EFFECT OF E-PROCUREMENT PRACTICES ON PERFORMANCE OF INVENTORY MANAGEMENT IN THE MANUFACTURING FIRMS IN NAIROBI COUNTY, KENYA

BY

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MASTER OF BUSINESS ADMINISTRATION (PROCUREMENT AND SUPPLIES MANAGEMENT)

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DECLARATION

I declare that this dissertation is my original work and has not been previously published or submitted elsewhere for award of a degree. I also declare that this contains no material written or published by other people except where due reference is made and author duly acknowledged.

Student Name: Leah Nyokabi Maina Reg, No. 15/03258

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I do hereby confirm that I have examined the master's dissertation of

Leah Nyokabi Maina

And have certified that all revisions that the dissertation panel and examiners recommended have been adequately addressed.

Sign: _____ Date: _____

Dr Edward Owino.
Dissertation Supervisor

ABSTRACT

Technology has been responsible for the efficiency and effectiveness in most of the activities and competition rates in the world of business today. This has made the business world to be more creative and to put more efforts in ensuring that customers were provided with products that are sustainable and affordable Ramkumar (2015). Technology has put most of the organizations under pressure to ensure that they improve their operations, utilization of resources, development of their products, transparency and increasing their efficiency. Technology has also forced most of the companies to adopt to virtual e-procurement and supply chain philosophy from the traditional ways due to emerging of internet and Information, Communication and Technology (ICT) that has transformed most of the companies to running their activities through automation Mital (2014). Establishing the effects of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya was the study's main objective. The study was guided by the following specific objectives; to establish the effect of e sourcing on performance of inventory management in manufacturing firms in Nairobi County in Kenya. To examine the effect of digital buyer-supplier collaboration on performance of inventory management in manufacturing firms in Nairobi County in Kenya. To assess the effect of inventory control on performance of inventory management in manufacturing firms in Nairobi County in Kenya as well as to establish the effect of electronic data transmission on performance of inventory management in manufacturing firms in Nairobi County in Kenya. The study used descriptive research design. The target sample for this study was 278 and the respondents were 208. The study used stratified random sampling method to select companies from the various subsectors of the manufacturing sector in Nairobi County, Kenya. The study used the multiple regression analysis model to measure the relationship between eProcurement practices and performance of inventory performance and the significant of the study. The key findings of the study are that e-soucing, inventory control and electronic data transmission has significant influence on performance of inventory management in manufacturing firm in Nairobi County, Kenya while digital buyer supplier collaboration has insignificant effect on the performance of inventory management. The study recommends that manufacturing firms in Kenya should invest in e-procurement practices given its influence in performance of inventory management. The study also recommends that other key sectors in the economy for example the government sector adopts e-procurement practices to increase transparency in the procurement processes and enhance the accuracy of the stock as well as reduce pilferage of the stocks and reduce the lead times for overall better performance of the sector. Future researches might consider investigating the effect of e-procurement practices in various sectors other than manufacturing as well as in manufacturing sector in other counties across the country. The findings of this study have added to the body of knowledge in bridging the gap between the theories and practices of eProcurement.

Keywords: E-Procurement, E-Sourcing, Inventory Management, Inventory Control, Digital Buyer Supplier Collaboration, Electronic Data Transmission, Manufacturing Firms

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LIST OF ACRONYMS AND ABREVIATIONS

ANOVA: Analysis of Variance

ELI: Empirical Leanness Indicator

EFT: Electronic Funds Transfer

KAM: Kenya Association of Manufacturers

MRO: Maintenance Repair and Operations

MRP II: Manufacturing Resource Planning

MRP: Materials Requirements Planning

NAA: National Association of Accountants

RBT: Resource-Based theory

RSNI: Roads Service Northern Ireland

SPSS: Statistical Package for Social Sciences

TCE: Transaction Cost Economics

TPN: Trading Process Network

TERMS AND DEFINITIONS

Buyer/Supplier collaboration: This provides internet-based technology that enables teams to collaborate in the management of documentation by supporting contract and project management both before and after contract award within a shared and secure working environment Lysons and Farrington (2006).

Electronic Data Interchange (EDI): is the computer-to computer interchange of strictly formatted messages that represent documents other than monetary instruments Kwan (2010).

E-Procurement: is defined as the use of information and communication technologies (ICTs) to carry out individual or all stages of the procurement process that include sourcing, negotiation, ordering, receipt and post procurement review which leads to significant reduction in both cost and time Giunipero (2008).

E Sourcing: is the process of obtaining bids from different suppliers via a single online portal Michalski (2013).

Organizational Performance: Analysis of Company's performance compared to goals and objectives. Within Manufacturing, organizations there are three primary outcomes analyzed, these are shareholder value performance, market performance and financial performance in some cases, production capacity performance may be analyzed Malo (2011).

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The procurement and purchasing of companies usually involves integration of buyers and sellers using relevant IT systems, which are mostly driven by a process called E-procurement. Companies that have been able to embrace e-procurement despite the fact that it is still in its streamlining process Shale (2015) have experienced great profits and savings. Embracement of e-procurement has increased the efficiency and control of organizations' procurement activities compared to the traditional methods used. The two main concepts of e-procurement, which are, cloud computing and the cloud process have been the reason for further improvement of e-procurement. This process has been able to ensure that contracts and agreements management, comparison of prices, verification of products and selection of articles have been simplified and speeded, Nurmandi and Kim (2015).

Technology has been responsible for the efficiency of most of the activities and competition rates in the world of business today. This has made the business world to more creative and to put more efforts in ensuring that customers were provided with products that are sustainable and affordable Ramkumar and Jenamani (2015). Technology has put most of the organizations under pressure to ensure that they improve their operations, utilization of resources, development of their products, transparency and increasing their efficiency. Technology has also forced most of the companies to adopt to virtual e-procurement and supply chain philosophy from the traditional ways due to emerging of internet and Information, Communication and Technology (ICT) that has transformed most of the companies to running their activities through automation (Mital, Pani, & Ramesh, 2014). The use of e-procurement has continued to grow due to the advantages that it offers to buyers and suppliers and eventually to the customers. These benefits are; procurement cycles that are

shorter, reduction of inventory levels, reduction of transaction costs, staff requirement that are lower, increase in transparency and improved communication between suppliers and buyers, Mital, Pani and Ramesh (2014). Relationships are maintained through commitment from both buyers and sellers Davenport (2008). These relationships are responsible for long-term collaborations from other organizations Hsu and Chiu (2004).

1.1.1 The concept of e-procurement

The use of internet technology in the process of purchasing is what Mahalik (2014) termed as e-procurement. This process involves a procurement system that uses Information Technology (IT) to make purchases which is a product of the supply chain Mgidlana (2014). E-procurement involves purchases between a business-to- another business, a business to a consumer and a business to the government which may involve selling of supplies, work and services all done through the use of internet or use of data interchange electronics and enterprise resource planning Shale (2015). Indent management, e-Informing, e-Tendering, e-Auctioning, vendor management, catalogue management, Purchase Order Integration, Order Status, Ship Notice, e- invoicing, e-payment, and contract management make up the e-procurement's value chain. Preparation in making of tenders involves the management of indent, Stadtler (2015). Lead-time reduction, procurement costs reduction and transparency enhancement are the benefits that are associated with e-procurement Aikins, *et al* (2014).

Every organization should consider adopting e-procurement due to the advantages that it provides. Efficiency in the organization is achieved through e-procurement, reduction of costs that leads to savings and provision of quality products OGC (2005). Contracts between suppliers and buyers are made fast by use of e-procurement, which results to reduction of costs. Organizations should consider improving all supply chain functions its practices should be shifted from independent to general, and integrative to achieve an

effective implementation of supply chain management Sundram, Razak and Chandran (2011). This could be achieved successfully by ensuring that the organization evaluates each supply chain and how it performs. Use of various supply chain practices can also help in the successful achievement of supply chain in an organization.

The use of internet technology to identify the next suppliers for a specific category spent is termed as e- sourcing. Supply chain performance is achieved through identification of new suppliers that also increases the company's level of competition in a specific spend category. Spend category that is associated with supply risks are reduced through e-sourcing Harink (2012). E- Informing is a process in the Enterprise Resource Planning (ERP) that involves contracting and ordering through information sharing. This process is done through the internet where gathering and distribution information is collected form internal and external sources to enhance purchases Stonebraker (2016).

Represented documents, which are interchanged through strictly formatted messages in a computer-to-computer interchange without the use of monetary instruments, is termed as Electronic Data Interchange (EDI) Kwan (2010). These messages involve two parties that are the originator and the recipient. These messages are usually transmitted from the original source to the recipient through telecommunications or on electronic storage media. This process involves transmission of information through an agreed format, automatic processing and unambiguous from one computer to the other Puschmann and Alt (2005).

1.1.2 Performance of inventory management

In the production process, operations are facilitated by how raw materials are stocked, how the working progress is, quality of finished goods and supplies that are termed as inventories (Rushton, Croucher and Baker (2014). Inventories consist of assets or items held in the business process, goods consumed or goods used in the production process that are to be sold.

Inventory was evolved in the 1950 and its due purpose was to ensure that there was increase in supply chain and inventory management globally Michalski (2013). This process involves information integration, transportation, acquisition, inspection process, handling of materials, the process of warehousing, packaging process and control of supplies and security Axsäter (2015). Inventory controls all the processing that supplying involves from the production point to the supply chain process Peter (2000).

The factors used to measure the performance of inventories are; inventory turnover, cost of carrying inventory, receiving efficiency, inventory accuracy, or picking/packing Kesavan (2015). The frequency at which inventories are used in a company are measured by inventory turnover. The amount of products being sold is also important due to the amount of money a company has invested. A company also needs to evaluate whether the products they have stocked is what is in demand or not. If inventories are not carried out effectively, there is likelihood that there will be losses incurred too. Inventory that is not fast enough slows the activities in the company and this leads to slow supplies and losses Stadtler (2015). Inventory is also associated by the level of profits that a company incurs per supply chain. All costs in the company that involve rent, utilities and salaries, perishability, shrinkage (leakage) and insurance are all controlled by inventory (Pal, Mahapatra and Samanta (2015).

There have been benefits that have been associated with inventory management, production planning and scheduling since the 1980s. Inventory management includes activities of forecasting and product replenishment. It determines when to order products, how much to order and the most effective source of supply for each item in the warehouse. This ensures that distributors have the right quantity of the right item in the right location at the right time. Inventory control regulates the inventory that is already in a distributor's warehouse. This includes knowing what products are being stocked and how much of a particular item is available. It is about know exactly where each product is located in the

warehouse, ensuring that all inventory remains in great condition and laying out the warehouse in a way that minimizes the cost of filling customer orders. In the manufacturing industry for example, countries such as Japan, Europe and North America have recorded a significant improvement in effectiveness and efficiency in the process of manufacturing and distribution. Inventory has also enabled many countries to develop and grow through collaborations with other companies. This has been achieved by sharing of information from one company to the other on changes in demand and how to ensure they deal with the demand rates Silver, Pyke and Peterson (1998).

According to Silver, Pyke and Peterson (1998) the use of direct manufacturing labor expended per unit of output was responsible for improvement in productivity in the USA. They used this strategy as the industries had a high rate of labor content. This strategy has not been effective recently due to the reduced unit costs for labor. In the 1985, USA recorded a significant profit of 60% in dollars. This showed that effective management of raw materials could lead to improvement in productivity. This was also experienced in Japan as they recorded a massive development in performance, quality and inventory management in the 1980s. This thus shows that if firms embrace the strategy they are likely to record massive rates in their productivity and profit rates.

1.1.3 Manufacturing industry sector in Kenya

Manufacturing industry is the principal source of economic growth, the leading edge of modernization and skilled job creation, fundamental cause of positive spillovers thus foundation for industrialization Libanio and Moro (2007). It plays a key role of structural dynamics and transformation in the form of increased share in aggregate output leading to accelerated growth and reduced volatility Elhiraika (2008). All the informal and formal firms in Kenya make up the manufacturing industry. The formal industry is made up of large

enterprises and small and medium-sized enterprises (SMEs) that play a significant role in building of the industry the same way the informal sector does. There have been fluctuations in the manufacturing sector that have resulted from financial conditions over the years KPMG (2014). Kenya has recorded a great position in being the most developed country in the industry in East Africa while it is the most developed manufacturing sector in Africa as its 10% contribution to the GDP is from the industrial sector ROK (2014) and World Bank (2016).

