

**E-PROCUREMENT AND SUPPLY CHAIN PERFORMANCE OF
PUBLIC HOSPITALS IN KIAMBU COUNTY**

FRENA NYASETIA

SUPERVISOR MICHAEL CHIRCHIR

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF
THE REQUIREMENTS FOR THE AWARD OF MASTER OF BUSINESS
ADMINISTRATION, SCHOOL OF BUSINESS UNIVERSITY OF NAIROBI**

2019

DECLARATION

STUDENT'S DECLARATION

I declare that this project is my original work and has never been submitted for a degree in any other university or college for examination/academic purposes.

Signature:Date:.....

FRENA NYASETIA

D61/77046/2015

SUPERVISOR

This research project has been submitted for examination with my approval as the University Supervisor.

Signature.....Date.....

MICHAEL CHIRCHIR

Lecturer, Department of Management Science

School of Business, University of Nairobi

DEDICATION

I dedicate this work to the lord Almighty and also my family for the immense support and encouragement all throughout this project.

ACKNOWLEDEMENT

First and foremost I give sincere thanks to the Lord Almighty for the gift of life, strength, courage, wisdom and good health to reach this stage of my studies and the ability to compile this report.

I sincerely thank my supervisor Michael Chirchir who made my work easier to tackle, his devotion and clear guidance made it both interesting and enjoyable in doing the research project.

My appreciation goes to the head of Supply Chain and E procurement departments of the Public hospitals in Kiambu County who offered me support in terms of allowing me access and providing me with the information I needed.

To my family I really appreciate the prayers, support and encouragement during the entire duration of my studies especially the difficult moments when I felt like quitting.

My gratitude also goes to my other fellow students at the University of Nairobi for their support and effort in obtaining relevant information and exchange of ideas in order to develop a quality piece of work.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDEMENT.....	iv
LIST OF TABLES.....	viii
ABBREVIATIONS AND ACRONYMS.....	ix
ABSTRACT	x
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background of the Study	1
1.1.1 E-Procurement	2
1.1.2 Supply Chain Performance.....	4
1.1.3 Public Hospitals in Kiambu County	6
1.2 Research Problem.....	7
1.3 Research Objectives	10
1.4 Value of the Study.....	10
CHAPTER TWO: LITERATURE REVIEW	12
2.1 Introduction.....	12
2.2 Theoretical Literature Review	12
2.2.1 Principal-Agent Theory.....	12
2.2.2 Dynamic Capabilities Theory.....	13
2.3 E-Procurement in Public Sector.....	15
2.4 Supply Chain Performance	17
2.5 Empirical Literature Review.....	18
2.6 Summary of Literature Review.....	23

2.7 Conceptual Framework	30
CHAPTER THREE: RESEARCH METHODOLOGY	31
3.1 Introduction.....	31
3.2 Research Design.....	31
3.3 Population	31
3.4 Data Collection	32
3.5 Data Analysis	32
CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION.....	35
4.1 Introduction.....	35
4.1.1 Response Rate	35
4.1.2 Reliability Analysis.....	36
4.2 Background Information	36
4.2.1 Respondents' Gender	37
4.2.2 Respondents' Age Bracket	37
4.2.3 Respondents' Academic Qualifications	38
4.3 Extent of E-procurement among Public Hospitals.....	39
4.4 Impact of E-Procurement on Supply Chain Performance of Public Hospitals..	41
4.4.1 Quality.....	41
4.4.2 Dependability	45
4.4.3 Timeliness	48
4.5 Inferential Statistics	53
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS	57

5.1 Introduction.....	57
5.2 Summary	57
5.3 Conclusion	59
5.4 Recommendations	60
5.5 Limitation of the Study.....	61
5.6 Suggestions for Further Study	62
REFERENCES	63
APPENDICES	69
Appendix I: Introduction Letter.....	69
Appendix II: Research Questionnaire for Supply Chain Manager	70
Appendix III: Research Questionnaire for Users of E-Procurement System.....	74
Appendix IV: List of Hospitals in Kiambu County	78

LIST OF TABLES

Table 3. 1: Summary of Data Collection and Data Analysis	33
Table 4.1: Response Rate.....	35
Table 4.2: Reliability Analysis.....	36
Table 4.3: Respondents' Gender	37
Table 4.4: Respondents' Age Bracket	37
Table 4.5: Respondents' Academic Qualifications	38
Table 4.6: Extent to Which Public Hospitals Implement Aspects of E-Procurement.	39
Table 4.7: Regression Coefficients.....	41
Table 4. 8: Model Summary	43
Table 4.9: Analysis of Variance (ANOVA).....	44
Table 4.10: Regression Coefficients.....	45
Table 4.11: Model Summary	47
Table 4.12: Analysis of Variance (ANOVA).....	47
Table 4.13: Regression Coefficients.....	49
Table 4. 14: Model Summary.....	51
Table 4.15: Analysis of Variance (ANOVA).....	51
Table 4.16: Regression Coefficients.....	53
Table 4. 17: Model Summary.....	55
Table 4.18: Analysis of Variance (ANOVA).....	56

ABBREVIATIONS AND ACRONYMS

EAPCC	East African Portland Cement Company
EDI	Electronic Data Interchange
ERP	Enterprise Resource Planning
ICTS	Information and Communication Technologies
IFMIS	Integrated Financial Management Information System
KPIs	Key Performance Indicator
KPMG	Klynveld Peat Marwick Goerdeler
Pe-P	Participatory Electronic Procurement
RFQ	Request For Quotations

ABSTRACT

E-Procurement among public hospitals marked progress in many areas over the past decades. 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 influence of e-Procurement on supply chain performance of public hospitals in Kiambu County. The study was guided by the following specific objectives: to determine the extent of e-procurement adoption among public hospitals in Kiambu County and to establish the influence of e-procurement on supply chain performance of public hospitals in Kiambu County. The study was anchored on; Principal-Agent theory and the dynamic capability theory. This study employed descriptive survey research design. In this study, the population consisted of public hospitals in Kiambu County. Kiambu County has 59 facilities (Appendix II) classified in the following tiers: Tier 5- Inter-county facility (1), Tier 4 -Hospitals (19) and Tier 3 -Health Centres (39). Since the target population is not too large, a census was carried out. The study used primary data. Questionnaires and observation schedule were used to collect data. The quantitative data collected was analyzed using descriptive statistics such as includes frequency, percentages, mean and standard deviation. Data analysis was done with help of software program SPSS version 25.0. Content analysis was used in processing of qualitative data from open ended questions and results presented in prose form. Further, a multivariate regression model and correlation were applied to determine the relative importance of each of the variables with respect to e-Procurement. The findings reveal that the public hospitals implemented the allocation of responsibility, advertising, supplier involvement and sourcing projects per month. On the influence of e-procurement on quality of supply chain performance, the study found that the paperwork is minimal. Furthermore, on the influence of e-procurement on dependability of supply chain, the study found that e-procurement increases productivity. Concerning the impact of e-procurement on timeliness of supply chain, the study found that e-procurement encourages use of technology. The study concluded that e-planning practice had the greatest influence on the supply chain performance of public hospitals in Kiambu County, followed by e-sourcing then e-supplier selection practice while e-tendering practice had the least influence on the supply chain performance of public hospitals in Kiambu County. The study recommends that public hospitals management should consider implementing e-procurement system in their respective organizations for the smooth running of the supply chain. The resistant staff should be trained enough to see the importance of e-procurement in the promotion of supply chain performance. The government through the relevant ministry should institute policies concerning data handling to enhance the application of electronic procurement practices between the buyers and suppliers. Time was a major challenge the researcher faced in the course of doing this study. Another challenge faced was the administration of the questionnaires and scarcity of funds. Future researchers should consider conducting a similar study with respect to public hospitals within Nairobi 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-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing to firms.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The establishment and application of procurement function in various organizations have been considered a significant aspect of determining performance of the organizations. Globally, e-procurement has gained popularity especially with the advent of technology. Through the internet, organizations today can cultivate long term and good working relationship with customers and the suppliers. The advancement in technology has ushered in new changes in the field of procurement (Van Weele, 2015). The rapid advancement in technology has enabled organizations to adopt e-procurement practices. Electronic procurement has therefore emerged as a key enabler in supply chain processes (Handfield, Monczka, Giunipero & Patterson, 2019). In United States of America for instance, rapid development of e-procurement was reported in early 2000 just before the recession.

In Malaysia, the government at some point issued a statement calling for all suppliers to use the e-procurement system. Kaliannan, Awang and Raman (2014) point out that Malaysian public sector is going through a rapid change especially as far as adoption of technology is concerned. Adoption of e-government and particularly e-procurement is inevitable for the government. Instead of satisfying requirements for goods, works, systems, and services in a timely manner the Kenya procurement system has proved to be long, cumbersome and time consuming. This procurement system has several deficiencies that contributed to huge losses in public funds. E-procurement involves the use of internet based (integrated) information and communication technologies (ICTS) to carry out individual or all stages of the procurement process. While there

are various forms of e-Procurement that concentrate on one or many stages of the procurement process such as e-tendering, e-marketplace, e-auction/reverse auction, and e-catalogue/purchasing, e-procurement can be viewed more broadly as an end-to-end solution that integrates and streamlines many procurement processes throughout the organization (Yossuf, 2011).

The study was hinged on principal-agent theory and the dynamic capabilities theory. Agency theory was developed by Ross and Mitnick (1970) and it is concerned with agency relationships. The important assumptions underlying agency theory is that; potential goal conflicts exist between principals and agents; each party acts in its own self-interest; information asymmetry frequently exists between principals and agents; agents are more risk averse than the principal; and efficiency is the effectiveness criterion. The two parties have an agency relationship when they cooperate and engage in an association wherein one party (the principal) delegates decisions and/or work to another (an agent) act on its behalf. The dynamic capability theory was developed Teece, Pisano and Shuen (1997). Dynamic capabilities theory refers to the ability to effectively adapt and respond to changes in the environment. An organisation should effectively and timely react to changes in its environment. This requires the adoption of different strategies that will harness multiple capabilities of the organisation and put them into use.

1.1.1 E-Procurement

E-procurement is the business-to-business or business-to-consumer or business-to-government purchase and sale of supplies, work, and services through the Internet as well as other information and networking systems, such as electronic data interchange and enterprise resource planning (Yossuf *et al.*, 2011). 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 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 into a virtual trading environment. Organizational characteristics and organizational influences' are significant motivators to the use of e-procurement (Van Weele, 2015). Compliance by internal users is critical to the achievement of cost and efficiency gains from electronic procurement, and therefore internal customer satisfaction should be a key concern in the development, adoption and deployment of such systems. In other words, the level of compliance with e-procurement is strongly influenced by the general disposition of the organization as a whole to either electronic process redesign or the desire to gain perceived benefits from electronic procurement (Soeters *et al.*, 2014).

Implementation of e-procurement can impact organizations buying behavior such as their buying process, selection criteria and the buying center. The buying process often is described as a sequential process with separate stages, steps, or phases of buying activities that take place from the time that a need arises to the actual purchase and subsequent evaluation. E-procurement will change procurement processes leading to procurement efficiency in an organization. Kingori (2013) postulates that, there exists a strong relationship between e-Procurement, the levels of ICT expertise and the levels of e-Procurement application. This indicates that the procurement efficiency highly correlated with e-Procurement applications.

