

**EFFECT OF PUBLIC PROCUREMENT POLICY  
FRAMEWORK ON INVENTORY MANAGEMENT  
PERFORMANCE OF GOVERNMENT MINISTRIES IN  
KENYA**

**CHARLES KYALO NDETO**

**DOCTOR OF PHILOSOPHY**

**(Business Administration)**

**JOMO KENYATTA UNIVERSITY OF  
AGRICULTURE AND TECHNOLOGY**

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**Charles Kyalo Ndeto**

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## DECLARATION

This thesis is my original work and has not been submitted for a degree in any other University.

Signature: ..... Date: .....

**Charles Kyalo Ndeto**

This thesis has been submitted for Examination with our approval as the University Supervisors:

Signature: ..... Date: .....

**Prof. Mike Iravo Amuhaya, PhD**

**JKUAT, Kenya**

Signature: ..... Date: .....

**Prof. Maurice M. Sakwa, PhD**

**JKUAT, Kenya**

## **DEDICATION**

I would like to dedicate this research to my dear wife Ruth and children Masaku, Mukulu and Nduku.

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I take this chance to pass special thanks to God for giving me good health and the ability to accomplish this PhD in Business Administration (Procurement and Supply Chain Management option). The success of this work would not have been possible without the keen, dedicated supervision and direction of Prof. Amuhaya M. Iravo and Prof Maurice M. Sakwa, of Jomo Kenyatta University of Agriculture and Technology. I also would like to acknowledge my wife Mrs. Ruth Kyalo for her efforts to ensure that this work was kept on course. I wish to thank Jomo Kenyatta University of Agriculture and Technology for giving me the opportunity to accomplish my studies successfully. Last but not least, my appreciation goes to my research assistant Mr. Titus Muhihu and all those who tirelessly assisted me through this research and whose names have not appeared here.

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## LIST OF ACRONYMS AND ABBREVIATIONS

<b>GDP:</b>	Gross Domestic Product
<b>GOK:</b>	Government of Kenya
<b>GP:</b>	Government Procurement
<b>JIT:</b>	Just in Time
<b>KISM:</b>	Kenya Institute of Supplies Management
<b>KPSA:</b>	Kenya Private Sector Alliance
<b>KSH:</b>	Kenya Shillings
<b>MRPI:</b>	Material Requirement Planning
<b>MRPII:</b>	Manufacturing Resource Planning
<b>NACC:</b>	National Aids Control Council
<b>PPAD:</b>	Public Procurement and Asset Disposal
<b>PPDA:</b>	Public Procurement and Disposal Act
<b>PPOA:</b>	Public Procurement Oversight Authority
<b>PPRA:</b>	Public Procurement and Regulatory Authority
<b>REAK:</b>	Rural Electrification Authority of Kenya
<b>UN:</b>	United Nations
<b>USAID:</b>	United States Agency for International Development

## **DEFINITION OF TERMS**

<b>Disposal management procedure:</b>	This is the procedure of transferring ownership of public asset from any government institution to another person. It includes sale of valuable goods of any kind or destruction of such goods (Ahmad, 2015).
<b>Inventory management performance:</b>	This refers to ensuring that a company always has the products it needs on hand and that it keeps costs as low as possible (Ayieko, 2011).
<b>Material acquisition procedure</b>	This is the process of purchasing equipment and supplies as well as goods and services (Akech, 2005).
<b>Records management procedure:</b>	This refers to a set of activities required to systematically control the creation, distribution, use, maintenance, and disposition of recorded information maintained as evidence of business activities and transactions (Chalotra, 2013).
<b>Stock control management procedures:</b>	These are the practices used to make sure that the correct level of stock is maintained, to be able to meet demand while keeping the costs of holding stock to a minimum (Godana & Ngugi, 2014).
<b>Public procurement policy framework:</b>	This refers to all laws and regulations guiding acquisition supplies and services in public institutions (Ayieko, 2011).

## **ABSTRACT**

Public procurement policy framework and its effect on inventory management performance in the government ministries in Kenya is critical as the entire budgetary allocation of the Republic of Kenya is expended through procurement process. The study purposed to establish the effect of public procurement policy framework on inventory management performance in the government ministries in Kenya. The framework sets forth procurement regulations and rules which establish the procurement procedures for carrying out the procurement activities effectively and efficiently. The study also sought to determine the effect of material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures on inventory management performance in the government ministries. The study was anchored on institutional theory, game theory, stock diffusion theory and theory of economic order quantity. The study adopted a cross sectional survey design. The target population of this study was 680 supply chain management officers in all the 20 Government ministries in Kenya. The sample size was determined using Fishers' formula. Stratified random sampling was used as it gives representative sample of the whole population. Both primary and secondary data were used. This study made use of semi-structured questionnaires to collect primary data. Secondary data was extracted from records availed by the targeted population. A pilot test was conducted to test the reliability and validity of the data collection instruments. The questionnaires were administered through a drop and pick later method. The data collected from the ministries headquarters, which form the largest buyers in terms of government financial allocation was both qualitative and quantitative. Thematic content analysis was used to analyze qualitative data that is, data collected from open ended questions. The results were then presented in form of a prose. Both descriptive and inferential statistics were used to analyze quantitative data. In descriptive statistics, the study used frequency, mean, standard deviation and percentages. The analyzed data was then presented in tables and figures. In relation to inferential statistics the study used analysis of variance, correlation analysis and regression analysis. The study also found

that there is a positive and significant relationship between material acquisition procedures and inventory management performance in government ministries in Kenya. The study further established that there is a positive and significant relationship between stock control management procedures and inventory management performance in government ministries in Kenya. The study also found that there is a positive and significant relationship between records management procedures and inventory management performance in government ministries in Kenya. The study revealed that there is a positive and significant relationship between disposal management procedures and inventory management performance in government ministries in Kenya. This study concludes that there is a positive and statistically significant relationship between material acquisition procedures and inventory management performance in government ministries in Kenya. This study recommends that all policies should comprise a section to guide a smooth implementation without affecting the supply chain. In addition, policy makers/the GoK should come up with policies to enhance efficiency in the procurement process by reducing bureaucracy and time taken to pay the suppliers. Further, the GoK should consider increasing the number of staff working in the supply chain departments so as to improve planning and reduce delays in the requirement process. Also, the government should provide constant and frequent trainings to equip supply chain management staff with the skills that they require in material acquisition.

## **CHAPTER ONE**

### **INTRODUCTION**

This chapter begins with the background of the study that covers the general public procurement policy framework from a global, Africa and local perspective. The chapter also covers statement of the problem, general objective, specific objectives, research hypothesis, significance of the study and scope of the study.

#### **1.1 Background of the Study**

Government Procurement (GP), also referred to as Public Procurement (PP) is the means by which a government provides goods, services and works to a society. GP is executed by or on behalf of government with taxpayers' money; as such it is believed that effective allocation of these funds will benefit all citizens (Mato, 1996). Public procurement is the process by which government departments or agencies purchase goods, works or services from the private sector. Public procurement refers to the acquisition of goods, services and works by a procuring entity using public funds (World Bank, 1995). It takes place at both National and County levels. The procurement process is usually subjected to specific rules and policies covering how the relevant decisions are made (PPOA, 2005).

Presently, in many countries public procurement has become an issue of public attention and debate, and has been subjected to reforms, restructuring, rules and regulations. According to Roodhooft and Abbeele (2006), public bodies have always been the big purchasers, dealing with huge budgets. Mahmood (2010) also reiterated that public procurement represents 18.42% of the world GDP. In developing countries, public procurement is increasingly recognized as essential in service delivery (Basheka & Bisangabasajja, 2010), and it accounts for a high proportion of total expenditure.

The model of public procurement policy framework applies whenever a procuring entity acquires goods, services or works from suppliers or contractors (PPOA, 2005). Policy

framework follows a special administrative procedure established by local legislations, where the principles of transparency, value for money and equality among suppliers are strictly applied (PPOA, 2005). This regulation helps in guiding the acquisition, stock control and disposal of inventory.

### **1.1.1 Inventory Management Performance**

Inventories are assets in the form of materials to be consumed in the production process, consumed or distributed in the rendering of services and held for sale or distribution in the ordinary course of operations (Financial management improvement programme, 2009). Inventories are materials stored, waiting for processing, or experiencing processing. They are ever-present throughout all sectors of the economy (Zipkin, 2000).

Inventory management is a component of procurement which is addressed by the procurement policy framework. The objectives of inventory management include: preventing wastage and loss; continuing utilization of supplies and; obtaining a fair return of value upon disposal of supplies. In order to achieve those objectives; sound inspection, testing, warehousing, and inventory practices should be applied and effective means of transferring and disposing of property should be employed (Swaleh & Were, 2014).

Bovis (2016) indicates that the main components of public procurement policy framework that influence inventory management encompasses disposal management procedures, stock control management procedures, material acquisition procedures and records management procedures. This argument is also supported by Munyao and Moronge (2017) argument that public procurement framework guides public institutions in material acquisition, stock control, records management and disposal management.

### **1.1.2 Global Perspective of Public Procurement Policy Framework**

International Public Procurement Forum II (2010) which was held at Central University of Finance and Economics in China highlighted about new developments, new discipline



and new profession in public procurement. The objective of the forum was to develop a global academic research and teaching network in the area of public procurement policy (Public Procurement, 2010). This is an indication that there are critical areas in the procurement field that need to be launched and standardized. This is critical not only for academic institutions, but mainly business and organizations world over.

Different organizations have different approaches to managing their procurement and inventory. Procurement system in the United Nations (UN) is governed by the established regulations and rules of each UN organization. While such regulations and rules may differ in matters of detail, all organizations are guided by the common guidelines for procurement. These common guidelines cover procurement stages from sourcing activities that precede a requisition to the execution and to a procurement contract (UN Procurement Practitioner's Handbook, 2006).

In India, the public procurement system is decentralized and comprises a multiplicity of entities at different levels of government. India does not have a general procurement law that is applicable throughout the country. Although no federal legislation exists on procurement, some states (Karnataka, Rajasthan & Tamil Nadu) have passed laws to regulate public procurement (Thomas, 2016). A bill is pending before the Indian legislature – the Public Procurement Bill 2012, which seeks to harmonize India's public procurement laws and regulations. Article 298 of the Constitution stipulates that executive power of the union and of each state shall extend to any trade or business activities and to the acquisition, holding and disposal of property as well as the conclusion of contracts for any given purpose. This Article gives the government the power to enter into contracts (Nair, 2015).

The legal framework for public procurement in Jamaica has evolved over the years. An Electronic Procurement Strategy was devised in 2007, which was followed by a comprehensive public procurement policy in 2008, along with public procurement regulations. These were complemented by a Procurement Appeals Board in 2012.

However, once passed, the Public Procurement Act 2015 sought to replace the previous fragmented legislative framework with a comprehensive law (Kanter, 2009).

The Republic of Korea's public procurement system is highly centralized in the Public Procurement Service (PPP), a central procurement agency which is responsible for concluding contracts of goods, services and construction works on behalf of public organizations. The Republic of Korea's public procurement is deemed one of the main factors leading to the country's successful economic development. Strategically, the government's aim is to achieve economic efficiency and "value for money" through public procurement. In addition, promoting economic growth, industrial innovation and development and job creation are core objectives the government intends to attain through public procurement (Kumar, Patel & Singh, 2017).

In India, Kanagaraju and Baskaran (2012) established that the fundamental function of inventory management, which is guided by public procurement policy framework, is to keep inventories at an optimum level to get maximum possible return on the funds invested in it. In Malaysia, Ahmad *et al.* (2015) found that multiple issues related to , which is guided by public procurement policy framework threaten the performance and sustainability of Malaysia's healthcare system against a background of rising health expenditure. The healthcare delivery system in Malaysia has been far from efficient and there has been a tremendous wastage of resources within the public and private sectors. This showed that the situation is critical and needed proper inventory management practices to control it. The medicine or drugs were not properly controlled and led to excess of stock. This excess or surplus leads to the reduction in the number of drugs served to the patients and this affects the quality of healthcare negatively.