Manufacturing of value add industries in Kenya was developed together with Kenya Association of Manufacturers (KAM) in 1959. The main role played by KAM is to ensure that it links dialogue between its members and the government by understanding and cooperation through presenting their views and concerns to the relevant authorities. Its main purpose is to; ensure promotion of upheld standards, enactment, trade and investment, encourage the formulation, presentation of sound policies to the government and ensuring that business people have a conducive environment to run their businesses KAM (2015). Appendix IV shows the 499 registered firms under different sectors in Nairobi County. Adoption of e-procurement has been embraced by most of these firms to enhance their performance in the overall activities of their organizations. These has enabled the organizations to enhance their performance through reduction of costs.

The industrial, supply and selling of products, inventory play an important role in ensuring their success that also marks a reduction of costs in most organizations. Most of the happenings ran in the supply chain process are measured by catalog for about 40% Moore, Lee and Taylor (2013) 33% of portfolio represents a company's total possessions while 90% represents their operational capital Sawaya and Giauque (2016). Advantages associated with inventory are growth and productivity of officialdoms that should embolden many firms to clasp it.

1.2 Problem Statement

The use of traditional procurement practices has been reported to be vulnerable to long procurement cycles, increased transaction costs, reduced service quality and low productivity. E-procurement has been reported to improve organization performance and reduce the malpractices in organizations. Batenburg (2017) conducted a study on e-procurement adoption by European firms. The study established that manufacturing companies ranging in size from a few million dollars in annual revenues to over a hundred billion dollars require managing procurement. The key finding from this study was that companies of different sizes approach ERP implementations differently across a range of issues. However, benefits differ by company size. Larger companies report improvements in financial measures whereas smaller companies report better performance in manufacturing and logistics.

Croom and Brandon (2017) conducted a study on impact of e-procurement on experiences from implementation in the UK manufacturing sector. Logistics information systems are increasingly becoming integrated with the enterprise resource planning systems. The approach rests on the ability to accurately capture information about the whereabouts and movement of materials, people, and equipment. Barcoding, RFID (Radio Frequency Identification) technology, warehouse management systems, transport management systems, quality management, inter-firm information exchange, and incorporation into ERP packages support this. Tatsis, Mena and Whicker, (2016) conducted a study on E-procurement in the Greek food and drink industry. They established that e-procurement involves Materials Requirements Planning (MRP) and Manufacturing Resource Planning (MRP II) systems, are expected to provide seamless integration of processes across functional areas with improved work flow, standardization of various business practices, improved order management, accurate accounting of inventory, and better supply chain management. However, these

studies were conducted in developed countries and they failed to look at effects of e-procurement practices in performance of inventory management in manufacturing firms in Kenya.

King'ori (2013) conducted a study on the effect of e-procurement on supply chain management at teachers' service commission. The study revealed that there was a strong relationship between e-Procurement, the levels of ICT expertise and the levels of e-Procurement application. This indicates that the Supply Chain Management is highly correlated with Supply Chain practices and e-Procurement applications. However, the level of management support on e-Procurement application is low. Therefore, management should increase the level of e-Procurement applications as well as the practices since they seem to have a positive impact on Supply Chain Management. Muthoka (2016) conducted a study on e-procurement and performance of government ministries in Kenya. The study found out that e-procurement had a significant impact on performance of government ministries. The study recommended that E-procurement is supposed to be adopted to aid the management staff appreciate the effect of these programs. The study also recommended that the administration should adopt quantitative and qualitative features altogether in making their decision and most viable and inter-linked e-procurement policies and practices throughout the group to enhance cooperation. Mwongela (2014) conducted a study on e-procurement adoption and supply chain performance among commercial banks in Nairobi, Kenya. The study recommends that commercial banks in Nairobi need to incorporate all the e-procurement activities into the system; they need to find out ways of encouraging employees to make use of e-procurement systems as well as find ways of addressing the factors that are critical to the success of e-procurement. This will enable them to improve adoption of e-procurement. The study also recommended that commercial banks in Nairobi should link their suppliers though the e-procurement website to improve product and service delivery. The reviewed literature

established that those studies failed to focus on the effects of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya. Thus, this study was determined to fill the gap on effects of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya.

1.3 Research Objectives

The general objective of the study was to establish effects of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya. The following were the specific objectives:

i. To establish the effect of e-sourcing on performance of inventory management in manufacturing firms in Nairobi County, Kenya
ii. To examine the effect of digital buyer-supplier collaboration on performance of inventory management in manufacturing firms in Nairobi County, Kenya
iii. To assess the effect of inventory control on performance of inventory management in manufacturing firms in Nairobi County, Kenya
iv. To establish the effect of electronic data transmission on performance of inventory management in manufacturing firms in Nairobi County, Kenya

1.4 Research Questions

i. What was the effect of e sourcing on performance of inventory management in manufacturing firms in Nairobi County, Kenya?
ii. What was the effect of buyer/supplier collaboration on performance of inventory management in manufacturing firms in Nairobi County, Kenya?

iii. What was the effect of inventory control on performance of inventory management in manufacturing firms in Nairobi County, Kenya?

iv. What was the effect of electronic data transmission on performance of inventory management in manufacturing firms in Nairobi County, Kenya?

1.5 Significance of the Study

The study is of benefit to different stakeholders in different sectors of the economy. Government and Policy Makers: The results of the study on of e-Procurement are likely to encourage the government and responsible authorities to take necessary action to address challenges facing the adoption of e-procurement practices in the government sector given its positive impacts on performance of inventory management. Suppliers and other business partners will be more informed on the benefits of adoption of e-procurement practices as opposed the tradition manual procurement practice which will warrants the investment in best supporting information technologies in the market. The findings of the study will assist other academicians to find gaps in literature on the topic and the study can be used as a reference point for other related studies. This research provides general understanding of e-procurement practices in the Kenyan context. This will add value to the body of knowledge in bridging the gap between theories and practices of the application of e-procurement.

1.6 Scope of the Study

The study focused on effects of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya. The study looked on effect of e-sourcing on performance of inventory management in manufacturing firms, effect of digital buyer-supplier collaboration on performance of inventory management in manufacturing firms, effect of inventory control on performance of inventory management in manufacturing

firms and effect of electronic data transmission on performance of inventory management in manufacturing firms.

1.7 Chapter Summary

Chapter 1 covered the background of the study on the e-procurement practices on performance of inventory management. A lot was discussed and cited from the previous studies. The problem statement was obtained from the background of the study, identified the research gap from the review. The justification and significance of the study was highlighted with research questions and objectives to be measured. The scope to the study were the manufacturing from Nairobi County. The next chapter is the literature review on the theories empirical studies and the conceptual framework as per the study topic

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This chapter reviews the theoretical framework of the study, empirical review, critique the existing literature, identification of research gaps, the conceptual framework and operationalization of the study variables.

2.2 Theoretical Framework

This section explains the different theories that relate to variables of the study. Theories are formulated to explain, predict and understand the challenges and extend existing knowledge within the limits of the critical bounding assumptions.

2.2.1 Transaction cost economics (TCE) theory

Reduction of transaction costs and transaction management by use of ICT are associated with the Transaction Cost Economics (TCE) theory Coase, 1937; Alchian and Demsetz (1972); Williamson (1975). This theory's main aim was to emphasize on how an organization could improve its efficiency and performance by reduction of costs in its tasks Williamson (1985). It also emphasized on the advantages of coordination between one organizations to another.

This theory showed that an organization could suffer the challenge of opportunism due to bargaining together with a number of other organizations Presutti (2003). It also focused on the advantages of having several suppliers as relying upon one as these increases

the negotiation power and offering of between procurement deals that reduces risks of relying upon one supplier. The more suppliers and organization had enabled them to have balance through coordination and reduction of risks involved Whitin (1955).

Since Procurement processes were standardized and automated, reduction of costs were enabled by Information Technology (IT) as it also emphasized coordination with many suppliers. The process mostly advantages the commodity items buying organizations. IT focuses on reducing costs by working with low cost suppliers to save costs and be able to purchase more goods and thus provide discounts to their customers Presutti (2003). Organizations that use IT are able to facilitate effective reduction of costs. The cost of searching and obtaining of information is made easier by use of IT as they provide the price and offering on products Catherine (2005) through electronic market places. Information sharing has also enabled many countries to develop and grow through collaborations with other companies. This has been achieved by sharing of information from one company to the other on changes in demand and how to ensure they deal with the demand rates Carlos, Wills and Plant (2008).

Various types of uncertainties that include; new product development uncertainty, demand uncertainty, technology uncertainty and supply uncertainty have been the main causes of uncertainty in the manufacturing sector Erridge (2007). Challenges that occur unexpectedly in the process of supply chain are known as supply chain uncertainties. These challenges are for example late deliveries and shortage of materials. These challenges affect the manufacturing process, which them affects the sales, down to distributors and then to the retailers. These challenges can cause great losses in a company that can even lead to collapse of the organization if the challenges are not resolved in good time Geoffrey (2015).

Another uncertainty may occur during the development of products or through the process of product prototyping, product design and market research, which is related to

manufacturing of products. Another uncertainty is the choosing of the appropriate technology platform to use in the manufacturing process of products Giunipero (2008). These uncertainties may be reduced by company's coordination in information sharing which reduces risks as companies may inform each other on the effective ways of planning, production and inventory. Information sharing may carry several advantages but on the other hand may involve various disadvantages incase the wrong or inappropriate information is spread across from one firm to the other. This thus concludes that internal activities of an organization can be affected by the rates at which the environmental changes are evolving and effects of uncertainty Kaliannan, Raman nd Dorasamy (2008). The theory supported e-procurement practices since it emphasizes on how an organization could improve its efficiency and performance by reduction of costs in its tasks by use of information technology.

2.2.2 The resource based view (RBV) theory

The RBV states that a resource has to be heterogeneous in nature and not mobile for it to ensure successful transformation of a short-term competitive advantage to a long-term competitive advantage. It focuses on the ability of organizations to being able to provide products that are not imitable and cannot be substituted. This factor enables an organization to sustain its competitive advantage, which in return ensures a long-term sustainability.

Supply chain management and procurement have been in the long term been controlled by IT (information technology) Pressutti (2003). Here, RBV comes in to analyze sustainability on how IT sources are involved. Strategic resources derive economic rent, which is measured by IT as per RBV Rajkumar (2001). This results from the focus of RBV on provision of goods that are inimitable, rare, valuable, and non-substitutable through

information technology. The theory also insists on resources that are immobile and heterogeneous.

The challenges that are associated with resources include lack of capability to provide unique products, lack of ambiguity social complexity and lack of adequate knowledge and skills, which are much emphasized by the theory for the long-term sustainability of competitive advantage Simon and Alistair (2005). The resources derived from information technology may be difficult for other firms to imitate, as they do not possess the learning capabilities, organizational knowledge and time. This is due to the IT nature of sustainability to provide dynamic and sensitive terms Webb (2004). The theory thus focuses on how to increase and sustain competitive advantage in businesses by using information technology, which is a strategic resource that needs to be embraced and adopted effectively in Kenya, is manufacturing industry. Firms should acquire resources from information technology/use lessons and time learnt from previous experiences.

2.3 Empirical Review

This section presents a review of literature on the study variables done by others.