The implementation of e-Procurement initiatives should be seen as an effort to improve the procurement goals, which normally include quality; timeliness; cost;

minimizing business, financial and technical risks; maximizing competition; and maintaining integrity (Thai, 2017). In a similar vein; cost, quality, program management progress measures (on-time, on-budget, and issue management), process performance factors, and Return on Investment as the most relevant measurements. There remains, however, the challenge of controlling the range of variables required to reap the benefits of e-Procurement. It should be remembered that because an e-Procurement initiative is expensive, demanding upon staff, and time consuming, it may take several years for public sector agencies to fully reap the strategic and operational benefits of e-Procurement (Hardy & Williams, 2015).

The stages of e procurement include 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, supplier selection where every business needs to determine where to get their goods and Price and terms: once a supplier is chosen, companies should stick with that relationship and try to establish the best price and specific terms, e-tendering which is an internet based process wherein the complete tendering process; from advertising to receiving and submitting tender-related information are done online and E-sourcing which is the process of obtaining bids from different suppliers via a single online portal (Neef, 2016).

1.1.2 Supply Chain Performance

Srinivasan et al. (2016) defined supply chain performance for a firm as the performance of the various processes included within the firm's supply chain function. Supply chain performance is the entire chain's ability to meet end-customer

needs through product availability and responsive, on-time delivery. Supply chain performance crosses both functional lines and company boundaries (Van Weele, 2015). Functional groups (engineering, manufacturing, and sales/marketing) are all instrumental in designing, building, and selling products most efficiently for the supply chain, and traditional company boundaries are changing as companies discover new ways of working together to achieve the ultimate supply chain goal: the ability to fill customer orders faster and more efficiently than the competition. Performance measures of supply chain performance for each company are treated very differently and it is subjective to individual company (Kleijnen & Smits, 2014).

Supply chain performance measures (quality, dependability and timeliness) are used to determine the efficiency and effectiveness of an existing system, or to compare competing alternative systems. Critical operations performance objectives are crucial factors that are strategically important to organizations. Being strategically important means that the performance objectives have to be considered as strategic goals to be achieved and the primary aim of the operations function is to deploy the appropriate resources to support the achievement of those goals. Typically, the operations performance objectives are specifically related to satisfying customers' requirements. When talking about performance management, you cannot leave aside two concepts: effectiveness and efficiency. Both are components of performance, which are addressed in different ways according to the subject or discipline to be investigated (Wanke, *et al.*, 2016).

1.1.3 Public Hospitals in Kiambu County

The County Government of Kiambu is responsible for County health services, pharmacies, and ambulance services, promotion of primary health care, licensing and control of undertakings that sell food to public, cemeteries, funeral parlors and waste disposal. The County Health Office, Kiambu is located in Thika Town, north of Kenya's capital city Nairobi. It's accessible through the road, rail and even by air using small chartered planes. It is housed in the former Directorate of Health building. The department is charged with the responsibilities of overseeing health related issues in terms of management, supervisory duties. Kiambu County has a total of 59 health facilities spread across the county.

Under the public facilities, the county has one level-five hospital namely Thika District Hospital, three level-4 in Gatundu South, Kiambaa and Kikuyu Constituencies, four level-three in Gatundu North, Juja, Kiambaa and Limuru Constituencies. There are 20 level-two (Health Centres) and 54 level-ones also known as dispensaries which are well distributed within the county. This will make Kenya a more attractive destination for investment. Kenya takes great pride in being the first African country to automate end-to-end procurement and payment processes in a devolved government system (Maskin, 2014).

The Kenya Health Policy (2014-2030) indicates that the government under the Ministry of Health works closely with public hospitals to ensure that goods and services are delivered on time in order to provide quality health care services to the citizens. According to the Kenya Constitution (2010) the Mandate of the Ministry of Health is to formulate policies, set standards, provide health services, create an enabling environment and regulate the provision of health service delivery.

Devolution of the health sector in Kenya is facing several challenges. The devolution of health workers to county management occurred under myriad of problems and resistance by the health workers. To date the country has witnessed several strikes by health workers in different counties as well as resignation of some health workers, especially doctors. It has also witnessed inequitable distribution of available health workforce due to health workers leaving certain counties in favor of others that have better working conditions.

Other problems include but are not limited to shortage of health care workers, loss of skilled workers to the private sector and other countries that offer better financial packages, lack of career opportunities as well as education opportunities, the lack of clarity in the due process for the transfer of health care workers in between counties, promotion of health workers, devolving of HRH records and administration of the HRH pension among others (Transparency International, 2015).

1.2 Research Problem

E-Procurement among public hospitals marked progress in many areas over the past decades. 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 (Snider & Rendon, 2016). However, Kenya continues to grapple with challenging health problems and issues of health service delivery. The healthcare sector in Kenya has been on the growing trajectory because of the continuous increase in demand for healthcare. Competition among public hospitals in Kenya has emerged and therefore

technology has been embraced in terms of providing efficient world class health services to patients (Kingori, 2013).

Despite efforts by public hospitals in Kiambu County to engage in e-procurement good practices there have been challenges in its utilization and implementation. Procurement officers of many organizations have adopted new strategies like e-auctioning and e-tendering in an attempt to achieve sound supply chain performances (Maskin, 2014). However, the adoption of these new technologies, such as use of the internet to source for suppliers as well as purchasing goods and services by firms has often proved to be reactive rather than proactive and its application affected on several occasions hence organizations' supply performances have continuously declined (Van Weele, 2015). Other challenges facing the public hospitals in Kiambu County are how to reduce their supply chain cost, drugs shortage, data shortage, inadequate supply chains integration and Poor Workflow Design. Trying to manage complexity of supply chains in an unsystematic, piecemeal and non-strategic way has resulted in sub optimal outcomes, waste of resources and loss of lives hence the effective planning of emergency, the management of supply chains in times of crisis is required in minimizing complexities in the supply chain to address and implement better response (Nyamasege & Biraori, 2015).

Globally, Nurmandi and Kim (2015) assessed making e-procurement work in a decentralized procurement system: a comparison of three Indonesian cities. The findings show that human resources are the pivotal factors that determine the performance of local e-procurement in the cities. Fernandes and Vieira (2015) examined public e-procurement impacts in small-and medium-enterprise. The study found that P e-P had a contagious effect on surveyed SME subcontractors supply

chain. Also Jayden (2018) conducted a study on factors influencing implementation of e- procurement focusing on a case study of small and medium size businesses in London United Kingdom where the study found that skills, supplier compatibility and the cost of systems infrastructure influence the implementation of E-procurement.

Locally, Mwangela (2014) carried out a study on the link between e-procurement and supply chain performance where the study found that the implementation through purchasing, installation and maintenance of various e-procurement software applications are expensive to manage for firms and therefore impediment to their full uptake for improved systems on supply chains. Songok (2018) also did a study on e-procurement and performance of public universities in Kenya, where the study found that that public universities to a moderate extent experience challenges like resistance to change by staff, high costs of implementation of e-procurement and high costs of training staff. Oliech and Mwangangi (2019) assessed the effect of strategic procurement management on performance of level five hospitals in Kenya, where the study found that e-procurement contributed to improved customer satisfaction by improving employee contribution through e-procurement performance. The study also found that influence of improved information transmission and user access to the procurement process through the adoption e-procurement had a significant impact on the configuration and structure of supply chains.

The reviewed studies mostly focused on private sector and did not focus on health sector. However, none of the studies focused on establishing the influence of e-Procurement on supply chain performance of public hospitals in Kiambu County creating a research gap that this study sought to bridge. This study sought to establish influence of e-Procurement on supply chain performance of public hospitals in

Kiambu County. The study therefore sought answers to the following research question: What is the influence of e-Procurement on supply chain performance of public hospitals in Kiambu County?

1.3 Research Objectives

The objective of the study was to establish influence of e-Procurement on supply chain performance of public hospitals in Kiambu County. The study was guided by the following specific objectives to;

- i. To determine the extent of e-procurement adoption among public hospitals in Kiambu County.
- ii. To establish the influence of e-procurement on supply chain performance of public hospitals in Kiambu County.

1.4 Value of the Study

The public hospitals in Kiambu County would benefit from as it would create awareness of the benefits of e procurement and as a result there would be more emphasis on this by the county government. The study findings would benefit management public hospitals in Kiambu County 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 public hospitals in Kiambu County that would enable them to effectively offer their services to the public.

The study would also help the government and policy makers in making decisions on policy regarding e-procurement and integration of public sector and government procurement systems. 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 economic strategy.

To scholars and academicians, the study was significant as it would provide them with valuable information in areas of interests as well as areas for further research. The findings of the study would be of importance to both theory and practice. To practice, it would enhance policy making and stakeholders in the public sector by establishing the relationship between e-Procurement on supply chain performance of public hospitals.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents literature relating to the e-Procurement and supply chain performance. The chapter contains the theories, e-Procurement, empirical literature review and challenges facing implementation e-procurement, the summary and the conceptual framework.

2.2 Theoretical Literature Review

The study was anchored on; Principal-Agent theory and the dynamic capability theory. Agency theory is relevant because it explains that a risk-sharing problem arises when principals and agents have different attitudes towards risk that cause disagreements about actions to be taken while the dynamic capability theory is relevant because it focuses on the survival of an organisation in the event of rapid changes. The main theory was dynamic capability theory as it summed the need for e-procurement as a business strategy for public hospitals.

2.2.1 Principal-Agent Theory

Principal-Agent theory was developed by Ross and Mitnick (1970). It is concerned with agency relationships. The two parties have an agency relationship when they cooperate and engage in an association wherein one party (the principal) delegates decisions and/or work to another (an agent) act on its behalf (Eisenhardt, 2014). The important assumptions underlying agency theory is that; potential goal conflicts exist between principals and agents; each party acts in its own self-interest; information asymmetry frequently exists between principals and agents; agents are more risk

averse than the principal; and efficiency is the effectiveness criterion. Two potential problems stemming from these assumptions may arise in agency relationships: an agency problem and a risk-sharing problem. An agency problem appears when agents' goals differ from the principals' and it is difficult or expensive to verify whether agents have appropriately performed the delegated work (moral hazard). This problem also arises when it is difficult or expensive to verify that agents have the expertise to perform the delegated work (adverse selection) that they claim to have. A risk-sharing problem arises when principals and agents have different attitudes towards risk that cause disagreements about actions to be taken.

The assumptions and prescriptions of agency theory fit naturally with the issues inherent in supply chain performance. In the process of managing supplier quality, buyers in agency relations are faced with potential problems. By their nature, buyers expect suppliers to provide good quality and to improve the quality of supplied products and/or services, but suppliers may be reluctant to invest substantially in quality, especially if they perceive that buyers are reaping all the benefits. The difference between buyers and suppliers will result in the two parties concerning themselves only with their self-interests (Eisenhardt, 2014).

2.2.2 Dynamic Capabilities Theory

The aspect of dynamic capability was first coined by Teece, Pisano and Shuen in 1997. The theory describes an organization's ability to deliberately organize its resources in an effort to improve performance. According to Chien and Tsai (2016), dynamic capability refers to the ability to effectively adapt and respond to changes in the environment. An organisation should effectively and timely react to changes in its environment. This requires the adoption of different strategies that will harness

multiple capabilities of the organisation and put them into use. This will give the company the ability to integrate, develop and leverage on the environmental competitive advantage. Indeed, the current business world is very dynamic. Changes ranging from organizational structures, culture, marketing and customer's tastes and preferences are taking a different path. As such, organisations should have the ability to respond to these changes in the most effective manner (Chen & Tsai, 2012). The dynamic capability theory asserts that only organisations able to achieve this will actually be able to break even in this competitive world.