### **1.1.3 Regional Perspective of Public Procurement Policy Framework**

African Development Bank (ADB) has developed rules and procedures for procurement of goods, services and works that govern bank financed procurement (Khader *et al.*, 2014). It is equally active in supporting the development and reform of public

procurement systems in different countries. As the expenditure through public procurement is a sizeable portion of Government expenditure, increased efficiency, fairness, transparency and equal opportunity are critical for sustainable development and poverty reduction, (Government of Kenya, 2005).

Currently, procurement is of particular significance in South Africa's public sector and has been used as a policy tool to correct past discriminatory and unfair practices that occurred during the apartheid era (Rogerson, 2017). Due to South Africa's history of discrimination, unfair practices and marginalization of people, various groups in society were denied the privilege of being economically active within the government procurement system. The Preferential Procurement Policy Framework Act (PPPFA) 2000 gives effect to the government's priority of empowering historically disadvantaged persons, by giving them preferential treatment in procurement activities.

In Ghana, Normanyo, Ansah and Boakye (2016) indicate that the Ghana Public Procurement 2003 (Act 663) guides public institutions in their procurement of goods, works and services from suppliers. To operationalise the concept of good governance and to push towards "zero tolerance" of corrupt practices, the Public Procurement Act, 2003 (Act 663) was enacted by the government of Ghana to address the real and perceived weaknesses in the public procurement of goods, works and services. The main objective of passing the procurement Act (Act. 663) in 2003 is eliminating corruption in the procurement process, regulating expenditure and also instilling discipline in public finances.

#### **1.1.4 Local Perspective of Public Procurement Policy Framework**

Kenya Public Procurement and Disposal Act, 2005 came into operation on 1st January, 2007. The purpose of the Act is to establish procedures for procurement and the disposal of unserviceable, obsolete or surplus stores and equipment by public entities to maximize economy and efficiency; promote competition and ensure that competitors are treated fairly; to promote the integrity and fairness of those procedures; increase

transparency and accountability in those procedures; and increase public confidence in those procedures; to facilitate the promotion of local industry and economic development (Godana & Ngugi, 2014).

Development of procurement policy framework in Kenya started in 1963 where procurement functions were carried out by Crown Agents. In 1969 to 2001, the National Treasury Circulars and Supplies Manual were developed. In 1997, the Government initiated public procurement reforms with the support of the World Bank. The reforms included insufficient legislation or lack of standard tender documents, rampant corruption, single sourcing, poor specifications, disjointed procurement procedures and lack of accountability (Madara, 2009).

The public procurement policy issued by the Ministry of Finance in 2001 unified all circulars that had governed the public procurement process. In 2003, an independent Procurement review established by the Government to review procurement processes, identified several short-comings in the procurement function including: abuse of contract variations, poor record keeping for audit, lack of guidance on low value procurements and lack of ceiling on procurement methods among others (Ng'ang'a, 2013). In the same year, due to poor procurement practices, the Government dismissed over 2000 procurement officers from ministries and state corporations and temporarily suspended all procurement activities. In 2005, the Government of Kenya enacted Public Procurement and Disposal Act and Public Procurement Disposal Regulations (Madara, 2009).

In January 2016, the Public Procurement and Asset Disposal Act (PPADA) 2015 was implemented. The Public Procurement and Assets Disposal Act 2015 give effect to article 227 of the Constitution of Kenya on efficiency and define the roles of regulatory bodies (PPADA, 2015). The Act provides guiding principles for Public Procurement and Asset Disposal for state organs and public entities. The principles are based on values and principles of the Constitution. These include maximization of value for money and incorporation of local content. The Act has addressed governance in accordance with the

international best practice, for instance it establishes the Public Procurement and Regulatory Authority (PPRA) to among other functions, monitor, assess and review the public procurement and asset disposal system to ensure they respect the national values and other provisions including Article 227 of the Constitution on Public Procurement. This in essence transforms the Public Procurement Regulatory Authority (PPRA) from an oversight authority to a regulatory authority as a distinct regulator of procurement related matters within the public sector. It has a governing board whose mandate would be to oversee prudent procurement practices with the Director General of the Authority to undertake executive role.

The Kenya public procurement policy framework covers procurement law and principles, institutional framework, procurement procedures and storage and inventory management. Despite the government efforts to put public procurement reforms in place and more so establishing Public Procurement Regulatory Authority to ensure that the Act and Regulations thereof are adhered to, it appears little has been achieved in the area of inventory management. This is demonstrated by the great deal of materials, plants and equipment that lie idle in the government stock yards, office corridors and inside offices. Most of the equipment is weathering out while some seem serviceable (Nyamamba, 2010).

In the Ministry of Internal Security, Ng'ang'a (2013) found that delays in procurement of goods, frequent stock outs and uncertain change of prices were some of the effects of a long bureaucratic procurement procedure. According to the study, inadequate and untimely dispatch of funds had a significant effect on inventory management performance. The study also revealed that unavailability of stationeries/stores records, a lack of specific time or date for posting stores records, lack of adequate qualified and well trained staff hinders effective inventory performance.

In the National Aids Control Council (NACC), Swaleh and Were (2014) established that the organization lacked adequate financial resources to implement inventory management systems, thus the study concludes that lack of adequate resources had a

negative effect on effective implementation of inventory management systems in organizations. The study established that public procurement policy has simplified the implementation of the system in NACC. Hence concluding that, government policies had a positive impact on effective implementation of inventory management system in organizations.

### **1.1.5 Government Ministries in Kenya**

The Kenya National Government is authorized to act based on the legal constitution in ensuring the protection of the safety and wellbeing of the citizens. The government structure is split into two namely administrative and economic structures which are coordinated jointly (Nyamamba, 2010). The Government not only focuses on efficiency and effectiveness but also ensuring accountability and interactive access of information on public expenditure by the public and improvement to service delivery to internal customers (employees). To achieve this much attention is given towards the procurement practices and operations of the state corporations (Marendi, 2015). The Government is run by ministries of which there are 20 ministries which are headed by the cabinet secretaries. The ministries mandate is formulating financial and economic policies, developing and maintaining both stable fiscal and monetary policies which promote socioeconomic advancement in all the government sub sectors (Mutui, 2014).

The Public Procurement System in Kenya, which guides government ministries, has evolved from a crude system with no regulations to a legally regulated procurement system in line with International Standards. The evolution was through a system regulated by Treasury Circulars in the 1970s, 80s and 90s and further to an orderly legally regulated procurement system under the Exchequer and Audit (Public Procurement) Regulations (Government of Kenya, 2014). Efforts made as part of the overall Public Finance Reform, a result of the implementation of this reform agenda a Public Procurement and Disposal Act was approved by parliament in 2005. In December 2015, the PPDA, 2005 was repealed and the Public Procurement and Asset Disposal Act, 2015 came into effect on 7<sup>th</sup> January, 2016.

## **1.2 Statement of the Problem**

The Public Procurement and Asset Disposal Act (PPADA), 2015 and the Public Procurement and Disposal Regulations (PPDR), 2006 outline clear guidelines on how public procurement should be handled with the objective of giving value for money. The Government of Kenya through the Ministry of Devolution and Planning in its 11<sup>th</sup> edition performance contracting guidelines for the financial year 2014-2015 set inventory management as a performance indicator for all the ministries.

However, despite the development of a public procurement policy framework, government ministries are still experiencing challenges related to inventory management. In addition, Munyao and Moronge (2017) reports that in 2016 25% of the government ministries experienced stock outs and 41% were still using manual records keeping methods. According to the Government of Kenya (2014), it is estimated that inefficiencies in the processes of public procurement and disposal cost Kenya about Kshs. 30 Billion annually. According to Nyamamba (2010) on the effectiveness of the disposal function in the Ministry of Finance, stated that despite the Government's effort to ensure value for money, it seems the documented policies in place are not being adhered to by the procuring entities and one can observe that there is a great deal of plants and equipment lying idle in the government stock yards, office corridors and in offices. Some equipment is weathering out while some seem serviceable.

Marendi (2015) carried out a study on Public Procurement legal framework implementation and performance of state corporations in Kenya but the study did not indicate the influence of the public procurement legal framework on inventory management performance.

In view of the above, the researcher sought to execute an in-depth study on how public procurement policy framework on material acquisition, stock control management, records management and disposal management which are some of the aspects of inventory management that affect inventory management performance in government ministries in Kenya.

### **1.3 General Objective**

To establish the effect of public procurement policy framework on inventory management performance in the Government ministries in Kenya

### **1.4 Specific Objectives**

The specific objective of this study is to:

1. Determine the effect of material acquisition procedures on inventory management performance in Government ministries in Kenya.
2. Examine the effect of stock control management procedures on inventory management performance in Government ministries in Kenya.
3. Determine the effect of records management procedures on inventory management performance in Government ministries in Kenya.
4. Examine the effect of disposal management procedures on inventory management performance in Government ministries in Kenya.



## **1.5 Research Hypotheses**

The following are the hypothesized relationships between the main constructs (inventory management performance in government ministries and the independent variables (include material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures).

The research focuses on four (4) hypothesis relationship,

**H<sub>01</sub>:** Material acquisition procedures do not have a statistically significant effect on inventory management performance of government ministries in Kenya.

**H<sub>02</sub>:** Stock control management procedures do not have a statistically significant effect on inventory management performance of government ministries in Kenya.

**H<sub>03</sub>:** Records management procedures do not have a statistically significant effect on inventory management performance of government ministries in Kenya.

**H<sub>04</sub>:** Disposal management procedures do not have a statistically significant effect on inventory management performance of government ministries in Kenya.

## **1.6 Significance of the Study**

Public procurement policy framework necessarily has an impact on supply chain management practices, including inventory management performance. Therefore, this research thesis offers deeper insights into the implementation framework and practices surrounding inventory management performance in government ministries in Kenya by exposing the ineffective areas in order to enhance better administration of inventory management.

The Kenya Private Sector engages in business with the Government through the supply chain. Therefore, this research project may help the Private Sector to understand how the material acquisition policies, stock control management procedures, records management procedures, and disposal management policies aspects of inventory management are managed. This may assist them to improve how they do business with the Government. Additionally, this provides incentives for policy lobbying through the Kenya Private Sector Alliance (KEPSA) or other relevant organizations, to improve transactional engagement with the government through inventory management performance.

The findings also provides an opportunity to other researchers to carry out further research and add new information to the body of knowledge on inventory management performance of ministries in Kenya and suggest further and critical areas for research.

### **1.7 Scope of the Study**

The study focused on four independent variables: material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures. According to Akech (2005), the main components of public procurement policy framework include material acquisition, stock control management, records management and disposal management. In addition, Bovis (2016) indicates that the regulation of public procurement encompasses disposal management procedures, stock control management procedures, material acquisition procedures and records management procedures. The study covered the twenty (20) national ministries in the Republic of Kenya which are located in the city of Nairobi. The target population was six hundred eighty (680) supply chain management officers in the twenty (20) government ministries in Kenya. Data was collected in the month of June 2016.

## **1.8 Limitations of the Study**

The limitations of a study refer to the characteristics of the research methodology or research design that can affect the interpretation of the study findings. The study made use of questionnaires to collect data. According to Greener (2008), questionnaires have low validity and there is no way of knowing whether the respondents are telling the truth. In addition, questionnaires depend on the respondents' ability to remember and hence are subject to recall bias. To mitigate this, validity and reliability of the instrument was used to determine whether what they indicated meets the required standard. Further, the collection of data through questionnaires depends on the respondents' willingness to answer the questions. The supply chain officers in government ministries in this study feared to fill the questionnaires due to fear of victimization. To mitigate against this, the researcher assured the respondents that the information collection would only be used for academic purposes only.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter presents the basis of the study focusing on theoretical and conceptual frameworks. The purpose is to indicate the relationships between the dependent and the independent variables. Areas and gaps for further research are also highlighted in the chapter are areas and gaps for further research.

