical institutions more

vulnerable to cyber-crime with statistics results showing that 48.6 per cent of public hospitals have lost data due to virus attacks (KNBS & CA, 2017).

1.3 Statement of the Problem

Electronic procurement adoption platforms enables the organization to reduce cost of doing , access wider markets and streamline purchasing operations (Shukla, Khan & Shah, 2016). The benefits o f e-procurement vary depending on the implementation context; while the general impact when applied appropriately has been critical (Barasa, Namusonge & Okwaro, 2017). Organizations conceive e-procurement platforms to be very expensive to operate, leading to organizational change and staff training (Ruzindana & Kalaskar, 2016). E-procurement process is associated with scandals and challenge of transparency mainly by mishandling of e-procurement information, dishonesty, lack of standard checks and controls and the deliberate inflation of figures which lead to excess corruption (Barngetuny & Kimutai, 2015).

The use of manual procurement to buy goods, services or works at the right time, price, place, quantity and quality for the use of all the department is a challenge firms undergo. Due to lack of efficiency and effectiveness of procurement process, the government lose many millions of shillings through fraud in procurement activities. Parastatal's operations are more inefficient and non-profitable, due to objectives collusion, stifled private sector initiatives and failure of joint ventures forcing the government to absorb major procurement burdens (Bilali & Bwisa, 2015).

Oliech and Mwangangi (2019) in there study of strategic procurement management on performance of level five hospitals in Kenya, results show that e-procurement led to improved customer satisfaction as employee performance contribution through e-procurement performance was higher.

Songok (2018) study on e- procurement and performance of public universities in Kenya, found that universities experience challenges of resistance to change, high costs of implementation and costs of training staff to be very high in electronic procurement.

Osir (2016) study looked at the e-procurement adoption on procurement performance in State Corporation, and the results showed that electronic bidding to tenders, increases the performance of procurement. The study summarized that e-procurement was adapted moderately by state corporations. While many state corporations are still using manual procurement methods. A few studies have been undertaken in e-procurement practices and supply chain performance, am not aware of any in the context of Kenya Medical Research Institute thus the need of carrying out this study. It's from this background that this study sought to cover the research gap by establishing the influence of e-procurement on supply chain performance of Kenya Medical Research Institute.

1.4 Objectives of the Study

1.4.1 General Objective

The general objective of this study was to investigate influence of e-procurement practices on perceived supply chain performance of Kenya Medical Research Institute.

1.4.2 Specific Objectives

The specific objectives of the study were;

1. To establish influence of e-tendering on supply chain performance of Kenya Medical Research Institute.
2. To analyze influence of e-sourcing on supply chain performance of Kenya Medical Research Institute.

3. To determine influence of e-invoicing on supply chain performance of Kenya Medical Research Institute.
4. To analyze the influence of e-ordering on supply chain performance of Kenya Medical Research Institute.
5. To examine the influence of e-payment on supply chain performance of Kenya Medical Research Institute.

1.5 Research Hypotheses

H_{01}: E-sourcing has no statistically significant influence on supply chain performance of Kenya Medical Research Institute.

H_{02}: E-tendering has no statistically significant influence on supply chain performance of Kenya Medical Research Institute.

H_{03}: E-invoicing has no statistically significant influence on supply chain performance of Kenya Medical Research Institute.

H_{04}: E-ordering has no statistically significant influence on supply chain performance of Kenya Medical Research Institute.

H_{05}: E-payment has no statistically significant influence on supply chain performance of Kenya Medical Research Institute.

1.6 Significance of the Study

The study findings would benefit management of Kenya Medical Research Institute who would gain insight into how e- Procurement influence supply chain performance by coming up with appropriate practices. This study would offer an understanding on the challenges facing implementation e-procurement in Kenya Medical Research Institute that would enable them to effectively offer their services.

The findings of this study will be used by the policy makers to improve the implementation and adoption processes of e-Procurement on supply chain performance in other state corporations. It will boost, promote and enhance the introduction of sound policies, procedures and standards to guide the management of e-procurement. It will alsosteer institution managers towards understanding and adopting e-procurement best-practice and by extension minimizing corruption and maximizing value for money.

By establishing the relationship between e-procurement and supply chain performance, the findings of the study would be a key ingredient in the planning, designing and implementation of a sound public procurement system that would align itself to the overall medical field.

The study will benefit Kenya Medical Research Institute and Kenyan government, shall obtain best bidders and perform procurement process more efficiently. Buyers and suppliers from different firms too will acquire value from this study. Buyers shall be able to send request for quotations to suppliers more easily while suppliers will be able to specify prices. The findings of the study would be of importance to practice, by enhancing policy making by establishing the relationship between e-Procurement on supply chain performance of Kenya Medical Research Institute.

Finally, to supply chain and procurement academicians and researchers will form a basis for further research on academic arena. To scholars and academicians, the study was significant as it provides them with valuable information in areas of e-procurement practices as well as areas for further research.

1.7 Scope of the Study

This study investigated the influence of e-procurement practices on supply chain performance Kenya Medical Research Institute. The study looked on how independent

variable (E-procurement) relate to dependent variable (supply chain performance). The study focused on five e-procurement practices; e-tendering, e-sourcing, e-invoicing, e-ordering and e-payment. The aim of the study was to examine the influence of e-procurement practices on supply chain performance.

The study singles out management as the respondents to obtain primary data on E-procurement practices as opposed to the entire staff to avoid collection of data from those not directly involved in E-procurement application and hence may not be privy to the required information. Choices of e-procurement practices were confined to electronic tendering, electronic order processing, electronic sourcing and electronic payment practices which were to be the most relevant in the study context covering the whole supply chain.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews relevant theoretical and empirical literature on E-procurement on supply chain performance. It also attempts to establish relationship between independent and dependent variable. The chapter further develops conceptual framework, also critique's existing literature and identifies research gaps.

2.2 Supply Chain Performance Concept

Supply chain performance applies to both functional lines and company boundaries (Van Weele, 2015). Functional lines like engineering, manufacturing, and sales/marketing) are all important in designing, building, and selling products to t h e supply chain, and while the traditional company boundaries are changing companies discover new methods of achieving the overall supply chain goals. Supply chain performance measures performance for every company are treated differently (Kleijnen & Smits, 2014).

Firms decentralize procurement processes operations and centralize strategic procurement processes to achieve higher supply chain transparency which is only possible in when a firm use E-procurement systems. Kagai (2013) asserts that e-procurement system allow efficient integration of supply chains and also provides good organization and tracking of transaction records. Further findings show that e-procurement activities improves communication to the suppliers, improves transparency in the procurement process and help to monitor supplier performance enhancing mutual trust with all parties.

Sundarraj and Kumari (2013) study found out that supply chains would synchronize and coordinate all activities in the entire supply-chain network from end-customers to suppliers. Thus, chains are competitive globally when they work together in an efficient coordinated way using electronic procurement platform.

A study by Kähkönen et al. (2013) relating to of E-business effect on supply management indicated that e-business applications range from into e-commerce, e-procurement and e collaboration. E-business technology is a vital tool in supply chain management as it leads to efficient information integration between supply chain members to achieve fast automation of routine work, faster lead times, process transparency and opportunities for growth. It may bring changes to companies‟ supply management and supply processes savings in time and cost, and change in business processes and development.

Shale (2014), e-procurement software system are mainly designed to reduce the effort and time spent to complete purchasing transactions by eliminating manual process of requisitions, approvals, receiving and reconciliation of payment. The outcome also showed that procurement cost reduction strategy there was a direct relationship with e-procurement strategy and thus improving the performance of procurement. The use of e-procurement platform is to help in realizing faster and more efficient procurement processes thus reducing procurement costs.

Onsongo and Moronge (2016) asserts that supply chain performance leads to performance measurement and that it depends on the performance of the supply chain stages. Candra and Gunawan (2016), study found out that procurement of goods and services when done electronically increase transparency and accountability, improve access to markets and bring healthy competition among players leading to and higher

efficiency of the procurement practice. Also , it improves accuracy of data , increase efficiency in operations, faster applications process , reduction of operating costs, reduction of the supply cost, better customer services, and enhanced relationships with partners.

Tan and Trang (2017) study relating to implementing electronic supply chain management in enterprise, there results showed that internet and IT influence Supply chain management and , it enables sharing information easily, communication to be real time to customer and results to faster responses. Thus improved customer satisfaction, efficiency and effectiveness and market development is increased.

2.3 Concept of E-Procurement Practices

E-procurement is the purchase and sale of supplies, work and services through the internet such as Electronic Data Interchange and Enterprise Resource Planning. It may be in the form of B-2-B or B-2-C or B-2-G. It allows companies to focus on customer needs and expectations (Farzin & Nezhad, 2010). Electronic -procurement includes a process requisitioning, purchasing, transportation, warehousing and in-bound receiving process, giving solutions to buyers in to order goods directly through the website in real time. Instant literature show that organizations spend as much as 50 to 60% of total revenue on e-procurement activities (Stephens & Valverde, 2013). While using e-procurement can reduce transaction cost by 65% (Inder and Punia, 2011)

Bakar, Peszynski, Azizan and Sundram (2016), found out that E-procurement activities range from advertising tenders, submitting tenders electronically, electronic ordering, internet sourcing email communications between buyers and sellers, email communications related to contract management, and the integration of procurement Furthermore, their study asserts that E-procurement is about enhancing collaboration,

streamlining business processes, controlling costs and enhancing information exchange within organization's boundaries.

Songok (2018) indicates that E-procurement is believed to be the solution to the inefficiencies caused by the traditional purchasing methods which were costly and consuming more time. Moreover, E-procurement involves the use of software to execute and manage procurement processes and creates interfaces to enable cost and friendly execution of activities.

Ngeera (2016) cites that public procurement consider E-procurement key major reforms in the industry. Due to the many benefits it offers thus the concept is in the business environment. E-procurement benefits range from namely, cost reduction, quality improvement, increase in competitive effect, increasing transparency and time saving (Svidronova & Mikus, 2015). E-procurement take the form e-tendering, e-marketing, e-auction/ Reverse auction, e-catalogue/purchasing, e-invoicing., e-ordering etc. We have three types of procurement systems: seller electronic procurement system, Buyer e-procurement systems, and online intermediaries (Tsuma & Kanda, 2017).

E-procurement assist firms to regionalize their operational procurement processes and consolidate their procurement processes and to provide superior supply chain precision (Singh & Punia, 2011). By electronically buying goods it leads to increasing transparency accountability, market access increase and leads to healthy competition in the e-procurement system (Candra & Gunawan, 2017). The utilization of these e-procurement platforms reduce cost of purchasing and creates a platform for enhanced coordination among different suppliers, transaction time becomes fast and overall efficiency increases (Ruzindana & Kalaskar, 2016).

2.4 Theoretical Framework

The study was guided by four theories; Technological Acceptance theory, Resource Based theory, Innovation Diffusion theory and Transaction Cost theory. According to Grant and Osanloo (2014), theoretical framework is the blueprint for the entire dissertation inquiry. It serves as the guide on which to build and support your study, and also provides the structure to define how you will philosophically, epistemologically, methodologically, and analytically approach the dissertation as a whole.

2.4.1 Technology Acceptance Theory

Technology acceptance theory was advanced by Davis in the 1989. Surendran (2012) argue that TAM predicts the use and acceptance of information systems and technology by individual users. Usefulness is the degree to which the use of computers enhances someone's performance, i.e. improved performance, enhanced productivity, effectiveness and efficiency in operations (Rotich & Okello, 2015). It refers to perceived ease of use of the new systems such as ease to learn, ease to use, ease to control and ease to remember.

TAM examines the individual technology acceptance behavior in different information systems constructs. Rotich and Okello (2015) assert that information technology adoption need investment in computer-based tools to enable the support decision making and planning communication. We must understand why people resist changes in technology and get solutions. Ndiiri (2016) assert that technological advancements will not cause the effectiveness and performance within an organization when their users have not accepted change.

Osir (2016) points out that ordering process which involves tasks like: order preparation, order approval and order transmission to the supplier can be undergo the changes. He further argues that the perception of employees and suppliers on the usefulness and ease of use of e-procurement system is critical in realizing full benefits of e-procurement adoption.

ICT implementation entails reengineering the existing system within the firm and that will ultimately impact on the way tasks are conducted (Kaliannan et al., 2008). The study therefore adopted this theory to determine the influence of e-ordering on supply chain performance of Kenya Medical Research Institute.

2.4.2 Innovation Diffusion Theory

The theory was proposed by Rogers (1962) innovation is a process aimed to improve economic development. This theory is also known as diffusion of innovation theory which is defined as an idea perceived as new by individuals. Osir (2016) the theory based on perception of the characteristics of the technology, and the user's perception of the system. It categorizes adopters of innovation into five categories; Innovators, Early Adopters, Early Majority, Late Majority and laggards.

Rotich and Okello (2015), categorize the innovators to be individuals who want and willing to be the first to try the innovation, Early Adopters, people who represent opinion leaders, Early Majority individuals who need to see evidence that the innovation works before they can adopt it, Late Majority, skeptical individuals who only adopts an innovation after it has been tried by the majority and Laggards, individuals who are very skeptical of change and are the hardest group to involve in the innovation process.

First, it is determined by relative advantage given to the organization, compatibility, complexity, trial-ability of the new strategies and observability to the stakeholders within the social system. Secondly, communication that lays information and creates information sharing relating to innovative initiatives in the organization.

Osir (2016) asserts that the issues influencing the spread of a new technology include: the innovation itself, communication channels, time, and a social system. There is direct impact on e-tendering adoption success among both buyers and bidders as it requires the following: electronic advertisement of tender to the public, electronic transmission of bid documents to renderers for filling in and electronic submissions of bid documents by tenderers.

Rotich and Okello (2015) criticized innovation diffusion theory since it has got some limitation. In that it does not foster a participatory approach. This is so as it can only work best with adoption of behaviors. More so, it does not take into account organizations resources and social support in adoption of new methods. In addition, Inzofu (2016) says that innovation diffusion theory does not consider social support or individual resources. This theory is therefore important in analyzing the influence of e-tendering on supply chain performance of Kenya Medical Research Institute.

2.4.3 Resource Based Theory

This theory was advanced by Prahalad and Hamel (1990). It focuses on internal organizational capabilities of an entity which enables achievement of higher performance. It requires resources internal to the firm are source of competitive advantage. The resources are valuable in such a manner that they are rare, inimitable and difficult to substitute (Nafuna & Namusonge, 2017). A firm that uses its valuable resources should utilize opportunities to reduce the existing threats from the external

environment. This means that internal capacity of an organization means a lot. In addition, technological innovation frameworks are resources that lead to improved service delivery and performance (Nganga, 2017).

Firm's resources are beyond finances and materials and encompass the methods and processes. Ndunge (2016) cited Baily (2008), resource-based theory analyses the sources and sustainability of Information Technology. Further says that a firm optimizes use of available resources to enhance efficiency and effectiveness in procurement and hence deliver a competitive advantage in terms of improved lead times, cost efficiency and customer satisfaction.

Bartai and Kimutai (2018) leveled some critics to of resource-based theory. First, the theory defined a competitive advantage as a value-creating strategy based on resources that are among other characteristics, valuable. Secondly, the theory does not constitute a theory of the firm. Thirdly, the conditions of law like generalizations of empirical content, economic necessity and generalized conditionals are not met. Fourthly, different resource configurations can generate the same value for firms and thus would not be competitive advantage. Finally, the role of product markets is underdeveloped in the argument, limited focus on capabilities.

Resource based view is significant to the decisions of sourcing. If an organization lacks the resources and capabilities needed to perform these activities internally, they can be outsourced to external suppliers of the firm. Through sourcing, specialized knowledge is acquired which leads competitive advantage thus achieving lower cost positions. The adoption of E-procurement enhances e-sourcing in a better and transparent way. This theory will be of importance in analysis the influence of e-sourcing on supply chain performance of Kenya Medical Research Institute.

2.4.4 Transaction Cost Theory

Performing business by the use of technology reduces transaction costs in supply management (Kähkönen, Lintukangas and Virolainen, 2013). The assumptions TCT rests upon human behavior and environmental characteristics. They explain reason firms may face superior costs for market-based transactions and why firms may be relatively more efficient than markets at organizing transactions.

Chipiro (2009) quoting Williamson (1989), transaction cost theory predicts that as environmental uncertainty and speed of transactions between companies increase, vertical integration is preferred in order to reduce transaction costs. These costs include cost associated with negotiating, implementing, coordinating, monitoring, adjusting, enforcing and terminating exchange agreements. When doing procurement of goods and services, transaction cost can either increase or reduce. Wagner and Essig (2006) argues that internet inclines the transaction cost curve of markets and makes markets the cost-optimal governance structure for a wider range of specificity. Stephens and Valverde (2013) said that when e-procurement is used it reduces transaction costs.