2.3.1 E-sourcing and performance of inventory management

E-Sourcing is defined by Hunsinger (2015) as use of internet and other related services as a decision support tool to detect, evaluate, negotiate and build up supplier and customer relationships that will effectively and efficiently aid supply chain and procurement processes. Objective of e-sourcing is to cost effectively identify vendors, goods and works that can be bought at the best lowest total cost and at the same time achieving organization objectives Chitungo and Munongo (2013). It assists organizations to enhance knowledge and train other members of staff in the entity, on the use of proven sourcing methods. E- sourcing can lead to

process efficiencies of reduced overheads, reduced lead-time and can allow buyers through the internet technology to identify across spatial boundaries a set of new suppliers for a certain category of requirements Lu, (2015). The use of internet technology to identify the next suppliers for a specific category spent is termed as e- sourcing. Supply chain performance is achieved through identification of new suppliers that also increases the company's level of competition in a specific category spent. Spend category risks are reduced through decrease of supply chain and the process is called e- sourcing (Williams and Wynn (2015).

A study done by Carlisle et al, (2006) on what drives and barriers e-procurement in a Northern Ireland construction company. Seventy potential contractors who were interested in the tendering of Northern Ireland were sampled to rank the drivers and barriers. These contractors were members of RSNI, which is a Northern Ireland, which is takes care of roads in the country and serves as a major construction client. Other studies found to have similar findings were done in Australia and America in how goods and services were supplied through e-procurement system. The findings were that e-procurement was driven significantly by improvement of communication and reduction of costs through IT. The barriers found were associated with security issues and uncertainty in e-procurement legal issues.

Kamotho (2014) did a study to find out how state government agencies' performed and the e-procurement practices they had adopted and the extent to which they had been adopted. He further examined the challenges the agencies faced while adopting e-procurement; he also determined the connection between e-procurement and procurement performance in the Kenyan state corporations. He used a sample of all the state corporations in Kenya, which are 210 in total. He later sampled them to 42 in number. He used questionnaires to collect the required information. The findings showed that most of the

companies according to chapter 12 of the New Constitution of 2010, Public Financial Management Acts of 2012 and 2015 and the Public Procurement Disposal Act of 2015 had adopted some e-procurement practices to ensure that they improved their procurement and operational practices. The results also showed that the e-procurement practices the companies had adopted had an effect on procurement performance through the regression analysis he conducted.

How procurement had been adopted and the efficiency its adoption had in public hospitals; was evaluated by Ateto, Ondieki and Okibo (2013). The main objective of his study was to find out how efficiency had been improved by e-procurement structures adopted by the public hospitals, to find out how the pricing expenditure had been changed and its effects and to find out how value for money had been ensured by e-procurement in the hospitals. The study found that e- tendering, e-quotations and e-sourcing were the main e-procurement systems that Kisii Level 5 hospital uses in its daily transactions and supplies. The study further found that the challenges the hospital faced in adoption and use of the systems were inadequate funding, organization's inability to handle change management and lack of training of employees on how to use the system. The study thus concluded that most public hospital have adopted e-procurement systems but the use and adoption is faced by various challenges.

Dzama and Matavire (2013); did another study where they tried to find out what influenced adoption of e-procurement, impact of adoption of e-procurement to strategic sourcing and to help the staff and management to understand its impact on CBZ Bank in Zimbabwe. The study used factors such as strategic elevation, benefits of information sharing and current procurement practices of e-procurement and their impact on strategic sourcing. The authors used CBZ as their case study, the respondents were expected to fill in questionnaires and interviews were conducted on CBZ management. The study concluded

that the financial stability of the organization influenced the level of adoption of e-procurement processes, which had a significant effect on its strategic sourcing. The factors found to affect the adoption of e-procurement processes were cost and strategic factors in CBZ. The study thus recommended that CBZ needed to have stronger support from the overall management on the adoption of the processes to ensure that their strategic factors were effectively responded to. The study therefore hypothesizes that:

> ***H_{01}:*** *Adoption of e sourcing has no significant effect on performance of inventory management*

2.3.2 Digital buyer-supplier collaboration and performance of inventory management

Buyer-Supplier Collaboration is where both the buyer and the supplier have a strong, cemented and long-term relationship that makes them partners. This relationship's main role in business is to create a strong commercial advantage to both parties Coviello and Gagliarducci (2017). This relationships goal is to ensure that they maintain teamwork in their businesses. This relationship helps in providing the customer with the best products as their collaboration contributes to the customer's satisfaction. This collaboration is only successful if both parties have the same interests and wish the same to their partners Coggburn (2017). A long-term relationship created by two parties with the same business interest is what Monczka, Trent, and Handfield (1989) defined as collaboration. This relationship is significant in the business as it shapes the current nature and future direction of the business. This process requires both parties to have balanced power and mutual commitment for the success of their objectives. These relationships' main challenges are conflicts that both parties encounter from time to time; it is therefore advisable for both parties to come up with mechanisms to deal with the conflicts.

According to Krause, Handfield and Tyler, (2007), efforts by both the suppliers and the buyers in collaboration to improve their performance and capabilities through cost, quality, delivery, time-to-market, technology, environmental responsibility, and managerial capability and financial viability is what defines supplier development. This relationship between the supplier and the buyer has been improved and made more efficient through a process called Digital Buyer-Supplier Collaboration, which uses the internet to ensure that both parties share information especially on their contracts easily and fast thus creating a conducive environment for both Veatch (2017). Management of logistics and physical distribution is greatly affected by the buyer and supplier's collaboration. Through the years, relationships between buyers and suppliers have continued to grow in the aspect that they do not only engage in transaction processes, but are involved in sharing of information which strengthens their trust for each other which eventually helps both parties to respond effectively on unpredictable and dynamic changes that occur in the business activities. A relationship between the buyer and supplier is founded/sustained, if both parties have the same interests Graells (2015). Cicala (2015) indicated that collaborations were motivated by the inter-organizational relationships created by both buyers and suppliers. Relationships between buyers and suppliers are motivated by factors that include; incentive alignment, joint decision making and information sharing to create as stronger collaboration.

Emerging of the internet came about with various changes in the business world that forced organizations to make changes in how they ran their business and adopt different strategies to make their activities more efficient and create more collaborations with their partners (Lashgari, Taleizadeh and Sana (2016). E-procurement has been advantageous especially to the buyers but even supplies can benefit greatly by adopting this process. Ways the suppliers can benefit through e-procurement are; increase in volume sales; reduction of sale costs, reduction of operating costs and improvement of insight demands. The relationship

between suppliers and buyers can be enhanced through creating a better and stronger team network, which helps in reducing procurement costs Williams, Dobie and Wynn (2015).

Adoption of e-procurement enables more activities to be done and more time allocated to them, as it is able to fasten on order placements, catalog management, payment reporting and transactions making it easier to respond to the market demands. E-procurement helps the supplier to create a catalog which they store in e-commerce server website where the buyers can easily access and acquire information they require Hunsinger (2015). These catalogues are also included in the buyers systems to ensure that the purchases undertaken are correct. A buyer to various suppliers can use this system where the back-end ERP of the supplier is correctly integrated with the buyer's back-end ERP system. Despite this possibility, various drawbacks are experienced in the process Graells (2015). Integration of many activities between the buyer and supplier sometimes involves various challenges where the use of Maintenance Repair and Operations (MRO) is now commonly used to purchase goods through e-procurement. Intangible and tangible factors are used collectively to ensure that greater value is achieved by improving supply chain performance. This thus shows that supply chain performance is enhanced through value creation Coggburn (2017). Collaboration between the buyer and supplier are enhanced through joint-learning strategy, which also improves mutual competency and leads to improvement in overall performance. Performance is also increased through information sharing that should be sustained for long-term results Cicala (2015).

A study conducted in a General Electric's (GE's) Trading Process Network (TPN) by Lee, Chu, and Tseng (2009) found that employment of e sourcing played a significant role in creating collaborations between buyers and suppliers. The study focused on how the collaboration had been impacted by adoption of the internet. This showed that buyers were able to choose their suppliers and place orders more efficiently. This process also affects how

selection of suppliers is conducted and how contract agreement purchasing of products is carried out. Due to the benefits that have been experienced through e-procurement, the ERP software providers have been able to increase capabilities of e-procurement. The sampled company GE was found to reduce costs of materials, finding new suppliers easily and reduced costs due to adoption e-procurement. This thus concludes that the benefits of TPN are; reduction in the sourcing time cycle, shrinking of market time, reduction of marketing time and reduction of costs and taxes. The study therefore hypothesizes that:

> ***H_{02}:*** *Adoption of digital buyer supplier collaboration has no significant effect on performance of inventory management*

2.3.3 Inventory control and performance of inventory management

The processes that a company uses to control its uses of inventory is termed as inventory control as per Whitin (1955). Inventory controls are achieved through using the least of inventory investments without interfering with the levels of customer satisfaction to generate the highest profit possible Lashgari, Taleizadeh and Sana (2016). Due to nature of investments in a company, a relationship between inventory turnover and capital intensity was found to exist by Kolias (2011), who did an examination on inventory-performance in Bursa Malaysia's listed construction firms. Another study found that there is a relationship between firm's profitability and how functions such as reduced set up times, preventive, maintenance programs, and uniform workloads have been implemented in manufacturing firms that have implemented higher degrees of modern inventory management techniques compared to those that have not Fullerton et al,. (2003). These shows that the firms that have implemented modern inventory management techniques effectively have been fund to record high levels of profits compared to those that have not.

Boudijilda and Pannetto (2013) also found a relationship between inventory management and performance through a study they performed whereby they made use of Empirical Leanness Indicator (ELI) to measure management of inventory. The found that the best management tool of inventory was inventory leanness. This was due to the leanness nature of being minimized as a form of waste through good management of inventories. The study conclude that profit margins affected leanness in manufacturing firms in the United States between 2003 and 2008. Firms that have an average leaner industry Eroglu and Hofer (2011) experience positive returns to leanness. These findings showed that a non-linear relationship exists between firm performance and inventory leanness. This also elaborates that a negative financial performance was found, as inventory leanness is concave in nature, which affects the theory of inventory management.

Inventory management practices were assessed in industries using 351 management accountants as the number of respondents of the National Association of Accountants (NAA) in the U.S found that adoption of the processes was increasing in popularity due to the developing levels of internets and the benefits companies are acquiring through their implementation. Respondents indicated that they had no intentions in changing their inventory controls as they had greatly benefited from them and had increased the level of profits they received (85%). They also indicated that assessing inventory levels and balancing stock-out costs were not common practices in the company Romano (2011). Analyzing of how working capital management was related to corporate profitability was stressed by Ngunyi (2014) as an important factor to consider in firms being able to maintain their inventory at an optimum level, which if not well managed, would result to non-profitable operations.

Rajeev (2008) found that inventory performance of businesses was impacted by effective inventory management practices through a study he did on 91 Indian Machine Tool

Enterprises to establish how inventory costs were linked to inventory management practices. The findings also showed that this relationship had an effect on the overall performance of the businesses. Value was also found to be effectively created by managers in Spanish 8872 small and medium-sized firms through reduction of inventory days Deasy et al,. (2014). Operational efficiency in firms is increased, improvement of customer services, reduction of costs in inventory and distribution and being able to track items and dates of expiration which balances availability and demand through implementation of effective inventory management processes. The study therefore hypothesizes that:

> ***H_{03}:*** *Adoption of inventory control has no significant effect on performance of inventory management*

2.3.4 Electronic data transmission and performance of inventory management

Electronic data transmission transferring or sharing of information through electronic media from one party to another, which was previously transferred through paper Veatch (2017). Two main faces are involved in transmission of data through the internet. They are agents of security in addition to messages. These tools are responsible for easy of transfer of information from the buyer to the supplier and vice versa. Transactions on payments, invoices and processes receipts are done through the internet then integrated to both the buyer and supplier for them to receive accurate information Batenburg (2017). The use of e-procurement has enhanced most of the activities done in the company especially to enhance how marketing is done and how information is shared between suppliers and buyers. Security on the other hand involves confidentiality between the information transmitted to both parties, as their information has to be protected in all e-procurement systems Coggburn (2017).