This theory insists on the key issues surrounding this sustainable competition. It focuses on the survival of an organisation in the event of rapid changes. This is a trait senior manager in high end organisations ought to understand in order to keep all stakeholders happy during these tough and dynamic times. This theory is related to the subject matter since public hospitals today are in a market that is highly dynamic and competitive. Changes in marketing strategy, organizational structure as well as tastes and preferences among customers is prevalent. Evidently, e-procurement integrates the in-house and external procurement components to address dynamics in the way organisations achieve operational excellence by reducing cost and saving on time used to procure goods (Kalau, 2016). Additionally, e-procurement will have a supply chain system that is up to date as far as trends in the market is concerned. This, in itself, equally implies that the organization's capabilities remain dynamic. Based on this, the study chose to include this theory as it best explained the need to have e-procurement as a business strategy for public hospitals.

2.3 E-Procurement in Public Sector

E-Procurement is the application of information technology with a view to creating a procurement process which satisfies the dynamics within the environment. All counties will embrace the electronic procurement concept. E-procurement applications are to attend to one of the three core elements of procurement functions, for example, indirect/direct procurement as well as sourcing (Saprikis, 2013). The reasons why county governments embrace digital procurement processes is to improve the adaptability of operations and strategies and the enhancement of technical versatility and environmental flexibility (Neef, 2016).

This orientation has the outcome of determining innovative and optional procurement systems that offer tangible business benefits to the localized governments. E-Procurement seats at the core of this, and the possible benefits to be obtained from the adoption of electronic procurement have triggered a substantial amount of debate across research that's been published (Amit & Zott, 2015). In the long run, the objective of e-procurement is to harness Internet technologies to create a digital trading platform that brings together county governments and vendors. E-procurement is a digital procurement environment that supports engagement among multiple buyers and multiple sellers, and it lets county authorities operate as independent purchasing entities within one buying organization (Oyediran & Akintola, 2011).

The elements of electronic procurement are e-planning practice, e-supplier selection practice, e-tendering practice and e-sourcing. 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 (Alexander, 2016). Documentation is core to the planning role

and they have to meet standards in terms of confidentiality, authenticity and for future reference. The e-tools such as intranet, optical scanners, e-forms submission are used to improve efficiency in their service delivery and achieve their goals (Gil-García & Martinez-Moyano, 2017).

E-tendering is an internet-based process wherein the complete tendering process; from advertising to receiving and submitting tender-related information are done online. This enables firms to be more efficient as paper-based transactions are reduced or eliminated, facilitating for a more speedy exchange of information (Oyediran & Akintola, 2011). Data exchanged through e-tendering is more concerned with product and services. The system allows the screening and selecting of suppliers. Currently organizations are practicing e-tendering as one of the mechanisms to cut costs. Through e-tendering the organization generates wealth through electronics business (Amit & Zott, 2015).

Supplier selection is the process of selecting a supplier to acquire the necessary materials to support the outputs of organisations. The effects of poor supplier selection become apparent as an entity grows because it also comes to rely on outsourcing services for its core activities (Chan & Lee, 2018). A number of enhancements in practices of selecting suppliers can bring about a downstream effect in the supply chain. This is also because of the increase in the number of suppliers eligible for selection including the international and regional ones due to the market globalization effect through web-based practices of procurement where customer's tastes and preferences keep changing and more transparency is a requirement (Bai & Sarkis, 2010).

E-sourcing is the process of obtaining bids from different suppliers via a single online portal (Saprikis, 2013). 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 (Neef, 2016). Presently, e-sourcing applications offer two main functions which are; online request for quotations (RFQ) and online auctions. The lowest bidder is usually the one given the contract to supply needed goods or services.

2.4 Supply Chain Performance

Supply Chain Performance refers to the extended supply chain's activities in meeting end-customer requirements, including product availability, on-time delivery, and all the necessary inventory and capacity in the supply chain to deliver that performance in a responsive manner. Supply chain performance for a firm as the performance of the various processes included within the firm's supply chain function. Supply chain performance is the entire chain's ability to meet end-customer needs through product availability and responsive, on-time delivery. Supply chain performance crosses both functional lines and company boundaries (Van Weele, 2015). Functional groups (engineering, manufacturing, and sales/marketing) are all instrumental in designing, building, and selling products most efficiently for the supply chain, and traditional company boundaries are changing as companies discover new ways of working together to achieve the ultimate supply chain goal: the ability to fill customer orders faster and more efficiently than the competition (Neef, 2016).

Supply chain performance measurement which he understands as a system of measures to evaluate the effectiveness and efficiency of organizational structures,

processes and resources not only for one firm but also for the entire supply chain. To properly run a supply chain performance measurement system, the participants of a supply chain should jointly decide on one commonly used system. Such an effective performance measurement system can provide the basis for understanding the whole system, influence the behavior and supply information about the performance of the supply chain to participants and stakeholders (Saprikis, 2013).

2.5 Empirical Literature Review

This section discusses studies conducted by researchers on e-procurement and performance. Greunen, Herselman and Niekerk (2010) carried out a study on the adoption of regulation-based e-procurement in the Eastern Cape provincial administration. The objective of the study was to establish the adoption of regulation-based e-procurement in the Eastern Cape provincial administration. The study adopted a descriptive research design where data was collected using questionnaires from provincial officials. The study found that measurable benefits of supply chain management have not yet been realized due to general limited understanding of how supply chain management concept works within government environment. This study did not focus on the supply chain performance aspect.

Sheng (2012) studied the effect of internet-based technologies on development of procurement strategy implementation. The objective of the study was to establish the effect of internet-based technologies on development of procurement strategy implementation. The study was a case study design. It was established that there were more research works on e-procurement that involved intergovernmental electronic framework. The study found that the benefits of e-procurement come not only through direct cost savings but also through the improved efficiency of companies rethinking

how they operate. This study was not done in Kenya and also had different objectives compared to the current study.

Vaidya, Sajeev and Callender (2012) conducted a study on the critical factors that affect e-procurement adoption success in the public sector. The objective of the study was to establish the critical factors that affect e-procurement adoption success in the public sector. The study adopted a descriptive research design where the data was collected using questionnaires and analyzed using SPSS. The study concluded that if e-Procurement initiatives in the public sector are to assist the development of e-Procurement across the information economy, there should be wider discussion and agreement on what constitutes the relevant CSFs and how the achievement of success can be assessed. This study did not focus on supply chain performance of public hospitals.

Kamotho (2014) examined e-procurement and procurement performance among state corporations in Kenya. The objective of the study was to establish the effect of e-procurement on procurement performance among state corporations in Kenya. The target population of the study was all the state corporations in Kenya totaling two hundred and ten (210). A sample of 42 state corporations was taken out of this sampling frame. Data was collected through questionnaires. Analysis of the data was done using frequency and percentage. The study found out that state corporations have adopted various e-procurement procurement practices to enhance their procurement performance. The regression analysis conducted revealed that the respective e-procurement practices adopted by state corporations have had a significant impact on their procurement performance. This study focused on state corporations and health sector in counties.

Makali (2015) conducted a study on e-procurement and procurement performance of supermarkets in Nairobi. This study was informed by the contingency theory of management and the resource based view of strategy. The objective of the study was to e-procurement and procurement performance of supermarkets in Nairobi. This study sought to contribute by focusing on the contribution of e-procurement to procurement performance in supermarkets. The survey targeted 40 supermarkets drawn from Nairobi and its environs. Data was collected from the respondents using a semi structured questionnaire. The findings in this study show that adoption of e-procurement is still relatively low at 56% of the supermarkets and most supermarkets adopted e-procurement practices less than a year ago. From the ratings by respondents, the study established that the adoption process is far from optimal and a lot needs to be done to enhance the migration of procurement functions to the e-platforms. The study was on procurement performance of supermarkets in Nairobi and not health sector in Kiambu County.

Masheti (2016) examined e-procurement practices and operational performance of pharmaceutical manufacturing firms in Nairobi. The objective of the study was to examine the effect of e-procurement practices on operational performance of pharmaceutical manufacturing firms in Nairobi. The study used descriptive cross sectional survey design. The population of the study was 50 pharmaceutical firms operating in Nairobi. The primary data was analyzed using descriptive statistics. The regression analysis was used to assess e-procurements practices and operational performance. The findings of the study were that E-planning practice enabled the pharmaceutical manufacturing firms to flag the drugs that are needed at a particular point and time and the distribution of the same drugs in different warehouses. It also

helps the companies to control the production of products whose expiry dates are closely monitored and the buyer and suppliers have a means that they can use to access information on the performance of the drugs they buy from the firm. The study focused on pharmaceutical manufacturing firms in Nairobi and not health sector in Kiambu County.

Jeptoo (2017) conducted a study on effect of governance structure on e-Procurement by state corporations in Kenya. This study sought to investigate whether government structures influence the adoption of e-procurement in state corporations in Kenya. The study adopted a descriptive research design. Questionnaire was the main tool for data collection which included both closed-ended and open-ended questions. The collected data included both qualitative and quantitative data. Qualitative data was analyzed by use of the content analysis. Quantitative data was analyzed by use of the SPSS version 23 where both descriptive and inferential statistics were generated. The study findings revealed that the independent variables had a positive influence on adoption of e-procurement in state corporations in Kenya. The study recommended the Kenyan government to develop, implement and enforce policies to adequately guide the implementation of e-procurement in State Corporations in Kenya

Songok (2018) did a study on E-Procurement and performance of public universities in Kenya. The study was aimed at establishing the enactment of electronic-procurement management practices amongst public universities. The study adopted use of descriptive statistics in its research methodology where firsthand data which was gathered by use of questionnaires from a population which was made up of the 31 public universities in Kenya. The descriptive statistics showed that to a moderate extent all the five e-procurement administration practices had been implemented in

public universities. The results ascertained that implementation of e-procurement management practices had a large impact on cost and reliability at 60%, quality affected by 43% and flexibility 47%. Hence there is affirmative relationship amongst implementation of e-procurement management practices and supply chain performance. This study majorly focused on performance of public universities in Kenya and not health sector in Kiambu County.

Nur (2018) also conducted a study on electronic procurement and procurement performance of private hospitals in Nairobi, Kenya. The study aimed at determining a link between e-procurement and supply chain performance. The design adopted was descriptive. The study findings established that the E-Tendering was implemented at a very large extent among private hospitals in Nairobi County. Other respondents established that E-Catalogue was implemented at a large extent. The findings are consistent with the existing literature. Competent firms are adopting electronic tendering as a mechanism to increase their efficiency, reduce lead-time and reduce operational costs as well as satisfying their customers. More importantly, firms generate more wealth through proper implementation of electronic tendering systems. With regard to the relationship between E-Procurement and procurement performance, (R) was 0.782 which was a positive strong relationship. R² was 0.615 indicated that the model explained 62% of the variations or changes in procurement performance among private hospitals in Nairobi County. The study also established different challenges experienced in the implementation of E-Procurement among private hospitals in Nairobi County. Resistance to change by staff experienced at a very large extent while high cost of implementation and lack of supplier interest were challenges experienced at a large extent. The study findings also revealed that lack of

performance measurement system and lack of top management support were challenges experienced at a small extent. The study findings were consistent with the existing literature. Cost implications are a reasonably considered as a challenge on E-Procurement.