The effort to reduce transaction costs should not be limited to reducing the effect of a single factor but the overall effects of the interdependence between factors (Grover, & Malhotra, 2003). As such, in the procurement of goods and services for Kenya Medical Research Institute, transactional cost can be reduced by automating procurement processes. During tender award in an open tendering, sourcing of suppliers and subsequent process of evaluation is normally carried out to make a decision on the winning bidder. Since one of the major objectives of ICT adoption is to enhance cost reduction by eliminating transaction cost, TCT remains the best model to be used in resolving all questions pertaining to E-Sourcing on the supply chain performance. This

theory will be used to examine the influence of e-invoicing on supply chain performance of Kenya Medical Research Institute.

2.5 E-ordering and Supply Chain Performance

E-ordering is defined as a formal electronic request for products and include all the phases from need identification, purchasing, payment for the services or goods received to after sales services including management of the contract and the suppliers (Ibem & Laryea, 2015). It is mostly utilized in the last stages of procurement process leading to savings and increased effectiveness of the e-procurement process (Singh & Punia, 2011).

E-ordering has contributed to great savings in procurement costs incurred by various firms (Munyao & Moronge, 2018). It focuses mainly on the procedure for creating and the approval of the requisitions, order placement, receipt of the services and goods ordered electronically. E-catalog is used by the staff of the organization to create an order forthe products needed urgently.

According to Wangui (2013), e-procurement on supply chain management at teachers' service commission established that departments adopted electronic requisitions to a high extent. Moreover, the study asserts a rise in online requisitions will lead to arise in the corporation's supply chain performance.

Chepkwony and Chepkwony (2017) argues that E-ordering refers to creating and approving purchasing requisition, placing purchase orders and receiving goods and services using a software system based on electronic technology and greatly improves the supply chain performance . The study found out that E-ordering has an effect on supply chain performance as it increases productivity and leads to improved customer service

A study by Oteki, Namusonge, Sakwa and Ngeno (2018) on influence of electronic order processing on supply chain performance of sugar processing firms in Kenya. The study found out that order processing starts with the purchase requisition from the customer which can be received either by faxes, phone, electronic file transfer. The study concluded that there was significant relationship between e-ordering practice and supply chain performance as it reduces paper work order processing time, thus reduced costs, and reduces human errors.

Bartai and Kimutai (2018) researched on the role of e-requisition on procurement performance of North Rift County Assemblies in Kenya. The findings suggest that e-requisition system enhanced purchase supplies by using credit card. Furthermore, online ordering has been enhanced by use of E-requisition system.

Samoei and Ndede (2018) conducted a study on adoption of e-procurement and financial performance of Ministry of Education, Science and Technology, Kenya. The study concludes that e-ordering has a significant effect on most financial performance as there was reduced ordering error and increases ability to track orders faster.

Wariga (2017) while citing Ingram (2016) asserts that e-order systems records data of orders from clients and stores the information on the database. Nevertheless, the study further reveals that e-ordering helps in keeping track of inventory and ensures fast response to customers‟ orders due to enhanced speed and reduced transmission error.

Kipkemboi and Langat (2016) in their study of e-ordering and e-informing on supply chain performance in retail outlets in Kenya. Found out that e-ordering and e-informing are main elements of e-procurement dimensions and that it increases supply chain performance. Hence need for firms to use of e-ordering and e-informing in the procurement process.

Oteki (2019) examined the influence of electronic procurement practices on supply chain performance of sugar processing firms in Kenya. He concluded that there was significant positive relationship between electronic order processing process and supply chain performance. The study therefore concluded that electronic order processing practice enhances supply chain performance.

Chepkwony and Lagat (2016) sought to determine the effect of E-ordering and E-informing on supply chain performance. The study was informed Innovation Diffusion Theory. Findings of the study was that e-ordering and e-informing were the main are elements of e-procurement dimensions and thus increases supply chain performance

2.6 E-tendering and Supply Chain Performance

E-tendering is the process of conducting the full procurement cycle on the internet including submission of price bids in a way that ensures effectiveness, economy and speedof internet is well harnessed. It is the process of electronic request transmission throughthe internet (Munyao & Moronge, 2018).

E-tendering entails the dissemination and receiving of tender data, the expressions of interest for the tender doc and lastly the awarding of the tender digitally through technologically networked platforms (Ibem & Laryea, 2015). It entails sending the requests for information (RFIs) and request for proposals (RFP) to vendors and obtaining back their responses through the electronically.

This is an e-procurement stage that entails union of e-submission and e-access phases. This particular union comes as result of electronic advertisements for calls on contract and tenders notices at phase of e-noticing. E-Informing also known as e-noticing is an e-procurement stage which involves gathering and also distributing information on purchasing both to and from internal as well as external parties via internet supported

by on-line notification systems (McConnell, 2009). This increases the effectiveness of the tendering process which leads to improved procurement performance (Gunawardhana *et al*, 2012).

Rotich, Muma, Waruguru (2015) noted that e-tendering has benefits which include; improved process efficiency, reduced overhead costs, enhanced transparency and accountability in the procurement function, reduced ordering and holding costs, reduced paperwork, improved cash flow and reduced cost associated with credit control. It was also established that e-tendering practice has enabled faster submissions of tender documents by prospective suppliers therefore shortening the tender cycle period and cost associated during tender process.

According to Wariga (2017), e-tendering means the use of web-based technology in sending invoice & purchases request to the suppliers. The supplier's feedback are received online as part of e- tendering process and all the transactions are done online by buyers and sellers and all documents are easily exchanged.

Sarker, Chowdury, and Deb (2012) reveals that appropriate tender selection ensures a smooth delivery process and eliminate several complexities during construction. The researchers proposed the need for tender evaluation system and decision support system in order to improve tender assessment process as well as finding the relative importance ranking of basic criteria of best tender which help the decision maker to evaluate the best tender more precisely. Their study further shows that the implementation of E-GP can save public money and erase political influence from bidding. The idea of a virtual bidding process could also save more than 15% of the government's procurement costs.

According to Kagai (2013) e-tendering is a process of sending RFI and RFP to suppliers and receiving their response using internet platform. E-tendering offers many benefits,

which includes; price reduction due to less paper work, postage fee less cost in sending of tender documents, faster since documents are sent electronically less effort when looking for potential suppliers (Barngetuny & Kimutai, 2015).

Research conducted by Nawi, Roslan, Salleh, Zulhumadi and Harun (2016) shows that the Malaysian government implemented online tendering and streamlined government activities to improve the quality of services. The study concludes that business communications, business process, cost reduction and cycle time, exploration of new markets and business opportunities, increase transparency in contracts,

The e-tendering had an alert system that would always remind its users concerning essential issues and functions which have been accomplished by various teams, helped to reduce human errors and to direct documents to suitable and relevant parties. Empirical gaps exist since the study was not focused on influence of e-tendering, e-payment and e-invoicing and did not focus on SMES. Contextual gap also exist as the study was not done in Kenya. Empirical gaps arise as the study was not focused on influence of e-sourcing, e-payment, and e-invoicing. Focus of the study was also on KEMRI.

Watuleke (2017) points out that electronic bid can take place using a centralized server approach and or an interconnected server approach for localized markets. In which central server displays the item to be sold, announcing the deadline for placing bids in which bidders access the server for bid placements and it is their responsibility to ensure that their bids get to the server before the deadline.

Kamotho (2014) studied e-procurement and procurement performance among state corporations. The study found out that corporations owned by state have adopted e-procurement practices to enhance their procurement performance. The study also

revealed that the procurement practices had a significant impact on procurement performance. The study further recommends that the government should put effort to ensure all remnant state corporations adopt e-procurement. This study addressed the practices not yet adopted and specifies the non-compliant procurement partner, is the buyer's side or the seller's side.

Chepkirui (2015) in her study on the effects of e-procurement on supply chain performance in state corporation in Nairobi County, the results indicated that e-tendering, e-ordering, e-informing have a significant effect on supply chain performance and e-souring have a negative significant effect on SCP.

Chegugu and Yusuf (2017) investigated the impact of e-procurement activities on performance of public hospitals within Uasin Gishu, Kenya. The study concluded that hospitals have benefited from e-procurement technologies. Through e-tendering hospitals achieved increased competitiveness in the tendering bids. Overall, this study showed that e-tendering helps the businesses in the medical field.

Gathima and Njoroge (2018) examined the effect of e-tendering on the performance of County Government of Nairobi. Results showed that E-tendering practices had positive and significant relationship with the performance of supply chain department in the sector. The study recommended the County to pay attention to adopting and implementing various aspects of e-tendering to ensure that its activities remain improved.

2.7 E-invoicing and Supply Chain Performance

According to Groznik and Manfreda (2015) an e-invoice is a document that contains mandatory elements for the goods delivered or services performed issued to the debtor or recipient in electronic form and equivalently replaces an invoice in the paper form.

The study further points out benefits associated with e-invoicing like reduced administrative task and number of errors. E-invoicing refers to the delivery of bills and related information by an enterprise to its clients using electronic communication and more so the internet. It offers lots of advantages: great cost reductions, the process is also made simple, reduced time for makingpayments, greater data security, and also lots of environmental benefits (Barasa, Namusonge & Okwaro, 2017).

To create a financially viable e-invoicing platform, corporates need to design method of creating a network of alliance partners and technology solution providers to add the necessary desirability for electronic invoicing through a financial supply chain (Barngetuny & Kimutai, 2015). The e-invoices enable the business to maintain business information throughout the supply chain and to enhance the authentication and non-repudiation of origin and receipt, confidentiality and privacy.

A study by Keifer (2011) notes there are many ways in which invoices can be exchanged between buyers and suppliers in a transaction i.e. paper invoice sent by post; invoice sent as an electronic attachment electronic invoice created from scanning a paper document using optical character recognition; electronic invoice sent as structured EDI.

Ali (2016) conducted a study on adapting e-invoicing: benefits, challenges and future strategies to overcome challenges a comparative and indicated that e-invoicing is fully automated and it is cost efficient. Furthermore, both sender and receiver are free to choose their operators to exchange digital invoices since it’s not a must for parties to choose same e-invoice operators for exchanging their digital invoices. The study further notes that e-invoicing promotes security and improved relationship with supplier.

Chegugu and Yusuf, (2017) analyzed the effect of practices on electronic procurement on performance of an organizational of public hospitals in Uasin Gishu. They reported that when using the e-invoicing, the hospitals were able to easily monitor charges from purchasers to suppliers.

Waganda (2018) performed an investigation on effects of e-procurement on performance of United Nations agencies, the study established a positive association between e-invoicing and performance of procurement. The use of e-invoices enable the agencies to reduce costs, to simplify the invoicing processes, to reduce the payment time, and to increase data security.

Chepkwony and Lagat (2016) investigated influence of technology (Electronic Data Interchange Electronic Invoicing) adoption and implementation on buyer-seller relationships. It recommended the implementation of electronic invoicing.

Electronic invoicing advantages include: automated matching vendor self-service, digital invoice capture, enhanced account reconciliation, and enhanced spend management. This investigation had empirical gaps as it did not focus on e-sourcing, e-payment, and e-tendering. This study did not also focus on KEMRI.

2.8 E-sourcing and Supply Chain Performance

E -sourcing refers to the internet-linked applications and their decision support systems enabling the associations between suppliers and buyers through online negotiations, onlineauctions, reverse auctions and other related applications (Candra & Gunawan, 2017). It entails the use of electronic purchase procedures implemented through different types of web-based tools. Its systems are used to standardize and automate purchasing procedures (Munyao & Moronge, 2018). Its 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 suppliers (Singh & Punia, 2011).

Watuleke (2017) views electronic catalogs as electronic representations of information about the products and/or services of an organization that are available for sale. Gelderman, Semeijn and Nagel (2017) indicate that purchasing professionals are motivated to use electronic reverse auction as a sourcing strategy. In addition, purchasing professionals value ERAs for the economic gains and benefits at the expense of suppliers. Reverse auctioning is a saving strategy in terms of cost and procurement time. More so, it reduces operating, selling and customer acquisition costs through an improved and expedited bidding process.

E-sourcing enables the determination of prospective vendors for a specific category of purchasing requirements using internet technologies across spatial boundaries. Key advantages of e-sourcing include: improved flexibility to make decisions and also to reducethe prices (Corina, 2011). It is mostly applied during the stage of coming up with specifications and gives the firm improved competitiveness and more savings on costs incurred (Barngetuny & Kimutai, 2015).

A study by Kamarulzamana and Mohamed (2013) on application of e-procurement technologies for selecting suppliers of agro-based SMEs in Malaysia indicated that e-catalogue is an innovative digital medium in which information about products and services may be placed within an executable file that can be distributed by email or made downloadable from a website.. E-procurement also facilitates integrating multiple supplier catalogues into a single buyer-managed view of catalogue.

Mora-Monge et al (2010) performed a study on impact of e-procurement on procurement practices and performance of various industries in USA. The e-souring

technologies enabled the businesses to reduce the costs incurred in the procurement activities, and minimize errors in the sourcing and ordering processes. Contextual gaps emerge on the need to undertake another study focusing on the impact of e-tendering, e-payment, and e-invoicing on performance. There is also need to conduct a study focusing the KEMRI. There was also a contextual gap as the study was not conducted in Kenya and hence the need for another study in Kenya.

Swamy, Nanjundeswaraswamy and Nalini, (2014) analyzed the influence of e-procurement on ordering and souring of different companies in the different economic sectors in India. From analysis, the study found that adoption of E-procurement technologies offers the businesses numerous benefits particularly cost saving the sourcing and ordering processes. The e-souring technologies have increased the procurement cycle times, has reduced unauthorized buying, and has enabled the businesses to have highly organized information. An empirical gap exists as the study did not focus on the influence of e-tendering, e-payment as well as e-invoicing.

Twawinyinyu and Laptane (2012) studied the impact of strategic sourcing and e-procurement on supply chain performance management in Thailand. The results indicated that e-sourcing and e-procurement are not effective in improving flexibility however, advanced technologies are better. In addition, increased flexibility does not lead to improved supply chain performance.

Kimutai and Ismael (2016) established the role of strategic sourcing practices on supply chain performance in state corporations, a case of Kenya electricity generating company ltd. The study says that strategic e-sourcing create value by reducing cost, streamlining processes and enabling development of new businesses. The findings indicated that e-sourcing creates efficiency.

Rotich, Muma and Micheni (2016) reveals that a well-managed sourcing process should prioritize organizational requirements, , develop cost reduction strategies and enhance long term performance, understand supply market, select the supplier best placed in satisfying organizational needs, manage relationships with suppliers of the purchasing operations. The study also indicated that exits relationship between e-sourcing and procurement performance of county governments in Kenya. It also recommends should be done every procurement cycle and that databases should be created on online suppliers in order to make them more traceable.

Oteki *et al,* (2018) analysed influence of electronic order processing on supply chain performance of sugar processing firms in Kenya, the study established a significant positive relationship between e-sourcing and the procurement performance. The study found out that the adoption of e-sourcing has enabled the businesses to create savings from supply chains, to increase the visibility of critical business information and to reduce the duration required to accomplish procurement tasks.

Ochari and Kaswira (2016) studied the effects of electronic sourcing on performance of procurement function at the county government of Nakuru. Their study revealed that the concept of e- sourcing has been adopted, but has not realized the full benefits of e-sourcing. Even though the researchers discussed the benefits of e-sourcing, the study failed to highlight on issues leading to organizations realizing the benefits of e-sourcing. This study sought to assess the issues leading successful e-sourcing.

Kimutai and Noor (2016) used a cross sectional survey to study the role of strategic e-sourcing practices on supply chain performance in state corporations in Kenya, a case of Kenya Electricity generating Company. The results showed that e-sourcing implementation have broadened in reach and deepened in scope. It can be argued that

e-sourcing eliminates the reliance few suppliers and thus, increases competitiveness which leads to better prices of works and goods.

Okubo (2014) carried out a study on e-purchasing and operational performance of commercial state corporations. The study found out that e-purchasing practices were used. The study revealed a positive relationship between e-purchasing practices and operational performance

Kimutai and Ismael (2016) sought to establish the role of strategic e-sourcing practices on supply chain performance in state corporations and thereby determine the value addition in the value chain. The study found that Organization cost reduction is important in customer service, return on investment and total cost while organization cost reduction is slightly important in impacting return on investment and speed of delivery.