#### **2.2 Theoretical Framework**

A theory is a coherent group of tested general propositions, commonly regarded as correct, that can be used as principles of explanation and prediction for a class of phenomena. The study was anchored on four theories, namely; institutional theory, game theory, stock diffusion theory and theory of economic order quantity as explained below.

##### **2.2.1 Institutional Theory**

Institutional theory was developed by Hall in 1986 and adopts a sociological perspective to explain organizational structures and behavior (Scott, 2004). It draws attention to the social and cultural factors that influence organizational decision-making and in particular how rationalized activities are adopted by organizations (Hennart, 2015). The institutional theory is the traditional approach that is used to examine elements of public procurement. Scott (2004) identifies three pillars of institutions as regulatory, normative and cultural cognitive. The regulatory pillar emphasizes the use of rules, laws and sanctions as enforcement mechanism, with expedience as basis for compliance. The normative pillar refers to norms and values with social obligation as the basis of compliance.

The cultural-cognitive pillar rests on shared understanding on common beliefs, symbols, and shared understanding. According to Scott (2004), institutions are composed of cultural-cognitive and regulative elements that, together with associated activities and resources give meaning to life.

From the three pillars of institutions propounded by Scott (2004), organizational culture, social influence, organizational incentives and enforcement are identified as antecedents of compliance to procurement rules. It is therefore crucial to strengthen institutions in order to attain high levels of performance. Procurement and disposal processes in the public sector need a body that is not only focused but committed to attaining the set up goals and objectives.

In Kenya, public procurement is guided by the PPADA, 2015, regulations and guidelines which are from time to time issued by the Public Procurement Regulatory Authority (PPRA) and which must be complied by all the public entities. The Procurement and Disposal Act 2015 and Regulations 2006 clearly indicate the process that should be followed in obtaining material in public institutions. It indicates that in the identification of qualified persons a procuring entity may use a pre-qualification procedure or the results of a pre-qualification procedure used by another public entity.

In addition, the regulations and the guidelines show how public institutions should control stock. Stock levels should be maintained in accordance with the inventory management procedures set out in the Public Procurement and Disposal General Manual to ensure the best possible services to users at the lowest cost. Also, the regulatory framework indicates how records related to procurement and disposal of material or assets should be managed. According to Procurement and Disposal Act, 2015 and Regulations, 2006 of the Republic of Kenya, a procuring entity shall maintain a proper filing system with clear links between procurement and expenditure files. The regulations and guidelines should show how disposal of assets in public institutions should be carried out.

### **2.2.2 Game Theory**

Game theory is concerned with the analysis of situations involving conflict and cooperation. Since its development in the early 1940s by John von Neumann and Oskar Morgenstern, game theory has found many applications in diverse areas such as auction, business, economics, politics and philosophy (Fiestras-Janeiro *et al.*, 2011). After the initial excitement generated by its potential applications, interest in game theory by operations research/inventory management specialist increased during 1960s and 1970s. Game theory provides mathematical tools to model strategic interactions in which there are several players (decision makers) that want to maximize their benefits by playing a certain strategy that considers the strategies of the other players (Qinan & Parlar, 2009). The games can be divided into two branches: non-corporative games and corporative games. In non-corporative games, players are unable to make binding commitments regarding which strategy they will choose. Therefore, decisions are made independently. In corporative games, groups of players can form coalitions. So they are able to make binding commitments with side-payments (Mahdavi Mazdeh & Karamouzian, 2014).

Public institutions, which include government ministries, maximize their benefits by reducing cost of acquiring and storing inventory. However, decision makers in public institutions are guided by the Public Procurement and Asset Disposal Act, 2015 on when and how to acquire or dispose materials or assets. The Act provides guidelines on material acquisition, stock control management, records management, and disposal management. In a study on application of game theory on inventory level decision making, Vaziri and Sodhi (2014) applied the game theory to determine the sale price and stock level of Original Equipment Manufacturers (OEM). The study revealed that the OEM chooses the optimal level of inventory with respect to the probability of intensity factors that the market can produce. A comparison of the maximum attainable payoff and guaranteed payoff in the uncertain situation would justify the OEM's extra investment on improving the demand forecasting efforts.

Chinchuluun, Karakitsiou and Mavrommati (2016) conducted a study on game theory models and their applications in inventory management and found that inventory problems are concerned with a single decision maker, who makes the decisions on the ordered or produced quantity under certain assumptions on the demand and the planning horizon.

### **2.2.3 Stock Diffusion Theory**

The Stock Diffusion Theory was pioneered by Braglia, Gabbrielli and Zammori (2013) with an intention to derive the probability distribution of the stock consumption and that of the reorder time. These authors further explain that the importance of Stock Diffusion Theory is to assess and evaluate the required inventory levels in theory and practice. There are three considerations of the theory: storage space required; how quickly inventory is sold or used; and how to avoid inventory from becoming outdated before it is used. These considerations can prevent shortages and wasteful spending. In addition, the theory has been confirmed to lower inventory level and has a direct impact on cost savings emanating from storage costs including stock insurance premiums (Kanet, Gorman & Stosslein, 2010).

In public institutions, the replenishment or reorder of stock is dictated by public procurement policies like the Public Procurement and Asset Disposal Act, 2015. The amount of stock in an institution can be known from purchase and usage records and hence the importance of records management (Liu & Yang, 2015). In addition, the procurement policy framework dictates how and when assets should be disposed. Material acquisition is key in the replenishment of stock in public institutions. Stock control is concerned with how much stock an institution must have at any given point in time and it ensures that stock levels are maintained through material acquisition.

#### **2.2.4 Theory of Economic Order Quantity**

EOQ model was developed by was Ford Wilson Harris in 1913 and is also known as Wilson EOQ model, who critically analyzed the model in detailed (Bovis, 2016). The use of the model has shown increase in some costs as other costs decline, an example of ordering costs decline with the inventory holdings, while holding costs rise and the total inventory associated costs curve have a minimum point. It is also known as the point where total inventory costs are minimized. EOQ is the level of inventory that minimizes the total of inventory holding costs and ordering costs.

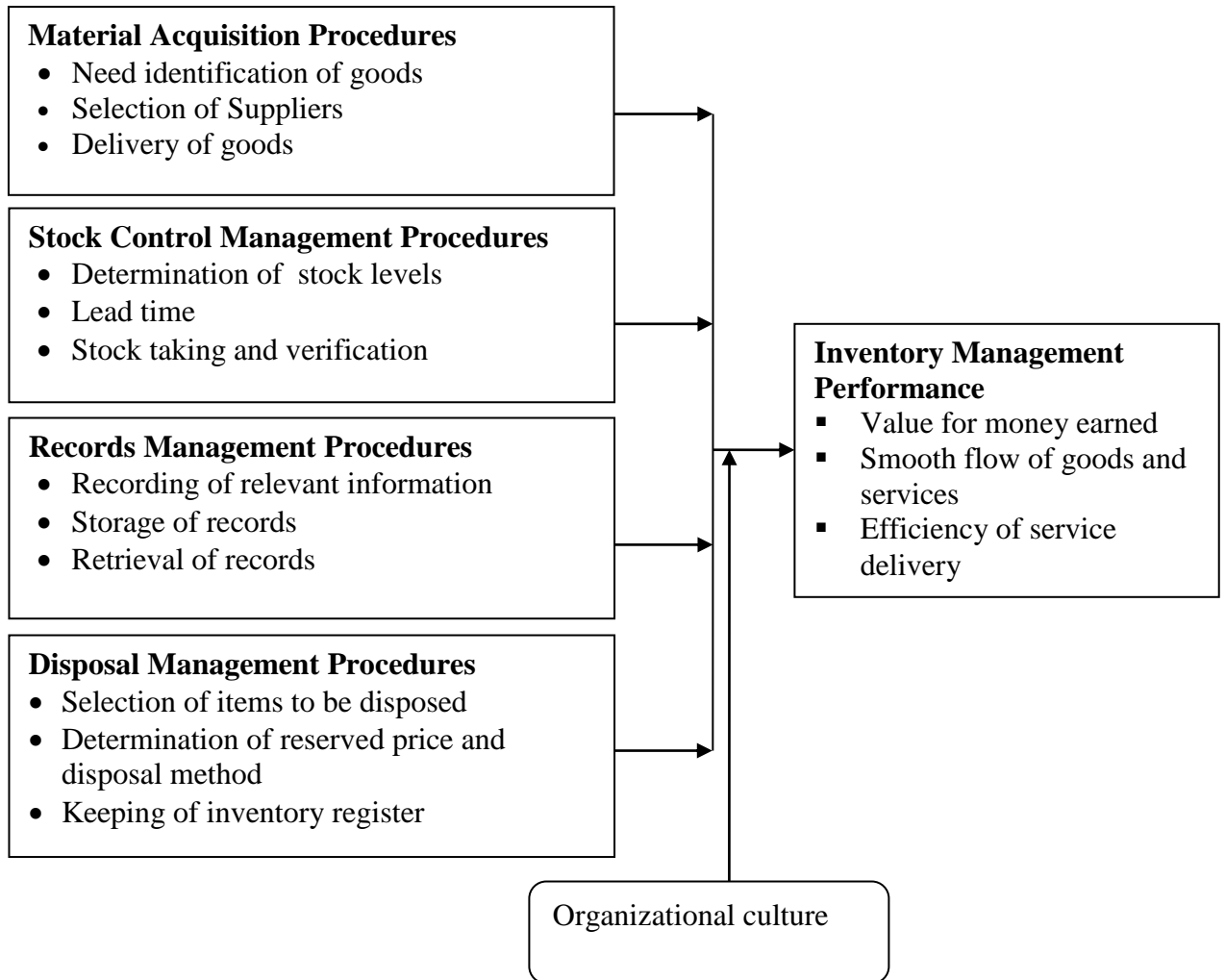
Allen (2008) defines the model as one that order quantities which minimize the balance of cost between inventories holding costs and re-order costs. Erickson and Kovalainen (2008) describes the basic EOQ, assumptions that are necessary to calculate EOQ as follows: That stock holding costs are known, and constant; ordering costs is known and constant; the rate of demand are known and constant; lead time cycle is known and constant; the price per unit is constant; the replenishment is made instantaneously, the whole batch is delivered at once and no stock-outs are allowed. One disadvantage of EOQ is that it ignores the need to have buffer stocks, which are maintained to cater for variations in lead-time and demand making it difficult to be observed in practice (Chalotra, 2013).

The EOQ model requires that for every item stocked in the stores, there is need to determine the point of order and that of the most cost effective quantity to order (Chinchuluun, Karakitsiou & Mavrommati, 2016). The model assumes that all other variables are constant even though uncertainties are common and regular all business. For example uncertainty includes change in demand, damage during transportation and delay in delivery. Uncertainty in demand, will therefore force EOQ to be adjusted to buffer against uncertain business atmosphere.



### **2.3 Conceptual Framework**

According to Mugenda and Mugenda (2003), a conceptual framework refers to conceptualization of the relationship between variables in the study and it is shown diagrammatically. Apart from showing the direction of the study, through the conceptual framework, the researcher is able to show the relationships of the different constructs that the researcher was to investigate. In the study, the independent variables were material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures while dependent variable was inventory management performance in the government ministries in Kenya.



**Independent Variables**

**Moderating variable**

**Dependent Variable**

**Figure 2.1: Conceptual Framework**

## **2.4 Review of the Literature**

This section presents a review of literature on the variables of the study. The section covers literature on material acquisition procedures, stock control management procedures, record management procedures, disposal management procedure and inventory management performance.

### **2.4.1 Public Procurement Legal and Regulatory Framework**

Public procurement is broadly defined as the purchasing, hiring or obtaining by any other contractual means of goods, construction works and services by the public sector (Madara, 2009). It can also be defined as the purchase of commodities and contracting of construction works and services if such acquisition is effected with resources from public funds. Public procurement therefore means procurement by a procuring entity using public funds (Mahmood, 2010).