2.6 Summary of Literature Review

This chapter has reviewed the literature on e-procurement which should be viewed as an enabling mechanism to make the process of procurement more efficient in terms of cost, time, and achievement of value for money. E-Procurement among public hospitals marked progress in many areas over the past decades. 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. However, Kenya continues to grapple with challenging health problems and issues of health service delivery. The healthcare sector in Kenya has been on the growing trajectory because of the continuous increase in demand for healthcare. Competition among public hospitals in Kenya has emerged and therefore technology has been embraced in terms of providing efficient world class health services to patients. Where existing procurement practices and procedures may contradict the goals and objectives of the new initiative, the implementation of e-Procurement requires the re-engineering of existing purchasing processes. The roles and responsibilities might change substantially with the new process, which requires staff to adapt according to these technologies. A summary is provided in Table 2.1. It provided the scholars, title of the study, methodology, findings and research gaps.

Table 2.1: Summary of Literature Review

Scholars	Study	Methodology	Major Findings	Research gaps
Greunen, Herselman and Niekerk (2010)	Adoption of regulation-based e-procurement in the Eastern Cape provincial administration	The study adopted a descriptive research design	The study found that measurable benefits of supply chain management have not yet been realized due to general limited understanding of how supply chain management concept works within government environment	This study did not focus on the supply chain performance aspect. The current study sought to assess the influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County
Sheng (2012)	Effect of internet-based technologies on development of procurement strategy implementation	case study design	The study found that the benefits of e-procurement come not only through direct cost savings but also through the improved efficiency of companies rethinking how they	This study was not done in Kenya and therefore the current study sought to assess the influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu

			operate	County
Vaidya, Sajeev and Callender (2012)	Critical factors that affect e-procurement adoption success in the public sector	The study adopted a descriptive research design	The study concluded that if e-Procurement initiatives in the public sector are to assist the development of e-Procurement across the information economy, there should be wider discussion and agreement on what constitutes the relevant CSFs and how the achievement of success can be assessed	This study did not focus on supply chain performance of public hospitals. The current study sought to assess the influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County
Mose (2014)	E-procurement adoption among large scale manufacturers in	The research involved a cross-sectional	The study revealed that majority of the large-scale manufacturers in Nairobi, Kenya has adopted e-	The study established influence of e-procurement implementation on supply chain performance of public hospitals in

	Nairobi, Kenya.	survey	procurement	Kiambu County
Kamotho (2014)	E-procurement and procurement performance among state corporations in Kenya	The target population of the study were all the state corporations in Kenya totaling two hundred and ten (210)	The study found out that state corporations have adopted various e-procurement procurement practices to enhance their procurement performance.	Public hospitals in Kiambu County are different from state corporations in Kenya
Makali (2015)	E-procurement and procurement performance of supermarkets in Nairobi	Due to the small number of supermarkets in Nairobi, a census survey	Further, the study established that e-procurement in supermarkets helps enhance cost efficiency by reducing wastage e.g. use of many papers and reduced costs of	The current study was carried out in public institution context different from performance of supermarkets in Nairobi

		was done.	sourcing for suppliers.	
Nyile and Shale (2016)	Role of sustainable procurement practices on supply chain performance of manufacturing sector in Kenya: A case study of East African Portland Cement Company.	The study adopted a case study research design	The study findings indicated that 76.3% of change in Supply Chain Performance at EAPCC can be explained by four variables namely Procurement Preferences and Reservations, Green Procurement Practices, Supplier Involvement and Electronic Procurement.	A case study of East African Portland Cement Company was carried out different from public hospitals in Kiambu County.
Masheti (2016)	E-procurement practices and operational performance of	The study used descriptive cross-sectional survey design.	E-procurement was found to have enabled the pharmaceutical manufacturing firms improve their operational performance though	The current study established influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County

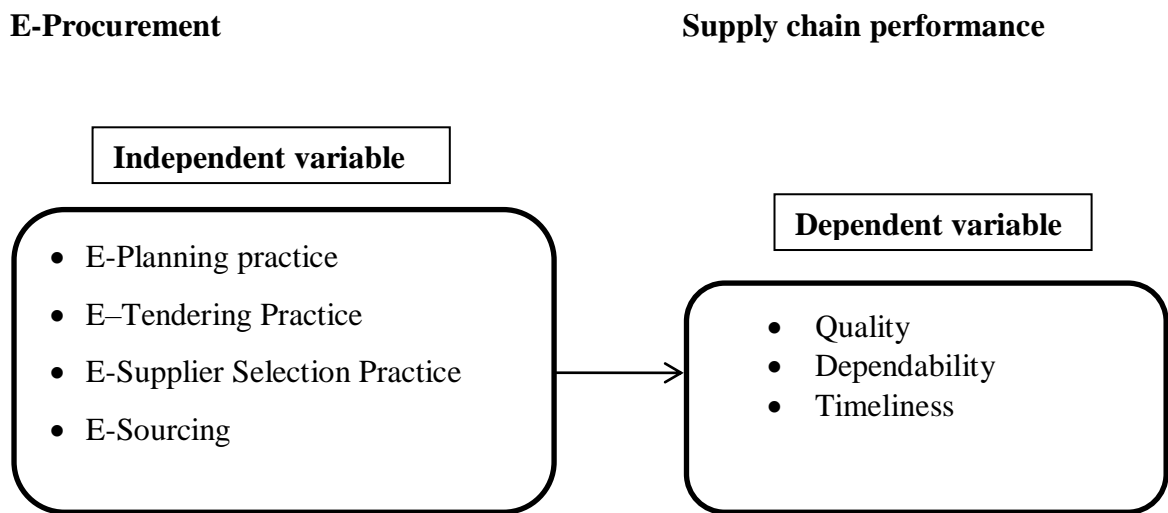
	pharmaceutical manufacturing firms in Nairobi		cost reduction, decreased transaction cost, improved order processing, reduced material lead time, decreased cost of delivery, improved product/service quality and increased order placement.	
Jeptoo (2017)	Effect of governance structure on e-procurement implementation by state corporations in Kenya	The study adopted a descriptive research design	The study findings revealed that the independent variables had a positive influence on adoption of e-procurement in state corporations in Kenya	The study focused on state corporations in Kenya whereas the current study focused on the supply chain performance of public hospitals in Kiambu County
Songok (2018)	E-procurement implementation and	The study adopted use of	The descriptive statistics showed that to a moderate extent all the five	This study majorly focused on performance of public universities in Kenya and not

	performance of public universities in Kenya	descriptive research design	e-procurement administration practices had been implemented in public universities	health sector in Kiambu County. The current study established influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County
Nur (2018)	Electronic procurement and procurement performance of private hospitals in Nairobi, Kenya	The design adopted was descriptive	The study findings established that the E-Tendering was implemented at a very large extent among private hospitals in Nairobi County. Other respondents established that E-Catalogue was implemented at a large extent	The current study established influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County

2.7 Conceptual Framework

The independent variable in this study was e-procurement implementation which is operationalized by e-planning practice, e-supplier selection practice, e-tendering practice and e-sourcing. The dependent variable was supply chain performance which is operationalized by quality, dependability and timeliness.

Figure 1: Conceptual Model



Source: Researcher (2019)

The conceptual framework illustrates how the system of concepts, expectations, beliefs, assumptions and theories informs and support the research and forms a key part of the research design. The conceptual framework illustrates diagrammatically how these variables relate to each other. From the conceptual framework, the e-procurement was assessed by e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing. On the other hand the supply chain performance was assessed by quality, dependability and timeliness.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter includes the research methodology that was followed to complete the study. The chapter therefore comprise of the following subsections: research design, target population, data collection and data analysis and presentation.

3.2 Research Design

This study employed descriptive survey research design. Babbie (2014) argued that descriptive survey designs are appropriate where the overall objective is to establish whether significant associations among variables existed at some point in time. The design was ideal since it sought to describe the characteristics of certain groups, estimate the proportion with certain characteristics and make predictions. Descriptive research also presents the possibility for error and subjectivity. This design involved the collection of quantitative data for carrying out inferential analysis and qualitative data for describing and explaining themes of behavior discerned about the e-procurement and supply chain performance of public hospitals in Kiambu County.

3.3 Population

In this study, the population consisted of public hospitals in Kiambu County. Kiambu County has 59 facilities (Appendix IV) classified in the following tiers: Tier 5- Inter-county facility (1), Tier 4 -Hospitals (19) and Tier 3 -Health Centres (39). Since the target population was not too large, a census was carried out.

3.4 Data Collection

The study used primary data. Questionnaires and observation schedule were used to collect data. The questionnaires were made up of both open ended and closed ended questions. The open-ended questions were used so as to encourage the respondent to give an in-depth and felt response without feeling held back in illuminating of any information and the closed ended questions allow respondents to respond from limited options that have been stated. The questionnaires contained four sections, i.e. where section A consisted of general information of the respondents, section B had the extent of e-Procurement among public hospitals and section C covered the influence of e-Procurement on supply chain performance of public hospitals. The researcher administered the questionnaire individually to the supply chain managers and users of the e-procurement systems. The questionnaire was administered using a “drop and pick later” method to the sampled respondents.

3.5 Data Analysis

This section discusses the techniques that were used to analyze data and test the variables. Before processing the responses, data preparation was done on the completed questionnaires by editing, coding, entering and cleaning the data. The quantitative data collected was analyzed using descriptive statistics such as includes frequency, percentages, mean and standard deviation. Data analysis was done with help of software program SPSS version 25.0. Content analysis was used in processing of qualitative data from open ended questions and results presented in prose form.

In order to evaluate the influence of e-procurement on supply chain performance in public hospitals in Kiambu County, a trend analysis was used. In addition, factor analysis was carried out to assess the influence of e-Procurement on supply chain

performance of public hospitals in Kiambu County. Further, a multivariate regression model was applied to determine the relative importance of each of the variables with respect to e-Procurement. The findings were presented using frequency tables and graphs.

Table 3. 1: Summary of Data Collection and Data Analysis

Objective	Data Collection	Data Analysis
General information	Section A	Descriptive statistics
To determine the extent of e-procurement adoption among public hospitals in Kiambu County.	Section B	Descriptive statistics Content analysis
To establish the influence of e-procurement on supply chain performance of public hospitals in Kiambu County	Section C	Regression and correlation analysis

Source: Researcher (2019)

The multiple regression model generally assumed the following equation;

$$Y_j = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where: Y_j = Supply Chain Performance

β_0 = Constant Term;

$\beta_1, \beta_2, \beta_3, \beta_4$ = Beta coefficients;

$j=1,2,3,$

Y_1 = Quality

Y_2 = Dependability

$Y_3 =$ Timeliness

$X_1 =$ E-Planning practice

$X_2 =$ E-Tendering Practice

$X_3 =$ E-Supplier Selection Practice

$X_4 =$ E-Sourcing

$\varepsilon =$ Error term

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents the analysis of data and discussion of the research findings. The chapter outlines the findings based on the research objectives. With the help of SPSS statistical software, data on E-procurement practices and their impact on the supply chain performance of the respective public hospitals in Kiambu county was analyzed using; mean scores, standard deviations, and regression analysis. The research findings were presented in form of tables.

4.1.1 Response Rate

The researcher issued 176 questionnaires to the respondents out of which 138 respondents returned their questionnaires fully filled. This represented a response rate of 78.4%. This was considered sufficient for analysis as noted by Babbie (2015) that the response rate should be over 70% is adequate for data analysis to be undertaken.