2.9 E-payment and Supply Chain Performance

E -payment system is a form of financial commitment that involves the buyer and the sellers facilitated transactions through the use of electronic platforms. It is a monetary transaction that use of electronic systems to perform business transactions using platforms like mobile payments, internet payments, e-cards, PC banking and e- cash in the supply chain (Munyao & Moronge, 2018).

E-payment is the process whereby payments are made and processed electronically. According to Songip et al., (2013), e-payment enables businesses to carry out financial transactions in a quick, efficient and secure way. By speeding up payments, e-payment speed ups the procurement and ensures timely delivery of goods and services. Thus increases customer satisfaction through constant and timely supply of good and services.

E-payment gives the clients the benefits of conducting their transactions anytime and anywhere with reduced costs. Furthermore, it minimizes the distance between the participants and makes the world appear as a small village with ease of access.

Khaoya and Muchelule (2019) conducted an investigation on effects of e-procurement on performance of SMEs in Bungoma County. This investigation used descriptive research design and primary data was collected by use of structured questionnaires. Further, data was analyzed using correlation and also regression methods to determine relationship between variables. Based on the analysis carried out, the study showed a significant association between e-payment approaches used by the businesses and performance. The e-payment platforms enable the firms get timely payment for goods and to bolster the relationship between the businesses and their suppliers. Empirical gaps arise as this study did not emphasis on the influence of e-sourcing, e-tendering and e-invoicing.

Barngetuny and Kimutai (2015) performed an investigation on impacts of e-procurement on performance of management of supply chain in County of Elgeyo-Marakwet focusing on role of e-payment. Based on primary data gathered from a sample of 30 personnel in the county of Elgeyo Marakwet and 10 personnel from referral hospital Iten in the County, the study found that the e-payment system had offered a better and convenient means of making payments. This has increased the effectiveness of the supply chain and has increased information transparency. Although this study was very informative on the role of e-invoicing, empirical exist as the study did not focus on the influence of e-sourcing, e-invoicing, and e-tendering and did not also focus on KEMRI.

In another study, Chegugu and Yusuf, (2017) analyzed the impact of electronic procurement practices on performance of an organizational of public hospitals in county government of Uasin Gishu in Kenya. Descriptive research design was deployed to gather data in 5 hospitals from a sample of 367 respondents which was analyzed using both quantitative as well as qualitative techniques. It established that the adoption of e-payment had greatly helped to initiate transactions. The study revealed that e-payment enables hospitals to make prompt payments easily to suppliers. Empirical gaps arise since the survey did not focus on influence of e-tendering, e-payment, and e-invoicing.

2.10 Conceptual Framework

The conceptual framework for this study included supply chain performance which was the dependent variable and e-procurement practices consisting of e-ordering, e-tendering, e-invoicing, e-sourcing and e-payment which formed the independent variable. The conceptual framework consists of the independent variable e--ordering, e- tendering, e-invoicing, e-sourcing and e-payment while the Dependent variable is the supply chain performance comprising of Service delivery, Cost reduction, Lead Times and quality products. The conceptual framework is shown by Figure 2.1.

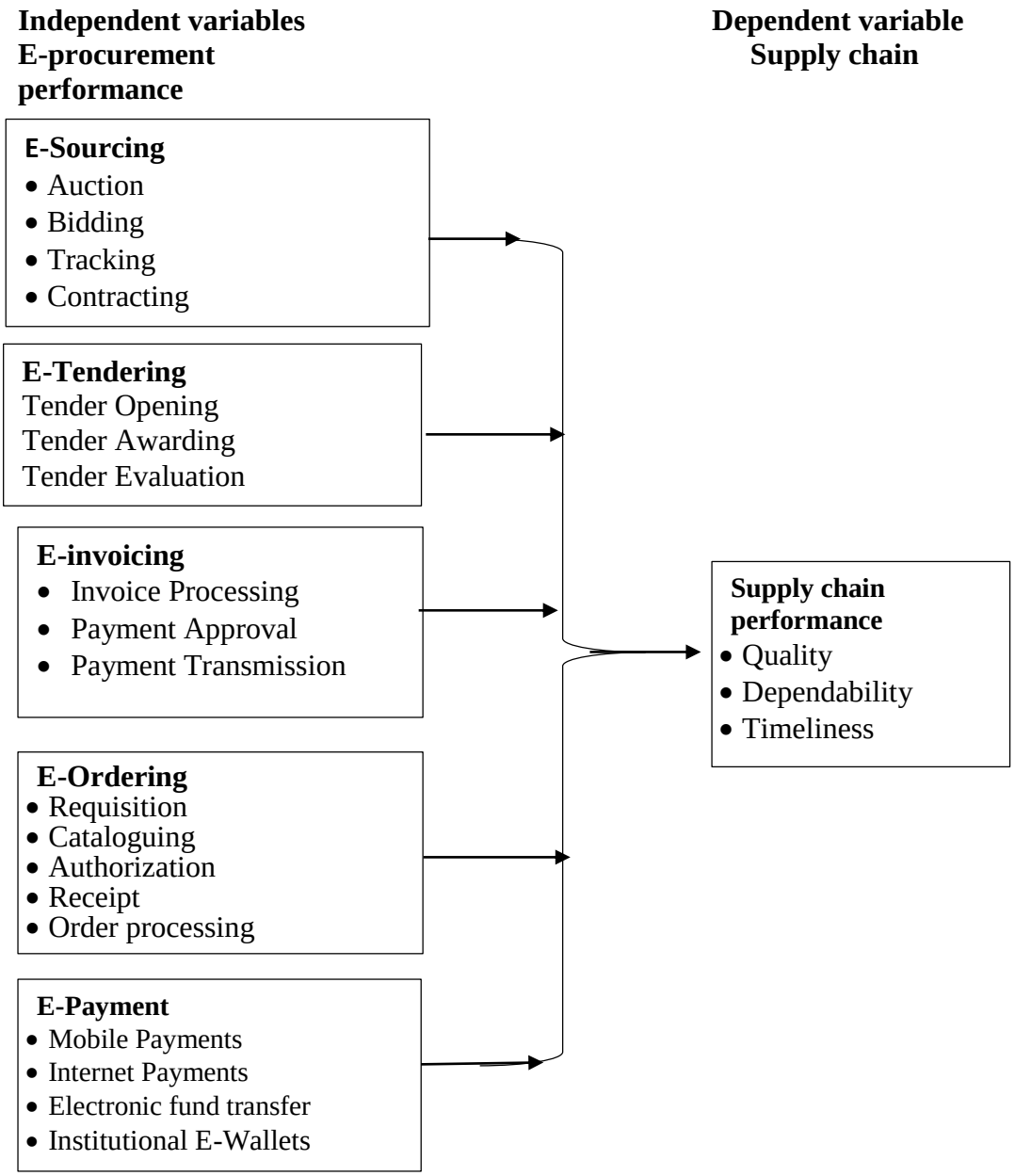

Figure 2.1 Conceptual Framework
Source: Researcher 2020

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research design, target population, description of the sample and sampling procedures, description of the data collection instruments, validity and reliability of the research instruments, data collection procedures, data analysis procedures, limitation and ethical considerations.

3.2 Research Design

This study adopted explanatory research design. The design was appropriate for the study since allowed the study to be carried out in the natural settings and researcher employed probability samples. The statistical inferences made on the broader populations and permit findings generalizations to real-life situations, (Frankfort-Nachmias & Nachmias, 2008). Explanatory research evaluated the cause-and-effect relationships that existing between two or more constructs since the study was mainly concerned with quantifying a relationship or comparing groups purposely to identify a cause-effect relationship. Zikmund, Babin, Carr & Griffin (2010) views that the major purposes of explanatory study are to examine the cause-and-effect relationships among variables, and testing hypotheses check on the and the capability of given theories in making predictions about social phenomena

3.3 Target Population

Target population of a study is a group of individuals taken from the general population who share a similar characteristic. The target population of the study was the employees working within Kenya Medical Research Institute. The respondents were suitable since they participate in the procurement process. For this study, target population comprised

of 126 supply chain managers and 355 users of the e-procurement systems as shown in Table 3.1.

Table 3.1 Target population

Category	Target population
Supply chain managers	126
Users of the e-procurement systems	355
Total	**481**

3.4 Sampling Procedure and Sample Size

Sampling involves drawing of a target population for observation. It was appropriate when it is not feasible to involve the entire population under study. The stratified sampling technique was used to categorize employees into supply chain managers and users of the e-procurement systems, each forming a stratum. According to Saunders *et al.,* (2007) stratified sampling technique also provide a better comparison across the strata. Stratified random sampling was appropriate as it enabled the researcher to represent not only the overall population but also key sub-groups of the population.

After stratification, simple random procedure was used to select 57 supply chain managers and 161 users of the e-procurement systems who participated in this research from the county hospitals. Simple random sampling was a major sampling technique because each respondent had an equal chance of inclusion in the sample. It was appropriate because the entire population is relatively large, diverse and sparsely distributed, hence random sampling technique would help to achieve the desired objective. The sampling technique gave each health worker in the population an equal probability of being in the sample.

The major issue in sampling is to determine samples represent best the population so as to allow for an accurate generalization of results. Using Yamane's sample size for

proportions (1967), at 95% confidence level, P = 0.05, the sample size was computed as hereunder:

$$\mathbf{n} = \frac{N}{1 + N(e)^2}$$

Where;

n = the sample size,

N = the population size,

ε= the acceptance sampling error

= 481/1+481 $(.05)^2$

=481/2.2025

=218.4 respondents

From the target population of 481 respondents, the researcher used proportionate sampling to select 218 respondents as summarized in Table 3.2.

Table 3.2 Sampling Size

Category	Target population	Sample size
Supply chain managers	126	57
Users of the e-procurement systems	355	161
Total	**481**	**218**

3.5 Data Collection Instruments

Primary data was collected from the respondents' using questionnaires. Primary data was collected by use of structured questionnaire that captured the various variables of the study. Questionnaires are set of questions which give answers of the research participants in a set of ways. Most questionnaires are designed to gather already structured data and so include a set of answers which the respondent can choose from, although some may include more open-ended questions which allow the respondent to answer the question in their own way; others give a provision where all the participants

are asked the same questions in the same order and using the same wording and have the same set of answers to choose from (Matthews & Ross, 2010).

According to Kothari (2008), questionnaires are usually free from the interview bias as the answers are in respondent's own words. It also allowed the participants to give their own opinion on the issue at stake (Matthews & Ross 2010).

The questionnaire was designed to address specific objectives and that it had closed-ended questions. The researcher administered the questionnaire individually to the supply chain managers and users of the e-procurement systems working in the Kenya Medical Research Institute. The closed ended items gave precise information which minimize information bias and facilitate data analysis. The responses to the items were made using a 5-point Likert scales, ranging from 'strongly agree' to 'strongly disagree'. A Likert scale is selected as the appropriate measurement scale, seeing that the purpose is to gain an understanding of the influence of E-procurement practices on supply chain performance. Unless otherwise stated, all variables were measured on a 5-point Likert scales ranging from 5= strongly agree to 1= strongly disagree. A Likert scale is an appropriate measurement scale to measure cognitively, affectively and behaviorally based attitudes (Cooper & Schindler, 2006) such as beliefs about electronic procurement and supply chain performance.

3.6 Reliability and Validity of the instruments

A pilot study was carried out in Kenya Medical Training College because it has similar characteristics to those institute under the study. A pilot study was conducted among 22 employees. The purpose of the pilot was to establish the validity and reliability of the instruments.

3.6.1 Validity

Validity is the extent to which a construct measures what it is supposed to measure (Zikmund *et al.,* 2010). The validity ensures that the instrument measures what it is intended to measure. Therefore, validity test falls into four forms, face validity; content validity; criterion validity; and construct validity. The face validity refers to an expert's evaluation of research instrument, particularly relating to language usage. Face validity was established in this research through pilot study.

Construct validity refers to how well a research instrument measures what is supposed to measure (Heale and Twycross, 2015). It measured how statistically meaningful the items are in measuring a construct. This form of validity was established through the statistical measurements in this research.

The content validity involves the extent to which the research instrument captures all aspects to be measured by the construct (Heale and Twycross, 2015). To determine content validity of the instrument, the researcher sought suggestions from a panel of lecturers at the School of Business and Economics at Moi University. The study established the content and face validity to assess the accuracy, meaningfulness, appeal and appearance of the data collection instruments.

The expert opinion in this case was the supervisors who assessed the data collection tools. They reviewed and analyzed the contents of the questionnaire to ascertain if the instruments were suitable for the purpose for which they are set. Their suggestions and comments were used as a basis to modify the research items and make them adaptable to the study.

3.6.2 Reliability

Reliability means the statistical consistency of a measure of a particular construct (Heale and Twycross, 2015). The instrument was administered in a consistent fashion to enhance reliability. After obtaining the information it was coded into the statistical package for social scientist and the reliability analysis done using Cronbach's Coefficient Alpha. Cronbach's Alpha Coefficient was computed for each item to determine the reliability of the research instrument.

The results indicated that supply chain performance was (.877), e-tendering (.836), e-ordering (.829), e-sourcing (.703), e-invoicing (.726), e-payment (.711) and overall Cronbach's Coefficient Alpha was 0.886. A reliability Cronbach's Coefficient Alpha of 0.7 or over was assumed to reflect the internal reliability of the instruments (Fraenkel & Wallen, 2000).

This is because likert type questions used for reliability testing using Cronbach's Coefficient Alpha (Neuman, 2000). The questionnaires deemed reliable after many typographical errors and omissions detected was corrected in the instrument.

3.7 Data Collection Procedures

The researcher obtained an introductory letter from Moi University, which assisted in conducting the research. After obtaining an introductory letter the researcher sought a research permit from the National Commission for Science and Technology Innovation (NACOSTI). Permission to collect data was obtained from the Kenya Medical Research Institute. The researcher embarked on pilot study, to determine the reliability and validity of the research instruments. After completion of the pilot study the researcher then embarked on administering questionnaires and interview schedule for the main study. The questionnaires were then administered to the selected respondents at Kenya

Medical Research Institute.

3.8 Measurement of Variables

The variables to be measured included the dependent variable; supply chain performance and independent variables; e-tendering, e-ordering, e-sourcing, e-invoicing and e-payment A five-point Likert scale was used in this study to measure all variables (where 1= strongly disagree and 5= strongly agree). A five-point Likert scale was used in this study to measure supply chain performance using 12 indicators. An independent variable is a variable that is expected to influence the dependent variable in some way. A five-point Likert scale was used to measure e-tendering and e-payment each had 10 indicators, e-sourcing using 8 statements and e-ordering and e-invoicing using 9 statements each.

3.9 Data Analysis

After all data has been collected, the researcher conducted data cleaning, which involved identification of incomplete or inaccurate responses and correct to improve the quality of the responses. Quantitative techniques such as descriptive statistics and inferential statistics were used to understand relationships between different variables. Descriptive statistics consisted of mean, and standard error. Inferential statistics consisted of Pearson product moment correlation, linear and multiple regression analysis. Data was subjected to correlation and regression analysis with the aid of statistical Package for social sciences (SPSS V26).

Data was presented by use of tables. Linear regression analysis was used to test the Hypotheses H_{O1} H_{O2}, $H_{O3,}$ H_{O4} and H_{O5}. To test the five hypotheses proposed, several models was derived so as to facilitate testing.

The Multiple regression model assumed the following form:

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4X4 + \beta 5X5 + \varepsilon$ ……Equation 3.1

Where:

Y = dependent variable (Supply chain performance)

$\beta 0, \beta 1\ \beta 2\ \beta 3\ \beta 4\ \beta 5$= constants

$X1$ = independent variable (E-sourcing)

$X2$ = independent variable (E-invoicing)

$X3$ = independent variable (E-tendering)

$X4$ = independent variable (E-payment)

$X5$ = independent variable (E –ordering)

ε=error term

3.9.1 Assumptions of Multiple Regression

The assumptions of multiple regression identified as of primary concern in the research included; linearity, homoscedasticity, normality, and collinearity. Normality assumption is based on the shape of normal distribution and gives the researcher knowledge about what values to expect (Keith, 2006). The researcher tested this assumption using visual inspection of data plots, skewness, kurtosis, and Q-Q plots (Osborne & Waters, 2002). Normality was further checked through histograms of the standardized residuals.

Residual plots showing the standardized residuals and the predicted values were used to establish linearity. The assumption of homoscedasticity refers to equal variance of errors across all levels of the independent variables (Osborne & Waters, 2002). This means that the study assumed that errors are spread out consistently between the

variables (Keith, 2006). Homoscedasticity was checked using the standardized residual scatter plot.