According to Procurement and Disposal Act and Regulation of the Republic of Kenya (2005), the legal and regulatory framework sets forth procurement Regulations and Rules. The aim of the Act and Regulations is to establish the procurement procedures as well as provide instructions and further guidance for carrying out the procurement activities effectively and efficiently in compliance with the Act and Regulation (Marege, 2011).

In the past decades, the public procurement system in Kenya has undergone significant developments. From being a system with no regulations in the 1960s, and a system regulated by Treasury Circulars in the 1970s, 1980s and 1990s, the introduction of the Public Procurement and Disposal Act (PPDA) of 2005 and the Procurement Regulations of 2006 has introduced new standards for public procurement in Kenya (Marende, 2015).

The Public Procurement Reform in Kenya was jointly initiated in 1997 by the Kenya Government and the World Bank. The procurement audits carried out on Kenya's public procurement system disclosed serious shortcomings ranging from inefficiency to lack of

sound and transparent legal framework. The government decided to review and reform the existing procurement system with a view to enhancing efficiency, economy, accountability and transparency in public procurement (Munyao & Moronge, 2017).

The Public Procurement and Disposal Act (2005) borrowed heavily from the Exchequer and Audit (Public Procurement) Regulations, 2001. At the same time, it has introduced some major changes in the Public Procurement System. The major highlights include: Maximizing economy and efficiency; promoting competition and ensure that competitors are treated fairly; promoting the integrity and fairness of the procurement procedures; increasing transparency in those procedures, and; increasing public confidence in the procurement procedures.

The Act became effective in Kenya on 1st January 2007 after the gazettelement of the Public Procurement and Disposal Regulations 2006. The purpose of this Act is to establish procedures for procurement and the disposal of unserviceable, obsolete or surplus stores and equipment by public entities to achieve efficient management of public funds. The Principal reason for the enactment of the Act was to remove: Inefficiencies in the procurement process; patterns of abuse and; the failure of the public purchaser to obtain adequate value in return for the expenditure of public funds. According to Muturi (2010), these objectives have never been fully achieved in practice.

The Procurement and Disposal Act 2005 and Regulations 2006 clearly indicate the process that should be followed in obtaining material in public institutions. It indicates that in the identification of qualified persons a procuring entity may use a pre-qualification procedure or may use the results of a pre-qualification procedure used by another public entity. In addition, it indicates that the procuring entity shall prepare specific requirements relating to the goods, works or services being procured that are clear, that give a correct and complete description of what is to be procured and that allow for fair and open competition among those who may wish to participate in the procurement proceedings (Muturi, 2012).

Stock control entails how much stock is kept at any given point in time, and how to keep track of it. Efficient control means that funds are not tied up unnecessarily, that the threat of stock losses is reduced and the quality of the products and services is maintained thus ensuring that there is sufficient stock to meet the demands of customers (Wanyama, 2010).

Stock levels should be maintained in accordance with the inventory management procedures set out in the Public Procurement and Disposal General Manual to ensure the best possible services to users at the lowest cost. Replenishment should be undertaken by taking into account the actual and anticipated use based on inventory management procedures in place (Rembe, 2010).

The Procurement Records Management Procedures aims to address the weaknesses in the management of procurement records and to provide guidelines and direction for best practices. Contemporary Records management procedures advocate for the use of information technology alongside the paper based records management system. Good records management practices allow information to be easily accessed and reproduced on demand, regardless of location or form (Nyarku, 2014). According to Procurement and Disposal Act 2005 and Regulations 2006 of the Republic of Kenya- a procuring entity shall maintain a proper filing system with clear links between procurement and expenditure files.

Disposal literally means shedding off or discarding what one does not need. Disposal according to Ndolo and Njagi (2014), means disengaging on ownership from what was once useful to oneself. Looking at the Procurement and Logistics profession, disposal is a concept that should arise in the initial planning for any asset/equipment. Every Public Entity is therefore required to plan for disposal of assets/equipment before the end of their useful/economic life (Muturi, 2012).

In relation to ethical practices, the Procurement and Disposal Act 2005 and Regulations 2006 indicates that no person shall be involved in a fraudulent practice in any procurement proceeding; no person shall collude or attempt to collude with any other person; and an employee or agent of the procuring entity or a member of a board or committee of the procuring entity who has a conflict of interest with respect to a procurement. The Acts also indicate that during or after procurement proceedings, no procuring entity and no employee or agent of the procuring entity or member of a board or committee of the procuring entity shall disclose information related to the procurement that would impede law enforcement; prejudice legitimate; and inhibit fair competition (Mwangi & Kwasira, 2014).

This Act regulates both public and private sector procurement practitioners and strives to professionalize procurement practice in Kenya. In terms of the Act, Kenya Institute of Supplies Management (KISM) is tasked with registering and licensing all supplies practitioners operating in Kenya. A supplies practitioner is defined as any person or procuring agent engaged in public or private procurement, purchasing, stores management, logistics, supply chain or related activities (Munyao & Moronge, 2017).

The Public Procurement and Asset Disposal Act, 2015 came into force on 7th January 2016 repealing the previous Public Procurement and Disposal Act of 2005. The new Act contains various controversial provisions including the requirement by a bidder, who wishes to challenge the decision of a procuring body, to deposit 10% of the bid price before the Review Board will accept a request for review. The new Act also introduces new deadlines which are unlikely to work in practice (Munyao & Moronge, 2017).

#### **2.4.2 Material Acquisition Procedures**

The main role of public procurement was to obtain inventory (goods and services). This process must follow prescribed procedure that gives a major weight on fairness and equity and is subjected to oversight by the legislature and public audit. Several attempts are being made to regulate global procurement practices (Kleyn *et al.*, 2012).

Procurement can significantly influence the overall success of an inventory management depending on how it is managed. In most organizations, procurement represents a very large proportion of the total expenditure and should be managed effectively to achieve the desired objectives, which is to improve inventory performance. Procurement works like a pivot in the internal supply chain process turning around requests into actual products or services to fulfill the needs. Hawkins, Gravie and Powley (2011) further argue that procurement serves three levels of users namely the internal customer, programs in response to emergencies and ongoing programs and prepositioning of stocks, for both internal customers and program needs.

Ndolo and Njagi (2014) argue that the overall aim and objective of procurement is to carry out activities related to procurement in such a way that the goods and services so procured are of the right quality, from the right source, are at the right cost and can be delivered in the right quantities, to the right place and at the right time.

There are 'six rights' in procurement and they can be achieved through following specific objectives of procurement (Rashid, 2015). These specific objectives are to: buy quality materials, items and services economically from reliable sources; ensure timely delivery through the selection of capable and efficient suppliers, continuously locate, evaluate and develop economical and reliable supply sources, identify the most reliable sources of supply through either open tender, direct procurement, pre-qualifying suppliers and retaining only those that are capable of meeting the organization's requirements. Strategic sourcing and limited tendering investigate the availability of new materials, and monitor trends in market prices, and buy in accordance with organizations policies (Shogren *et al.*, 2015).

There are three important principles of procurement namely; transparency which emphasizes that the procurement process should be fair and accurately documented, secondly principle is accountability to financiers who may require that certain rules and procedures should be followed by beneficiaries of the money they have provided and finally, efficiency and cost effectiveness. This principal is about meeting the 'six rights'

of supply; price, right time, right quantity, quality services, and delivery to the required places and from the most economical source (Tan & Lee, 2015).

The Public Procurement and Asset Disposal Act, 2015 indicates that a procuring entity shall use standard procurement and asset disposal documents in all procurement and asset disposal proceedings. In addition, the Act dictates that the tender documents used by a procuring entity shall contain sufficient information to allow fair competition among those who may wish to submit tenders. Further, the head of procurement function shall maintain and continuously update lists of registered suppliers, contractors and consultants in various specific categories of goods, works or services according to its procurement needs (PPADA, 2016).

The Act also indicates that submission of tender documents whether in electronic or manual form, shall be in writing and signed. In the case of manual submission, they shall be sealed in an envelope. A procuring entity may, in writing, request a clarification of a tender from tenderer to assist in the evaluation and comparison of tenders. An evaluation committee may, after tender evaluations, but prior to the award of the tender, conduct due diligence and present the report in writing to confirm and verify the qualifications of the tenderer who submitted the lowest evaluated responsive tender to be awarded the contract in accordance with this Act (PPADA, 2015). All these procurement/material acquisition procedures are meant to ensure value for money earned, smooth flow of goods and services and efficiency of service delivery.

### **2.4.3 Stock control management procedures**

Stock control entails how much stock is kept at any given point in time, and how to keep track of it. Efficient control means that funds are not tied up unnecessarily, that the threat of stock losses is reduced and the quality of the products and services is maintained thus ensuring that there is sufficient stock to meet the demands of customers (Purchasing & Stock Control, 2013).



Holding stock or inventory is a very expensive business, particularly where the goods are of high value. However, for small value items, the cost can be high if the quantities involved are large enough. The alternative to holding stock is to operate a Just in Time (JIT) policy where stock arrives just as and when it is needed (Buyukkaramikli, Ooijen & Bertrand, 2015).

There are many costs associated with holding stock namely; warehouse costs money tied up in stock damage, deterioration and obsolescence, ordering costs, delivery costs and cost of any stock-outs. There is a cost of a 'stock-out'; that is, the cost of not having sufficient stock to meet demand. For instance, for each sale not made as a result of a stock-out, the company will lose the profit on this sale, and possible future sales if customers find other supplier(s) (Kanagaraju & Baskaran, 2012).

Most models indicate the quantity and time of order. For instance, the simplest model is the Economic Order Quantity Model which assumes that: demand is known and constant; lead time is constant; only one item is involved; stock is monitored on a continuous basis and an order is made when the stock level reaches a re-order point; when an order arrives, the stock level is replenished instantly and; stock-outs do not occur (Godana & Ngugi, 2014).

Material Requirement Planning (MRPI) is a dependent demand system meaning the demand for material depends on what the material will be used for. If the quantity of raw material used in manufacturing a given unit of finished product is known and the total quantity of finished product to be manufactured is known, then it is possible to calculate the total materials required for a given production program (Ahmad *et al.*, 2015).

Manufacturing Resource Planning (MRPII) involves determining various resources necessary in order to accomplish a given production program. From sales forecast, the production program is drawn which provides information about the product to be manufactured in order to satisfy the sales requirement on the basis of this production

program, details of various resources necessary in order to accomplish the production program are compiled. These resources include material requirement, human resource requirement as well as financial requirement. Together they constitute the manufacturing resource planning which will be used to look for the resource specified (Ng'ang'a, 2013).

Just in Time (JIT) involves arranging for materials to be delivered from supplier only when they are needed thus avoiding the necessity of stock holding. JIT technique in inventory control requires that both the supplier and the customer work closely in collaboration so as to know in advance the requirements of the customer as well as the manufacturing conditions of the supplier. The collaboration includes joint planning sessions in which the customer's requirement schedule as well as the supplier delivering schedules are discussed, harmonized and agreed upon (Swaleh & Were, 2014). Stock-taking and stock verification is critical because it confirms how much stock is physically in the system and then reconciles that figure with the amount shown in the records. The regularity between placing one stock order and the next is referred to as the reorder cycle.

The Public Procurement and Asset Disposal Act, 2015 indicates that an Accounting Officer of a procuring entity shall manage its inventory, assets and stores for the purpose of preventing wastage and loss, and continuing utilization of supplies. To avoid unprofitable lock-up of funds, the Act indicates that stocks shall be kept to the minimum necessary for the efficient conduct of the procuring entities. In addition, the Accounting Officer of a procuring entity may employ inventory management and control software to assist it meet the objectives of sound supply chain management. Further, an Accounting Officer of a procuring entity shall set up an inventory management system which shall be managed by the head of the procurement function, for the purpose of control and managing its inventory, stores and assets (PPAD, 2015). Policies on stock control management are meant to ensure that government ministries enjoy value for money earned, smooth flow of goods and services and efficiency of service delivery.