Table 4.1: Response Rate

	Supply Chain Managers	Users of E-Procurement System
Response	40	98
Non-response	19	19
Total	59	117

Source: Research Data (2019)

4.1.2 Reliability Analysis

A reliability analysis was carried out. An internal consistency technique was applied using Cronbach's Alpha. The alpha value ranges between 0 and 1 with reliability increasing with the increase in value. In this study, 0.7 Cronbach's Alpha was considered acceptable.

Table 4.2: Reliability Analysis

	Cronbach's Alpha
E-planning practice	0.860
E-supplier selection practice	0.905
E-tendering practice	0.852
E-sourcing	0.818
Supply chain performance	0.787

Source: Research Data (2019)

According to the findings, the e-supplier selection practice had a Cronbach's alpha of 0.905, e-planning practice had a Cronbach's alpha of 0.860, e-tendering practice had a Cronbach's alpha of 0.852, e-sourcing had a Cronbach's alpha of 0.818 and supply chain performance had a Cronbach's alpha of 0.787. The results on reliability indicate that the Cronbach reliability alpha of all the factors were greater than 0.7 and hence there was no need to change the measures and indicators in the questions.

4.2 Background Information

To appreciate and clearly understand the respondents who participated in the study, the researcher sought to establish their background information. The aspects sought were the respondents' gender, age bracket and academic qualifications.

4.2.1 Respondents' Gender

The researcher requested the respondents to indicate their gender. The results are portrayed in Table 4.3.

Table 4.3: Respondents' Gender

	Frequency	Percent
Male	75	54.3
Female	63	45.7
Total	138	100.0

Source: Research Data (2019)

The findings reveal that 54.3% of the respondents were male while the rest as shown by 45.7% were female. This implies that the researcher considered both genders and therefore was not gender bias in the research findings.

4.2.2 Respondents' Age Bracket

The respondents were requested to specify their age bracket. The results were as displayed in Table 4.4.

Table 4.4: Respondents' Age Bracket

	Frequency	Percent
18-25 years	21	15.2
26-36 years	34	24.6
36-45 years	40	29.0
46-55 years	28	20.3
Over 56 years	15	10.9
Total	138	100.0

Source: Research Data (2019)

The results show that 29.0% of the respondents indicated that they were aged between 36-45 years, 24.6% indicated that they were aged between 26-36 years, 20.3% indicated that they were aged between 46-55 years, 15.2% indicated that they were aged between 18-25 years while 10.9% indicated that they were over 56 years old. This implied that the data was collected from a variety of age groups and hence the information sought was accurate and reliable.

4.2.3 Respondents' Academic Qualifications

The researcher also sought to determine the respondents' highest academic qualifications. Table 4.5 presents the results.

Table 4.5: Respondents' Academic Qualifications

	Frequency	Percent
Certificate	3	2.2
Diploma	39	28.3
First Degree	70	50.7
Masters Level	16	11.6
PhD Level	10	7.2
Total	138	100.0

Source: Research Data (2019)

From the findings, 50.7% of the respondents specified that they had attained a first degree, 28.3% indicated they had attained a Diploma, 11.6% indicated that they had reached the Masters Level, 7.2% indicated that they had reached the PhD Level while 2.2% had attained the certificate. 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.

4.3 Extent of E-procurement among Public Hospitals

This section sought to evaluate the influence of e-Procurement on supply chain performance of public hospitals in Kiambu County. To achieve this, the researcher aimed to determine the extent of e-procurement adoption among public hospitals in Kiambu County and requested the respondents to indicate the extent to which public hospitals implement the various aspects of E-procurement. The findings are as shown by in Table 4.6.

Table 4.6: Extent to Which Public Hospitals Implement Aspects of E-Procurement

	Mean	Std. Dev.
E-Sourcing	4.013	0.812
E-Planning practice	3.773	0.902
E-Tendering	3.710	1.063
E-Supplier Selection Practice	3.560	1.191

From the findings, the respondents indicated that e-sourcing as shown by a mean of 4.013, that e-planning practice as shown by a mean of 3.773, e-tendering as shown by a mean of 3.710 was implemented by public hospitals in a great extent. The respondents also indicated that e-supplier selection practice as shown by a mean of 3.560. The findings are in line with Gil-García and Martínez-Moyano (2017) who stated that documentation is core to the planning role and they have to meet standards in terms of confidentiality, authenticity and for future reference. 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 findings are also in line with Bai and Sarkis (2010) who noted that a number of enhancements in practices of selecting suppliers can bring about a downstream effect in the supply chain. This is because of the increase in the number of suppliers eligible for selection including the international and regional ones due to the market globalization effect through web-based practices of procurement where customer's tastes and preferences keep changing and more transparency is a requirement. The findings were different from those of Nur (2018) who conducted a study on electronic procurement and procurement performance of private hospitals in Nairobi, Kenya and instead established different challenges experienced in the implementation of E-Procurement among private hospitals in Nairobi County.

The findings are in consonance with Principal-Agent theory was developed by Ross and Mitnick (1970). The assumptions and prescriptions of agency theory fit naturally with the issues inherent in supply chain performance. In the process of managing supplier quality, buyers in agency relations are faced with potential problems. By their nature, buyers expect suppliers to provide good quality and to improve the quality of supplied products and/or services, but suppliers may be reluctant to invest substantially in quality, especially if they perceive that buyers are reaping all the benefits.

The findings are also in line with dynamic capabilities theory which was first coined by Teece, Pisano and Shuen in 1997. This theory is related to the subject matter since public hospitals today are in a market that is highly dynamic and competitive and the study chose to include this theory as it best explained the need to have e-procurement as a business strategy for public hospitals.

4.4 Impact of E-Procurement on Supply Chain Performance of Public Hospitals

The research sought to establish the influence of e-procurement on supply chain performance of public hospitals in Kiambu County. The researcher required the respondents to indicate the extent to which they agreed with the statements concerning impact of e-procurement on supply chain performance of public hospitals.

4.4.1 Quality

Multiple regression analysis was conducted as to determine the relationship between e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing against the dependent variable quality of supply chain in public hospitals in Kiambu County.

Table 4.7: Regression Coefficients

	Unstandardized		Standardized	z	p-value
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	0.987	0.086		11.477	.000
E-planning practice	0.803	0.309	0.709	2.599	.011
E-tendering Practice	0.781	0.217	0.629	3.599	.000
E-supplier selection practice	0.674	0.233	0.601	2.893	.005
E-sourcing	0.878	0.221	0.733	3.973	.000

Source: Research Data (2019)

The regression equation obtained from this outcome was: -

$$Y = 0.987 + 0.803X_1 + 0.781X_2 + 0.674X_3 + 0.878X_4$$

From the findings, it was revealed that if all independent variables were held constant at zero, then the quality of supply chain performance will be 0.987 which is significant since $p=0.000$ is less than 0.05. The coefficient for e-planning practice is 0.803 which is significant since $p=0.011$ is less than 0.05 and z tabulated (2.599) was greater than z critical (1.96), meaning that when a unit change in e-planning practice leads to a 0.803-unit change in quality of supply chain performance in Kiambu County. The study further found that a unit change in e-tendering practice would lead to 0.781 unit change in quality of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.002 < 0.05$ and z tabulated (3.599) was greater than z critical (1.96). 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 into a virtual trading environment.

The study further found that a unit change in quality e-supplier selection practice would lead to 0.674-unit change in quality of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.004 < 0.05$ and z tabulated (2.893) was greater than z critical (1.96). The findings concur with Van Weele (2015) who asserts that through the internet, organisations today can cultivate long term and good working relationship with customers and the suppliers

The study further found that a unit change in e-sourcing would lead to 0.878-unit change in quality of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.000 < 0.05$ and z tabulated (3.973) was greater than z critical (1.96). This correspond to 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.

Overall, e-sourcing had the greatest influence on the quality of supply chain performance of public hospitals in Kiambu County, followed by e-planning practice then e-supplier selection practice while e-tendering practice had the least influence on the quality of supply chain performance of public hospitals in Kiambu County. All variables were significant since their p-values were less than 0.05 and z tabulated values were greater than z critical values.

Table 4. 8: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.888	0.789	0.778	0.861

Source: Research Data (2019)

Table 4.8 is a model fit which establish how fit the model equation fits the data. The adjusted R^2 was used to establish the predictive power of the study model and it was found to be 0.778 implying that 77.8% of the variations in quality of supply chain performance in Kiambu county are explained by changes in e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing. This is in line with Gil-García and Martínez-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.

Table 4.9: Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	213.109	4	53.277	124.274	.000 ^b
1 Residual	57.018	133	0.429		
Total	270.127	137			

Source: Research Data (2019)

The probability value of 0.000 indicates that the regression relationship was highly significant in predicting how the e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing influence quality of supply chain performance in Kiambu County. The F calculated at 5 per cent level of significance was 124.274. Since F calculated is greater than the F critical (value = 2.4398), this shows that the overall model was significant. 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. These findings are in line with Oyediran and Akintola (2011) who noted that the elements of electronic procurement are e-planning practice, e-supplier selection practice, e-tendering practice and e-sourcing. 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.

The findings are also in line with dynamic capabilities theory which was first coined by Teece, Pisano and Shuen in 1997. This theory is related to the subject matter since

public hospitals today are in a market that is highly dynamic and competitive and the study chose to include this theory as it best explained the need to have e-procurement as a business strategy for public hospitals.

4.4.2 Dependability

Multiple regression analysis was conducted as to determine the relationship between e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing against the dependent variable dependability of supply chain performance in Kiambu County.

Table 4.10: Regression Coefficients

	Unstandardized		Standardize	z	p-value
	Coefficients		d		
	B	Std. Error	Beta		
(Constant)	0.991	0.183		5.415	.000
E-Planning practice	0.786	0.314	0.688	2.503	.015
E-Tendering Practice	0.719	0.217	0.619	3.313	.001
E-Supplier Selection Practice	0.666	0.226	0.567	2.947	.004
E-Sourcing	0.891	0.278	0.721	3.205	.002

Source: Research Data (2019)

The regression equation obtained from this outcome was: -

$$Y = 0.991 + 0.786X_1 + 0.719X_2 + 0.666X_3 + 0.891X_4 + \varepsilon$$

From the findings, it was revealed that if all independent variables were held constant at zero, then the supply chain performance will be 0.991 which is significant since $p=0.000$ is less than 0.05. The coefficient for e-planning practice is 0.786 which is significant since $p=0.011$ is less than 0.05 and z tabulated value (2.503) was greater than z critical value (1.96), meaning that when a unit change in e-planning practice leads to a 0.786-unit change in dependability of supply chain performance in Kiambu County.

The study further found that a unit change in e-tendering practice would lead to 0.719 unit change in dependability of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.002 < 0.05$ and z tabulated value (3.313) was greater than z critical value (1.96).

The study further found that a unit change in quality e-supplier selection practice would lead to 0.666-unit change in dependability of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.004 < 0.05$ and z tabulated value (2.947) was greater than z critical value (1.96).

The study further found that a unit change in e-sourcing would lead to 0.891-unit change in dependability of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.000 < 0.05$ and z tabulated value (3.205) was greater than z critical value (1.96).

Overall, e-sourcing had the greatest influence on the dependability of supply chain performance of public hospitals in Kiambu County, followed by e-planning practice then e-supplier selection practice while e-tendering practice had the least influence on the dependability of supply chain performance of public hospitals in Kiambu County.