Multicollinearity occurs when many independent variables correlate at high levels with each other or when one independent variable is a near linear combination to the other independent variables (Keith, 2006). Statistical software packages such as SPSS include collinearity diagnostics that measure the extent to which each variable is independent of other independent variables. Tolerance and Variance Influence Factor (VIF) statistics was used to carry out the diagnosis (Keith, 2006).

3.10 Ethical Considerations

The researcher explained to the respondent the purpose of the study and all the respondents were assured of the confidentiality of the information they give. The researcher assured them that their names will not be revealed. The respondents were assured of feedback from the researcher if they need it after the study. The respondent's informed consent was obtained before the commencement of the study. The participation of respondents was voluntary and no benefits attached.

3.11 Limitation of the Study

The study was based on a self-reported questionnaire and therefore there was a possibility of respondents answering questions in a way that is perceived to be desirable to them than the actual reality. To alleviate this, researcher assured respondents involved that data and information given was to be utilized strictly for educational purposes and that their identity is kept confidential.

The organizational confidential policy restricted most of the respondents from answering some of the questionnaires. It was considered to be against the organization confidentiality policy to expose the organization confidential matters. This was solved

by assuring the respondent of utmost confidentiality and disclosing the academic purpose and intention of the study. The introduction letter obtained from the university and the Ministry to the institution management to avoid suspicion and enabled most institutions to disclose much of the information sought by the study.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter highlights the data analysis, presentation and interpretation of the findings on the influence of e-procurement practices on supply chain performance of Kenya Medical Research Institute. This section presents the findings in terms of demographic characteristics of the study sample, reliability and validity results, descriptive analysis of independent and dependent variables, inferential analysis, interpretation of the results and discussions thereof. The findings are presented in the following order; the response rate and the demographic characteristics of the respondents, the descriptive statistics, reliability tests, factor analysis, correlation analysis, regression analysis, assumptions of multiple regression and multiple regression analysis.

4.2 Response Rate

The researcher issued 222 questionnaires to the respondents out of which 201 respondents returned their questionnaires fully filled. This represented a response rate of 90.5% as summarized in Table 4.1. This was considered sufficient for analysis as noted by Babbie (2015) response rate should be over 70% is adequate,

Table 4.1: Response Rate

	Frequency	Response rate (%)
Responded	201	90.5
Did not respond	21	8.5
Total	**222**	**100.0**

4.3 Background information of Respondents

The background features of employees were assessed in terms of gender, age, level of education, professional qualification and their working experience.

4.3.1 Respondents gender

Results of the gender study of respondents as seen in Table 4.2 indicate that the survey consisted of more female 103(51.2%) than male 98(48.88%). There were more female staff employed in the institute and reflected a fair proportion of the diversity of gender among respondents.

Table 4.2: Gender of Respondent

	Frequency	Percent	Cumulative Percent
Male	98	48.8	48.8
Female	103	51.2	100.0
Total	201	100.0	

4.3.2 Age of Respondents

Results of the descriptive analysis of employees' age distribution are presented in Table 4.3 revealed that 69(34.3%) are in the age bracket 21-30 years, with 67(33.3%) had between 31 and 40 years age bracket, while 46(22.9%) had between 41 and 50 years and 9.5% were aged more than 51 years. This result implies that majority of the employees in management at institute were 31 years and above and capable of giving information that is useful to this study based on their extensive work experience.

Table 4.3 Age of Respondents

	Frequency	Percent	Cumulative Percent
21-30 years	69	34.3	34.3
31-40 years	67	33.3	67.7
41-50 years	46	22.9	90.5
>51 years	19	9.5	100.0
Total	201	100.0	

4.3.3 Level of Education

The study sought to establish the highest level of education for different respondents and the results were summarized in Table 4.4. The majority of respondents had

university education 139(69.2 percent) and a minority had college diploma. This means that the respondents had adequate level of education that allowed them to provide training and manage the institute. This implies that the respondents were learned enough to read and comprehend the questions, the purpose of the study and give reliable and precise information.

Table 4.4 Level of Education

	Frequency	Percent	Cumulative Percent
University	139	69.2	69.2
College	62	30.8	100.0
Total	201	100.0	

4.3.4 Professional Qualifications

The research tried to assess the professional qualification of different respondents, and Table 4.5 outlined the results. In the study, 106(52.7 percent) had a diploma qualification, with 50(24.9 percent) holding a university degree, 34(16.9 percent) had a higher diploma and at least 11(5.5 percent) with credential certificates. This suggests that in order to respond to the respondents had adequate professional qualification.

Table 4.5 Professional qualifications

	Frequency	Percent	Cumulative Percent
Certificate	11	5.5	5.5
Diploma	106	52.7	58.2
Higher diploma	34	16.9	75.1
Degree	50	24.9	100.0
Total	201	100.0	

4.3.5 Experience working with the institute

The research aimed to determine the employees' working experience. It was shown from the results in Table 4.6 that 79(39.3 percent) of the respondents had less than five years of working experience, 46(22.9 percent) were workers with 5 to 10 years of

experience, while 34(16.9 percent) had 15 to 20 years and 42(20.9 percent) had more than 20 years. This is an indicator that the obtained data were from Experience employee working with the institute.

Table 4.6 Experience working with the institute

	Frequency	Percent	Cumulative Percent
0-5 years	79	39.3	39.3
5-10 years	46	22.9	62.2
15-20 years	34	16.9	79.1
>20 years	42	20.9	100.0
Total	201	100.0	

4.4 Descriptive Analysis

The respondent was asked to show to what degree they agree or disagree on influence of e-procurement practices on supply chain performance of Kenya Medical Research Institute. The study used a 5-likert scale to accomplish the study goals, where 1= Strongly Disagree (SD), 2= Disagree (D), 3= Neutral (N), 4= Agree (A), 5= Strongly Agree (A), 5= Strongly Agree (SA). Therefore, as the scale varied from 1 to 5, the mean score given was driven by the following: 1-5, where 1-1.4 Strongly Disagree (SD), 1.5-2.4 Disagree (D), 2.5-3.4 Neutral (N), 3.5-4.4 Agree (A), 4.5-5 Strongly Agree (A), 4.5-5 (SA). The researcher used the mean and standard error to present the descriptive findings.

4.4.1 Supply Chain Performance

The study sought to understand the nature of supply chain performance as the dependent variable during the study. Means and standard error were used to explore responses from the questionnaire on supply chain performance. The respondent was asked to indicate to what extent they agreed with various aspects of supply chain performance

using a 5-likert scale. A total of 12 items were used to explore the respondent's views on the supply chain performance in Kenya Medical Research Institute and findings are presented in Table 4.7.

Majority of the respondents agreed that the adoption of E-procurement reduces purchasing cost (*M=3.98; SE=0.06*), improves efficiency and time taken to complete procurement process (*M=4.34; SE=0.06*). E-procurement has led to improvement in quality of products/ service (*M=3.98; SE=0.06*) and improved the flow of information (*M=3.98; SE=0.06*). The e-procurement have led to less complaints from stakeholders and customers (*M=3.98; SE=0.06*), reduction in errors of order transmission (*M=3.98; SE=0.06*), reduces procurement corruption (*M=3.98; SE=0.06*) and reduction in inventory (*M=3.98; SE=0.06*).

Majority of the respondents were undecided that that the adoption of E-procurement standardizes purchasing process across the organization (*M=2.87; SE=0.09*) and improves supply chain managers decision making (*M=2.91; SE=0.09*). Majority of the respondents disagreed that that the adoption of E-procurement facilitates real time response to suppliers and customers (*M=2.50; SE=0.09*) and reduces discretion & increases transparency (*M=2.40; SE=0.08*).

Table 4.7 Descriptive statistics of Supply Chain Performance

	N	Min	Max	Mean	Std. Error
Reduces purchasing cost	201	1.00	5.00	3.98	0.06
Improves efficiency and time taken to complete procurement process	201	1.00	5.00	4.34	0.06
Standardizes purchasing process across the organization	201	1.00	5.00	2.87	0.09
Facilitates real time response to suppliers and customers	201	1.00	5.00	2.50	0.08
Reduces discretion & increases transparency	201	1.00	5.00	2.40	0.08
Improves supply chain managers decision making	201	1.00	5.00	2.91	0.09
Improvement in quality of products/ service	201	1.00	5.00	4.03	0.06
E-procurement improves the flow of information	201	2.00	5.00	4.32	0.05
Less complaints from stakeholders and customers	201	2.00	5.00	4.52	0.04
Reduction in errors of order transmission	201	1.00	5.00	4.15	0.06
Reduces procurement corruption	201	1.00	5.00	4.01	0.05
Reduction in inventory	201	1.00	5.00	4.06	0.06
Mean	**201**	**2.17**	**5.00**	**3.67**	**.035**

A total of 12 items were used to explore the respondent's opinion on the supply chain performance. The overall mean response score among the respondents with regard to supply chain performance was 3.67 and standard error of 0.35. This value lies in the interval which implies that employees appeared to show agreement with supply chain performance.

4.4.2 Influence of E-tendering Practice on Supply Chain Performance

The first objective sought to establish the influence of E-tendering practices on supply chain performance. Before examining the effect, a quantitative analysis of questionnaire responses was conducted to identify their awareness on E-tendering practice. A total of 10 statements were used to determine the E-tendering practice and

responses elicited on a 5-point likert scale and responses presented in Table 4.8. Majority of the respondents agreed that the adoption of E-tendering have enabled online screening and selection of suppliers (*M=4.14; SE=0.06*), prepare and publish tenders online (*M=4.29; SE=0.05*) and made online supplier performance assessments (*M=4.19; SE=0.05*).

Most of them agreed that there are historical bid submissions (*M=4.10; SE=0.05*), enhance online supplier contract management (*M=4.28; SE=0.04*), made suppliers able to access tenders/quotation/requests any time anywhere in the world (*M=4.20; SE=0.05*). E tendering has made tender documents cannot be accessed by unauthorized person (*M=4.13; SE=0.06*). Majority of the respondents disagreed that that the adoption of e-tendering Alteration of tender documents is impossible or easy to detect (*M=2.44; SE=0.09*), neither party can deny sending or receiving documents (*M=2.75; SE=0.09*) and reduces tender processing time (*M=2.48; SE=0.08*).

Table 4.8 Descriptive statistics of E-tendering

	N	Min	Max	Mean	Std. Error
Online screening and selection of suppliers	201	1.00	5.00	4.14	0.06
Prepare and publish tenders online	201	2.00	5.00	4.29	0.05
Online supplier performance assessments	201	3.00	5.00	4.19	0.05
There are historical bid submissions	201	2.00	5.00	4.10	0.05
Online supplier contract management	201	3.00	5.00	4.28	0.04
Suppliers are able to access tenders/quotation/requests any time anywhere in the world	201	2.00	5.00	4.20	0.05
Tender documents cannot be accessed by unauthorized person	201	1.00	5.00	4.13	0.06
Alteration of tender documents is impossible or easy to detect.	201	1.00	5.00	2.44	0.09
Neither party can deny sending or receiving documents	201	1.00	5.00	2.75	0.09
Reduces tender processing time.	201	1.00	5.00	2.48	0.08
Mean	**201**	**2.40**	**5.00**	**3.70**	**.034**

A total of 10 items were used to explore the respondent's opinion on the e-tendering. The overall mean response score among the respondents was 3.7 and standard error of 0.35. This value lies in the interval which implies that the respondents appeared to show agreement with e-tendering.

4.4.3 Influence of E-ordering on Supply Chain Performance

The second objective sought to establish the influence of E-ordering on supply chain performance. A total of 9 statements were used to determine the views of respondents on E-ordering practice and responses elicited on a 5-point likert scale and responses presented in Table 4.9. Majority of the respondents were undecided that the adoption of E-ordering notification of receipt by the system (*M=3.02; SE=0.10*), reduces order

processing time (*M=2.78; SE=0.08*), timely order requisitions and uploading of orders (*M=2.64; SE=0.08*) and use of online order management system (*M=3.57; SE=0.09*).

Majority of the respondents disagreed that that the adoption of e-ordering had prompt approval of orders (*M=2.48; SE=0.08*), dispatch of purchase orders is done online (*M=2.48; SE=0.08*), used online customized order forms (*M=2.48; SE=0.08*), assists to monitor order due dates (*M=2.48; SE=0.08*) and all the purchase requisitions were done online (*M=2.48; SE=0.08*).

Table 4.9 Descriptive statistics of E-ordering

	N	Min	Max	Mean	Std. Error
Use of online order management system	201	1.00	5.00	3.57	0.09
Use of online customized order forms	201	1.00	5.00	2.41	0.09
Assists to monitor order due dates	201	1.00	5.00	2.34	0.09
All the purchase requisitions are done online	201	1.00	5.00	2.29	0.08
Timely order requisitions and uploading of orders	201	1.00	5.00	2.64	0.08
Prompt approval of orders	201	1.00	5.00	2.39	0.09
Dispatch of purchase orders are done online	201	1.00	5.00	2.09	0.09
Notification of receipt by the system	201	1.00	5.00	3.02	0.10
Reduces order processing time.	201	1.00	5.00	2.78	0.08
Mean	**201**	**1.00**	**5.00**	**2.61**	**.056**

A total of 9 items were used to explore the respondent's opinion on the e-ordering. The overall mean response score among the respondents was 2.6 and standard error of 0.356. This value lies in the interval which implies that the respondents appeared to show agreement with e-ordering.

4.4.4 Influence of E-sourcing practices on supply chain performance.

The third objective sought to establish the influence of E-sourcing practices on supply chain performance. A total of 9 statements were used to determine the E-sourcing practice and responses elicited on a 5-point likert scale and responses presented in Table 4.10. Majority of the respondents were undecided that the adoption of E-sourcing has made electronic search for new suppliers (*M=3.02; SE=0.09*), ability of e-procurement system to interaction with international, regional and local suppliers (*M=3.44; SE=0.09*), pre-qualified suppliers have online access to key information (*M=3.00; SE=0.09*), online requests for quotations (*M=3.22; SE=0.09*). The e-sourcing sometimes offers online bidding (*M=3.41; SE=0.09*) and e-sourcing has helped to reduce delays in the sourcing process (*M=3.49; SE=0.07*).

Majority of the respondents disagreed that that the adoption of e-sourcing enhanced online communication to suppliers (*M=2.72; SE=0.09*), ability of the e-procurement system to evaluate suppliers, (*M=2.34; SE=0.08*) and e-sourcing has offered cost efficient means of sourcing goods (*M=2.22; SE=0.09*).

Table 4.10 Descriptive statistics of E-sourcing

	N	Min	Max	Mean	Std. Error
Electronic search for new suppliers	201	1.00	5.00	3.02	0.09
Ability of e-procurement system to interaction with international, regional and local suppliers	201	1.00	5.00	3.44	0.09
Pre-qualified suppliers have online access to key information	201	1.00	5.00	3.00	0.09
Online requests for quotations	201	1.00	5.00	3.22	0.09
Offers online bidding	201	1.00	5.00	3.41	0.09
Standardized, timely, online communication to suppliers	201	1.00	5.00	2.72	0.09
Ability of the e-procurement system to evaluate suppliers	201	1.00	5.00	2.34	0.08
E-sourcing has offered cost efficient means of sourcing goods.	201	1.00	5.00	2.22	0.09
E-sourcing has helped to reduce delays in the sourcing process	201	1.00	5.00	3.49	0.07
Mean	**201**	**1.56**	**4.89**	**2.99**	**.054**

A total of 9 items were used to explore the respondent's opinion on the e-sourcing. The overall mean response score among the respondents was 2.99 and standard error of 0.054. This value lies in the interval which implies that the respondents appeared to show some agreement with e-sourcing.

4.4.5 Influence of E-invoicing practices on Supply Chain Performance

The fourth objective sought to establish the influence of E-invoicing practices on supply chain performance. A total of 8 statements were used to determine the E-invoicing and responses elicited on a 5-point likert scale and responses presented in Table 4.11. Majority of the respondents were undecided that the adoption of E-invoicing has made institute conduct invoice payment online (*M=2.72; SE=0.09*) and adversely impacts transactional cost (*M=2.72; SE=0.09*).

The institute uses electronic data interchange to exchange invoices (*M=2.72; SE=0.09*) and gives automatic payment reminders (*M=2.72; SE=0.09*), offer late payment online notifications (*M=2.72; SE=0.09*). The e-invoicing has reduced delays and promoted timeliness in invoicing settlements by the suppliers (*M=2.72; SE=0.09*), e-invoicing has helped to prevent invoice errors and to enhance accuracy (*M=2.72; SE=0.09*), e-invoicing has highly enhanced data security (*M=2.72; SE=0.09*).