#### **2.4.4 Records Management Procedures**

Records management is the application of policies, practices, technologies and other management controls related to information in order to support business operations and protect legal interests and respond to regulators (PPOA, 2010). Records management seeks to manage and control records throughout their life cycle, from their creation and distribution, through their filing and use, and ultimately to their final disposition or permanent retention. The primary concern of Florida's Records Management Program is the efficient, effective, and economical management of public records and information. Proper records management ensures that information is available when and where it is needed, in an organized and efficient manner, and in an appropriate environment (Rembe, 2010).

An efficient records management system is essential for effective policy formulation, decision making, business operations, cost reduction, ensuring value for money, preventing overstocking and reducing stock outs. Good record keeping practices enable speedy and efficient access to and sharing of information. Good records management implies capturing complete, accurate, reliable, secure and accessible records. It also means assigning responsibilities for records management in an organization (Chan & Prakash, 2012).

The world of a knowledge worker is fast changing as a result of technology. Technology revolution has broadened access to authoring tools, e-mail and other forms of electronic communication. While the truly paperless office still has not been actualized, business decisions, research and number-crunching activities have all moved into predominantly online form. Records managers and other information professionals have been developing tools to ensure that appropriate lifecycle management practices cover electronic as well as paper documents (Ranganatham, 2014).

Procurement entities should ensure that records management becomes a long-term organizational priority, not merely a short-term reaction to current events. Procurement entities should increasingly view records management as a strategic component of business success not simply a tactical, cost-driven activity (KMWorld Magazine, 2004).

An electronic record is any information that is recorded in machine readable form. Electronic records include numeric, graphic, audio, video, and textual information which is recorded or transmitted in analog or digital form such as electronic spreadsheets, word processing files, databases, electronic mail, instant messages, scanned images, digital photographs, and multimedia files. In order to determine what electronic records must be managed, procurement entities should create an inventory or other means of identifying and locating all of their records, regardless of format, and ensure that all the records are included in approved retention schedules (Khmelnitsky & Singer, 2015).

The benefits of an effective records and information management program are many. Compliance with legal retention requirements, faster retrieval of information, space savings, fewer lost or misfiled records, and reduction of expenditures for records filing equipment are just a few of the benefits that good records management can help achieve. *The Basics of Records Management* is intended to serve as an effective introduction to records management and a useful guide to the ways in which Florida's Records Management Program can help you achieve your goals (Rembe, 2010).

The PPRA is well aware of the benefits of digitalization of the procurement system. Among planned initiatives is the introduction of e-procurement, which is supported by USAID. As part of an e-procurement drive, the PPOA developed a web-based system for collecting and disseminating procurement information, including tender invitations, requests for proposals, and contract award information for all National Government contracts above KES 5,000,000 (PPOA, 2007).

In relation to records management, the Public Procurement and Asset Disposal Act, 2015 stipulates that an Accounting Officer of a procuring entity shall keep records for procurement for at least six years after the resulting contract has been completed or, if no contract resulted, after the procurement proceedings were terminated. The records for a procurement shall include; a brief description of the goods, works or services being procured; if a procedure other than open tendering was used, the reasons for doing so; if, as part of the procurement procedure, anything was advertised in a newspaper or other publication, a copy of that advertisement as it appeared in that newspaper or publication; if the procurement proceedings were terminated without resulting in a contract, an explanation of why they were terminated; a copy of every document that this Act requires the procuring entity to prepare; and such other information or documents as are prescribed (PPAD, 2015). The Public Procurement and Asset Disposal Act, 2015 seeks to ensure appropriate records management so as to improve value for money earned, smooth flow of goods and services and efficiency of service delivery.

#### **2.4.5 Disposal Management Procedure**

Disposal, as earlier referred to by Nyamamba (2010), means disengaging on ownership from what was once useful to oneself. The aim of public procurement and disposal Act and Regulations 2005, and as Mwangi (2013) emphasizes, is to establish the procurement procedures as well as provide instructions and further guidance for carrying out the procurement activities effectively and efficiently in compliance with the Act and Regulation.

Managerialism and performance are at the center in disposal management. Social-economic pressures at both domestic and global levels have propelled governments to seek better performance from their public sectors. Public procurement reforms have focused on improving public procurement efficiency, effectiveness, and outcomes. This has underscored human resource aspect of managerialism as critical in disposal management (Owuoth & Mwangangi, 2015).

According to a research survey undertaken in Thailand, the most common supply chain responsibilities were scrap and surplus disposal (Thai, 2001). The study indicated the levels of involvement in scrap and surplus disposal to be eight six percent (86%). Although the need for efficient and responsible disposal, these results were critical and important. This is an indicator that disposal is critical in Supply Chain Management (Thai, 2001).

Whereas the high level of purchasing involvement in scrap and surplus disposal in public sector organizations may be caused by procedural requirements, the emphasis on the tendering process for the sale and disposal of scrap and surplus equipment and materials may require the involvement of the supply function in such activities. The higher level of centralization in the public sector firms may account for its control over scrap and surplus disposal, whereas many private sector firms may delegate this responsibility to individual business units or plants (Kusi, Aggrey & Nyarku, 2014).

According to Public Procurement and Disposal Act 2005 and Regulations 2006, the disposal of the items/assets/equipment can be either through public auction, transfer to other needy public organizations, sale by open tendering, destruction or even dumping depending on the recommendations by the disposal committee. Such items, in the researcher's view constitute a valuable source of revenue and therefore timely arrangements for disposal and proper conduct of sale operations are suggested instruments in securing realistic prices, failure to which it can lead to great loss of public assets (Kusi, Aggrey & Nyarku, 2014).

It has been a major concern of the government of Kenya that affected departments effectively carry out disposal through appropriate procedures as soon as possible to avoid further losses due to deterioration and also to free space occupied by such items. This has been done through circulars as , Treasury Circulars No. 5 of 12<sup>th</sup> March 1987 and No. 15 of 7<sup>th</sup> April 1993 and currently the Public Procurement and Disposal Act, No. 3 of 2005 (Kagendo, 2016).

The Public Procurement and Disposal Act (2005) and the Public Procurement and Disposal Regulations (2006) state that Disposal of Unserviceable, Obsolete and Surplus Items/Assets/Equipment must comply with the Act and directions given by the policy makers. This might not always have been the practice and if it may be so, the disposal procedure may have proved too long to enable the public entity realize the optimal salvage value of the equipment/asset/item.

According to Nyamamba, (2010), decisions by the stakeholders to dispose-off properties takes long and the procedures are bureaucratic and if they end up recovering enough salvage value after selling off these obsolete items. The mode of disposal seems not to maximize revenue of value generation. In any case, most of the items are sold after ten years since being declared unserviceable, obsolete or uneconomical to use. Collectively, the government might be losing a lot of appropriation in aid revenue that would have other- wise been channeled into buying new capital equipment.

The corridors of Government office are filled with assets deemed to be awaiting disposal. The manner of storage or handling does not augur well to the public who are the contributors of the public fund. Disposal of unserviceable, obsolete or surplus stores and equipment rests with each respective public entity (Kagendo, 2016). The unserviceable stores also pose a great environmental hazard and blocks accessibility to other parts of the buildings or yards and could in case of fire out break cause serious damage given that some of them are highly inflammable (Isindu, 2009).

The Public Procurement and Asset Disposal Act, 2015 dictates that an Accounting Officer shall establish a disposal committee as and when prescribed for the purpose of disposal of unserviceable, obsolete, obsolescent, or surplus stores, equipment or assets. The Act also indicates that the disposal committee shall be responsible for verification and processing of all disposal recommendations in liaison with the head of procurement function as prescribed. Further, the employee in charge of unserviceable, obsolescent, obsolete or surplus assets shall bring the matter to the attention of the disposal committee through the head of procurement function (PPAD, 2015). The disposal

component of Public Procurement and Asset Disposal Act, 2015 highlights procedures that are to be used to ensure value for money earned, smooth flow of goods and services and efficiency of service delivery.

#### **2.4.6 Inventory Management Performance**

Assets held in inventory are generally required to ensure production or service delivery can continue as planned without interruption. Like any asset, decisions need to be made whether they should be held, and how much to hold, and they need to be efficiently managed (National Treasury, 2009). Often the level of effort dedicated to inventory management will depend on the level of inventory investment. One of the key challenges in inventory management performance is to hold the minimum level of stock, tying up minimum cash resources, while ensuring delivery continues uninterrupted, (National Treasury, 2009).

The techniques of inventory management include: ABC inventory control model which classifies items for differential management; Just in time inventory control; stock-take; physical protection from theft, damage and abuse; warehouse and stockroom organization; competencies and training of staff and; determining quantities to be held, order size and order frequency: economic order quantity model, quantity discount model and, reorder point model (National Treasury, 2009).

Inventory management is concerned with the right levels of inventory, trade-off between inventory cost and customer service and treating inventory as an asset or a liability. It is a strategic area in logistics operation and has an impact on the efficiency and effectiveness of the overall supply chain systems. The cycle of production and consumption never matches and therefore inventory has to be kept in stock to get over the uncertainties in demand and supply (Sople, 2008).



Modern inventory management system includes Material Requirement Planning (MRPI), Manufacturing Resource Planning (MRPII) and Just in Time (JIT). MRPI is a dependent demand system meaning the demand for material depends on what the material will be used for. If the quantity of raw material used in manufacturing a given unit of finished product is known, and the total quantity of finished product to be manufactured is known, then it is possible to calculate the total materials required for a given production program (Buyukkaramikli, Ooijen & Bertrand, 2015).

Efficient inventory management performance should incorporate stock tracking and batch tracking. This means being able to trace a particular item backward or forward from source to finished product and identify the other items in the batch (Ranganatham, 2014). Automation of inventory management system makes tracking relatively straight forward and it is time saving. Manual inventory management methods can also use a code to systematize tracking and make it easier to trace particular batches (Obermaier & Donhauser, 2012).

Inventory classification is a component of inventory management with advantage of stock control, purchasing, storing materials, accounting and codification of equipment and material kept in an organization. The major activities involved in inventory management include: codification, standardization, valuation of stock, continuous maintenance, safety and security of stock and disposal of items (Saxena, 2009).

Measures of inventory performance consist of two main types. The first is concerned with how well inventory levels are being controlled, and the most common measure is inventory turnover (Thomas, 2016). The second is concerned with how good a service the inventory function is providing to users. The most common measure of this is customer service level. Although all organizations monitor the total value of stocks held, this figure is not very useful when viewed in isolation. It needs to be related to the value of material usage. The most common measure used to do this is inventory turnover. This gives an indication of the number of times the inventory has been consumed or turned over during a specified period, usually a year (Nair, 2015).

## **2.5 Empirical Review**

Various studies have been conducted on public procurement policy framework as well as inventory management performance both globally and locally. In Ghana, Kusi, Aggrey and Nyarku (2014) conducted an assessment of public procurement policy implementation in the educational sector by focusing on Takoradi Polytechnic. Subject to the nature of the population and the field of study, descriptive survey design was adopted for the study with questionnaires and semi-structured interview as the main data collection instruments. The findings of the study proved that Takoradi Polytechnic uses the Ghana Public Procurement 2003 (Act 663) in its procurement of goods, works and services from suppliers through the established procurement unit of the institution. However, there were some major challenges such as excessive bureaucracy, cumbersome documentation processing and inadequate storage facilities is incumbent on the Public Procurement Authority to intervene to curtail some of the challenges even as the Polytechnic performed certain internal interventions to counter such challenges in the procurement cycle.

In Kenya, Muturi (2012) carried out a research on factors affecting efficiency of inventory management in electricity sub- sector. The research adapted a case study research design and in its data collection, the study relied mainly on the questionnaire as a tool for data collection. The study found out that inventory management policy, staff competencies and use of automated record management had a significant effect on inventory management. Muturi recommends that other factors which affect inventory management policies, training of staff is important in improving inventory management practices should be studied.

Ayieko (2011) carried out a research on the “influence of Inventory Management on organizational performance of the Automobile Business sector in Kenya.” The study aimed at determining the influence of Inventory Management on organization performance of the Automobile Business sector in Kenya. The researcher found out that organizational performance is influenced by Inventory Management through inventory

planning, control and warehousing management. For further research, Ayieko also identified gaps on the other factors affecting Inventory Management such as Automation of the system and policy framework.