All variables were significant since their p-values were less than 0.05 and z tabulated values were greater than z critical values.

Table 4.11: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.894	0.800	0.789	0.927

Source: Research Data (2019)

Table 4.11 is a model fit which establish how fit the model equation fits the data. The adjusted R^2 was used to establish the predictive power of the study model and it was found to be 0.789 implying that 78.9% of the variations in dependability of supply chain performance in Kiambu county are explained by changes in e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing.

Table 4.12: Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	264.112	4	66.028	132.817	.000 ^b
1 Residual	66.119	133	0.497		
Total	330.231	137			

Source: Research Data (2019)

The probability value of 0.000 indicates that the regression relationship was highly significant in predicting how the e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing influence dependability of supply chain performance in Kiambu County. The F calculated at 5 per cent level of significance was 132.817.

Since F calculated is greater than the F critical (value = 2.4398), this shows that the overall model was significant.

These findings are in line with Vaidya, Sajeev and Callender (2012) who conducted a study on the critical factors that affect e-procurement adoption success in the public sector and found that if e-Procurement initiatives in the public sector are to assist the development of e-Procurement across the information economy, there should be wider discussion and agreement on what constitutes the relevant CSFs and how the achievement of success can be assessed. The findings also correlate with Jeptoo (2017) conducted a study on effect of governance structure on e-Procurement by state corporations in Kenya and established that the independent variables had a positive influence on adoption of e-procurement in state corporations in Kenya.

The findings are different from the findings of dynamic capability theory that changes ranging from organizational structures, culture, marketing and customer's tastes and preferences are taking a different path. As such, organisations should have the ability to respond to these changes in the most effective manner.

4.4.3 Timeliness

Multiple regression analysis was conducted as to determine the relationship between e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing against the dependent variable timeliness of supply chain performance in Kiambu County.

Table 4.13: Regression Coefficients

	Unstandardized		Standardize	z	p-value
	Coefficients		d		
	B	Std. Error	Beta		
(Constant)	0.973	0.128		7.602	.000
E-Planning practice	0.704	0.307	0.689	2.293	.025
E-Tendering Practice	0.612	0.298	0.513	2.054	.043
E-Supplier Selection Practice	0.623	0.209	0.538	2.981	.004
E-Sourcing	0.796	0.297	0.703	2.680	.009

Source: Research Data (2019)

The regression equation obtained from this outcome was: -

$$Y = 0.973 + 0.704X_1 + 0.612X_2 + 0.623X_3 + 0.796X_4$$

From the findings, it was revealed that if all independent variables were held constant at zero, then the supply chain performance will be 0.973 which is significant since $p=0.000$ is less than 0.05. The coefficient for e-planning practice is 0.704 which is significant since $p=0.011$ is less than 0.05 and z tabulated value (2.293) was greater than z critical value (1.96), meaning that when a unit change in e-planning practice leads to a 0.704-unit change in timeliness of supply chain performance in Kiambu County.

The study further found that a unit change in e-tendering practice would lead to 0.612 unit change in timeliness of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.043 < 0.05$ and z tabulated value (2.054) was greater than z critical value (1.96). The study further found that a unit change in quality e-supplier selection practice would lead to 0.623-unit change in timeliness of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.004 < 0.05$ and z tabulated value (2.281) was greater than z critical value (1.96). The study further found that a unit change in e-sourcing would lead to 0.796-unit change in timeliness of supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.009 < 0.05$ and z tabulated value (2.68) was greater than z critical value (1.96).

These findings are in line with Songok (2018) who did a study on E-Procurement and performance of public universities in Kenya and revealed that implementation of e-procurement management practices had a large impact on cost and reliability at 60%, quality affected by 43% and flexibility 47%. Hence there is affirmative relationship amongst implementation of e-procurement management practices and supply chain performance.

Overall, e-sourcing had the greatest influence on the dependability of supply chain performance of public hospitals in Kiambu County, followed by e-planning practice then e-supplier selection practice while e-tendering practice had the least influence on the dependability of supply chain performance of public hospitals in Kiambu County. All variables were significant since their p -values were less than 0.05 and z tabulated values were greater than z critical values.

Table 4. 14: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.849	0.721	0.713	1.524

Source: Research Data (2019)

Table 4.14 is a model fit which establish how fit the model equation fits the data. The adjusted R² was used to establish the predictive power of the study model and it was found to be 0.713 implying that 71.3% of the variations in timeliness of supply chain performance in Kiambu county are explained by changes in e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing.

Table 4.15: Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	233.164	4	58.291	113.823	.000 ^b
1 Residual	68.112	133	0.512		
Total	301.276	137			

Source: Research Data (2019)

The probability value of 0.000 indicates that the regression relationship was highly significant in predicting how the e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing influence timeliness of supply chain performance in Kiambu County. The F calculated at 5 per cent level of significance was 113.823. Since F calculated is greater than the F critical (value = 2.4398), this shows that the overall model was significant.

These findings are similar with Masheti (2016) who examined e-procurement practices and operational performance of pharmaceutical manufacturing firms in

Nairobi and established that E-planning practice enabled the pharmaceutical manufacturing firms to flag the drugs that are needed at a particular point and time and the distribution of the same drugs in different warehouses. It also helps the companies to control the production of products whose expiry dates are closely monitored and the buyer and suppliers have a means that they can use to access information on the performance of the drugs they buy from the firm. The study focused on pharmaceutical manufacturing firms in Nairobi and not health sector in Kiambu County.

The findings are different from Principal-Agent theory developed by Ross and Mitnick (1970) assumptions underlying that potential goal conflicts exist between principals and agents; each party acts in its own self-interest; information asymmetry frequently exists between principals and agents; agents are more risk averse than the principal; and efficiency is the effectiveness criterion.

The research also sought the respondents' recommendations on how to improve supply chain performance of public hospitals in Kenya. The respondents indicated that there was need for the hospitals to have the suppliers undergo performance assessments to enhance timely delivery of products; the hospitals should ensure that the supplier provides quality products and continuous improvement is virtually guaranteed by the organization; there is need to educate the staff on the ICT system on supply chain for positive outcomes; organizations and suppliers in the health care sector should try to have a positive relationship and devise approaches to collaboratively solve supply chain challenges; information gathering and processing should be improved in the supply chain through availability of records of customers and information on provider performance. Further, the respondents were asked to

indicate the ways does e-procurement implementation impact supply chain performance of public hospitals in Kenya. The respondents indicated through attainment of store control level, enhanced competitive advantage, reduced tender processing time, elimination of postal, printing & storage costs and quick information sharing with suppliers.

4.5 Inferential Statistics

The study conducted both the multiple regression analysis to establish the relations between the independent and dependent variables while correlation was conducted to assess the degrees of association between the variables. In this study, multiple regression analysis was conducted as to determine the relationship between e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing against the dependent variable supply chain performance in Kiambu County.

Table 4.16: Regression Coefficients

	Unstandardized		Standardized	z	p-value
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	13.774	1.086		12.683	0.000
E-Planning practice	0.809	0.315	0.797	2.568	0.011
E-Tendering Practice	0.662	0.208	0.629	3.183	0.002
E-Supplier Selection Practice	0.753	0.254	0.667	2.965	0.004
E-Sourcing	0.760	0.209	0.713	3.636	0.000

Source: Research Data (2019)

The regression equation obtained from this outcome was: -

$$Y = 13.774 + 0.809X_1 + 0.662X_2 + 0.753X_3 + 0.760X_4 + \epsilon$$

From the findings, it was revealed that if all independent variables were held constant at zero, then the supply chain performance will be 13.774 which is significant since $p=0.000$ is less than 0.05. The coefficient for e-planning practice is 0.809 which is significant since $p=0.011$ is less than 0.05 and z tabulated value (2.568) was greater than z critical value (1.96), meaning that when a unit change in e-planning practice leads to a 0.809-unit change in supply chain performance in Kiambu County. 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 study further found that a unit change in e-tendering practice would lead to 0.662 unit change in supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.002 < 0.05$ and z tabulated value (3.183) was greater than z critical value (1.96). 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 into a virtual trading environment.

The study further found that a unit change in quality e-supplier selection practice would lead to 0.753-unit change in supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.004 < 0.05$ and z tabulated value (2.965) was greater than z critical value (1.96). The findings concur with Van Weele (2015) who

asserts that through the internet, organisations today can cultivate long term and good working relationship with customers and the suppliers.

The study further found that a unit change in e-sourcing would lead to 0.760-unit change in supply chain performance in Kiambu County. The variable was significant since $p\text{-value}=0.000 < 0.05$ and z tabulated value (3.636) was greater than z critical value (1.96). The findings are different from those of 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.

Overall, E-planning practice had the greatest influence on the supply chain performance of public hospitals in Kiambu County, followed by E-Sourcing then E-Supplier Selection Practice while E-tendering practice had the least influence on the supply chain performance of public hospitals in Kiambu County. All variables were significant since their p -values were less than 0.05.

Table 4. 17: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.849	0.721	0.713	1.524

Source: Research Data (2019)

Table 4.17 is a model fit which establish how fit the model equation fits the data. The adjusted R^2 was used to establish the predictive power of the study model and it was found to be 0.713 implying that 71.3% of the variations in supply chain performance in Kiambu county are explained by changes in e-planning practice, e-tendering

practice, e-supplier selection practice and e-sourcing. 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.

Table 4.18: Analysis of Variance (ANOVA)

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	818.483	4	204.621	86.101	.000 ^b
1 Residual	316.076	133	2.377		
Total	1134.559	137			

Source: Research Data (2019)

The probability value of 0.000 indicates that the regression relationship was highly significant in predicting how the e-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing influence supply chain performance in Kiambu County. The F calculated at 5 per cent level of significance was 86.101. Since F calculated is greater than the F critical (value = 2.4398), this shows that the overall model was significant. This is in line with Gil-García and Martínez-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 findings are also in line with dynamic capabilities theory which was first coined by Teece, Pisano and Shuen in 1997. This theory is related to the subject matter since public hospitals today are in a market that is highly dynamic and competitive and the study chose to include this theory as it best explained the need to have e-procurement as a business strategy for public hospitals.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents a summary of the findings from the study, the conclusions that have been arrived at, the recommendations made by the researcher based on the findings and suggestions on the areas the researcher felt may require further investigation through research activity.

5.2 Summary

The study sought to determine the extent to which the public hospitals implement the aspects of E-planning in Kiambu County. The study found that the public hospitals implemented the allocation of responsibility; monitoring processes; functioning website to manage the entire procurement process; online calls for proposals and set goals, strategies and baseline to a great extent. The study further found that coordination of activities was implemented to a moderate extent.

On the extent to which aspects of E-tendering was being adopted in the public hospitals in Kiambu County, the study found that the public hospitals implemented advertising; tender aggregation; and tender specification to a great extent while evaluation and placing of the contract was implemented to a moderate extent.

To determine the extent to which aspects of E-supplier selection was being adopted in the public hospitals in Kiambu County, the study found that supplier involvement; technical skills & knowledge and information processing capacity were implemented to a great extent. The study also found that networking infrastructure was adopted in public hospitals in Kiambu County to a moderate extent.

The research pursued to establish the extent to which the public hospitals implement the aspects of E-sourcing in Kiambu County. The study found that sourcing projects per month; trained users; active suppliers and E-Sourcing process cycle time were implemented by public hospitals in Kiambu County to a great extent.