Table 4.11 Descriptive statistics of E-invoicing

	N	Min	Max	Mean	Std. Error
Institute conducts invoice payment online	201	1.00	5.00	3.05	0.08
The adoption of e-invoicing adversely impacts transactional cost.	201	1.00	5.00	3.31	0.07
Institute uses electronic data interchange to exchange invoices,	201	1.00	5.00	3.58	0.06
Gives automatic payment reminders	201	1.00	5.00	3.00	0.08
Offer late payment online notifications	201	1.00	5.00	2.77	0.08
The e-invoicing has reduced delays and promoted timeliness in invoicing settlements by the suppliers.	201	1.00	5.00	3.57	0.07
The e-invoicing has helped to prevent invoice errors and to enhance accuracy.	201	1.00	5.00	3.40	0.07
E-invoicing has highly enhanced data security	201	1.00	5.00	2.56	0.08
Mean	**201**	**1.50**	**4.67**	**3.14**	**.045**

A total of 8 items were used to explore the respondent's opinion on the e-invoicing. The overall mean response score among the respondents was 3.15 and standard error of 0.45. This value lies in the interval which implies that the respondents appeared to show some agreement with e-invoicing.

4.4.6 Influence of E-payment practices on supply chain performance

The fifth objective sought to establish the influence of E-payment on supply chain performance. A total of 10 statements were used to determine the E-payment practice and responses elicited on a 5-point likert scale and responses presented in Table 4.12. Majority of the respondents were undecided that the adoption of E-payment has made suppliers have access to their online supply accounts 24/7 (*M=2.88; SE=0.08*), use of credit and debit cards for payments (*M=3.14; SE=0.08*) and use of smart cards for payments (*M=2.71; SE=0.08*). The use of online bank transfers for payment (*M=2.92; SE=0.09*) and use of online payment platforms for payment (*M=3.23; SE=0.08*).

E-payment has helped to reduce transaction costs (*M=3.58; SE=0.09*) and have helped the business to reduce to reduce the time taken to pay suppliers (*M=3.47; SE=0.08*). E-payment has helped to increase transparency in the payment process, (*M=3.67; SE=0.07*) and institute utilizes electronic payment system to settle bills (*M=3.22; SE=0.08*). Electronic fund transfer payment assists to transfer money to the supplier's account (*M=2.88; SE=0.07*).

Table 4.12 Descriptive statistics of E-payment

	N	Min	Max	Mean	Std. Error
Suppliers have access to their online supply accounts 24/7	201	1.00	5.00	2.88	0.08
Use of credit and debit cards for payments	201	1.00	5.00	3.14	0.08
Use of smart cards for payments	201	1.00	5.00	2.71	0.08
Use of online bank transfers for payment	201	1.00	5.00	2.92	0.08
Use of online payment platforms for payment	201	1.00	5.00	3.23	0.08
E-payment has helped to reduce transaction costs.	201	1.00	5.00	3.58	0.09
E-payment has helped the business to reduce to reduce the time taken to pay suppliers.	201	1.00	5.00	3.47	0.08
E-payment has helped to increase transparency in the payment process.	201	1.00	5.00	3.67	0.07
Institute utilizes electronic payment system to settle bills.	201	1.00	5.00	3.22	0.08
Electronic fund transfer payment assists to transfer money to the supplier's account.	201	1.00	5.00	2.88	0.07
Mean	**201**	**1.30**	**4.60**	**3.170**	**.0454**

A total of 10 items were used to explore the respondent's opinion on the e-payment. The overall mean response score among the respondents was 3.17 and standard error of 0.045. This value lies in the interval which implies that the respondents appeared to show some agreement with e-payment.

4.5 Validity of the Constructs

Factor analysis was employed to help in identifying the actual number of factors that actually measured each construct as perceived by the respondents. The validity of the instrument was measured through Kaiser-Meyer-Olkin measures of sampling adequacy

and Bartlett's Test of Sphericity. It was applied to test whether there was a relation between the study variables exist. Kaiser- Meyer- Olkin was used as a measure of sampling adequacy and a value of 0.5 was acceptable. Bartlett's test of sphericity was used to test the adequacy of the correlation matrix and should be significant. The component factor analysis with varimax rotation was conducted on all variables to extract factors from the scales of each construct.

The principal component analysis and Varimax rotation were performed in all the items and those with factor loadings lower than 0.50 were eliminated as postulated by Hair *et al.* (2006). According to Hair *et al*, (2006) all items loading below 0.50 were deleted and those with more than 0.50 loading factor retained (Daud, 2014). All items were well loaded into their various underlying variable structure dimensions. Factor analysis was used to validate whether the items in each variable loaded into the expected categories. Varimax rotation was used to validate the five variables that are distinct. After performing the factor analysis for each variable, the indicators were computed to create a score and subjected to inferential analysis.

4.5.1 Factor Analysis for supply chain performance

Principle Component Analysis was conducted to verify item loadings through which redundant items were identified and omitted from analysis. Five indicators were proposed to measure supply chain performance. The KMO value of talent attraction was 0.779 indicating that sampling was adequate. The significant chi-square value for Bartlett's test of sphericity (χ^2 = 536.995, $p<0.05$) confirmed that data collected for talent attraction was adequate (Table 4.13). None of the indicators were deleted and all the 12 indictors were retained, computed and renamed performance for further analysis. The items extracted loaded highly on four-dimension factors.

Table 4.13: Rotated Component Matrix[a] for supply chain performance

	Component			
	1	2	3	4
Improvement in quality of products/ service	.777			
Improves efficiency and time taken to complete procurement process	.673			
Less complaints from stakeholders and customers	.671			
Reduction in errors of order transmission	.620			
E-procurement improves the flow of information	.531			
Facilitates real time response to suppliers and customers		.850		
Improves supply chain managers decision making		.782		
Standardizes purchasing process across the organization		.778		
Reduces procurement corruption			.766	
Reduction in inventory			.671	
Reduces discretion & increases transparency				.815
Reduces purchasing cost				.572
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.779			
Bartlett's Test of Sphericity				
Approx. Chi-Square	536.995			
df	66			
Sig.	.000			
Total Variance Explained (61.737)	20.433	18.491	13.087	9.726
Total Eigenvalues	3.392	1.861	1.124	1.031

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

4.5.2 Factor Analysis for E-tendering

Principle Component Analysis was conducted to verify item loadings for E-tendering through which redundant items were identified. Five indicators were proposed to measure E-tendering. The KMO value of E-tendering was 0.649 indicating that sampling was adequate. The significant chi-square value for Bartlett's test of sphericity (χ^2 = 441.815, $p<0.05$) confirmed that data collected for E-tendering was adequate (Table 4.14). Rotated component matrix for E-tendering indicators was run. None of

the indicators were deleted and all the 10 indictors were retained, computed and renamed E-tendering for further analysis.

Table 4.14: Rotated Component Matrix[a] E-tendering

	Component	
	1	2
Online supplier performance assessments	.733	
Prepare and publish tenders online	.699	
Online supplier contract management	.697	
There are historical bid submissions	.643	
Online screening and selection of suppliers	.621	
Suppliers are able to access tenders/quotation/requests any time anywhere in the world	.618	
Tender documents cannot be accessed by unauthorized person	.596	
Alteration of tender documents is impossible or easy to detect.		.798
Reduces tender processing time.		.767
Neither party can deny sending or receiving documents		.735
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.723	
Bartlett's Test of Sphericity Approx. Chi-Square	510.154	
df	45	
Sig.	.000	
Total Variance Explained (50.45)	30.883	19.564
Total Eigenvalues	3.088	1.956

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

4.5.3 Factor Analysis for E-ordering

Principle Component Analysis was conducted to verify item loadings through which redundant items were identified and omitted from analysis. Five indicators were proposed to measure E-tendering. The KMO value of talent motivation was 0.804 indicating that sampling was adequate. The significant chi-square value for Bartlett's test of sphericity (χ^2 = 655.383, p<0.05) confirmed that data collected for E-ordering was adequate. None of the indicators were deleted and all the five indictors were retained, computed and renamed E-ordering for further analysis. The items extracted loaded highly on three-dimension factors, with component.

Table 4.15: Rotated Component Matrix[a] E-ordering

	Component		
	1	2	3
Use of online customized order forms	.835		
All the purchase requisitions are done online	.815		
Assists to monitor order due dates	.810		
Timely order requisitions and uploading of orders	.601		
Dispatch of purchase orders are done online	.542		
Reduces order processing time.		.807	
Notification of receipt by the system		.794	
Prompt approval of orders		.514	
Use of online order management system			.944
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.804		
Bartlett's Test of Sphericity Approx. Chi-Square	655.383		
df	36		
Sig.	.000		
Total Variance Explained (67.475)	33.319	22.137	12.019
Total Eigenvalues	2.999	1.992	1.082

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 6 iterations.

4.5.4 Factor Analysis for E-sourcing

Principle Component Analysis was conducted to verify item loadings through which redundant items were identified and omitted from analysis. Five indicators were proposed to measure E-sourcing. The KMO value of career management was 0.826 indicating that sampling was adequate. The significant chi-square value for Bartlett's test of sphericity ($\chi^2 = 577.529$, $p<0.05$) confirmed that data collected for E-sourcing was adequate (Table 4.16). None of the indicators were deleted and all the five indictors were retained, computed and renamed E-sourcing for further analysis. The items extracted loaded highly on three-dimension factors.

Table 4.16: Rotated Component Matrix[a] E-sourcing

	Component		
	1	2	3
E-sourcing has offered cost efficient means of sourcing goods.	.891		
Ability of the e-procurement system to evaluate suppliers	.869		
Standardized, timely, online communication to suppliers	.671		
Electronic search for new suppliers	.591		
Ability of e-procurement system to interaction with international, regional and local suppliers		.785	
Online requests for quotations		.627	
Pre-qualified suppliers have online access to key information		.609	
Offers online bidding		.563	
E-sourcing has helped to reduce delays in the sourcing process			.873
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.826		
Bartlett's Test of Sphericity Approx.			
Chi-Square	577.529		
df	36		
Sig.	.000		
Total Variance Explained (65.42)	30.190	22.057	13.171
Total Eigenvalues	2.717	1.985	1.185

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

4.5.5 Factor Analysis for E-invoicing

Principle Component Analysis was conducted to verify item loadings through which redundant items were identified and omitted from analysis. Five indicators were proposed to measure E-invoicing. The KMO value of E-invoicing was 0.752 indicating that sampling was adequate. The significant chi-square value for Bartlett's test of sphericity (χ^2 = 459.107, $p<0.05$) confirmed that data collected for E-invoicing was adequate (Table 4.17). None of the indicators were deleted and all the eight indictors were retained, computed and renamed E-invoicing for further analysis. The items extracted loaded highly on two-dimension factors.

Table 4.17: Rotated Component Matrix[a] for E-invoicing

		Component	
		1	2
Institute conducts invoice payment online		.780	
Gives automatic payment reminders		.777	
Offer late payment online notifications		.731	
E-invoicing has highly enhanced data security		.707	
The adoption of e-invoicing adversely impacts transactional cost.		.667	
Institute uses electronic data interchange to exchange invoices,		.643	
The e-invoicing has helped to prevent invoice errors and to enhance accuracy.			.863
The e-invoicing has reduced delays and promoted timeliness in invoicing settlements by the suppliers.			.856
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.752	
Bartlett's Test of Sphericity	Approx. Chi-Square	459.107	
df		28	
Sig.		.000	
Total Variance Explained (58.64)		38.845	19.797
Total Eigenvalues		3.108	1.584

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 3 iterations.

4.5.6 Factor Analysis for E-payment

Principle Component Analysis was conducted to verify item loadings through which redundant items were identified and omitted from analysis. Indicators were proposed to measure E-payment. The KMO value of E-payment was 0.766 indicating that sampling was adequate. The significant chi-square value for Bartlett's test of sphericity (χ^2 =605.467, p<0.05) confirmed that data collected for E-payment was adequate (Table 4.18). None of the indicators were deleted and all the five indictors were retained, computed and renamed E-payment for further analysis. The items extracted loaded highly on three-dimension factors.

Table 4.18: Rotated Component Matrix[a] for E-payment

	Component			
	1	2	3	4
E-payment has helped to increase transparency in the payment process.	.860			
E-payment has helped the business to reduce to reduce the time taken to pay suppliers.	.840			
Institute utilizes electronic payment system to settle bills.	.699			
Use of smart cards for payments		.838		
Use of online bank transfers for payment		.822		
Electronic fund transfer payment assists to transfer money to the supplier's account.		.640		
Use of online payment platforms for payment		.583		
E-payment has helped to reduce transaction costs.			.864	
Use of credit and debit cards for payments			.592	
Suppliers have access to their online supply accounts 24/7				.863
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.766			
Bartlett's Test of Sphericity Approx. Chi-Square	605.467			
df	45			
Sig.	.000			
Total Variance Explained (71.58)	24.587	24.200	11.842	10.952
Total Eigenvalues	2.459	2.420	1.184	1.095

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

4.6 Assumptions of Regression Analysis

Regression analysis was therefore used to test the posited direct relationships between e-procurement and supply chain performance. Prior to running the tests, assumptions of regressions were examined. It was argued that regression analysis and more so multiple regressions work best on the basis of certain assumptions (Tabachnick & Fidell, 2013). The construct indicators used in the questionnaire were positively worded, coded and entered into SPSS (V26) in order to test the assumptions of multiple

regression. Data for each of the variables were examined for regression assumptions; normality, linearity and multicollinearity, autocorrelation.

4.6.1 Normality Assumption Test

Normality in distribution of data across the five constructs was examined using the quantile–quantile (Q-Q) plots. In the Q-Q plot, normality was achieved when plotted data represented a given variable followed a diagonal line usually produced by a normal distribution. Supply chain performance was conceptualized as the dependent variable. The normal Q-Q plot displayed in Figure 4.1 indicates that data dots stayed alongside the diagonal throughout the distribution. Therefore, the supply chain performance followed a normal distribution. The normal Q-Q plot displayed in Figure 4.1 showed that data were largely along the diagonal line, which signifies that data distribution for e-tendering, e-ordering, e-sourcing, e-invoicing and e-payment was normal.

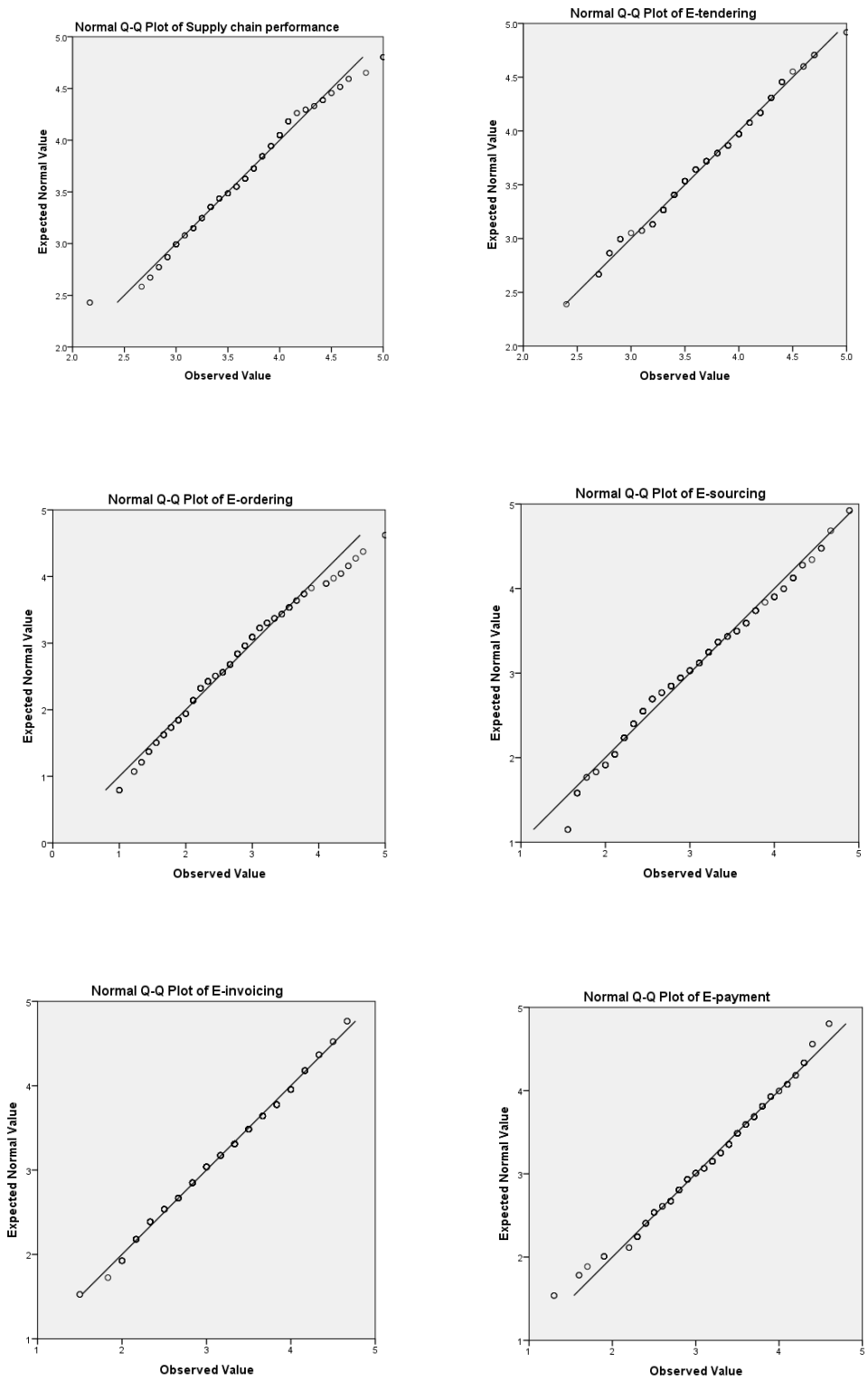

Figure 4.1: Normal Q-Q Plot of Variables

4.6.2 Linearity Assumption Test

The Bivariate Scatter plots were used to examine the degree of linear relationship among the study variables used in the study. This comprised of dependent variable employee performance and the independent variables (talent attraction, retention, motivation and career management). Tabachnick and Fidell (2013) recognize linearity as one of the assumptions upon which regression analysis was pegged. Bivariate Scatter plots captured linearity better than Pearson correlation which was only limited to capturing the linear component of the relationship. Linearity of variables was confirmed when elliptical or oval scatter plots were produced as shown in Figure 4.2.