Marege (2011) conducted a research on factors affecting the effectiveness of inventory management practices in the public sector; a case study of the Cabinet Affairs Office in the Presidency in Kenya. The study found that regulatory framework, staff competencies and use of technology affect inventory management practices. The researcher thus recommends that further research should be done on the forecasting of inventory management, storage space and storage equipment with a view of improving the quality of the practices.

Kagendo (2016) studied the effects of Public Procurement and Disposal Act on Procurement in Parastatals in Kenya. The specific objective was to establish the effect of PPADA, 2015 on the procurement process in Parastatals in Kenya and to find out the challenges to the implementation of the Act. The study adopted a cross sectional descriptive research design. The sample population was all parastatals in Nairobi County. The study established that PPADA improved the competitiveness of the procurement processes among parastatals. In addition, PPADA improved the quality of services and goods delivered, and finally it promoted ethical standards among parastatals in procurement. On the challenges of PPADA, the study concluded that corrupt officers, unresponsive bids, ignorance of the PPADA guidelines, inefficiency of the PPRA on enforcing the penalties to the offenders and lack of organizational incentives and pressures for public procurement guidelines implementation posed significant challenges.

Owuoth and Mwangangi (2015) conducted a study on the effect of public procurement regulations on procurement performance in public sector in the Rural Electrification Authority (REAK). The study employed a descriptive research design. The target population was 160 staff of the Rural Electrification Authority in Kenya. The findings of the study indicated that there is lack of compliance to Public Procurement Regulation in

the public sector, which led to poor procurement performance. Logically, one can argue that the current phenomenon of poor procurement performance in the public sector can be reversed if the public procuring entities ensure transparency in procurement procedures, application of competitive bidding in tendering process, use of professionals and ensuring quality sourcing. The procurement staff must also be willing to comply with Public Procurement Regulation to improve procurement performance.

## **2.6 Critique of the Existing Literature**

The intention of this research is to gain a broad overview of the general public procurement policy framework and its effect on inventory management in the Kenya public sector by examining material acquisition procedures, stock control management procedures, records management procedures and disposal management policies.

Kusi, Aggrey and Nyarku (2014) study on assessment of public procurement policy implementation in the educational sector by focusing on Takoradi Polytechnic was limited to Ghana. Different countries use different public procurement policy frameworks and hence the findings from one country cannot be generalized to another.

Ayieko's (2011) research on the influence of inventory management on organizational performance of the automobile business sector in Kenya generally ignores the legal framework governing inventory management. Muturi's (2012) Research evaluates factors affecting efficiency of inventory management in electricity sub- sector in Kenya but does not focus on material acquisition procedures, stock control management procedures, record management procedures and disposal management procedures. However, it touches on the automation aspects of records management. This study postulates that there is a probability that records management has an effect on inventory management but does not examine the legal framework of the same.

Muturi's (2010) Research on factors affecting the adaption of computerized Inventory Management in Retail Chain stores in Kenya, found out that despite the fact that the system is in place, it takes time to repair after breaking down and the cost of maintenance is very high. This research suffers the fact that the law governing Supply Chain Management does not cover much on inventory management; hence the researcher recommends a total overhaul of the system and its replacement with an efficient system to act as the basis of policy formulation for inventory management and increase the adaption and use of electronic inventory management system in many organizations.

Marege's (2011) research on factors affecting the effectiveness of inventory management practices in the public sector in Kenya, established that regulatory framework, staff competencies and use of technology affect inventory management practices. However, the research does not point out clearly the link between policy framework and inventory management performance.

## **2.7 Research Gaps**

Various studies have been conducted on public procurement and inventory management both globally and locally. In Europe, Bovis (2016) conducted a study on the regulation of public procurement as a key element of European economic Law and Steiner (2013) conducted a study on a Swiss Approach towards Sustainable Public Procurement. However, the two studies were conducted in developed countries and due to differences in procurement legal framework, organizational structures and economic capabilities, their finding cannot be generalized to the Kenya case. In addition, the studies did not show how the procurement legal framework influences inventory management performance in public institutions.

In Ghana, Dagbanja (2014) examined at the role of the legal framework for public procurement in promoting a competitive local business community in Ghana. However, this study did not show the influence of the legal framework on inventory management

performance. In Kenya, most studies have focused on inventory management performance (Muturi, 2011, Ayieko, 2011; Marege, 2011). However, these studies do not show the influence of the public procurement legal framework on inventory management in public institutions in Kenya.

Whereas previous studies have always examined at compliance and non-compliance of public procurement policy framework, not all factors have been dealt with within the institutions in Kenya. The aim of the Public Procurement and Asset Disposal Act, 2015 was to promote fairness, transparency and nondiscrimination in procurement in public sector with the main aim of ensuring efficient use of public funds. However, studies reveal that even after the enactment of the Act and Regulations, there are losses of public funds that can be attributed to public procurement.

## **2.8 Summary**

Chapter Two presents a review of the literature related to the research and research pertinent or the empirical studies in the area, thereby addressing the question of “WHY?” of the study. The study was anchored on three theories, namely; institutional theory, game theory and stock diffusion theory. The chapter discussed each and every variable in the concept model separately and at the same time attempted to justify their existence in the model.

The chapter also discussed at length the linkages between these variables and the existing relationship amongst them, so as to properly expound on the research problem in chapter one, hence bridging the gap in knowledge. The tentative analysis of the variables lays down a firm foundation for the research hypotheses towards the end of the chapter. From the literature review, it can clearly be seen that most of the research work on public procurement policy framework has been linked to inventory management performance.

Various scholars have conducted research on public procurement and inventory management both globally and locally. Whereas previous studies have always looked at compliance and non-compliance of public procurement policy framework, not all factors have been dealt with within public institutions in Kenya. This notwithstanding, studies reveal that even after the enactment of the Act and Regulations, there are losses of public funds that can be attributed to public procurement.

This study therefore seeks to establish the effect of public procurement framework implementation in terms of material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures on inventory management performance of government ministries in Kenya. This epitomizes inventory management as a vital component of supply chain management concerned with accounting for and management of current public assets which are classified as inventory and thus must be defined within a clear legal framework and implemented accordingly to determine the efficiency levels of an economy.

## CHAPTER THREE

### RESEARCH METHODOLOGY

This section deals with the research design, target population, sample and sampling procedures, data collection instruments, validity and reliability of the instruments, procedure for data collection and data analysis techniques.

#### 3.1 Research Philosophy

Research philosophy outlines the way data of a certain phenomenon should be gathered and analyzed (Saunders, Lewis & Thornhill, 2007). According to Saunders *et al.* (2007), research philosophy can be divided into three categories namely; positivism, interpretivism and realism.

This research relied on positivism philosophy. Positivism research philosophy is grounded on the belief that reality is stable. This reality can be observed and described from an objective viewpoint without necessarily interfering with the phenomenon itself (Matta, 2015). Positivists believe that hypothesis developed from existing theories can be tested by measuring observable social realities, thus positivism is derived from natural sciences. Based on previously observed, explained realities and their interrelationships, it is then possible under positivism research philosophy to make predictions. Halfpenny (2015) asserts that positivism research philosophy can be used to investigate what truly happens in organizations through scientific measurement of people and system behaviors. Moreover, Korstanje (2014) contend that, any knowledge that is not based on positivist thought is unscientific and invalid.

Under positivism research philosophy, it is possible to test hypothesis and generalize the findings (Halfpenny, 2015). However, to test the hypothesis, there is need to translate the underlying concepts into measurable forms (Saunders *et al.*, 2007). For instance, in this stock control management practice, is a construct that needs to be properly



measured in order to test its effect on inventory management performance in the government ministries in Kenya.

### **3.2 Research Design**

The study adopted a cross-sectional survey design, where data is collected on the whole study population at a single point in time to examine the relationship between variables of interest. Such studies are carried out at one point in time or over a short period (Greener, 2008). Cross-sectional analysis has the advantage of avoiding various complicated aspects of the use of data drawn from various points in time, such as serial correlation of residuals. It also has the advantage that the data analysis itself does not need an assumption that the nature of the relationships between variables is stable over time, though this comes at the cost of requiring caution if the results for one time period are to be assumed valid at some different point in time (Creswell, 2006).

Cross-section research design was used in this study because it allows researchers to compare many different variables at the same time. The design was used to investigate the effects of public procurement policy framework on inventory management performance in the government ministries in Kenya.

### **3.3 Target Population**

The unit of analysis in this study was government ministries in Kenya and the unit of observation was supply chain management officers. The target population of this study was 680 supply chain management officers who are handling material acquisition, stock control management, record management and disposal management in twenty (20) government ministries. Supply chain management officers were the target population in this study because they are direct implementers of inventory management system and therefore are knowledgeable. The ministries strategic location in Nairobi and their organizational structure made it possible to gather reliable and accurate information of material acquisition procedures, stock control

management procedures, records management procedures and disposal management procedures and its effects on inventory management performance in the government ministries in Kenya (Kinoti, 2014).

According to the Government of Kenya Executive Order No.1 (2016), there are twenty (20) national ministries in the Republic of Kenya. The National Treasury circular No. 6 of 2014 states that the total population of supply chain management officers in both the national and county government is one thousand six hundred and ninety eight (1698). The number of supply chain management officers in the twenty (20) government ministries was six hundred and eighty (680) who formed the target population of this study.

### **3.4 Sampling Frame**

According to Burns (2014), a sampling frame is a list of all the elements in the population from which the sample is drawn. In this study, the sampling frame comprised of the four (4) sections that deal with supply chain management in the twenty (20) Government ministries in Kenya (See Appendix IV).

**Table 3.1: Sampling Frame**

<b>Sections</b>	<b>Target Population</b>
Material Acquisition	112
Stock Control Management	186
Records Management	223
Disposal Management	159
<b>Total</b>	<b>680</b>

### 3.5 Sample and Sampling Technique

According to Bastian (2015) sample size must be large enough to be representative of the universe population. According to Burns (2014), the ideal sample should be a large number to serve as adequate representatives of the population and small enough to be selected economically, that is in terms of subject availability. The target population was estimated at six hundred and eighty (680) employees. The sample size was determined using Fishers (2003) formula.

$$n = \frac{z^2 pq}{d^2}$$

Where,

n = the desired sample size (if the target population is > 10,000).

Z = is the standard normal deviate at the required confidence level.

p = is the proportion in the target population estimated to have characteristics being studied. If unknown, 0.5 should be used.

q = 1-0.5 = 0.5.

d = the level of statistical significance set = 0.05

Z = Assuming 95% confidence interval Z = 1.96

$$n = \frac{1.96^2 * 0.5 * 0.5}{0.05^2}$$

n=384

For a population that is less than 10000 an adjustment must be done using Cochran's correction formula (Cochran, 2011);

$$nf = n / (1 + (n/N))$$

Where;

$nf$  = the final sample size, when population is less than 10,000

$n$  = the sample for populations of 10,000 or more

$N$  = the size of the total population from which the sample is drawn

$$nf = 384 / (1 + (384/680))$$

$$nf = 245.$$

The study used stratified sampling technique to identify and select two hundred and forty five 245 respondents from the target population in the four sections namely; material acquisition, stock control management and records management, and disposal management. Stratified random sampling is a probability sampling method that gives chances of selecting each unit within particular strata in a population. The strata in this study were sections of the procurement department such as material acquisition, stock control, records management and disposal management. The sampling technique was used as it gives representative sample of the whole population. Proportionate sampling was used in allocating samples in each of the strata. The formula is;

$$n_h = (N_h / N) * n$$

Where  $n_h$  is the sample size for stratum  $h$ ,  $N_h$  is the population size for stratum  $h$ ,  $N$  is the total population size, and  $n$  is total sample size.