The greatest factor that is now possessed and being adopted by most of the organizations' due to its competitive power is provision of quality services. Improvement of performance and reduction of costs is greatly controlled by the organization's level of Supply chain management Cicala (2015). Availability of adequate resources is also an important factor to ensure that good are delivered in the customer's desired time, shorter product life cycles and increased product variety Muinde (2014). The industries and the government have benefited by the evolution of computers and the internet in improvement of processes, lowering of costs and raising of productivity. Banks for example have made it easier to transfer funds by using the electronic funds transfer (EFT). These has increased the number of money transfers that are taking place every day by use of different kinds of electronic payments such as credit cards Erridge (2007). Costs of business activities have been reduced and customer services improved in the airline industry by use of electronic reservations and ticketing systems developed through the internet by carriers and travel agents, which has made the transactions easier for both parties Boudijilda and Pannetto (2013).

Adoption of processes and data has made Cisco the leading company in the world through achievement of integration in its supply chain Shalle and Irayo (2013). The firm achieved this by bringing together all its supply chain partners through the web in ensuring that all transactions were done through the network. They achieved this by creating a network where both the customers and resellers connect through the software to place, configure and manage their orders. The software also assists the customers to access information of the products offered and their prices. Another company that has adopted this process is the Manufacturing Connection Online (MCO), which provides information on the manufacturers, suppliers and logistics service providers; how their orders are prepared and supplied and the level of fulfillment from other customers. The software created offers information to the customers on how agile and swift the company is in its order information Geoffrey (2015).

A billing management system is involved in the e-procurement network on how usage charges are calculated, how invoices and statements are generated and distributed to customers. This system is also responsible in calculation of orders and distribution of operating costs by suppliers. The back office is responsible of the billing management functions, which help in generation of bills and these results to effective payments of revenues from the transaction fees Sánchez and Manzano (2015). Buyers benefit through negotiating for better deals through effective pricing while sellers benefit through liquidation of excess inventories. They use the Fixed Pricing and Dynamic Pricing options. Fixed prices are prices agreed upon between the buyer and the seller while dynamic prices are prices that are determined by the global markets, which are mostly listed in the catalog, and thus the seller has not control over adjusting it. Reverse auctions, exchanges and auctions are some of examples of dynamic prices Maria et al, (2014). Most of the organizations have benefited through these systems, as they have been able to acquire more profits and create better and stronger collaborations with their suppliers through implementation of e-procurement Dzama and Matavire (2013). The study therefore hypothesizes that:

H_{04}: *Adoption of electronic data transmission has no significant effect on performance of inventory management*

2.4 Knowledge Gaps

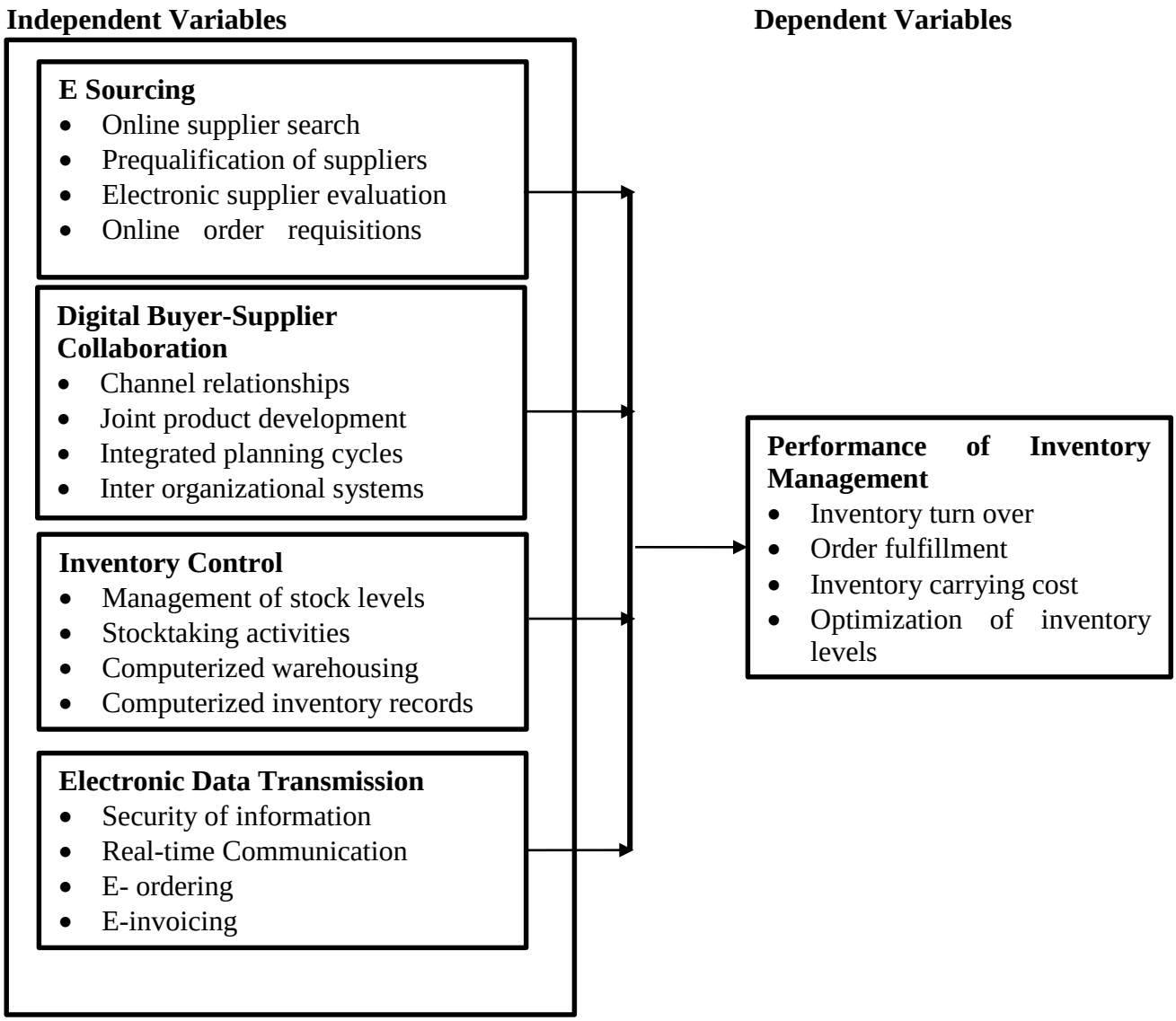
In reference to the reviewed literature above, it was acknowledged that although benefits of e-procurement systems had been discussed in the literature, it was still unclear how performance of inventory management was impacted by e-procurement systems implementation in the manufacturing sector. The study sought to address this concern by studying the effect of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya.

2.5 Conceptual Framework

According to Mathieson (2001), a conceptual framework is a written or virtual product that explains, either in narrative or in graphically form, the main things to be studied, the key elements being variables, concepts and the presumed relationships among them. Conceptual framework, according to Stratman Roth (2004), are structured from a set of broad theories and ideas that help a researcher in properly identifying the problem they are looking at, frame their research questions and find suitable literature. Most academic research uses a conceptual framework at the outset because it helps the researcher to clarify his research question and objectives. Figure 2.1 below presents the conceptual framework of the study. It shows four independent variables: (e-sourcing, digital buyer-supplier collaboration, inventory control and electronic data transmission) and one dependent variable (performance of inventory management).

FIGURE 2.1

Conceptual Framework



Source: Author (2018)

2.6 Operationalization of the Variables

The study operationalized the effect of e-Procurement on performance of inventory management in the manufacturing firms in Nairobi County, Kenya. The independent variables are e-sourcing digital buyer-supplier collaboration, inventory control and electronic data transmission. The dependent variable is performance of inventory management. The

following operationalization table gives insight on how the various variables will be measured, analyzed and conclusions drawn thereafter.

TABLE 2:1

Operationalization of the Study Variables

Objective	**Variable**	**Indictor**	**Measurement scale**	**Question in Questionnaire**
1. To establish the effect of e-sourcing on performance of inventory management in manufacturing firms in Nairobi County, Kenya	Independent **E-Sourcing**	-Online supplier search -Electronic supplier evaluation -Electronic supplier categorization -Online order requisitions	Ordinal/ Interval	Part B
2. To examine the effect of digital buyer-supplier collaboration on performance of inventory management in manufacturing firms in Nairobi County, Kenya	Independent **Digital Buyer-Supplier Collaboration**	-Channel relationships -Decision making -Information sharing -Inter organizational systems	Ordinal/ Interval	Part C
3. To assess the effect of inventory control on performance of inventory management in manufacturing firms in Nairobi County, Kenya	Independent **Inventory Control**	-Management of stock levels -Stocktaking activities -Computerized warehousing -Computerized inventory records	Ordinal/ Interval	Part D

4. To establish the effect of electronic data transmission on performance of inventory management in manufacturing firms in Nairobi County, Kenya	Independent **Electronic Data Transmission**	-Security -Real-time Communication -E- notification -Automation	Ordinal/ Interval	Part E
	Dependent **Performance of inventory Management**	- Inventory Turnover Rate -Order fulfillment -Inventory Carrying Cost	Ordinal/ Interval	Part F

Source: Author (2018)

2.7 Chapter Summary

The chapter highlighted the literature review to the study on related topics. Theories were reviewed and empirical studies recalled as per the study topic. A well-outlined conceptual framework was sketched to show the relationship of variables in the study. The next chapter is the research methodology.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the methods employed in providing answers to the research objective as stated in chapter one. The following aspects of research methodology were discussed: research design, target population, sampling design, data collection method and data analysis, and ethical consideration.

3.2 Research Design

The study used descriptive research design. The descriptive research is a study designed to depict the participants in an accurate way Mugenda and Mugenda (2003). Orodho (2003) observes that a descriptive research design is used when data are collected to describe persons, organizations, settings or phenomena. The design also has enough provision for protection of bias and maximized reliability Kothari (2008). The descriptive research design was important to this study since it helped in describing the impact of eProcurement practices on performance of inventory management and helped in getting in-depth of information from the study Kothari (2008).

3.3 Population of Study

According to Orodho (2003), a population is a well-defined set of people, services, elements, and events, group of things or households that are being investigated. According to the Kenya Association of Manufacturers KAM (2016), 499 large-scale manufacturing companies operated in Nairobi. Hence, the target population for this study was 998, target sample was 278 out of which the response turnout was 208. The targeted respondents were the Stock Managers/Officers and Procurement managers/Officers. E-procurement and its influence on performance of inventory management was relevant at this level prompting the choice of

these groups of respondents directly involved in the adoption of e-procurement policy. In addition, the respondents were chosen because they had adequate knowledge in the study area.

TABLE 3.1

Population Size

Manufacturing Sector	No. of Firms	Stocks Office	Procurement Office	Total Population	Target
Building	20	1	1	40	
Food, Beverages	71	1	1	142	
Chemical	70	1	1	140	
Energy	34	1	1	68	
Plastics	68	1	1	136	
Textile	35	1	1	70	
Wood Products	17	1	1	34	
Pharmaceutical	21	1	1	42	
Metal and Allied	66	1	1	132	
Leather	7	1	1	14	
Motor	27	1	1	54	
Paper	63	1	1	126	
Total	**499**			**998**	

Source: KAM (2016)

3. 4 Sampling Design

Sampling is where units of study are selected from sampling frame of a population Mugenda and Mugenda (2003). MsCledon (2004) defines a sampling size as a list of all units or elements of the research population from which a sample is selected. Generally, the sampling frame incorporates a great deal more structure than one would expect to find in a simple list of elements Ross (1991). The study used stratified random sampling method to select companies from the various subsectors of the manufacturing sector in Nairobi County, Kenya. The strata were different sub-sectors of the manufacturing sector as indicated in Table 3.2.