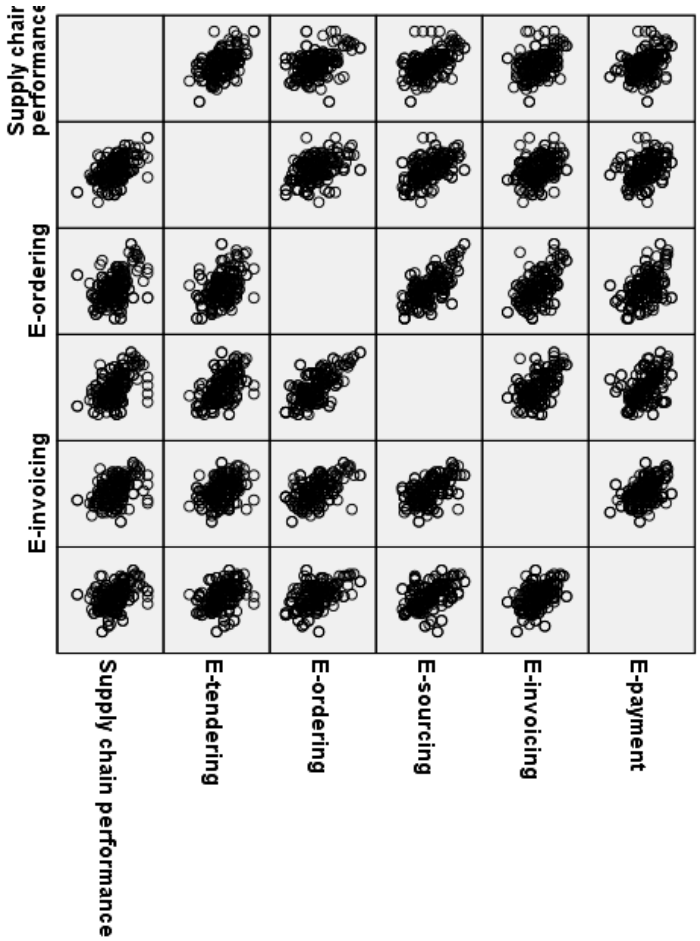

Figure 4.2: Bivariate Scatter plots

4.6.3 Multicollinearity Assumption Test

Multicollinearity is identified as a situation where independent variables or predictors are highly correlated among themselves (Vatcheva, Lee, McCormick, & Rahbar, 2016). To test for multicollinearity, the tolerance and Variance Inflation Factor (VIF), was used to assess the increase in the variance of an estimated regression coefficient when there is correlation among the predictors (Tabachnick & Fidell, 2013). Table 4.19 results showed that all the VIF values were below the threshold indicating that multicollinearity was not an issue in the study.

Table 4.19: Multicollinearity Statistics

Model		Collinearity Statistics	
		Tolerance	VIF
1	E-tendering	.677	1.478
	E-ordering	.472	2.120
	E-sourcing	.439	2.280
	E-invoicing	.604	1.655
	E-payment	.670	1.492

a. Dependent Variable: Performance

The rule of thumb for a VIF value should be less than ten and tolerance should be greater than 0.2 (Keith, 2006; Shieh, 2010). This was also supported by the VIF value, which fall below 5 and the least tolerance of 0.54, which is well below the cut-off of 10 and 0.2 respectively. Therefore, there is no violation of the multicollinearity assumption has not been violated. In the presence of multicollinearity, it may not be practically possible to assume the interpretation of the regression coefficient as being attributed to one variable, while holding others constant because of the information that could be overlapping.

4.6.4 Testing for Autocorrelation

Autocorrelation as stated by Tabachnick and Fidell (2013) is a test of the association between residual regressions. The independence of errors was then checked using the

Durbin-Watson statistic, which is assumed to be a measure of the autocorrelation of errors where the order of the cases is taken into account (Tabachnick & Fidell, 2013). Durblin-Watson statistic should be between 1.5 and 2.5 and therefore the data is not auto correlated. As a result, the Durbin-Watson statistic within the two crucial values was found to suggest a loss of the latter order linear auto-correlation in our multiple linear regression data. Results presented in Table 4.20 reveal that the Durbin-Watson statistic d=1.565 was between the two critical values and hence there was no auto-correlation in the data.

Table 4.20: Autocorrelation

Model	Durbin-Watson
1	1.565[a]

a. Predictors: (Constant), E-payment, E-tendering, E-invoicing, E-ordering, E-sourcing
b. Dependent Variable: Performance

4.7 Correlation Analysis of the Variables

The correlation analysis was conducted to determine the relationship between two variables and was indicated with the coefficient symbol of (r). Correlation coefficient indicates the strength of the relationship and magnitude either positive or negative. The coefficient obtained at the end of the analysis takes values between -1 and +1. Correlation results of the study (Table 4.21) showed that there was a significant positive and weak relationship between E-ordering and supply chain performance (r= 0.387, p =0.000).

There was a significant positive and strong relationship between E-sourcing and supply chain performance (r= 0.520, p =0.000). There was a significant positive and strong relationship between E-tendering and supply chain performance (r=0.522, p =0.00). There was a significant positive and weak relationship between E-invoicing and supply

chain performance (r= 0.419, p =0.000). There was positive and weak significant relationship between E-payment and supply chain performance (r= -0.387, p =.000).

Table 4.21 Correlation Analysis of the Variables

		1	2	3	4	5	6
1. Performance	Pearson Correlation	1					
	Sig. (2-tailed)						
2. E-tendering	Pearson Correlation	.522**	1				
	Sig. (2-tailed)	.000					
3. E-ordering	Pearson Correlation	.387**	.426**	1			
	Sig. (2-tailed)	.000	.000				
4. E-sourcing	Pearson Correlation	.520**	.550**	.673**	1		
	Sig. (2-tailed)	.000	.000	.000			
5. E-invoicing	Pearson Correlation	.419**	.364**	.548**	.536**	1	
	Sig. (2-tailed)	.000	.000	.000	.000		
6. E-payment	Pearson Correlation	.387**	.365**	.499**	.442**	.484**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	

**. Correlation is significant at the 0.01 level (2-tailed).
b. Listwise N=201

4.8 Linear Regression analysis

The regression coefficient summary explains the nature of the influence of independent variable and the dependent variable and test hypothesis of the study. A linear regression model explored the relationship between independent variable and the dependent variable. The R^2 represented the measure of variability in dependent variable that each independent variable accounted for.

4.8.1 Regression Analysis on E-tendering

The regression coefficient summary explains influence of e-tendering on supply chain performance and test hypothesis. The study used a linear regression model to explore the influence of e-tendering on supply chain performance. The R^2 represented the measure of variability in supply chain performance that e-tendering is accounted for.

From the model, (R^2 = 0.273) shows that e-tendering account for 27.3% variation in supply chain performance. The e-tendering predictor used in the model captured the variation in the supply chain performance as shown in Table 4.22. The adjusted R square of 0.269 shows that outside the constant component, e-tendering contributed 26.9 % percent of the variance in supply chain performance.

Table 4.22 E-tendering Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.522[a]	.273	.269	.41906

a. Predictors: (Constant), E-tendering

The study used ANOVA to determine whether the model could forecast the result better than the mean, as shown in Table 4.23. The regression model that used e-tendering as an indicator was significant (F=74.55, p value =0.000), indicating that e-tendering has a significant influence on supply chain performance.

Table 4.23 ANOVA on E-tendering

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.091	1	13.091	74.545	.000[b]
	Residual	34.947	199	.176		
	Total	48.039	200			

a. Dependent Variable: Performance
b. Predictors: (Constant), E-tendering

Table 4.24 shows the estimates of β-value and gives contribution of the predictor to the model. The β-value for e-tendering had a positive coefficient, depicting positive relationship with supply chain performance as summarized in the model as:

$Y = 1.698+0.534X_1 + \varepsilon$ …….…… Equation 4.1

Where: Y = Supply chain performance, X = e-tendering, ε = error term.

Table 4.24 E-tendering Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.698	.231		7.360	.000
	E-tendering	.534	.062	.522	8.634	.000

a. Dependent Variable: Performance

The study had hypothesized that there is no significant influence of e-tendering on supply chain performance. There was a positive significant influence of e-tendering (β=0.595 and p value<0.05) on supply chain performance. Following this, it showed that an increase in e-tendering leads to improvement of supply chain performance. The null hypothesis (**Ho_1)** rejected. E-tendering had a significant influence on supply chain performance.

This implies that for each increase in the e-tendering, there was a rise in supply chain performance. The findings concur with Yossuf et al. (2011) who note that e-procurement creates a framework in which government agencies as buyers procure goods/services by browsing catalogues advertised by suppliers hence a one-stop portal for public sector procurement. The findings coincide with Van Weele (2015) who argues that the long-term aim of the e-procurement initiative is to use internet technologies to bring government agencies in the country and suppliers around the world together intoa virtual trading environment.

Gathima and Njoroge (2018) that E-tendering practices had positive and significant relationship with the performance.

4.8.2 Regression Analysis on Influence of E-ordering on supply chain performance

From the regression model, R^2 = 0.150 showing that e-ordering accounted for 15% variation in supply chain performance. The e-ordering predictor used in the model

captured the variation in the supply chain performance as shown in Table 4.25. The adjusted R square of 0.145 depicts that the e-ordering explained the variation in supply chain performance by 14.5%.

Table 4.25 Model Summary on E-ordering

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.387[a]	.150	.145	.45308

a. Predictors: (Constant), E-ordering

The study used Analysis of variance to check whether the model could predict the result better than the mean, as shown in Table 4.26. The regression model that used e-ordering as a predictor was important (F=35.01, p value =0.000), indicating that e-ordering has a significant impact on supply chain performance.

Table 4.26 E-ordering Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.187	1	7.187	35.010	.000[b]
	Residual	40.852	199	.205		
	Total	48.039	200			

a. Dependent Variable: Performance
b. Predictors: (Constant), E-ordering

In addition, the study generated β coefficients in order to test the hypothesis under study (Table 4.27). The β-value for e-ordering had a positive coefficient, depicting positive influence on supply chain performance as summarized in the model as:

$Y = 3.047+0.240X_1 + \varepsilon$ …… Equation 4.2

Where: Y = Supply chain performance, X = e-ordering, ε = error term.

Table 4.27 E-ordering Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.047	.111		27.530	.000
	E-ordering	.240	.041	.387	5.917	.000

a. Dependent Variable: Performance

The study had hypothesized that there is no significant relationship between e-ordering on supply chain performance. From the findings e-ordering had significant influence on supply chain performance (β=0.240 and p value<0.05). The study therefore rejected the null hypothesis (**Ho_2**). This agrees with Chepkwony and Lagat (2016) that e-ordering and e-informing had a positive and significant effect on supply chain performance. This agrees with Munyao and Moronge (2018) that e-tendering, e-sourcing ande-ordering positively and significantly affect the purchasing performance.

4.8.3 Regression Analysis on the effect of E-sourcing on supply chain performance

A linear regression model explored the relationship between independent variable and the dependent variable. The results of regression analysis in Table 4.28 showed the coefficient of determination (R squared) of 0.271 showed that 27.1% of supply chain performance was explained by e-sourcing. The adjusted R-square of 0.267 indicated that e-sourcing in exclusion of the constant variable explained the change in supply chain performance by 26.7%.

Table 4.28 E-sourcing Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.520[a]	.271	.267	.41963

a. Predictors: (Constant), E-sourcing

Table 4.29 shows the results of the Analysis of Variance for the regression coefficient: F=73.804, p value = 0.000. Since the p-value is less than 0.05, it is obvious that e-

sourcing has a positive influence on supply chain performance

Table 4.29: E-sourcing ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.996	1	12.996	73.804	.000[b]
	Residual	35.042	199	.176		
	Total	48.039	200			

a. Dependent Variable: Performance
b. Predictors: (Constant), E-sourcing

In order to test the hypotheses, the study generated the β coefficients for e-sourcing as independent variable from the model. Table 4.30 shows the estimates of β-value and gives contribution of the predictor to the model. The β-value for e-sourcing had a positive coefficient, depicting positive influence with supply chain performance as summarized in the model as:

$Y = 2.677+0.334X_1 + \varepsilon$ …….…… Equation 4.3

Where: Y = Supply chain performance, X = e-sourcing, ε = error term.

Table 4.30 E-sourcing Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.677	.120		22.356	.000
	E-sourcing	.334	.039	.520	8.591	.000

a. Dependent Variable: Performance

The study hypothesized that e-sourcing has no significant influence on supply chain performance. The results of the study indicated that e-sourcing has a strong substantial impact on supply chain performance (=0.334 and p value=0.000). The study rejects the null hypothesis (**Ho_3**).

Increase in e-sourcing led to an increase in supply chain performance. The findings agree with Neef (2016) who noted that the benefits of e-sourcing include streamlining

the sourcing process, reducing prices by maximizing supplier competition, and creating a repository for sourcing information. E-sourcing is one of the best e-purchasing practices that organizations are employing to reduce costs. The results are similar to the study by Masheti (2016) that revealed that e-planning, e-supplier selection, e-tendering and e-sourcing influences the performance of pharmaceutical manufacturing companies.

4.8.4 Regression Analysis on the effect of E-invoicing on supply chain performance

The results of regression analysis in Table 4.31 showed the coefficient of determination (R squared) of 0.175 showed that 17.5% of supply chain performance was explained by E-invoicing. The adjusted R-square of 0.171 indicated that E-invoicing in exclusion of the constant variable explained the change in supply chain performance by 17.1%.

Table 4.31 E-invoicing Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.419[a]	.175	.171	.44622

a. Predictors: (Constant), E-invoicing

Table 4.32 shows the results of the Analysis of Variance for the regression coefficient: F=42.260, p value = 0.000. Since the p-value is less than 0.05, it is obvious that E-invoicing has a positive influence on supply chain performance

Table 4.32 E-invoicing ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.415	1	8.415	42.260	.000[b]
	Residual	39.624	199	.199		
	Total	48.039	200			

a. Dependent Variable: Performance

b. Predictors: (Constant), E-invoicing

In order to test the hypotheses, the study generated the β coefficients for E-invoicing as independent variable from the model. Table 4.33 shows the estimates of β-value and

gives contribution of the predictor to the model. The β-value for E-invoicing had a positive coefficient, depicting positive influence with supply chain performance as summarized in the model as:

$Y = 2.663+0.321X_1 + \varepsilon$ ……..…… Equation 4.4

Where: Y = Supply chain performance, X = E-invoicing, ε = error term.

Table 4.33 E-invoicing Regression Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.663	.159		16.792	.000
	E-invoicing	.321	.049	.419	6.501	.000

a. Dependent Variable: Performance

The study hypothesized that E-invoicing has no significant influence on supply chain performance. The results of the study indicated that E-invoicing has a strong substantial impact on supply chain performance (=0.321 and p value=0.000). The study rejects the null hypothesis (**Ho_4**). Increase in E-invoicing led to an increase in supply chain performance. This agrees with Barngetuny and Kimutai (2015) that e-tendering and e-invoicing positively affects supply chain performance, but operational performance was not factored in the study.