**Table 3.2: Sample Size**

<b>Sections</b>	<b>Target Population</b>	<b>Sample Size</b>	<b>Percent</b>
Material Acquisition	112	40	16.47
Stock Control Management	186	67	27.35
Records Management	223	80	32.79
Disposal Management	159	57	23.38
<b>Total</b>	<b>680</b>	<b>245</b>	<b>100</b>

**Source: The National Treasury Circular No. 6 of 2014**

### **3.6 Research Instruments**

Methods chosen for data collection should provide high accuracy and convenience of obtaining data from the respondents. This study used both primary and secondary data. According to Greener (2008) primary data is the data collected directly from first-hand occurrence which has not been exposed to processing or any other handling. Creswell (2006) contends that primary data can be collected by means of qualitative data collection instruments (focus group discussions, interview guide and observations) and quantitative data collection instruments (questionnaires).

This study used semi-structured questionnaires to collect primary data. The questionnaires encompassed both closed ended and open ended questions to enable the respondents to express their views without being influenced by the researcher. The structured questions were used in order to save time and money as well as to facilitate an easier analysis since they are in immediate usable form. The unstructured questions were used since they encourage the respondent to give an in-depth and well thought response without feeling held back in revealing information. Kothari (2004) indicates that a questionnaire is a cost efficient method to collecting information particularly from a huge group of respondents. It also facilitates anonymity. Questionnaires were utilized in this research to preserve anonymity as some of the information needed is sensitive.

### **3.7 Data Collection Procedure**

Before data collection, the researcher obtained a permission letter to collect data from Jomo Kenyatta University of Agriculture and Technology, and National Commission for Science, Technology and Innovation. Further, before embarking on the exercise, the researcher sought permission from the management of the twenty (20) Government ministries in Kenya.

The questionnaires were then administered through a drop and pick later method. The drop and pick later technique was an effective means to reduce potential non-response bias through increased response rate.

### **3.8 Pilot Testing**

A pilot test was conducted to test the reliability and validity of the data collection instruments. A pilot study is meant to eliminate, in advance, some of the problems that are likely to be encountered during the final study (Cooper & Schindler, 2006). In this study pretesting involved 24 supply chain management officers (10% of the sample size). The test was conducted in the National Treasury. The National Treasury was chosen as it is responsible of handing all the funds involved in procurement.

#### **3.8.1 Validity of the Research Instrument**

According to Creswell (2006) validity is the extent to which results acquired from the process of data analysis actually embodies the phenomenon under study. This study focused on two types of validity: content validity and face validity. Face validity refers to probability that a question is misinterpreted or misunderstood. Content validity refers to the degree to which a measure depicts all facets of a given social construct. In this study, the content validity was improved by seeking the opinions of experts in the field of study, particularly the supervisors. Also, the face validity of the research instrument was improved by carrying out a pilot test and changing any unclear and ambiguous question.

### 3.8.2 Reliability of the Research Instrument

Reliability is the consistency of measurement, or the degree to which an instrument measures the same way each time it is used under the same condition with the same subject (Bryman, 2003). Cronbach alpha, which is a measure of internal consistency, was used to test the internal reliability of the measurement instrument.

$$\alpha = \frac{N \cdot \bar{c}}{\bar{v} + (N-1) \cdot \bar{c}} \quad \text{Equation (Cronbach, 1951)}$$

Where N is equal to the number of items,  $\bar{c}$  is the average inter-item covariance among the items and  $\bar{v}$  equals the average variance.

The higher the score, the more reliable the generated scale is. Adrian, *et al.* (2003) indicated that a Cronbach's alpha of 0.7 is an acceptable reliability. Based on the feedback from the pilot test, the questionnaire was modified and a final one developed. In this study, a Cronbach's Alpha of 0.7 was considered acceptable reliability.

### 3.9 Data Analysis and Presentation

The data collected from the national ministries headquarters which is the largest buyer in terms of government financial allocation was both qualitative and quantitative. Thematic content analysis was used to analyze qualitative data collected from open ended questions. The results were then presented in prose.

Preceding the analysis, a codebook for the different quantitative variables was prepared on the basis of the numbering structure of the questionnaires. All the questionnaires were numbered prior to data collection to make referencing easier. All the quantitative variables were chronologically set to make sure that the accurate code is filled in for each variable. By making use of the coded variable number and the questionnaire number, it was easy to discover and correct mistakes done during data entry.

Both descriptive and inferential statistics were used to analyze quantitative data. In descriptive statistics, the study used frequency, mean, standard deviation and percentages. The analyzed data was then presented in tables and figures. In relation to inferential statistics the study used analysis of variance, correlation analysis, and regression analysis. Analysis of variance was used to establish the difference in mean between various categories. A correlation analysis and multivariate regression analysis were also carried out to determine the relationship between dependent variable and the four independent variables. According to Orodho (2007) a regression analysis is used to show the effect of the independent variables on a dependent variable.



### 3.9.1 Hypothesis Testing

**Table 3.3: Hypothesis Testing**

<b>Hypothesis</b>	<b>Type of Analysis</b>	<b>Interpretation of Results</b>
Ho <sub>1</sub> : Material Acquisition Procedures do not have a Statistically Significant Effect on Inventory Management Performance of Government Ministries in Kenya	<ul style="list-style-type: none"> <li>• Correlation</li> <li>• ANOVA</li> <li>• Regression</li> </ul>	For $p < 0.05$ , $H_0$ will be rejected; for $p > 0.05$ , We fail to reject the $H_0$
Ho <sub>2</sub> : Stock Control Management Procedures do not have a Statistically Significant Effect on Inventory Management Performance of Government Ministries in Kenya	<ul style="list-style-type: none"> <li>• Correlation</li> <li>• ANOVA</li> <li>• Regression</li> </ul>	For $p < 0.05$ , $H_0$ will be rejected; for $p > 0.05$ , We fail to reject the $H_0$
Ho <sub>3</sub> : Records Management Procedures do not have a Statistically Significant Effect on Inventory Management Performance of Government Ministries in Kenya	<ul style="list-style-type: none"> <li>• Correlation</li> <li>• ANOVA</li> <li>• Regression</li> </ul>	For $p < 0.05$ , $H_0$ will be rejected; for $p > 0.05$ , We fail to reject the $H_0$
Ho <sub>4</sub> : Disposal Management Procedures do not have a Statistically Significant Effect on Inventory Management Performance of Government Ministries in Kenya.	<ul style="list-style-type: none"> <li>• Correlation</li> <li>• ANOVA</li> <li>• Regression</li> </ul>	For $p < 0.05$ , $H_0$ will be rejected; for $p > 0.05$ , We fail to reject the $H_0$

The regression equation takes the form shown below:

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

Whereby; Y = Inventory management performance in Kenya public sector

$\beta_0$  = Constant

$\beta_1 = \beta_2 = \beta_3 = \beta_4$  = Coefficients of determination

$X_1$  = Material acquisition procedures

$X_2$  = Stock control management procedures

$X_3$  = Records management practices

$X_4$  = Disposal management procedures

$\varepsilon$  = Error term

### 3.9.2 Operationalization of Variables

**Table 3.4: Operationalization of Variables**

Variable	Indicators
Material Acquisition procedures	<ul style="list-style-type: none"> <li>• Need identification of goods</li> <li>• Selection of Suppliers</li> <li>• Delivery of goods</li> </ul>
Stock control management procedures	<ul style="list-style-type: none"> <li>• Determination of stock levels</li> <li>• Lead time</li> <li>• Stock taking and verification</li> </ul>
Records management procedure	<ul style="list-style-type: none"> <li>• Recording of relevant information</li> <li>• Storage of records</li> <li>• Retrieval of records</li> </ul>
Disposal management procedures	<ul style="list-style-type: none"> <li>• Selection of items to be disposed</li> <li>• Determination of reserved price and disposal method</li> <li>• Keeping of inventory register</li> </ul>
Inventory Management performance	<ul style="list-style-type: none"> <li>• Value for money earned</li> <li>• Smooth flow of goods and services</li> <li>• Efficiency of service delivery</li> </ul>

### **3.10 Ethical Considerations**

The study put into consideration ethical issues in order to avoid the loss of credibility in the study. First, all ideas borrowed from other authors were acknowledged in an effort to avoid plagiarism. In addition, only the personnel who showed willingness to participate in the study were given questionnaires to fill. Those who were not willing to take part in the study, for whatever reasons, were not forced to participate. The research also adhered to strict confidentiality and no information whatsoever was provided to any unauthorized person. To enhance the anonymity of the respondents, assurance was given to the respondents on the integrity of their confidentiality and also the respondents were not required to give their names. The researcher also applied for a research permit from the National Council of Science and Technology Council (NACOSTI).

## **CHAPTER FOUR**

### **RESEARCH FINDINGS AND DISCUSSIONS**

#### **4.1 Introduction**

This chapter presents the quantitative data analyzed by use of descriptive and inferential statistics and the findings of qualitative data. The chapter contains response rate, demographic information of the respondents, descriptive statistics and inferential statistics. The study findings were presented as per the objectives of the study, namely; to determine the effect of material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures on inventory management performance in government ministries in Kenya.

##### **4.1.1 Response Rate**

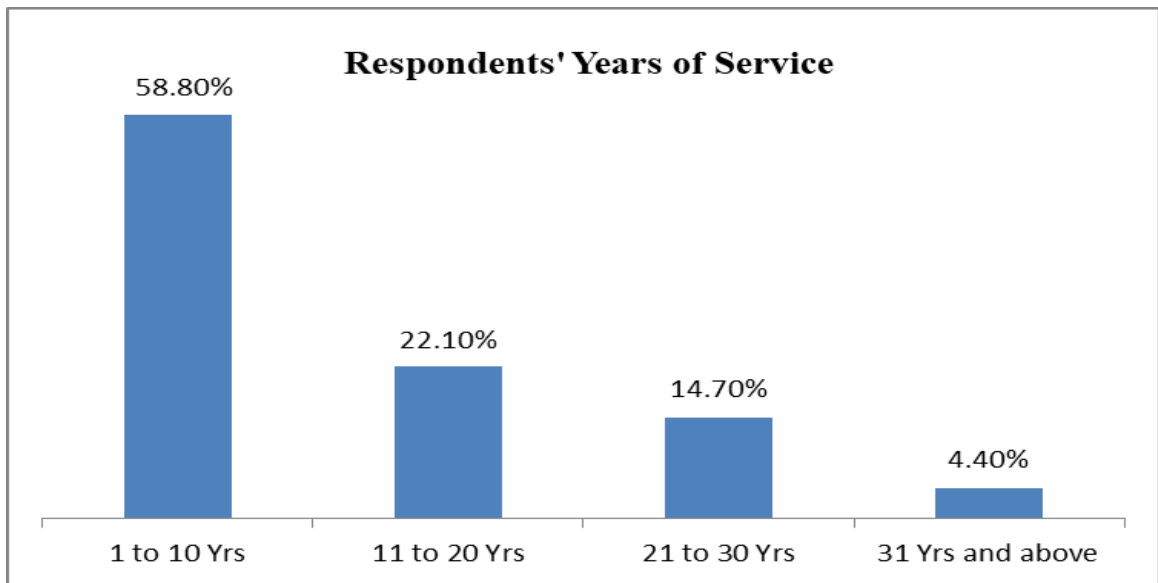
The sample size of this study was two hundred and forty five (245) staff working in the supply chain departments in the 20 Government ministries in Kenya. Out of two hundred and forty five (245) questionnaires that were distributed, Two Hundred and Four (204) responses were obtained, which gives a response rate of 83.26%. According to Kothari (2004) a response rate of 50% or more is adequate for analysis.

#### **4.2 General Information**

The general information about the respondents comprised of their years of service in their ministries, highest level of education and the sections of work in their ministries.

### 4.2.1 Respondents' Years of Service

The respondents were asked to indicate the number of years they had worked in their institutions as shown in Figure 4.1.