On the influence of e-procurement on quality of supply chain performance of public hospitals in Kiambu County, the study found that the paperwork is minimal. The study also found that there were less complaints from stakeholders and customers; there was e-procurement improvement in quality of products/ service; E-procurement leads to better service delivery; there was improved contract fulfillment; they had little bureaucracy; the information is integrated; the products are of high quality; E-procurement improves the flow of information and there is improved supply chain managers decision making.

Further, in relation to dependability of supply chain in public hospitals, the study found that e-procurement: increases productivity; leads to increase in competition; leads to reduction in inventory; leads to reduction in errors of order transmission; standardizes purchasing process across the organization; leads to improved controls and reduces procurement corruption. The study also found that it leads to reduction in errors of order transmission; there is easy access to supplier and leads to cost reduction.

Concerning the impact of e-procurement on timeliness of supply chain performance in public hospitals, e-procurement encourages use of technology; the system has improved the speed of service with consideration to the amount of work in selecting the right supplier; reduces discretion & increases transparency; reduces lead times; guarantees real time response to the market; and enables the organization to

streamline processes. The study also found that e-procurement encourages accountability and facilitates real time response to customers.

5.3 Conclusion

The study concluded that e-planning practice influences the supply chain performance in public hospitals in Kiambu County positively and significantly. The study concluded that e-planning involves finding solutions that integrate strategy, technology, processes, and people. Further, documentation is core to the planning role and they have to meet standards in terms of confidentiality, authenticity and for future reference.

The study concluded that E-tendering influences performance of supply chain public hospitals in Kiambu County positively and significantly. E-tendering is mainly used to cut costs and generates wealth in the organizations. On e-supplier selection, the study concludes that e-supplier selection had a significant positive influence on supply chain performance of public hospitals in Kiambu County. The study deduced that the public hospitals have online platform for a pool of qualified supplier for real time requests which improve operational performance and these online system help supplier respond once when bidding.

In addition, the study concluded that e-sourcing influence has a strong positive and significant relationship with supply chain performance of public hospitals in Kiambu County. The study concludes that the public hospitals use e-sourcing to reduce cost and improve efficiency in procurement process with online platform where buyer and suppliers work together.

5.4 Recommendations

The study recommends that public hospitals management should consider implementing e-procurement system in their respective organizations for the smooth running of the supply chain. This would be significant in promoting the efficiency in service delivery to clients. The study further recommends that management should focus on specialization of staff by empowering the employees on how to use e-procurement in their day to day running of the organization. The resistant employees/staff should be trained enough to see the importance of e-procurement in the promotion of supply chain performance in the hospitals. The study also recommends that suppliers to adopt e-procurement systems such as IFMIS Systems, EDI and ERP Systems in their business models so as to remain competitive in their activities.

The study established that e-tendering processing practice enhances supply chain performance positively. It is recommended that management should ensure that all modules from purchasing requisition, quotation/tenders, request for proposals, purchasing order approvals and transmission, contract monitoring, goods receipt note are done well. This will reduce tender processing time, eliminate postal, printing & storage costs, wide supplier base will be achieved and audit trails will be maintained thus reduction of corruption. The study found that e-supplier selection practice enhanced supply chain performance. It is therefore recommended that management should ensure that there are working websites, working internal and external mail to improve supplier and buyers integration.

The government through the relevant ministry should institute policies concerning data handling 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. In addition 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 company for electronic tendering.

For the public hospitals to benefit from the adoption of e-procurement technologies the firms must be able to move towards the same direction. There should be sufficient support from the management to reap the benefits associated with e-procurement practices. The public hospitals should advocate the adoption of e-procurement technologies by communicating the benefits to its staff in terms of internal operational processes. The adoption of e-procurement technologies by the whole industry will result in a more productive and efficient industry. An industry with an efficient and productive supply chain process will be profitable.

5.5 Limitation of the Study

Time was a major challenge the researcher faced in the course of doing this study. Time wasn't sufficient for the student to read materials on the topic, collect all the data from all the public hospitals in Kiambu County within the stipulated deadline. Future scholars are advised to allocate more time to the project work and manage this time efficiently.

Another challenge faced was the administration of the questionnaires. The fact that the intended mode of the data collection was to furnish the respondents with questionnaires and get them back immediately was not possible. Therefore, the questionnaires were dropped and picked after some days and this meant that the

control to who filled the questionnaires could not be verified. Scarcity of funds was another limitation.

5.6 Suggestions for Further Study

The study confirmed that the implementation of e-procurement has a big effect on supply chain performance among public hospitals in Kiambu County. Future researchers should consider conducting a similar study with respect to public hospitals within Nairobi 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-planning practice, e-tendering practice, e-supplier selection practice and e-sourcing to firms. This should cover issues such as cost, time quality and corruption. Researchers to apply various measuring methods in order to fully track and understand how benefits are distributed. The study recommends a study to find out the reasons why some of these hospitals 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 manufacturing industry or another industry.

REFERENCES

- Alexander, E. R. (2016). There is no planning—only planning practices: Notes for spatial planning theories. *Planning Theory*, 15(1), 91-103.
- Amit, R. & Zott, C. (2015). Value creation in e-business. *Strategic management journal*, 22(6-7), 493-520.
- Babbie, E. (2014). *The Practice of Social Research Thomson*. California: Wadsworth.
- Bai, C. & Sarkis, J. (2010). Integrating sustainability into supplier selection with grey system and rough set methodologies. *International Journal of Production Economics*, 124(1), 252-264.
- Boudijilda, N. & Pannetto, H. (2015). The European Public Procurement Initiative and Standards for Information Exchange. *Journal of Management Science*, 7(2), 651-874.
- Chan, J. K. & Lee, M. K. (2018). SME e-procurement adoption in Hong Kong-The roles of power, trust and value. *Proceedings of the 36th Annual Hawaii International Conference on System Sciences*, 2(1), 10-17.
- Chartered Institute of Purchasing & Supplies. (2018). *Global supply chain management and international logistics*. Abingdon: Routledge.
- Chien, S. Y. & Tsai, C. H. (2016). Dynamic capability, knowledge, learning, and firm performance. *Journal of Organizational Change Management*, 25(3), 434-444.
- Constitution of Kenya. (2010). *Government printer*. Nairobi: Acts Printers.
- Eisenhardt, K. M. (2014). Agency theory: An assessment and review. *Academy of management review*, 14(1), 57-74.

- Fernandes, T. & Vieira, V. (2015). Public e-procurement impacts in small-and medium-enterprises. *International Journal for Procurement Management*, 8(5), 587-589.
- Gil-Garcia, J. R. & Martinez-Moyano, I. J. (2017). Understanding the evolution of e-government: The influence of systems of rules on public sector dynamics. *Government Information Quarterly*, 24(2), 266-290.
- Handfield, R. B., Monczka, R. M., Giunipero, L. C. & Patterson, J. L. (2019). *Sourcing and supply chain management* (Vol. 4). Mason: Cengage Learning.
- Hardy, C. A. & Williams, S. P. (2015). Assembling e-government research designs: A transdisciplinary view. *Public Administration Review*, 71(3), 405-413.
- Heywood, J. B., Barton, M. & Heywood, C. (2014). *e-Procurement: Managing successful e-procurement implementation*. New Jersey: Financial Times Prentice Hall.
- Kalau, E. M. (2016). *E-Procurement Strategies and the Performance of Kenya Owned Parastatals*. MBA thesis, University of Nairobi.
- Kaliannan, O. M., Awang, H. & Raman, M. (2014). Government purchasing: A review of E-procurement system in Malaysia. *Bilgi Ekonomisi ve Yönetimi Dergisi*, 4(1), 27-41.
- Kamotho, D. K. (2014). *E-Procurement and procurement performance among state corporations in Kenya*. An unpublished master's thesis, University of Nairobi.
- Kingori, M. (2013). The effect of e-procurement on supply chain management at teachers' service commission. *International Journal of Social Sciences and Entrepreneurship*, 3(4), 17-20.

- Kiswili, N. E. (2016). *Role of Sustainable Procurement Practices on Supply Chain Performance of Manufacturing Sector in Kenya*. A Doctoral dissertation, Jomo Kenyatta University of Agriculture and Technology.
- Kleijnen, J. P. & Smits, M. T. (2014). Performance metrics in supply chain management. *Journal of the operational research society*, 54(5), 507-514.
- KPMG. (2012). *Knowledge management research report*. London: KPMG Website.
- Makali, S. (2015). *E-procurement and procurement performance in supermarkets in Nairobi*. MBA project, University of Nairobi.
- Mambo, P. N., Ombui, K. & Kagiri, A. (2015). Factors influencing implementation of e-procurement in the national government: a case of the ministry of interior and co-ordination of national government. *Strategic Journal*, 2(1), 12-25.
- Masheti, C. (2016). *E-procurement practices and operational performance of pharmaceutical manufacturing firms in Nairobi*. Unpublished Thesis, University of Nairobi.
- Maskin, E. (2014). Jean-Jacques Laffont: a look back. *Journal of the European Economic Association*, 2(5), 913-923.
- Mitra, K., Lakha, K. & Abdulla, S. (2016). *To B or Not To B: An overview of E-commerce*. Nairobi: The Institute of Certified Public Accountants of Kenya (Jan–March 2001 issue).
- Mose, J. M. (2014). *E-procurement adoption among large scale manufacturers in Nairobi, Kenya*. A Doctoral dissertation, University of Nairobi.
- Mwongela, S. M. (2014). *E-Procurement Adoption and Supply Chain Performance Among Commercial Banks in Nairobi, Kenya*. Unpublished Masters of Administration Research Project, University of Nairobi.

- Neef, D. (2016). *E-Procurement: From strategy to implementation*. New Jersey: FT press.
- Ngechu, M. (2014). *Understanding the research process and methods: An introduction to Research Methods*. Unpublished MBA Thesis: University of Nairobi.
- Nurmandi, A. & Kim, S. (2015). Making e-procurement work in a decentralized procurement system: A comparison of three Indonesian cities. *International Journal of Public Sector Management*, 28(3), 198-220.
- Nyamasege, O. J. & Biraori, O. E. (2015). Effect of supplier relationship management on the effectiveness of supply chain management in the Kenya public sector. *International Journal of Managing Value and Supply Chains*, 6(1), 25-29.
- Oliech, C. O. & Mwangangi, P. (2019). Effect of Strategic Procurement Management on Performance of Level Five Hospitals in Kenya. *International Journal of Supply Chain Management*, 4(1), 39-62.
- Ortuzar, G. B., Sevillano, E. M., Castro, C. L. & Uribe, C. (2017). Challenges in Chilean E-Procurement System: A Critical Review. *Digital Governance and E-Government Principles Applied to Public Procurement*, 3(1), 170-202.
- Oyediran, O. S. & Akintola, A. A. (2011). A Survey of the State of the Art of E-Tendering in Nigeria. *Journal of Information Technology in Construction (ITcon)*, 16(32), 557-576.
- Salbu, S. R. (2018). A delicate balance: Legislation, institutional change, and transnational bribery. *Cornell International Legislation Journal*, 33(2), 657-659.