4.8.5 Regression analysis on the influence of E-payment on Supply chain performance

From the model, (R^2 = .150) showing that E-payment account for 15% variation in Supply chain performance. The E-payment predictor used in the model captured the variation in the Supply chain performance (Table 4.34). The adjusted R square of 0.146 indicated that E-payment in exclusion of the constant variable explained the variation in Supply chain performance by 14.6%.

Table 4.34 E-payment Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.387[a]	.150	.146	.45301

a. Predictors: (Constant), E-payment

The regression model with E-payment as a predictor was significant (F=35.085, p value =0.000) shows a significant influence of e-payment on Supply chain performance (Table 4.35).

Table 4.35 E-payment Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	7.200	1	7.200	35.085	.000[b]
	Residual	40.839	199	.205		
	Total	48.039	200			

a. Dependent Variable: Performance
b. Predictors: (Constant), E-payment

Table 4.36 presented estimates of β-value and the contribution of the predictor to the model. The β-value for E-payment had a positive coefficient, depicting positive influence on Supply chain performance as summarized in the model as:

$Y = 2.739+0.295X_1 + \varepsilon$ …….…… Equation 4.5

Where: Y = Supply chain performance, X = e-awarding, ε = error term.

Table 4.36 E-payment Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.739	.161		17.013	.000
	E-payment	.295	.050	.387	5.923	.000

a. Dependent Variable: Performance

The study had hypothesized that there is no significant influence of E-payment on supply chain performance. From the findings E-payment had positive a significant influence of Supply chain performance (β=0.295 and p value<0.05). An increase in the E-payment, led improvement of Supply chain performance. The null hypothesis (**H_{O4}**) rejected. The E-payment had a significant influenced supply chain performance. This agrees with Songip et al., (2013), that e-payment enables businesses to carry out financial transactions in a quick, efficient and secure way. By speeding up payments, e-payment speed ups the procurement and ensures timely delivery of goods.

4.9 Multiple Regression Analysis

Multiple regression analysis was used to analyze the relationship between a single dependent variable and several predictor variables (Hair *et al.,* 2006). The regression coefficient summary was used to explain the nature of the relationship between independent variables and the dependent. Based on the multiple regression model the coefficient of determination (R squared) of .379 showing that 37.9% of the variation in e-procurement practices was explained by supply chain performance as summarized in Table 4.37. The adjusted R square of .364 depicts that all the supply chain performance in exclusion of the constant variable explained the variation in e-procurement practices by 36.4% the remaining percentage can be explained by other factors excluded from the model.

Table 4.37 Model Summary of e-procurement practices

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.616[a]	.379	.364	.39098

a. Predictors: (Constant), E-payment, E-tendering, E-invoicing, E-ordering, E-sourcing

The analysis of variance was used to test whether the model could significantly fit in predicting the outcome than using the mean as shown in (Table 4.38). The regression

model of supply chain performance as a predictor was significant (F=23.850, p value =0.000) showing that there is a significant relationship between supply chain performance and e-procurement practices.

Table 4.38: Analysis of Variance on e-procurement practices

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.229	5	3.646	23.850	.000[b]
	Residual	29.809	195	.153		
	Total	48.039	200			

a. Dependent Variable: Performance

b. Predictors: (Constant), E-payment, E-tendering, E-invoicing, E-ordering, E-sourcing

In addition, the β coefficients for supply chain performance as independent variable were generated from the model, in order to test the hypotheses of the study. The t-test was used as a measure to identify whether the e-procurement practices predictor is making a significant contribution to the model. Table 4.39 gave the estimates of β-value and the contribution of each predictor to the model.

Table 4.39 Coefficients of e-procurement practices

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.473	.235		6.276	.000
	E-tendering	.315	.070	.308	4.492	.000
	E-ordering	-.035	.051	-.056	-.680	.497
	E-sourcing	.167	.055	.260	3.056	.003
	E-invoicing	.107	.056	.140	1.924	.056
	E-payment	.091	.052	.120	1.740	.083

a. Dependent Variable: Performance

β-value for e-tendering, e-ordering, e-sourcing, e-invoicing and e-payment had a positive coefficient, depicting positive relationship, with supply chain performance as summarized in the model as:

$Y = 1.473 + 0.315X_1 - 0.035X_2 + 0.167X_3 + 0.107X_4 + 0.091X_5 + \varepsilon$…….....Equation 4.5

Where:

Y = Supply chain performance, X_1 = E-tendering, X_2 =E-ordering, X_3 = E-sourcing, X_4 =E-invoicing, X_5 =E-payment and ε = error term

From the study findings there was a positive significant influence in E-tendering (β_1= 0.315; p=.000) on supply chain performance. A change in E-tendering led to improvement in supply chain performance. Therefore, E-tendering had a significant influence on supply chain performance. The study findings depicted that there was insignificant influence of in E-ordering (β_2= -0.035 and p =0.497) on supply chain performance. The findings indicated that a rise in e-ordering does not lead to improvement in supply chain performance.

The study findings depicted that there was a positive significant influence of in E-sourcing (β_3= 0.167; p =0.000) on supply chain performance. An increase in E-sourcing led to improvement in supply chain performance. Therefore, in E-sourcing had positive significant influence on supply chain performance. There was significant influence of E-invoicing (β_4=.107 and p =0.056) on supply chain performance. The findings indicated that an increase in E-invoicing led to improvement in supply chain performance. There was significant influence of E-payment (β_5=.091 and p =0.083) on supply chain performance. The findings indicated that an increase in E-payment led to improvement in supply chain performance. This agrees with Munyao and Moronge (2018) that e-tendering, e-sourcing and e-ordering positively and significantly affect the purchasing performance while e-payment has a positive but not significant effect on purchasing performance.

This conforms to Alexander (2016) who highlighted that e-planning is the gathering and distribution of data for both internal and external users, tracking the progress of goods, accepting goods that meet the specifications and payment of goods using internet-based program. This is in line with Gil-García and Martinez-Moyano (2017) who stated that the e-tools such as intranet, optical scanners, e-forms submission are used to improve efficiency in their service delivery and achieve their goals. The study by Masheti (2016) revealed that e-supplier selection, e-tendering and e-sourcing influences operational performance of pharmaceutical firms andthis is in line with the findings of this study

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study based on objectives, research questions and hypothesis, conclusions based on the findings and recommendations as well as suggestions for further research.

5.2 Summary of the Study

The study sought to understand the nature of supply chain performance as the dependent variable during the study. The adoption of E-procurement reduces purchasing cost, improves efficiency and time taken to complete procurement process. E-procurement have led to improvement in quality of products/ service and improved the flow of information. The e-procurement have led to less complaints from stakeholders and customers, reduction in errors of order transmission. It reduces procurement corruption and reduction in inventory.

5.2.1 Influence of E-tendering Practice on Supply Chain Performance

The first objective sought to establish the influence of E-tendering practices on supply chain performance. The descriptive findings showed that the adoption of E-tendering have enabled online screening and selection of suppliers, prepare and publish tenders online and made online supplier performance assessments. There are historical bid submissions, enhance online supplier contract management, made suppliers able to access tenders/quotation/requests any time anywhere in the world and E tendering has made tender documents cannot be accessed by unauthorized person.

From the model, (R^2 = 0.273) shows that e-tendering account for 27.3% variation in supply chain performance. There was a positive significant influence of e-tendering

(β=0.595 and p value<0.05) on supply chain performance. The null hypothesis (**H_{o1}**) rejected. E-tendering had a significant influence on supply chain performance. An increase in e-tendering leads to improvement of supply chain performance. This implies that for each increase in the e-tendering, there was a rise in supply chain performance.

5.2.2 Influence of E-ordering on Supply Chain Performance

The second objective sought to establish the influence of E-ordering on supply chain performance. The adoption of E-ordering had some notification of receipt by the system, reduces order processing time, timely order requisitions and uploading of orders and use of online order management system.

From the regression model, R^2 = 0.150 showing that e-ordering accounted for 15% variation in supply chain performance. The e-ordering predictor used in the model captured the variation in the supply chain performance. From the findings e-ordering had significant influence on supply chain performance (β=0.240 and p value<0.05). The study therefore rejected the null hypothesis (**H_{o2}**). The e-ordering had a positive and significant effect on supply chain performance.

5.2.3 Influence of E-sourcing practices on supply chain performance.

The third objective sought to establish the influence of E-sourcing practices on supply chain performance. The E-sourcing has made electronic search for new suppliers, ability of e-procurement system to interaction with international, regional and local suppliers, pre-qualified suppliers have online access to key information, online requests for quotations. The e-sourcing sometimes offers online bidding and e-sourcing has helped to reduce delays in the sourcing process.

The results of regression analysis showed the coefficient of determination (R squared) of 0.271 showed that 27.1% of supply chain performance was explained by e-sourcing. The results of the study indicated that e-sourcing has a strong substantial impact on supply chain performance (β =0.334 and p value=0.000). The study rejects the null hypothesis (**Ho_3**). Increase in e-sourcing led to an increase in supply chain performance.

5.2.4 Influence of E-invoicing practices on Supply Chain Performance

The fourth objective sought to establish the influence of E-invoicing practices on supply chain performance. The adoption of E-invoicing sometimes has made institute conduct invoice payment online. The institute uses electronic data interchange to exchange invoices and gives automatic payment reminders. The e-invoicing has reduced delays and promoted timeliness in invoicing settlements by the suppliers, e-invoicing has helped to prevent invoice errors and to enhance accuracy, e-invoicing has highly enhanced data security.

The results of regression analysis showed the coefficient of determination (R squared) of 0.175 showed that 17.5% of supply chain performance was explained by E-invoicing. The results of the study indicated that E-invoicing has a strong substantial impact on supply chain performance (β=0.321 and p value=0.000). The study rejects the null hypothesis (**Ho_4**). Increase in E-invoicing led to an increase in supply chain performance.

5.2.5 Influence of E-payment practices on supply chain performance

The fifth objective sought to establish the influence of E-payment on supply chain performance. Majority of the respondents were undecided that the adoption of E-payment has made suppliers have access to their online supply accounts 24/7, use of

credit and debit cards for payments and use of smart cards for payments. The use of online bank transfers for payment and use of online payment platforms for payment. E-payment has helped to reduce transaction costs and helped the business to reduce to reduce the time taken to pay suppliers. E-payment has helped to increase transparency in the payment process and institute utilizes electronic payment system to settle bills.

From the model, (R^2 = .150) showing that E-payment account for 15% variation in Supply chain performance. The E-payment predictor used in the model captured the variation in the Supply chain performance. From the findings E-payment had positive a significant influence of Supply chain performance (β=0.295 and p value<0.05). An increase in the E-payment, led improvement of Supply chain performance. The null hypothesis (**H_{O4})** rejected. The E-payment had a significant influenced supply chain performance.

5.3 Conclusion

The study concluded that E-tendering had a significant influence on supply chain performance. An increase in e-tendering leads to improvement of supply chain performance. This implies that for each increase in the e-tendering, there was a rise in supply chain performance.

The study concluded that e-ordering had significant influence on supply chain performance. The e-ordering had a positive and significant effect on supply chain performance.

The study concluded that e-sourcing had a significant effect on supply chain performance.

The study concluded that E-invoicing had a strong substantial impact on supply chain

performance. An Increase in E-invoicing led to an increase in supply chain performance.

The study concluded that E-payment predictor used in the model captured the variation in the Supply chain performance. E-payment had positive a significant influence of Supply chain performance. An increase in the E-payment, led improvement of Supply chain performance.

5.4 Recommendations of the Study

The management should ensure that all modules from purchasing Requisition, Quotation/tenders, request for proposals, purchasing order approvals and Transmission, contract monitoring, Goods receipt note.

The e-tendering management ensure effective and efficient tender awarding and also ensure the suitable criteria for contractor selection. The study further recommends that Kenya medical research institute management should adopt and utilize e-tendering to streamline the process of procurement and reduce the costs involved.

It is recommended that in order to achieve maximum benefits of reduced order processing time, reduced costs, reduced human errors and improved delivery, management should enhance electronic system and insist on all orders being processed electronically.

The Government through the relevant ministry should institute policies concerning data handing to enhance the application of electronic procurement practices between the buyers and suppliers. This will improve the electronic payment, and use of electronic signature acceptance.

Further the firms should provide the supplier with access credentials for the supplier

portal. This will increase user's access to information in the electronic procurement process with effective internet and thus an increase in chances of selecting the best supplier for electronic tendering.

The management should work towards ensuring full adoption of electronic invoicing which will in turn improve services offered to customers hence making them more satisfied. In addition, Kenya Medical Research Institute should adopt e-invoicing to reduce costs associated with storage, printing and delivery of paper invoices.

The study found that e-sourcing has moderately increased the market share of the SMEs and improved customer satisfaction. This study therefore recommends that management of Kenya Medical Research Institute should embrace supplier management systems which will help them track their entire suppliers and ensure continuous supply of good hence increasing market share and improving the level of customer satisfaction.

The study recommends adoption of electronic payment by all counties so as to ensure easy, fast and safe transactions hence increasing the level of customer satisfaction. The study further recommends that all Kenya medical research institute should adopt e-payment to improve performance by improving efficiency in payments and reducing errors related to cash transactions.

5.5 Suggestion for Further Studies

The study confirmed that the implementation of e-procurement has a big effect on supply chain performance among Kenya medical research institute. Future researchers should consider conducting a similar study with respect to County and the same can be replicated in other counties as well.

The study recommends further research to document findings on the achievements of e-ordering, e–tendering practice, e-source and e-invoice and e-payment firms. This should cover issues such as cost, time quality and corruption. The study recommends a study to find out the reasons why some of these learning institutions have not incorporated all the procurement activities in E-procurement.

A comparative study will be critical in order to establish whether there are any similarities or differences in the factors leading to success of E-procurement across different industries such as between private and public firms and between medical learning institution and another industry.

REFERENCES

Aduwo, E. B., Ibem, E. O., Uwakonye, O., Tunji-Olayeni, P. F., & Ayo-Vaughan, K. (2016). Barriers to the uptake of e-Procurement in the Nigerian building industry. *Journal of Theoretical and Applied Information Technology*, *89*(1), 133-147.

Afande, F. O. (2015). Constraints to Small and Micro Enterprises' Participation in Public Procurement in Kenya: A Case of Cleaning Services Industry in Nairobi Central Business District. *Journal of Marketing and Consumer Research,* 41-63.

Akoth, A. B. (2015). Kaizen sustainability and operational performance: A case of manufacturing firms in Mombasa County, Kenya. *Unpublished MBA Project.* University of Nairobi.

Alomar, M. A., & Visscher, C. (2017). Which factors can affect e-public procurement adoption by private firms? The case of Belgium. *Electronic Journal of E-Government*, *15*(2), 103-115.

Audu, J. (2018). Technology adoption in Democratic Republic of Congo (DRC): An empirical study investigating factors that influence online shopping adoption. *Doctoral dissertation,* Universitéd' Ottawa/University of Ottawa.

Barasa, W. F., Namusonge, G. & Fredrick, O. (2017). Effects of e-procurement on the organizational performance of County Governments in Kenya: A case study of Bungoma County Government. *International Journal of Recent Research in Commerce Economics and Management*, *4*(4), 161-182.

Barney, J. B. (2001). Resource-based theories of competitive advantage: A ten-year retrospective on the resource-based view. *Journal of management*, *27*(6), 643-650.

Barngetuny, D. C., & Kimutai, G. (2015). Effects of e-procurement on supply chain management performance in Elgeyo-Marakwet County. *International Academic Journal of Procurement and Supply Chain Management*, *1*(5), 99-120.

Batenburg, R. (2007). E-procurement adoption by European firms: A quantitative analysis. *Journal of purchasing and supply management*, *13*(3), 182-192.

Bayo-Moriones, A., & de Cerio, J. M. D. (2002). Human resource management, strategy and operational performance in the Spanish manufacturing industry. *Management,5*(3), 175-199.

Bigsten, A., & Gebreeyesus, M. (2007). The small, the young, and the productive: Determinants of manufacturing firm growth in Ethiopia. *Economic Development and Cultural Change*, *55*(4), 813-840.

Brun, M., 2008, Electronic invoicing to the public sector in Denmark, http:// www.epractice.eu/cases/EID.

Calvin, R.J. (2002). *Entrepreneurial Management.* New York: McGraw-Hill.

Chege, J., Ngui, D. & Kimuyu, P. (2016). Scoping paper on Kenyan manufacturing. *Working Paper No. 25,* Africa Growth Initiative at Brookings.