The formula of sampling forwarded by Krejcie and Morgan's (1970) was used in calculating the sample size (Appendix III). Adopting proportionate sampling approach, the study then computed a percentage of each stratum that gave equal representation as shown in Table 3.2

TABLE 3.2

Sample Size

Manufacturing Sector	**No. of Firms**	**Stocks Office**	**Procurement Office**	**Total Target Population**	**Sample Size**	**Percentage of sample size per sector**
Building	20	1	1	40	11	28%
Food, Beverages	71	1	1	142	40	28%
Chemical	70	1	1	140	39	28%
Energy	34	1	1	68	19	28%
Plastics	68	1	1	136	38	28%
Textile	35	1	1	70	19	28%
Wood Products	17	1	1	34	9	28%
Pharmaceutical	21	1	1	42	12	28%
Metal and Allied	66	1	1	132	37	28%
Leather	7	1	1	14	4	28%
Motor	27	1	1	54	15	28%
Paper	63	1	1	126	35	28%
Total	**499**			**998**	**278**	

Source: KAM (2016), Krejcie and Morgan's (1970)

3.5 Data Collection Methods

Data collection methods refer to the approach that the researcher takes while collecting data in relation to the study Kumar (2009). The study used questionnaires that contained close-ended questions. Questionnaires were preferred because they were effective data collection instruments that allowed respondents to give much of their opinions pertaining to the research problem Kothari (2008). The main method of administration of questionnaires was drop and pick later at an agreed time with the researcher.

3.6 Instrumentation

The instrument used in the study was a structured questionnaire. A cover letter (Appendix I) was attached to the questionnaire to introduce the researcher and provide respondents with information on the study. The questionnaires contained closed-ended questions constructed to address the research objectives. The structured questions asked to minimize response variability while scaled questions used to rank the response. The questionnaire had six Parts. Part A sought background information on the manufacturing firms while Part B to Part F of the questionnaire sought information necessary to answer to the research objectives. The study adopted a 5-point Likert scale1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent.

3.6.1 Validity and reliability

Reliability is a measure of degree to which research instruments yields consistent results or data after repeated trials Fairchild (2002). The validity showed the extent to which a measure or a set of measures correctly represented the concept of the study. According to Fairchild (2002), face validity is a non-statistical assessment of whether or not a test appears to be valid. The face validity test was undertaken by administering the questionnaire to 12 manufacturing firms who were excluded from the final survey. Their feedback was used to remove vague questions, double-barreled questions and to improve the questionnaire. The questionnaire was subjected to a pilot test to check for face validity. The questionnaire was tested for reliability. Field (2005) observes that a Cronbach's $\alpha > 0.7$ implies the instrument provides good measurement tool hence reliable.

3.7 Data Analysis

Data analysis is the process of inspecting, cleaning transforming and modeling data with the goal of discovering useful information, suggesting conclusion, and supporting decision-

making (Cooper and Schindler, 2003). The questionnaires were sorted, cleaned and data coded and edited for completeness and consistency. The data was analyzed by employing descriptive statistics and inferential statistics using statistical package for social sciences (SPSS) version 22. Descriptive statistics involved computation of mean scores, standard deviation, percentages, cross tabulation and frequency distribution, which described the demographic characteristics of the organization and the respondents. Inferential statistics was used to determine the relationships and significance between eProcurement practices and performance of inventory management in manufacturing firms in Nairobi County. The study used the multiple regression analysis models to measure the relationship between e-procurement practices and performance of inventory performance and the significant of the study. Prior to the regression analysis, diagnostics tests were performed to ascertain the appropriateness of the data under regression analysis. The diagnostic tests performed include normality test, linearity test, and multi-collinearity.

3.7.1 Normality test

Statistical student t-test was used to test normal distribution data and hypothesis of data at 95% significance test as well as the Q-Q plots. Statistical t-test assisted the researcher in ascertaining normal distribution of data. The researcher also used statistical mean in analyzing the data.

3.7.2 Linearity test

Linearity test was used to predict the linear relationship of data by plotting independent variable (y) (Performance of inventory Management) against the dependent variable (x) (Electronic Data Transmission, Digital Buyer-Supplier Collaboration, Inventory Control, E-Sourcing) on a graph. Where, if the graph moved upward that is left to right, indicated positive relationship meaning there was a strong relationship between the variables.

Downward movement of graph indicated negative relationship meaning there was no relationship between the variable.

3.7.3 Multi-collinearity test

Multi-Collinearity test was used to test the co-variance between variables for a specified time. Statistical ANOVA, which means analysis of variance, was used to test the variance of population mean and sample mean in establishing the significance of the study. The researcher also used F- Statistics in testing significance of data.

Multiple Linear Regressions;

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Where,

Y = Performance of Inventory Management

β_0 = constant showing the level of performance of inventory management in absence of eProcurement

β_1, β_2, β_3 and β_4 = Beta coefficients (coefficients of the independent variables)

X_1 = E-Sourcing

X_2 = Digital Buyer-Supplier Collaboration

X_3 = Inventory Control

X_4 = Electronic Data Transmission

e = error term

3.8 Ethical Considerations

To ensure participation of the despondence in the data collection the researcher guaranteed confidentiality of the data collected. The data collected by the researcher was used for the purposes of the study only. It was treated with confidentiality and assurances given in respect

to this issue, in addition, authority of the parties involved were sought before the data collection process was undertaken. The researcher also attached a consent letter from the University for Data Collection.

3.9 Chapter Summary

Chapter 3 looked at the research methodology to the study. Thus included the research design, research tools, data collection method, the coding and analysis procedure for the obtained data, the regression model employed as well as ethic consideration. The next chapter that was chapter four introduces the data investigation, presentation and interpretation from the findings.

CHAPTER FOUR

RESEARCH FINDINGS, PRESENTATION AND INTERPRETATION

4.0 Introduction

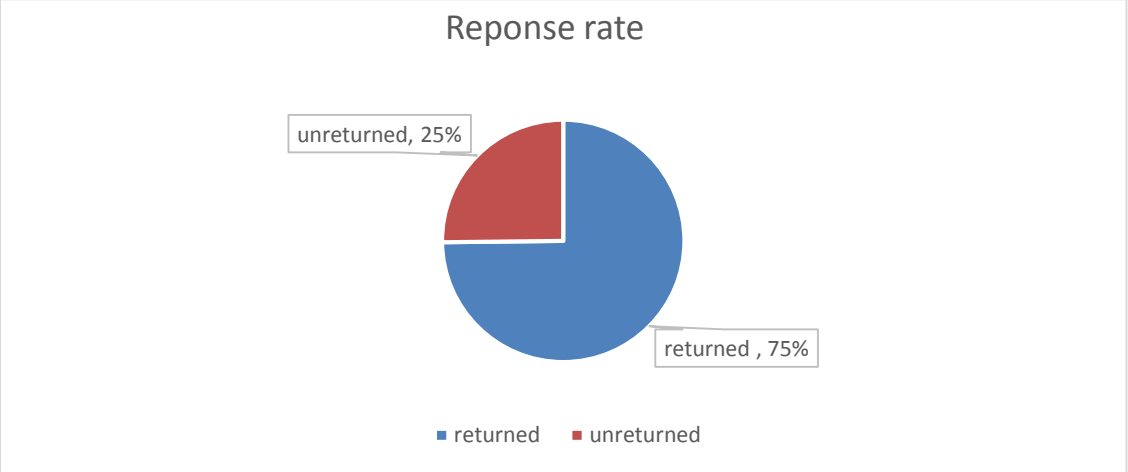
The chapter outlines the analysis process obtained from the analysis tool used (SPSS). The data was organized in excel and imported to SPSS. The analysis section covers the test of linearity, multicollinearity, normality, as well as the general significance of the model

4.1 Response Rate

This section represents the response rate of the respondents. Response rate is a measurement of the amount of people who respond to a certain call-to-action or that it is the number of eligible sample units that cooperate in a survey Holtom (2008). The number of questionnaires that were administered were 278 where properly filled and returned questionnaires from the respondents were 208, which made a 75 % response rate. The data for the study was accurate as the response rate was more than 50% of the targeted sample size.

FIGURE 4.1

Response Rate



Source: Author (2018)

4.2 Descriptive Analysis

From the descriptive analysis, the study obtained the following mean values result from the respondents.

4.2.1 E-sourcing

The study aimed at establishing the effect of e sourcing on performance of inventory management in manufacturing firms in Nairobi County, Kenya

TABLE 4.1

E Sourcing

	N	Mean	Std. Deviation
Online supplier search	208	4.1058	1.14561
Electronic supplier categorization	208	4.1058	1.08051
Online advertisement	208	4.0817	1.17874
Online bid selection	208	3.9615	0.79154
Market Analysis	208	3.8413	1.30729
Electronic supplier evaluation	208	3.5769	1.25642
Online order requisitions	208	3.52885	1.38632
Prequalification of suppliers	208	3.1875	1.54746
Valid N (listwise)	208		

Source: Author (2018)

The results in Table 4.1 shows that online supplier search influences the performance of inventory management with a mean of 4.1058 corresponding to a standard deviation of 1.14561. Prequalification of suppliers influences the performance of inventory management with a mean of 3.1875, electronic supplier evaluation as an e-procurement practice, influences the performance of inventory management with mean of 3.5769. Electronic supplier categorization has an effect on performance of inventory management with a mean of 4.1058, Online order requisitions has an effect on performance of inventory management in the manufacturing firms of Nairobi County with a mean of 3.52885. Market Analysis has an effect on performance of inventory management with a mean of 3.8413, online

advertisement has an effect on performance of inventory management with a mean of 4.0817. Online bid selection, an e-procurement practice has an effect on performance of inventory management in the manufacturing firms of Nairobi County with a mean of 3.9615.

Dzama and Matavire (2013); did another study where they tried to find out what influenced adoption of e-procurement, impact of adoption of e-procurement to strategic sourcing and to help the staff and management to understand its impact on CBZ Bank in Zimbabwe. The study thus recommended that CBZ needed to have stronger support from the overall management on the adoption of the processes to ensure that their strategic factors were effectively responded to. Through the study hypothesis, the researcher has concluded that indeed adoption of esourcing had significant effect on performance of inventory management at 5% significant level.

4.2.2 Digital buyer-supplier collaboration

The study sought to establish the effect of digital buyer-supplier collaboration on performance of inventory management in manufacturing firms in Nairobi County, Kenya

TABLE 4.2

Digital Buyer-Supplier Collaboration

	N	Mean	Std. Deviation
Channel Relationships	208	4.1442	1.14139
Joint Product Development	208	4.1202	1.17542
Inter Organizational Systems	208	4.0962	1.09914
Integrated Planning Cycles	208	3.8413	1.32928
Real Time Information Sharing	208	3.601	1.27382
Supplier Development	208	3.5337	1.40696
Decision Synchronization	208	3.2163	1.50565
Valid N (listwise)	208		

Source: Author (2018)

The results in Table 4.2 shows that Channel Relationships as a Digital Buyer-Supplier Collaboration practice of e-procurement has an effect on the performance of inventory management in manufacturing firms in Nairobi County with a mean of 4.1442, Decision

Synchronization has an effect on the performance of inventory management in manufacturing firms with a mean of 3.2163. Real Time Information sharing has an effect on the performance of inventory management in manufacturing firms with a mean of 3.6010. Inter Organizational Systems has an effect on the performance of inventory management in manufacturing firms with a mean of 4.0962. Supplier Development has an effect on the performance of inventory management in the manufacturing firms in Nairobi with a mean of 3.5337 while Integrated Planning Cycles had a mean of 3.8413 on the performance of inventory management in the manufacturing firms in Nairobi. Joint Product Development, has an effect on the performance of inventory management in manufacturing firms with a mean of 4.1202.

A study conducted in a General Electric's (GE's) Trading Process Network (TPN) by Lee, Chu, and Tseng (2009) found that employment of e sourcing played a significant role in creating collaborations between buyers and suppliers. The study focused on how the collaboration influenced by adoption of the internet. The process also affected how selection of suppliers was conducted and how contract agreement purchasing of products is carried out. Due to the benefits that were experienced through e-procurement, the ERP software providers have been able to increase capabilities of e-procurement. The sampled company GE was found to reduce costs of materials, finding new suppliers easily and reduced costs due to adoption e-procurement. This thus concludes that the benefits of TPN are; reduction in the sourcing time cycle, shrinking of market time, reduction of marketing time and reduction of costs and taxes. The study was justified in section 4.6 of the chapter four on the significance of the variables under study on the effect of Digital Buyer-Supplier Collaboration on the performance of inventory management in the manufacturing firms in Nairobi County at 5% significant level.