- Saprikis, V. (2013). Suppliers' behavior on the post-adoption stage of business-to-business e-reverse auctions: An empirical study. *Telematics and Informatics*, 30(2), 132-143.
- Snider, K. F. & Rendon, R. G. (2016). Public procurement: Public administration and public service perspectives. *Journal of Public Affairs Education*, 18(2), 327-348.
- Soeters, J., Shields, P. M. & Rietjens, S. (Eds.). (2014). *Routledge handbook of research methods in military studies*. Abingdon: Routledge.
- Srinivasan, M., Mukherjee, D. & Gaur, A. S. (2016). Buyer-supplier partnership quality and supply chain performance: Moderating role of risks, and environmental uncertainty. *European Management Journal*, 29(4), 260-271.
- Teece, D. J., Pisano, G. & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal*, 18(7), 509-533.
- Thai, K. V. (2017). Public procurement re-examined. *Journal of public procurement*, 1(1), 9-50.
- Transparency International. (2015). *Corruption Perceptions Index*. Berlin: Transparency International.
- Van Weele, A. J. (2015). *Purchasing and supply chain management: analysis*. London: Planning and Practice, Thomson International.
- Wanke, P., Correa, H. L. & Hijjar, M. F. (2016). Establishing the relationship between logistics complexity and supply chain objectives and decision areas in large companies operating in Brazil. *Journal of Operations and Supply Chain Management (JOSCM)*, 3(1), 34-54.

World Bank. (2015). *World Development Report 2004 (Overview): Making Services Work for Poor People*. Washington, D.C.: World Bank.

APPENDICES

Appendix I: Introduction Letter

Dear Sir/Madam,

REF: REQUEST TO CARRY OUT DATA COLLECTION.

I am a Master of Business Administration student at the University of Nairobi and in my final year of study. As part of the requirement for the award of the degree of Master of Business Administration, I'm undertaking a research project on "INFLUENCE OF E-PROCUREMENT ON SUPPLY CHAIN PERFORMANCE OF PUBLIC HOSPITALS IN KIAMBU COUNTY". In this regard, I'm kindly requesting for your support in terms of time, and by responding to the attached questionnaire. Your accuracy and candid response will be critical in ensuring objective research.

Any assistance accorded to me in my noble cause and information given shall be treated as confidential and will be used purely for the purpose of this research and a final copy of the document shall be availed to you upon request. Your cooperation will be highly appreciated and thank you in anticipation.

Yours Faithfully,

Frena Nyasetia

Appendix II: Research Questionnaire for Supply Chain Manager

This questionnaire is to collect data for purely academic purposes. The study seeks to investigate the influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County. All information will be treated with strict confidence. Do not put any name or identification on this questionnaire.

Answer all questions as indicated by either filling in the blank or ticking the option that applies.

Section A: General information of the respondents

1. Gender Male Female

2. Age Bracket

18-25 years <input type="checkbox"/>	26-36 years <input type="checkbox"/>	36-45 years <input type="checkbox"/>
46-55 years <input type="checkbox"/>	Over 56 years <input type="checkbox"/>	

3. Academic Qualifications

PhD Level <input type="checkbox"/>	Masters Level <input type="checkbox"/>	First Degree <input type="checkbox"/>
Diploma <input type="checkbox"/>	Certificate <input type="checkbox"/>	

Section B: Extent of E-procurement among public hospitals

4. To what extent do public hospitals implement the following aspects of E-procurement?

1= No extent 2 =Little extent 3= Moderate extent 4= Great extent 5= Very great extent

	Very great extent	Great extent	Moderate extent	Little extent	Not at all
E-Planning practice					

Online calls for proposals					
Functioning website to manage the entire procurement process					
Allocation of responsibility					
Monitoring processes					
Set goals, strategies and baseline					
Coordination of activities					
E-tendering					
Tender specification					
Advertising					
Tender aggregation					
Evaluation and placing of the contract					
E-Supplier Selection Practice					
Supplier Involvement					
Information Processing Capacity					
Technical Skills & Knowledge					
Networking Infrastructure					
E-Sourcing					
Active suppliers					
Sourcing projects per month					
Trained users					
e-Sourcing process cycle time					

Section C: Impact of E-Procurement on Supply chain performance of public hospitals

5. Kindly indicate the extent to which you agree with the following statements concerning impact of e-procurement on supply chain performance of public hospitals and the supply chain performance of public hospitals.

5= Strongly agree 4= Agree 3= Not sure 2= Disagree 1=Strongly disagree

	1	2	3	4	5
Quality					
Our paperwork is minimal					
We Have little bureaucracy					
Our products are of high quality					
Our information is integrated					
E-procurement Improvement in quality of products/ service					
E-procurement Leads to better service delivery					
E-procurement improves the flow of information					
Improves supply chain managers decision making					
Less complaints from stakeholders and customers					
Improved contract fulfillment					
Dependability					
Reduction in errors of order transmission					
Reduces procurement corruption					
E-procurement leads to cost reduction					
Standardizes purchasing process across the organization					
Reduction in inventory					

Reduction in errors of order transmission					
Increases productivity					
Improved controls					
Easy access to supplier					
Increase in competition					
Timeliness					
We have reduced lead times					
E-procurement Encourages Accountability					
E-procurement Enables the organization to streamline processes					
E-procurement Facilitates real time response to customers					
E-procurement Guarantees real time response to the market					
Reduces discretion & increases transparency					
The system has improved the speed of service with consideration to the amount of work in selecting the right supplier.					
Encourages use of technology					

6. What recommendations would you give to improve supply chain performance of public hospitals in Kenya?

.....
.....

7. In what ways does e-procurement implementation impact supply chain performance of public hospitals in Kenya?

.....
.....

THANK YOU FOR YOUR TIME

Appendix III: Research Questionnaire for Users of E-Procurement System

This questionnaire is to collect data for purely academic purposes. The study seeks to investigate the influence of e-procurement implementation on supply chain performance of public hospitals in Kiambu County. All information will be treated with strict confidence. Do not put any name or identification on this questionnaire.

Answer all questions as indicated by either filling in the blank or ticking the option that applies.

Section A: General information of the respondents

1. Gender Male Female

2. Age Bracket
 18-25 years 26-36 years 36-45 years
- 46-55 years Over 56 years

3. Academic Qualifications
 PhD Level Masters Level First Degree
- Diploma Certificate

Section B: Extent of E-procurement among public hospitals

4. To what extent do public hospitals implement the following aspects of E-procurement?

1= No extent 2 =Little extent 3= Moderate extent 4= Great extent 5= Very great extent

	Very great extent	Great extent	Moderate extent	Little extent	Not at all
--	------------------------------	-------------------------	----------------------------	--------------------------	-----------------------

E-Planning practice					
Online calls for proposals					
Functioning website to manage the entire procurement process					
Allocation of responsibility					
Monitoring processes					
Set goals, strategies and baseline					
Coordination of activities					
E-tendering					
Tender specification					
Advertising					
Tender aggregation					
Evaluation and placing of the contract					
E-Supplier Selection Practice					
Supplier Involvement					
Information Processing Capacity					
Technical Skills & Knowledge					
Networking Infrastructure					
E-Sourcing					
Active suppliers					
Sourcing projects per month					
Trained users					

e-Sourcing process cycle time					
-------------------------------	--	--	--	--	--

Section C: Impact of E-Procurement on Supply chain performance of public hospitals

5. Kindly indicate the extent to which you agree with the following statements concerning impact of e-procurement on supply chain performance of public hospitals and the supply chain performance of public hospitals.

5= Strongly agree 4= Agree 3= Not sure 2= Disagree 1=Strongly disagree

	1	2	3	4	5
Quality					
Our paperwork is minimal					
We Have little bureaucracy					
Our products are of high quality					
Our information is integrated					
E-procurement Improvement in quality of products/ service					
E-procurement Leads to better service delivery					
E-procurement improves the flow of information					
Improves supply chain managers decision making					
Less complaints from stakeholders and customers					
Improved contract fulfillment					
Dependability					
Reduction in errors of order transmission					
Reduces procurement corruption					
E-procurement leads to cost reduction					

Standardizes purchasing process across the organization					
Reduction in inventory					
Reduction in errors of order transmission					
Increases productivity					
Improved controls					
Easy access to supplier					
Increase in competition					
Timeliness					
We have reduced lead times					
E-procurement Encourages Accountability					
E-procurement Enables the organization to streamline processes					
E-procurement Facilitates real time response to customers					
E-procurement Guarantees real time response to the market					
Reduces discretion & increases transparency					
The system has improved the speed of service with consideration to the amount of work in selecting the right supplier.					
Encourages use of technology					

THANK YOU FOR YOUR TIME

Appendix IV: List of Hospitals in Kiambu County

1. AAR HEALTHCARE THIKA OUTPATIENT CENTRE
2. AFRICAN MUSLIMS AGENCY HEALTH CENTRE
3. AKSHAR HEALTH CARE LIMITED
4. ASSUMPTION OF MARY CATHOLIC DISPENSARY
5. ATHI DISPENSARY
6. BETA CARE HOSPITAL LIMITED
7. CARITAS COMMUNITY HOSPITAL
8. CARITAS MARIANA DISPENSARY
9. CENTRAL MEMORIAL HOSPITAL (THIKA)
10. COMRADE NURSING HOME
11. DONYO SABUK MAT & NUR HOME
12. GAKOE HEALTH CENTRE
13. GALAXY MEDICARE CONSULTANTS
14. GATUNDU DISTRICT HOSPITAL
15. GATUNDU WOMENS HOSPITAL
16. GITARE HEALTH CENTRE
17. HOLY FAMILY CATHOLIC MISSION HOSPITAL
18. IMMACULATE HEART OF MARY HOSPITAL
19. ITHANGA HEALTH CENTRE
20. J. K. U. A. T. HOSPITAL
21. JUJA FARM HEALTH CENTRE
22. KALIMONI MISSION HOSPITAL
23. KARATU HEALTH CENTRE

24. KIANDUTU HEALTH CENTRE
25. KIMBO HEALTH CARE CENTRE
26. KIMENDE ORTHODOX MISSION H/CENTRE
27. LIMURU COTTAGE HOSPITAL
28. LIMURU NURSING HOME
29. MERCY LIGHT HOSPITAL
30. MT.SINAI HOSPITAL
31. MUNYU HEALTH CENTRE
32. NAIDU HOSPITAL
33. NGENDA HEALTH CENTRE
34. NGOLIBA HEALTH CENTRE
35. OASIS MISSION HOSPITAL
36. PEFA MERCY MEDICAL CENTRE
37. RADIANT GROUP OF HOSPITALS-KIAMBU
38. ROMKAN MEDICAL CENTRE
39. PRIVATE HOSPITAL
40. SUB DISTRICT HOSPITAL
41. SIMBI ROSES MEDICAL STAFF CLINIC
42. SPA NURSING HOME
43. ST. IMMACULATE HEART HOSPITAL/ LIMURU
44. ST. JUDE NURSING HOME
45. ST. PAUL'S UNIVERSITY HEALTH CENTRE
46. ST.ANN MEDICAL CENTRE/ LIMURU
47. ST.MARGARET MEDICAL CLINIC

48. ST.MARK MEDICAL CLINIC
49. ST.MARY'S MOTHER AND CHILD MEDICAL CENTRE
50. ST.TERESA HOSPITAL KIAMBU
51. ST.TERESA KIKUYU MATERNITY & NUR. HOME
52. SUNVIEW MATERNITY AND NURSING HOME
53. SUVA HEALTH SERVICES
54. THIKA LEVEL 5 HOSPITAL
55. NURSING HOME (THIKA)
56. TIGONI DISTRICT HOSPITAL
57. TRANSCON WENDO MEDICAL SERVICES
58. TUMAINI MEDICAL CLINIC
59. VINEYARD HOSPITAL

Source: County Government of Kiambu (2019)