Chegugu, N. R., & Yusuf, K. G. (2017). Effect of electronic procurement practices on organizational performance in public hospitals in the county government of Uasin Gishu, Kenya. *International Academic Journal of Procurement and Supply Chain Management*, *2*(3), 16-32.

Cooper, D.R., & Schindler, P.S., (2003). *Business research methods.* 8th Edition. Boston:15McGraw-Hill Irwin.

Corina, P. S. (2011). The role of the e-procurement in the purchasing process. *The Annalsof the University of Oradea*, 1, 687-691.

Croom, S. R., & Brandon-Jones, A. (2005). Key issues in e-procurement: procurement implementation and operation in the public sector. *Journal of Public Procurement,5*(3), 367-387.

Das, C. P., & Swain, R. K. (2018). Influence of Capital Structure on Financial Performance. *Parikalpana: KIIT Journal of Management*, *14*(1), 161-186

Donkor, J., Donkor, G. N. A., Kankam-Kwarteng, C., & Aidoo, E. (2018). Innovative capability, strategic goals and financial performance of SMEs in Ghana. *Asia Pacific Journal of Innovation and Entrepreneurship*, *12*(2), 238-254.

Drucker, P. (1985). Innovation and entrepreneurship: principles and practices. *New York: Harper Trade*.

Drucker, P. (2014). *Innovation and entrepreneurship*. Abingdon, United Kingdom: Routledge.

Eadie, W. (2007). Migrating to internet based e- procurement: factors affecting e-procurement adoption and migration at the firm level. *Information and Management, 43*, 204-221.

Eei, K. S., Husain, W., & Mustaffa, N. (2012). Survey on benefits and barriers of e-procurement: Malaysian SMEs perspective. *International Journal on Advanced Science, Engineering and Information Technology*, *2*(6), 424-429.

Epoh, L. R., & Mafini, C. (2018). Green supply chain management in small and medium enterprises: Further empirical thoughts from South Africa. *Journal of Transport and Supply Chain Management*, *12*(1), 1-12.

Gunasekaran, A., McGaughey, R. E., Ngai, E. W., &Rai, B. K. (2009). E-Procurement adoption in the Southcoast SMEs. *International Journal of Production Economics*, *122*(1), 161-175

Hernandez-Ortega, B. (2011). The role of post-use trust in the acceptance of a technology: Drivers and consequences. *Technovation*, *31*(10-11), 523-538.

Hwang, G., Han, S., Jun, S., & Park, J. (2014). Operational performance metrics in manufacturing process: Based on SCOR Model and RFID Technology. *International Journal of Innovation, Management and Technology*, *5*(1), 50-55.

Ibem, E. O., & Laryea, S. (2015). E-procurement use in the South African construction industry. *Journal of Information Technology in Construction*, *4*(2), 364-384.

Ittner, C. D., Larcker, D. F., & Randall, T. (2003). Performance implications of strategic performance measurement in financial services. *International Journal on Advanced Science, Engineering and Information Technology*, *2*(6), 424-429.

Kayanula, D. &Quartey, P. (2012). The Policy Environment for Promoting Small and Medium-Sized Enterprises in Ghana and Malawi. *Information and Management, 43*, 204-221.

Kaynak, H. & Hartley, J. L. (2008). A replication and extension of quality management into the supply chain. *Journal of Operations Management*, *2*(6), 468-489.

Kenya National Bureau of Statistics (2017). *Economic Survey 2017.* Nairobi: KNBS. Retrieved fromhttp://dyerandblaironline.com/

Khaoya, E. M., & Muchelule, Y. (2019). Effect of e-procurement on performance of small and medium size enterprises: a case of Bungoma County. *Strategic Journal of Business & Change Management, 6*(2), 32-54.

Kothari, C. R., (2004). *Research Methodology –Methods and Techniques, 2nd Ed.,* New Age International (P) Ltd., New Delhi.

Kothari, T., Hu, C., & Roehl, W. S. (2005). E-Procurement: an emerging tool for the hotel supply chain management. *International Journal of Hospitality Management*, *24*(3), 369-389.

Madhani, P. M. (2009). Resource based view (RBV) of competitive advantages: Importance, issues and implications. *Indian Management Research Journal*, *1*(2), 01-15.

Masheti, C. (2016). E-procurement practices and operational performance of pharmaceutical manufacturing firms in Nairobi. *Unpublished MBA Project.* University of Nairobi.

McConnell, D. J. (2009). An analysis into the factors affecting the uptake of applications of e-procurement, within the UK public sector. *Journal of Information Technology in Construction, 12*, 103-120.

McCue, C., & Roman, A. V. (2012). E-procurement: Myth or reality. *Journal of Public Procurement, 12*(2), 221-248.

Mikalef, P., Pateli, A., Batenburg, R., & van de Wetering, R. (2013). Investigating the impact of procurement alignment on supply chain management performance. *Procedia Technology,* 9, 310-319.

Mose, M., Njihia, M. & Magutu, P. (2013). The Critical Success Factors and Challenges in E-procurement Adoption among Large Scale Manufacturing Firms in Nairobi, Kenya. *European Scientific Journal*, *9*(13), 21-34.

Mugenda, O.M & Mugenda, A.G. (2003). *Research Methods*. Nairobi: Acts Press.

Munyao, J. M., & Moronge, M. (2018). Influence of e-procurement practices on the performance of procurement in public universities in Kenya. *Strategic Journal of Business & Change Management, 5*(2), 1623-1628.

Myers, J. L., Well, A. D., & Lorch Jr, R. F. (2013). *Research design and statistical analysis*. New York: Routledge.

Nganga, K. S. (2017). The impact of e-procurement on operational performance of parastatals in the ministry of energy in Kenya. *Unpublished MBA Project.* University of Nairobi.

Nyakundi, M.G. (2018). Procurement Best Practices and Procurement Performance of SMEs in Nairobi County. *International Business and Global Economy*, 37, 421-435.

Oh, S., Yang, H., & Kim, S. W. (2014). Managerial capabilities of information technology and firm performance: role of e-procurement system type. *International Journal ofProduction Research, 52*(15), 4488-4506.

Olson, E. M., Slater, S. F., & Hult, G. T. M. (2005). The performance implications of fit among business strategy, marketing organization structure, and strategic behavior. *Journal of marketing*, *69*(3), 49-65.

Oniszczuk-Jastrząbek, A., Dębicka, O., Czuba, T., & Czechowski, P. O. (2018). Innovation as a determinant of SMEs competitiveness in Poland. *International Business and Global Economy*, 37, 421-435.

Papanek, G. F. (1962). The Development of Entrepreneurship. *American Economic Review*, *52*(2), 46-8.

Petersen, K. J., Handfield, R. B., & Ragatz, G. L. (2003). A model of supplier integration into new product development. *Journal of product innovation management*, *20*(4), 284-299.

Purchase, S., & Dooley, K. (2010). The acceptance and use of e-procurement systems. *International Journal of Logistics: Research and Applications*, *13*(6), 459-473.

Quesada, G., González, M. E., Mueller, J., & Mueller, R. (2010). Impact of e-procurement on procurement practices and performance. *An International Journal, 17*(4), 516- 538.

Raphaeli, O., Berman, S., & Fink, L. (2015). E-business value creation from a resource-based perspective: A review of the last decade of empirical research. *Foundationsand Trends® in Information Systems*, *1*(1), 1-68.

Römer, A., Pache, M., Weißhahn, G., Lindemann, U., & Hacker, W. (2001). Effort-saving product representations in design—results of a questionnaire survey. *Design studies*, *22*(6), 473-491.

Rotich, G. K., & Okello, B. (2015). Analysis of use of e-procurement on performance of e-procurement functions of County Governments in Kenya. *International Journal of Economics, Commerce and Management, 3*(6), 1381-1398.

Selase, A. M., Selase, A. E., Ayishetu, A. R., Comfort, A. D., Stanley, A., & Ebenezer, G. A. (2019). Impact of Technology Adoption and Its Utilization on SMEs in Ghana. *International Journal of Small and Medium Enterprises*, *2*(2), 1-13.

Shukla, A., Khan, M. A., & Shah, M. (2016). Literature review of adoption of e-procurement practices by construction industries. *AIMA Journal of Management &Research, 10*(2), 01-25.

Singh, I., & Punia, D. K. (2011). Employee's adoption of e-procurement system: an empirical study. arXiv preprint arXiv: 1112.2699.

Sitienei, G. (2018). *Micro, Small & Medium-Sized Enterprises Day (27th June, 2018)*. Retrieved from https://uonlibrary.uonbi.ac.ke/ node/395262

Smart, A. F. (2010). E-procurement and its impact on supply management–evidence fromindustrial case studies. *International Journal of Logistics: Research and Applications, 13*(6), 423-440.

Songip, A.R., Lau, B. H., Jusoff, K. & Ramli, H.N. (2013). A Working Integrated Model for the Diffusion of Construction Innovation. *American Journal of Applied Sciences*, *10*(2), 23-38

Subramaniam, Q. S. (2006). Impact of B2B E-procurement System A Summary Report. *American Journal of Applied Sciences, 10*(2), 23-38

Sunday, A., Rebecca, K., Dorothy, K., & Eric, M. (2018). Access to Micro-Credit and the Growth of Small and Medium Enterprises (SMEs) In Uganda. *International Journal of Research*, *5*(12), 1767-1775.

Teo, T. S., & Lai, K. H. (2009). Usage and performance impact of electronic procurement. *Journal of Business Logistics, 30*(2), 125-139.

Tiwari, S. T. S., Chan, S. W., Ahmad, M. F., & Zaman, I. (2019). Application and Implementation of E-Procurement Technologies in Malaysian Manufacturing Firm. *Int. J Sup. Chain. Mgt, 8*(2), 923-929.

Vaidyanathan, G., & Devaraj, S. (2008). The role of quality in e-procurement performance:An empirical analysis. *Journal of Operations Management, 26*(3), 407-425.

Vencataya, L. (2011). *An assessment of the operational performance of supermarkets in Mauritius.* University of Mauritius

Voss, C. A., Åhlström, P., & Blackmon, K. (1997). Benchmarking and operational performance: some empirical results. *International Journal of Operations & Production Management, 17*(10), 1046-1058.

Waganda, A. (2018). Effect of electronic procurement on performance of United Nations agencies in Nairobi: a study of selected UN agencies in Nairobi. *International Business and Global Economy*, 37, 421-435.

Were, A. (2016). *Manufacturing in Kenya: Features, challenges and opportunities. A scoping exercise.* Overseas Development Institute

APPENDICES

Appendix I: Letter of Introduction

Dear respondent,

Master student at Moi University. I am undertaking a study entitled, '**INFLUENCE OF E-PROCUREMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE OF KENYA MEDICAL RESEARCH INSTITUTE'.** You have been identified as one of the respondents for this study. Kindly assist me in filling this questionnaire. Your responses were treated with utmost confidentiality and was used for purposes of this study only.

Thank you.

Appendix II: Questionnaire

Instructions
Please tick (√) or fill in the blanks as appropriate and respond to all items.
Section A: Background Information

1. Gender; Male [ ] Female [ ]

2. Age; 21 –30 [ ] 31-40 [ ] 41-50 [ ] 51 and above [ ]

3. Level of Education; KCSE [ ] College [ ] University [ ]

4. Professional qualifications; Certificate [ ] Diploma [ ] Higher Diploma [ ]

Degree[ ]

5. How long have you worked with the institute?

0-5[ ] 5-10[ ] 10-15 [ ] 15-20 [ ] Over 20 years [ ]

Section B: Supply Chain performance

6. The following statements about supply chain performance in your institute. Kindly indicate your level of agreement or disagreement with each of the statements using the following scale: where **1** = Strongly Disagree **(SD); 2** = Disagree **(D); 3** = Neutral **(N); 4** = Agree **(A);** and **5** = Strongly Agree **(SA),**

No.	**Statements**	**SD**	**D**	**N**	**A**	**SA**
a)	Reduces purchasing cost					
b)	Improves efficiency and time taken to complete procurement process					
c)	Standardizes purchasing process across the organization					
d)	Facilitates real time response to suppliers and customers					
e)	Reduces discretion & increases transparency					
f)	Improves supply chain managers decision making					
g)	Improvement in quality of products/ service					
h)	E-procurement improves the flow of information					
i)	Less complaints from stakeholders and customers					
j)	Reduction in errors of order transmission					
k)	Reduces procurement corruption					
l)	Reduction in inventory					

Section C: E-tendering

7. The following statements about e-tendering in your institute. Kindly indicate your level of agreement or disagreement with each of the statements using the following scale: where **1** = Strongly Disagree **(SD); 2** = Disagree **(D); 3** = Neutral **(N); 4** = Agree **(A);** and **5** = Strongly Agree **(SA)**

No.	**Statements**	**SD**	**D**	**N**	**A**	**SA**
a)	Online screening and selection of suppliers					
b)	Prepare and publish tenders online					
c)	Online supplier performance assessments					
d)	There are historical bid submissions					
e)	Online supplier contract management					
f)	Suppliers are able to access tenders/quotation/requests any time anywhere in the world					
g)	Tender documents cannot be accessed by unauthorized person					
h)	Alteration of tender documents is impossible or easy to detect.					
i)	Neither party can deny sending or receiving documents					
j)	Reduces tender processing time.					

Section D: E-ordering

8. The following statements about e-ordering in your institute. Kindly indicate your level of agreement or disagreement with each of the statements using the following scale: where **1** = Strongly Disagree **(SD); 2** = Disagree **(D**); **3** = Neutral (**N); 4** = Agree **(A);** and **5** = Strongly Agree **(SA)**

No.	**Statements**	**SD**	**D**	**N**	**A**	**SA**
a)	Use of online order management system					
b)	Use of online customized order forms					
c)	Assists to monitor order due dates					
d)	All the purchase requisitions are done online					
e)	Timely order requisitions and uploading of orders					
f)	Prompt approval of orders					
g)	Dispatch of purchase orders are done online					
h)	Notification of receipt by the system					
i)	Reduces order processing time.					

Section E: E-Sourcing

9. The following statements about E-sourcing in your institute. Kindly indicate your level of agreement or disagreement with each of the statements using the following scale: where **1** = Strongly Disagree (**SD); 2** = Disagree **(D); 3** = Neutral **(N)**; **4** = Agree **(A);** and **5** = Strongly Agree **(SA)**

No.	**Statements**	**SD**	**D**	**N**	**A**	**SA**
a)	Electronic search for new suppliers					
b)	Ability of e-procurement system to interaction with international, regional and local suppliers					
c)	Pre-qualified suppliers have online access to key information					
d)	Online requests for quotations					
e)	Offers online bidding					
f)	Standardized, timely, online communication to suppliers					
g)	Ability of the e-procurement system to evaluate suppliers					
h)	E-sourcing has offered cost efficient means of sourcing goods.					
i)	E-sourcing has helped to reduce delays in the sourcing process					

Section F: E-invoicing

10. The following statements about E-invoicing in your institute. Kindly indicate your level of agreement or disagreement with each of the statements using the following scale: where **1** = Strongly Disagree (**SD**); **2** = Disagree **(D); 3** = Neutral **(N); 4** = Agree (**A);** and **5** = Strongly Agree **(SA)**

	Statements	**SD**	**D**	**N**	**A**	**SA**
a)	Institute conducts invoice payment online					
b)	The adoption of e-invoicing adversely impacts transactional cost.					
c)	Institute uses electronic data interchange to exchange invoices,					
d)	Gives automatic payment reminders					
e)	Offer late payment online notifications					
f)	The e-invoicing has reduced delays and promoted timeliness in invoicing settlements by the suppliers.					
g)	The e-invoicing has helped to prevent invoice errors and to enhance accuracy.					
h)	E-invoicing has highly enhanced data security					

Section G: E-Payment

11. The following statements about E-payment in your institute. Kindly indicate your level of agreement or disagreement with each of the statements using the following scale: where **1** = Strongly Disagree (**SD**); **2** = Disagree **(D); 3** = Neutral **(N); 4** = Agree (**A);** and **5** = Strongly Agree **(SA)**

	Statements	**SD**	**D**	**N**	**A**	**SA**
a)	Suppliers have access to their online supply accounts 24/7					
b)	Use of credit and debit cards for payments					
c)	Use of smart cards for payments					
d)	Use of online bank transfers for payment					
e)	Use of online payment platforms for payment					
f)	E-payment has helped to reduce transaction costs.					
g)	E-payment has helped the business to reduce to reduce the time taken to pay suppliers.					
h)	E-payment has helped to increase transparency in the payment process.					
i)	Institute utilizes electronic payment system to settle bills.					
j)	Electronic fund transfer payment assists to transfer money to the supplier's account.					