4.2.3 Inventory control

The study aimed at assessing the effect of inventory control on performance of inventory management in manufacturing firms in Nairobi County, Kenya

TABLE 4.3

Inventory Control

	N	Mean	Std. Deviation
Management of Stock Levels	208	4.1635	1.16396
Computerized Inventory Records	208	4.1587	1.09845
Real time Receiving of Stock Items	208	4.1442	1.1911
Reduction of Pilferages in inventory	208	3.9423	0.77804
Enhancing Data Accuracy on Inventories	208	3.8606	1.3848
Computerizing Warehousing	208	3.6779	1.30665
Tracking Movement of Stock units in the Warehouse/stores	208	3.5817	1.47542
Stocktaking Activities	208	3.2596	1.51
Valid N (listwise)	208		

Source: Author (2018)

From Table 4.3 management of Stock Levels as an inventory mechanism in e-procurement practices has an effect on the performance of inventory management in firms of Nairobi with a mean of 4.1635; Stocktaking Activities influenced the performance of inventory management in the manufacturing firms with a mean of 3.2596. Computerizing Warehousing influence the performance of the inventory management in the manufacturing firms with a mean of 3.6779, Computerized Inventory Records has an effect on the performance of the inventory management in the manufacturing firms with a mean of 4.1587. Tracking Movement of Stock units in the Warehouse/stores has an effect on the performance of the inventory management in manufacturing firms of Nairobi with a mean of 3.5817. Enhancing Data Accuracy on Inventories has an influence on the performance of the inventory management in the manufacturing firms in Nairobi with a mean of 3.8606. Real time Receiving of Stock Items as an e-procurement practice has an influence on the performance of inventory management with a mean of 4.1442. Lastly, Reduction of

Pilferages in inventory has an impact on the performance of the inventory management in the manufacturing firms in Nairobi with a mean of 3.9423.

Rajeev (2008) found that inventory performance of businesses was impacted by effective inventory management practices through a study he did on 91 Indian Machine Tool Enterprises to establish how inventory costs were linked to inventory management practices. The findings also showed that this relationship had an effect on the overall performance of the businesses. Value was also found to be effectively created by managers in Spanish 8872 small and medium-sized firms through reduction of inventory days Deasy et al, (2014). Operational efficiency in firms is increased, improvement of customer services, reduction of costs in inventory and distribution and being able to track items and dates of expiration which balances availability and demand through implementation of effective inventory management processes. The study sought to establish whether adoption of inventory control had any significant effect on performance of inventory management. This was justified in section 4.6 of the chapter four on the significance of the variables under study on the effect of inventory control practice on the performance of the inventory management in the manufacturing firms of Nairobi Kenya.

4.2.4 Electronic data transmission

The study sought to establish the effect of electronic data transmission on performance of inventory management in manufacturing firms in Nairobi County, Kenya

TABLE 4.4

Electronic Data Transmission

	N	Mean	Std. Deviation

Security of Information	208	4.125	1.14367
Minimizing Errors	208	4.1154	1.07952
E- invoicing	208	4.101	1.17724
E- ordering	208	3.9615	0.78541
Real time communication	208	3.85096	1.31211
Reduction of Communication/ Printing Costs	208	3.601	1.25855
E – notification	208	3.5385	1.39303
Slashing Response Times	208	3.2115	1.53964
Valid N (listwise)	208		

Source: Author (2018)

The result in Table 4.4 shows that Security of Information has an effect on the performance of the inventory management in manufacturing firms in Nairobi with a mean of 4.1250. Slashing Response Times as an impact of electronic data transmission has an effect on the performance of the inventory management in manufacturing firms in Nairobi with a mean of 3.2115. The effects of the Reduction of Communication/ Printing Costs on the performance of the inventory management of the firms in Nairobi County has a mean of 3.6010. Minimizing Errors as a result of adoption of electronic data transmission has an effect on the performance of the inventory management in manufacturing firms with a mean of 4.1154. E-notification has an effect on the performance of the inventory management in manufacturing firms in Nairobi with a mean of 3.5385. The effects of the Real time communication on the performance of the inventory management of the firms in Nairobi County had a mean of 3.85096. E- Invoicing has an effect on the performance of the inventory management in manufacturing firms with a mean of 4.1010. Lastly, E- ordering has an effect on the performance of the inventory management in the manufacturing firms in Nairobi with a mean of 3.9615.

The use of e-procurement has influenced most of the processes in many companies especially to enhance how marketing is done and how information is shared between suppliers and buyers. Security on the other hand involves confidentiality between the information transmitted to both parties, as their information has to be. Adoption of processes

and data has made Cisco the leading company in the world through achievement of integration in its supply chain Shalle and Irayo (2013). The firm achieved this by bringing together all its supply chain partners through the web in ensuring that all transactions were done through the network. They achieved this by creating a network where both the customers and resellers connect through the software to place, configure and manage their orders. This was justified in section 4.6 of the chapter four on the significance of the variables under study on the effect of electronic data transmission practice on the performance of the inventory management in the manufacturing firms of Nairobi Kenya.

4.2.5 Performance of inventory management

The general objective of the study was to establish effects of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi County, Kenya

TABLE 4.5

Performance of Inventory Management

	N	Mean	Std. Deviation
Reduction of Lead Time	208	4.0962	1.07694
Inventory Turnover Rate	208	4.0769	1.16048
Reduction of Inventory Carrying Cost / Holding Costs	208	3.5385	1.26203
Optimization of Inventory Levels	208	3.4615	1.42051
Order Fulfillment	208	3.0769	1.50485
Valid N (listwise)	208		

Source: Author (2018)

Reference to Table 4.5, Inventory Turnover Rate as an indicator of performance of inventory management had a mean effect of 4.0769 while order fulfillment has a mean of 3.0769. Reduction of Inventory. Carrying Cost / Holding Costs as indicator of performance of the inventory management has a mean of 3.5385 and reduction of Lead Time has mean of 4.0962. Optimization of Inventory Levels, a key performance indicator on inventory management in the manufacturing firms in Nairobi has an overall mean of 3.4615.

The factors used to measure the performance of inventories are; inventory turnover, cost of carrying inventory, receiving efficiency, inventory accuracy, or picking/packing Kesavan (2015). The frequency at which inventories are used in a company are measured by inventory turnover. The amount of products being sold is also important due to the amount of money a company has invested. A company also needs to evaluate whether the products they have stocked is what is in demand or not. If inventories are not carried out effectively, there is likelihood that there will be losses incurred too. This thus shows that if firms embrace the strategy they are likely to record massive rates in their productivity and profit rates. This was justified in section 4.6 of the chapter four on the significance of the model under study on the effect of e-procurement practices on performance of inventory management in manufacturing firms in Nairobi Kenya.

4.3 Inferential Statistical Analysis

The study undertook inferential statistical test in the form of regression analysis. The data was subjected to the assumptions of regression including linearity, multi-collinearity and normality with no major violation observed.

4.3.1 Linearity of the coefficients

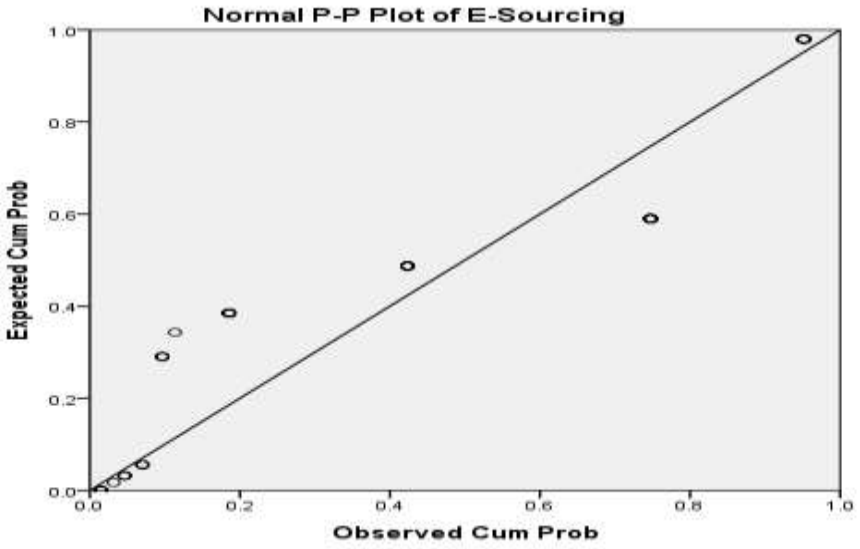
The linearity of the coefficients was tested using the P-P plot for each variable against the cumulative probability as shown below:

4.3.2 E-sourcing

From Figure 4.2, the points are distributed on both sides of the P-P line in an almost even manner thus a clear indication of linearity between E-sourcing as a factor against the observed cumulative probability among the respondent.

FIGURE 4.2

E Sourcing



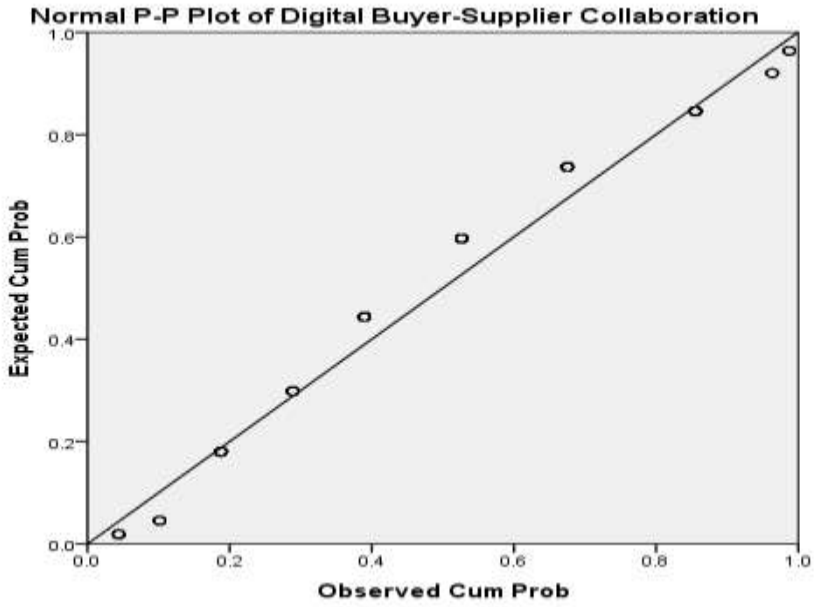
Source: Author (2018)

4.3.3 Digital buyer supplier collaboration

As observed in Figure 4.3, the plotted points are evenly distributed on both sides of the P-P line, which implies linearity between the digital buyer-supplier collaboration vs. the observed cumulative probability.

FIGURE 4.3

Digital Buyer Supplier Collaboration



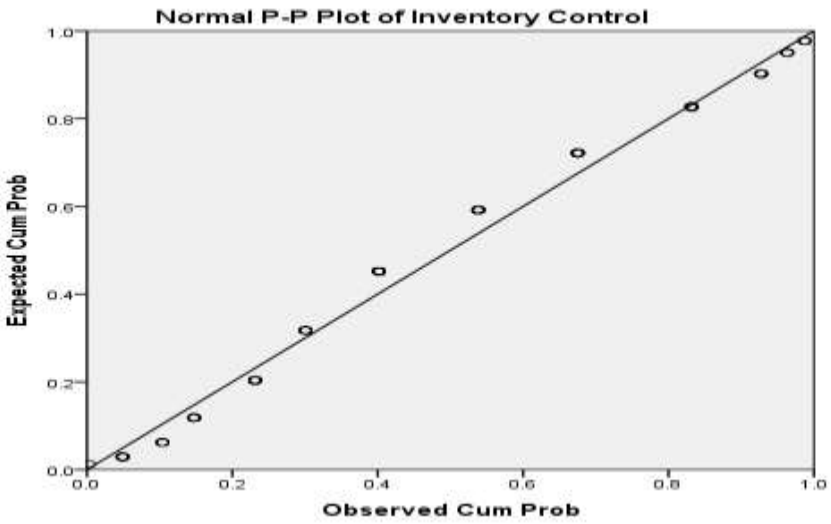
Source: Author (2018)

4.3.4 Inventory control

Linearity is displayed in the out as observed from the distribution of the plotted points. The plots imply that there was a linear correlation between the inventory control variable against the observed cumulative probability

FIGURE 4.4

Inventory Control



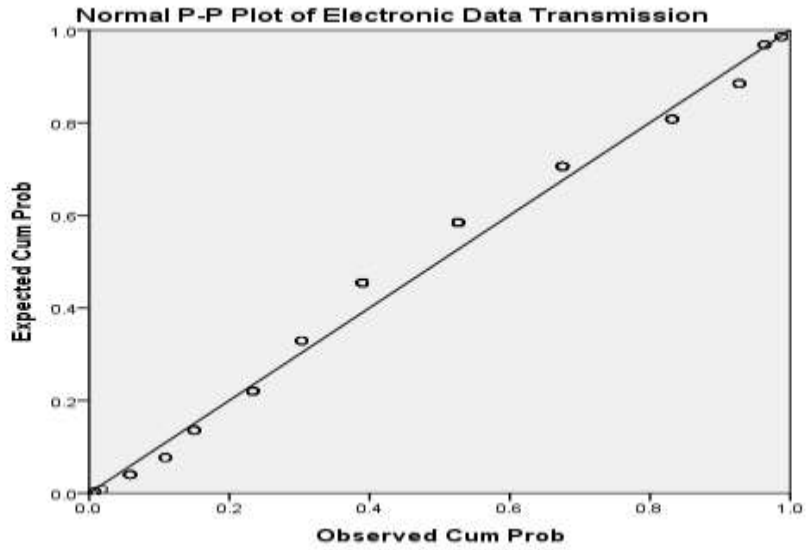
Source: Author (2018)

4.3.5 Electronic data transmission

From the output from SPSS, there is linearity between the electronic data transmission and the observed cumulative probability from the respondents since the P-P points are equally aligned along the P-P line with approximately similar deviations from the estimated line.

FIGURE 4.5

Electronic Data Transmission



Source: Author (2018)

4.4 Test on Normality of the Variables

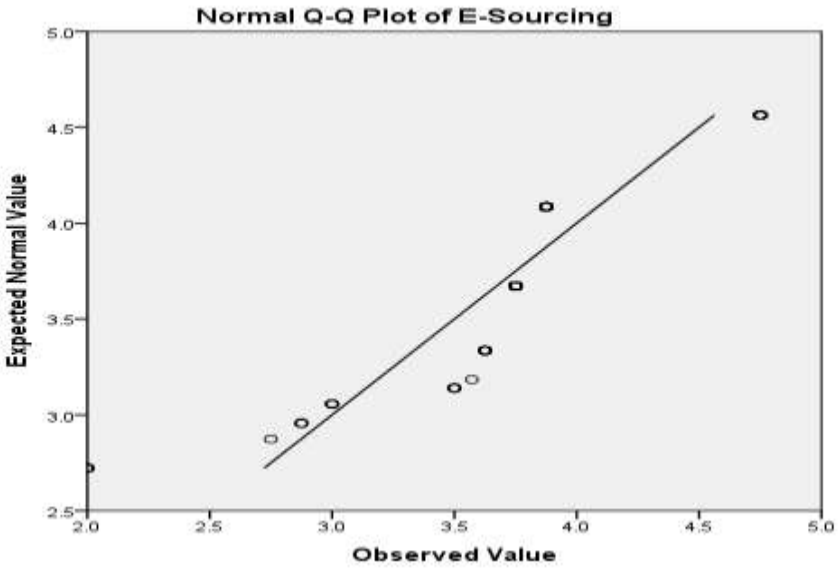
The normality of the variables is tested by used of the Q-Q plot. Normality draws a picture of the accuracy of the data distribution in any given model of any form.

4.4.1 E sourcing

Reference to figure 4.6, the Q-Q plots are equally and evenly distributed along the Q-Q line with approximately equal diversion from the line of normality. Which implies there is normality distribution between the given factor E-Sourcing and observed values

FIGURE 4.6

E Sourcing



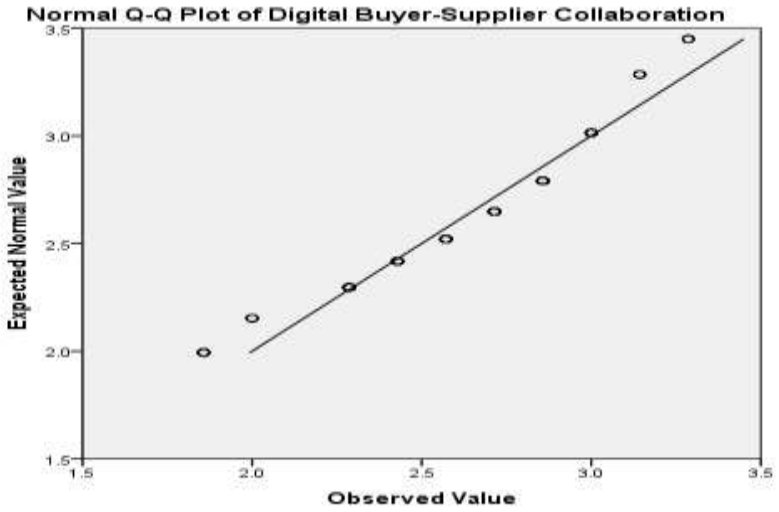
Source: Author (2018)

4.4.2 Digital buyer-supplier collaboration

From figure 4.7, the plotted points deviate from the line of reference that is the Q-Q line with similar margins, which is a clear impression of normality between the electronic data transmission variable and the observed values from the respondents. Which implies that the data was normally distributed.

FIGURE 4.7

Digital Buyer-Supplier Collaboration



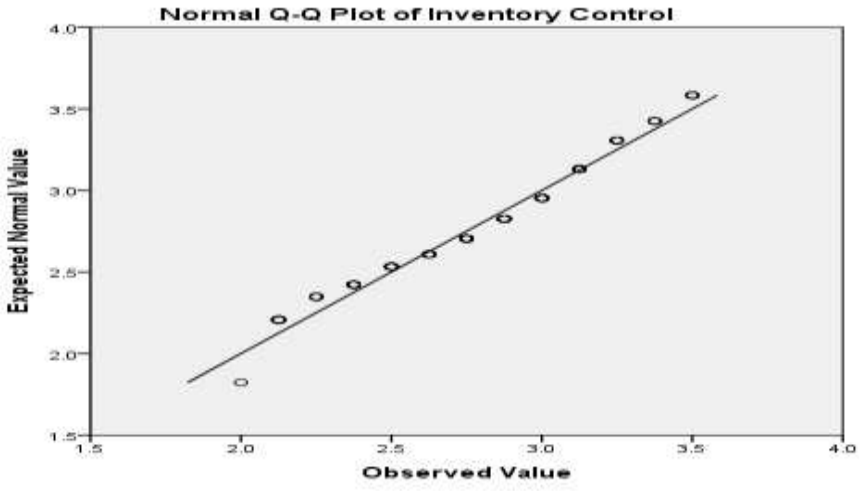
Source: Author (2018)

4.4.3 Inventory control

Refer to figure 4.8, there is normality in response data as displayed in the output. The plotted Q-Q points all tend to gather along the Q-Q line implying the data was normally distributed.

FIGURE 4.8

Inventory Control



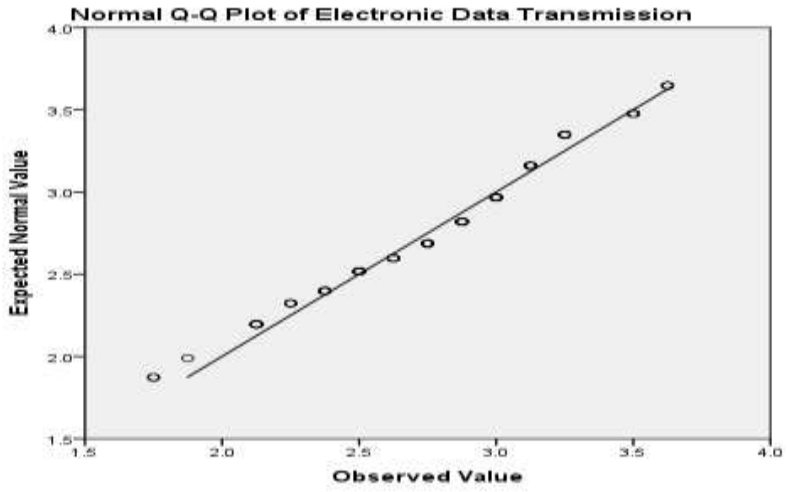
Source: Author (2018)

4.4.4 Electronic data transmission

Refer to figure 4.9; there is normality in the responses between the Electronic data transmission and the observed value as displayed in the output with marginalized deviation from the line of normality

FIGURE 4.9

Electronic Data Transmission



Source: Author (2018)

4.5 Test of Multicollinearity

The test on multicollinearity entails a closer reference to the correlation matrix that is testing the null hypothesis that:

$H_{0:}$ There is no multicollinearity against the alternative

Any correlation P-value less than P< 0.05 indicate a good model, thus no multicollinearity observed. In the study correlation Matrix the P-value for the two-tailed test is 0.000; thus P-value=0.000<0.05, the study conclude that there is no presence of multi-collineraity in the model. The Pearson correlation between performance of inventory management and e sourcing is 0.557 this is a clear indication of an existing positive relationship between the two factors. The correlation between e-sourcing and Digital Buyer-Supplier Collaboration in positively weaker with a registered figure of 0.265. Similarly, e-sourcing is weakly positively

correlated with inventory control on a value of 0.356 and correlated with electronic data transmission on a slightly positive but weaker value of 0.475

TABLE 4.6

Correlation

		Performance of inventory Management	**E-Sourcing**	**Digital Buyer-Supplier Collaboration**	**Inventory Control**	**Electronic Data Transmission**
Performance of inventory Management	Pearson Correlation	1	.557**	.499**	.500**	.634**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	208	208	208	208	208
E-Sourcing	Pearson Correlation	.557**	1	.265**	.356**	.475**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	208	208	208	208	208
Digital Buyer-Supplier Collaboration	Pearson Correlation	.499**	.265**	1	.232**	.326**
	Sig. (2-tailed)	.000	.000		.001	.000
	N	208	208	208	208	208
Inventory Control	Pearson Correlation	.500**	.356**	.232**	1	.423**
	Sig. (2-tailed)	.000	.000	.001		.000
	N	208	208	208	208	208
Electronic Data Transmission	Pearson Correlation	.634**	.475**	.326**	.423**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	208	208	208	208	208

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

Source: Author (2018)

The Pearson correlation between performance and Digital Buyer-supplier collaboration is 0.499 this is an indication of an existing positively weak relationship between the two factors compared to the earlier correlation between e sourcing and performance. Also the P-value =0.000 which cuts across all correlations in the matrix is a clear indication that the study is 95% confidence with the result on variables' correlation in the study. The correlation between Digital Buyer-supplier collaboration and inventory control is positively

weak with a value of 0.232 and 0.326 with the electronic data transmission. Lastly, the existing correlation between electronic data transmission and inventory control is a positively weak correlation of 0.423. The resulting correlation output shows $r < 0.5$ meaning there was no problem of multicollinearity between the independent variables.

4.6 Multiple Regression Analysis

The study performed a multiple regression analysis resulting in the two tables discussed below.

TABLE 4.7

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.882[a]	.778	.774	.390702

a. Predictors: (Constant), Electronic Data Transmission, Digital Buyer-Supplier Collaboration, Inventory Control, E-Sourcing

Source: Author (2018)

Refer to Table 4.7, the study the R^2 =0.778 and the adjusted R^2 =0. 774.This is a clear indication that the model explains 77.8 ≈78% of the effects in the study as a result of the factors under study leaving out ≈22% unexplained which form part of the recommendation to other researchers to find out in future. The model therefore provided a good fit.

TABLE 4.8

ANOVA Table

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	108.777	4	27.194	178.150	.000[b]
	Residual	30.988	203	.153		
	Total	139.764	207			

a. Dependent Variable: Performance of inventory Management

b. Predictors: (Constant), Electronic Data Transmission, Digital Buyer-Supplier Collaboration, Inventory Control, E-Sourcing

Source: Author (2018)

Table 4.8 shows significance of the model. The resulting P value =0.000, shows the model predicted by e-procurement practices significantly affected performance of inventory management.

4.7 Test of Regression Coefficients

Since the test on the general regression model was of significance to the study, the researcher had to narrow down to the specific factors in question. The research hypothesis listed below were tested:

> ***H_{01}:*** *Adoption of e-sourcing has no significant effect on performance of inventory management*
>
> ***H_{02}:*** *Adoption of digital buyer supplier collaboration has no significant effect on performance of inventory management*
>
> ***H_{03}:*** *Adoption of inventory control has no significant effect on performance of inventory management*
>
> ***H_{04}:*** *Adoption of electronic data transmission has no significant effect on performance of inventory management*

Going by the values and levels of significance of the regression coefficients, the study rejected the null hypothesis H_{01} and H_{04} and concluded that e-sourcing and electronic data transmission have a significant effect on performance of inventory management in manufacturing firms in Nairobi County. Null hypothesis H_{02} and H_{03} were accepted based on the values and levels of significance concluding that digital buyer supplier collaboration and inventory control do not have significant effect on performance of inventory management in manufacturing firms in Nairobi County.

Table 4.9

Coefficients of E-procurement Practices

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	.349	.172		2.027	.044
	E-Sourcing	.652	.033	.752	19.513	.000
	Digital Buyer-Supplier Collaboration	.049	.031	.057	1.600	.111
	Inventory Control	.079	.040	.073	1.956	.052
	Electronic Data Transmission	.144	.040	.147	3.645	.000

a. Dependent Variable: Performance of inventory Management

Source: Author (2018)

From the output any P value<0.05, leads to rejection of all the null hypothesis. From the analysis e-sourcing and electronic data transmission have P values=0.000<0.05. This is 95% confidence on the significance of factors of e-procurement practice on the inventory performance. Inventory control with a P-value=0.052>0.05 and Digital buyer-supplier collaboration with a P-value=0.111>0.05 are therefore insignificant to the study at 5% level of certainty.

Resulting from Table 4.9, the fitted model was derived as follows;

$Y = 0.349 + 0.652X_1 + 0.144\ X_4$

The fitted model shows Y= Performance of inventory management, X_1=E-sourcing and X_4= Electronic data transmission. From this model, a unit change in E-sourcing would result in a 65% change in performance of inventory management and a unit change in electronic data transmission would result in a 14.4% change in performance of inventory management.

4.7 Chapter Summary

The chapter represented the analysis, presentation and interpretation of the obtained data. Here the study tested on the multicollinearity, normality, linearity, model significance as well as the individual coefficients significance. Data was presented in tables, figures as well as in numerical form. Chapter 5 introduces the result discussion, conclusion and recommendation.

CHAPTER FIVE
DISCUSSION, CONCLUSION AND RECOMMENDATION

5.0 Introduction

From the study, the researcher registered a positive response with a mean of 3.7494, which is positively skewed that the respondents believe E-procurement has an impact on the performance in inventory management largely. However, there could be other factors influencing the inventory performance practices apart from the mentioned factors, which needs to be looked at.

5.1 Summary of Findings

In this section a summary of the study findings is presented and discussed in relation to the previous studies.The first research objective sought to determine the effect of e-sourcing on

performance of inventory management in manufacturing firms in Nairobi County, Kenya. The study established that e-sourcing had a significant (P-value = 0.000) and positive effect on performance of inventory management. A mean analysis of E-sourcing identifies the key variables as including online supplier search (mean=4.1058) followed by electronic supplier categorization (mean=4.1058) and online advertisement (mean=4.0817). These results are in line with the findings of Carlisle et al, (2006) who lauded the use of communication and information technology in reducing cost and hence effective inventory management.

The second objective of the study sought to examine the effect of digital buyer supplier collaboration on performance of inventory management in manufacturing firms in Nairobi County, Kenya. The study established digital buyer supplier collaboration did not have a significant (P-value= 0.111) effect on performance of inventory management. These results are in line with the findings of Coggburn (2017) who found out that buyer supplier collaboration is only successful in influencing the performance of inventory management if both parties have the same interests and wish the same to their business partners.

The third objective of the study sought to assess the effect of inventory control on performance of inventory management in manufacturing firms in Nairobi County, Kenya. The study established inventory control did not significant (P-value=0.052>0.05) effect on performance of inventory management. Mean analysis of inventory control, identified the key variables as including management of s tock levels (mean= 4.1635), followed by computerize inventory records (mean= 4.1587) and real time receiving of stock items (mean= 4.1442). These results are in line with the findings of Ngunyi (2014), who established that inventory management and hence working capital management was related to corporate profitability and if not well managed would result to non-profitable operations.

The forth objective of the study sought to establish the effect of electronic data transmission on performance of inventory management in manufacturing firms in Nairobi

County, Kenya. The study established electronic data transmission had significant (P-value=0.000) and positive effect on performance of inventory management. Mean analysis of electronic data transmission, identified the key variables as including security of information (mean = 4.1250) followed by minimization of errors (mean = 4.1154) and e-invoicing (mean= 4.1010). The results are in line findings of Muinde (2014) who concluded that industries and government benefited from use of internet is sharing information by lowering costs of operation and raising productivity hence effective performance of inventory management.

5.2 Conclusion

The study concluded that e-procurement practices influences performance of inventory management in manufacturing firms in Nairobi County, Kenya. E-sourcing and Electronic Data Transmission has significant influence on performance of inventory management in manufacturing firms in Nairobi County, Kenya. More companies in manufacturing as well as other sectors in Kenya should strive to invest in e-procurement to enhance their performance of inventory management.

5.3 Recommendations

The study recommends that manufacturing firms in Kenya should invest in adoption of e-procurement practices. This would benefit these companies by increasing their inventory turnover, reducing in inventory carrying/holding costs, enhancing inventory accuracy and reducing lead times among other benefits. The firms should also seek for more opportunities to work in collaboration with their suppliers and integrate the entire supply chain for greater benefits.

The study also recommends that other key sectors in the economy for example the government sector adopts e-procurement practices to increase transparency in the procurement processes and enhance the accuracy of the stock as well as reduce pilferage of the stocks and reduce the lead times for overall better performance of the sector.

5.4 Recommendation for Further Studies

This study was limited to manufacturing firms in Nairobi County, Kenya. Similar studies should be conducted in other counties to establish the effect of e-procurement practices on performance of inventory management. This will form a platform to compare and contrast the key variables that have significant influence on performance of inventory management in the different counties and thus advise the manufacturers on the e-procurement practices to adopt to enhance their overall performance.

Future researches might also consider investigating the effect of e-procurement practices in various sectors other than manufacturing such as banking sector, government /public procurement, agricultural among others. This will help examine some of the factors that may affect the effectiveness and efficiency of inventory management in these sectors and investments that can be made to optimize this performance.

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APPENDIXES

APPENDIX I: Introduction Letter

Below is the introduction letter from the University

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KCAU/SGS/MBA/Aug.18/7 *August 15, 2018*

To whom it may concern,

Dear Sir/Madam,

RE: LEAH NYOKABI MAINA REG. NO. 15/03258

It is my distinct pleasure to introduce to you Ms. Leah Maina who is a student in our institution pursuing a Master of Business Administration in Procurement and Logistics Management at the School of Business and Public Management.

Leah is conducting research on a topic titled: "*Effect of E-Procurement Practices on Performance of Inventory Management in the Manufacturing Firms in Nairobi County, Kenya*" which is part of the requirements of the program she is pursuing. The research as well as the data procured thereof shall be used for academic purposes only.

Any assistance accorded to her is highly appreciated.

In case of further inquiry, do not hesitate to contact the undersigned.

Yours faithfully,

14 AUG 2018

Dr. Nyaribo Misuko
Dean, School of Graduate Studies & Research

APPENDIX II: Research Questionnaire

PART A: ORGANIZATIONAL PROFILE

1. Name of Organization.....

2. Department……

3. Job Designation……

Other specifications ……

4. Tick the appropriate subsector.

1. Building		5. Plastics		9. Metal and Allied	
2. Food, Beverages		6. Textile		10. Leather	
3. Chemical		7. Wood Products		11. Motor	
4. Energy		8. Pharmaceutical		12. Paper	

5. Has your company adopted e-procurement?

- ☐ Yes
- ☐ No

6. How many years have elapsed since your company adopted e-procurement?

- ☐ 1 – 5 Years
- ☐ 6 – 10 Years
- ☐ 11- 15 Years
- ☐ 16 Years and Above

PART B: E-SOURCING

Please indicate the extent to which the following e-sourcing systems have been integrated into the procurement function of this organization. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent

	E-Sourcing	1	2	3	4	5
1.	Online supplier search					
2.	Prequalification of suppliers					
3.	Electronic supplier evaluation					
4.	Electronic supplier categorization					
5.	Online order requisitions					
6.	Market Analysis					
7.	Online advertisement					
8.	Online bid selection					

PART C: Digital Buyer-Supplier Collaboration

Please indicate the extent to which the following Digital Buyer-Supplier Collaboration systems have been integrated into the procurement function of this organization. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent

	Digital Buyer-Supplier Collaboration	1	2	3	4	5
1.	Channel Relationships					
2.	Decision Synchronization					
3.	Real Time Information Sharing					
4.	Inter Organizational Systems					
5.	Supplier Development					
6.	Integrated Planning Cycles					

7.	Joint Product Development					

PART D: Inventory Control

Please indicate the extent to which information technology has been adopted to conduct the below Inventory Control activities in this organization. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent

	Inventory Control	1	2	3	4	5
1.	Management of Stock Levels					
2.	Stocktaking Activities					
3.	Computerizing Warehousing					
4.	Computerized Inventory Records					
5.	Tracking Movement of Stock units in the Warehouse/stores					
6.	Enhancing Data Accuracy on Inventories					
7.	Real time Receiving of Stock Items					
8.	Reduction of Pilferages in inventory					

PART E: Electronic Data Transmission

Please indicate the extent to which Electronic Data Transmission systems have enhanced the below listed in this organization. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent

	Electronic Data Transmission	1	2	3	4	5
1.	Security of Information					
2.	Slashing Response Times					
3.	Reduction of Communication/ Printing Costs					
4.	Minimizing Errors					

5.	E – notification					
6.	Real time communication					
7.	E- invoicing					
8.	E- ordering					

PART F: Performance of inventory Management

Please indicate the extent to which e-procurement practices have influenced Performance of inventory Management of this organization. Use a scale of 1-5, where (1-Not at all, 2-small extent, 3-moderate extent, 4-large extent and 5- very large extent

	Performance of inventory Management	1	2	3	4	5
1.	Inventory Turnover Rate					
2.	Order Fulfillment					
3.	Reduction of Inventory Carrying Cost / Holding Costs					
4.	Reduction of Lead Time					
5.	Optimization of Inventory Levels					

Thanks for your feedback.

APPENDIX III: Krejcie and Morgan's (1970) Table

Table for Determining Sample Size from a Given Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

Source: Krejcie and Morgan's (1970)

Appendix IV: List of Manufacturing Firms Registered with KAM in Nairobi County

Sector	No. of Firms
1. Building	20

2. Food, Beverages	71
3. Chemical	70
4. Energy	34
5. Plastics	68
6. Textile	35
7. Wood Products	17
8. Pharmaceutical	21
9. Metal and Allied	66
10. Leather	7
11. Motor	27
12. Paper	63
Total	**499**

Source: Kenya Association of Manufacturers (KAM) (2016)