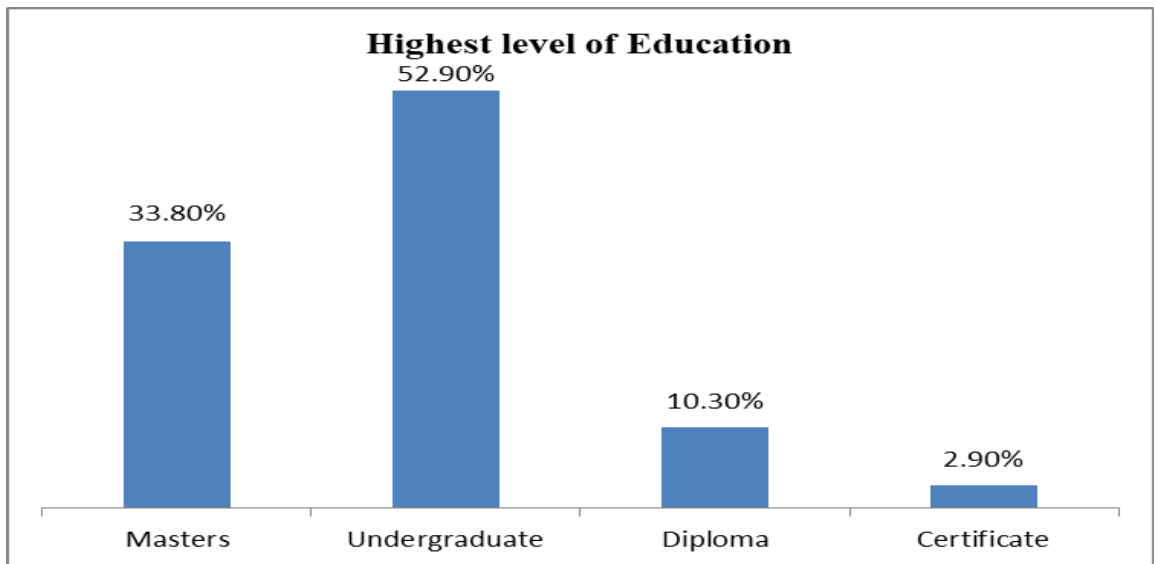


**Figure 4.1: Respondents' Years of Service**

From figure 4.1, 58.8% of the supply chain management officers indicated that they had worked in their ministries for between 1 and 10 years, and 4.4% indicated they had worked for 31 years and above. Most of the respondents therefore had worked in their Government ministries for between 1 and 10 years. The percentage of staff was reducing with increase in the number of years of service. This implies that after being employed in Government ministries, the supply chain management staff works for a short duration of time after which they exit the service by changing jobs. This may be because after staff have gotten experience in public institutions they can easily get jobs in other institutions.

#### 4.2.2 Respondents' Highest Level of Education

The respondents were also requested to indicate their highest level of education. The results are as shown in Figure 4.2.



**Figure 4.2: Respondents' Highest Level of Education**

According to figure 4.2, 52.9% of the respondents had their highest level of education as undergraduate degrees. Those who indicated that they had certificates were 2.9%. This therefore implies that majority of the respondents who participated in this study had the prerequisite knowledge to enable them understand the issues under study hence gave appropriate responses. This further confirms that supply chain management staff were using government ministries to further their education after which they sought jobs in other institutions. This is because after improving their competence in terms of skills and knowledge they can get better and well paying jobs in the Public sector.

### 4.2.3 Respondents' Work Section

The respondents were asked to indicate the sections, in which they were working in their ministries.

**Table 4.1: Respondents work station.**

	<b>Frequency</b>	<b>Percentage (%)</b>
Material Acquisition	84	41.2
Stock Control Management	39	19.1
Records Management	54	26.5
Disposal Management	27	13.2
<b>Total</b>	<b>204</b>	<b>100.0</b>

Table 4.1 shows that 41.2% of the respondents worked in the material acquisition section and only 13.2% were working in the disposal management section. The material acquisition section comprises of all procurement procedures and hence requires more staff than the rest of the sections. Stock control section in many government ministries does not require much manpower hence few respondents from the section.

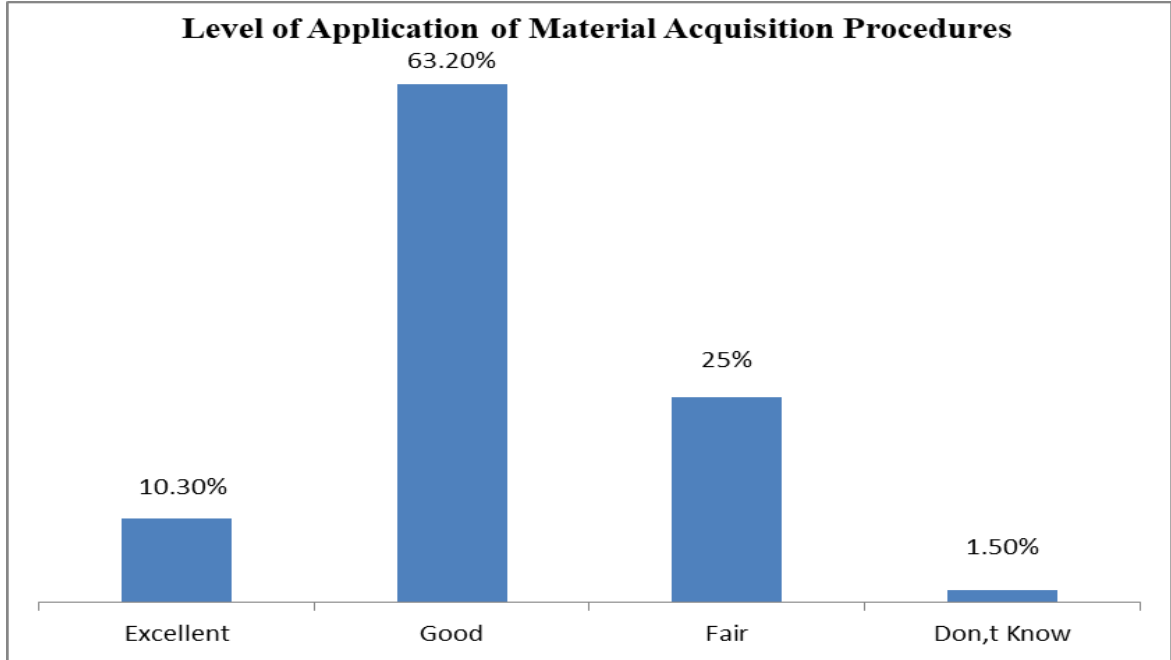
### 4.3 Material Acquisition Procedures

The first objective of this study was to determine the effect of material acquisition procedures on inventory management performance in government ministries in Kenya.

#### 4.3.1 Level of Application of Material Acquisition Procedures

The respondents were requested to indicate the application of material acquisition procedures in obtaining materials in their ministry. The results are as shown in Figure 4.3.





**Figure 4.3: Level of Application of Material Acquisition Procedures**

Figure 4.3 reveals that 63.2% of the respondents were of the opinion that the application of material acquisition procedures in obtaining materials in their ministry was good. This implies that Government ministries were following the laid down material acquisition procedures in obtaining materials. These findings agree with The Public Procurement and Asset Disposal Act, 2015 which indicates that a procuring entity shall use standard procurement and asset disposal documents in all procurement and asset disposal proceedings.

#### **4.3.2 Tendering Method Commonly Used in Procuring of Materials**

The respondents were asked to indicate the tendering method commonly used in their ministries in procuring materials. The results are shown in table 4.2.

**Table 4.2: Tendering Method Commonly Used in the Ministry in Procuring of Materials.**

	<b>Frequency</b>	<b>Percentage (%)</b>
Open tendering	108	52.9
Request for quotation	87	42.6
Restrictive tendering	6	2.9
Direct Procurement	3	1.5
<b>Total</b>	<b>204</b>	<b>100.0</b>

Table 4.2 reveals that 52.9% of the respondents indicated that the commonly used tendering method in their ministries in procuring of materials was open tendering while only 1.5% indicated direct procurement. This implies that the most commonly used tendering method for procuring materials in government ministries in Kenya was therefore open tendering. These findings concur with Tan and Lee (2015) who argue that public institutions mostly use open tendering in procuring materials.

#### **4.3.3 Procedures of Material Acquisition and Inventory Management Performance**

The respondents were asked to indicate the extent to which various procedures of material acquisition influence inventory management performance in their ministry. The results are shown in table 4.3

**Table 4.3: Procedures of Material Acquisition and Inventory Management Performance**

	<b>Strongly Disagree (%)</b>	<b>Disagree (%)</b>	<b>Neutral (%)</b>	<b>Agree (%)</b>	<b>Strongly Agree (%)</b>	<b>Mean</b>	<b>Std. Deviation</b>
Need identification of goods	1.5	4.4	5.9	45.6	42.6	4.235	.861
Determination of Procurement method	0.0	4.4	10.3	48.5	36.8	4.176	.786
Selection of supplier	0.0	7.4	10.3	47.1	35.3	4.102	.862
Delivery of goods	2.9	5.9	5.9	39.7	45.6	4.191	.991

**N=204**

Table 4.3 reveal that need identification of goods had the greatest (4.235) influence on inventory management performance in government ministries in Kenya in comparison to other parameters under study. This is because it is always the first step in any procurement process. An institution has to identify the inventory it requires before its starts the procurement process. In addition, delivery of goods and determination of procurement method influence inventory management performance government ministries. These findings concur with Shogren *et al.* (2015) argument that the procurement or tendering method used in public institutions influences inventory management performance. Also, the findings show that the selection of suppliers influences inventory management performance in government ministries. These findings concur with Rashid (2015) argument that the main objective of material acquisition procedures is to ensure timely delivery of quality materials, items and services through the selection of capable and efficient suppliers continuously locate.

#### 4.3.4 Material Acquisition Procedures and Inventory Management Performance

The study sought to evaluate the effect of material acquisition procedures on inventory management performance.

**Table 4.4: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.647	.419	.416	.50104

a. Predictors: (Constant), Material Acquisition procedures

Table 4.4 reveal that there is a strong positive relationship ( $R=0.647$ ) between the variables. The study also reveals that 41.9% of inventory management performance in government ministries in Kenya could be explained by material acquisition procedures in place.

The ANOVA findings reveal that at 95% confidence level, material acquisition procedures produce statistically significant values and can be relied on to determine inventory management performance. The results were as shown in Table 4.5.

**Table 4.5: Analysis of Variance**

Model		Sum of Squares	Degrees of Freedom	Mean Square	F-calculated	P-value
	Regression	36.520	1	36.520	145.475	.000
1	Residual	50.709	202	.251		
	Total	87.229	203			

a. Dependent Variable: Inventory Management Performance

b. Predictors: (Constant), Material Acquisition procedures

The F-critical (1, 202) was 3.92 while the F-calculated was 145.475 as shown in Table 4.5 above. This shows that F-calculated was greater than the F-critical and hence there is a linear relationship between the two variables. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of material acquisition procedures on inventory management performance.

From this study it was evident that at 95% confidence level, material acquisition procedures produce statistically significant values for this study (high t-values,  $p < 0.05$ ).

**Table 4.6: Regression Coefficients**

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	1.522	.215		7.064	.000
1 Material Acquisition procedures	.616	.051	.647	12.061	.000

a. Dependent Variable: Inventory Management Performance

Table 4.6 reveals that, holding material acquisition procedures constant, inventory management performance will have an index of 1.522. In addition, the Beta coefficient was 0.616. This reveal that a unit increases in material acquisition procedures would lead to a 0.616 increase in inventory management performance. The relationship is significant as the P-value (0.000) was less than the significance level (0.05). Therefore one can accept the alternative hypothesis that “there is a positive significant relationship between material acquisition procedures and inventory management performance in government ministries in Kenya”.

Using the unstandardized coefficients shown in Table 4.6, the following equation applies:

$$Y = 1.522 + 0.616 X_1$$

Where; Y is inventory management performance and  $X_1$  represents material acquisition procedures.

#### 4.3.5 Challenges Faced in the Implementation of Material Acquisition Procedures

The respondents were requested to indicate the challenges they face in their ministries during the implementation of material acquisition procedures.

**Table 4.7: Challenges Faced in the Implementation of Material Acquisition Procedures**

<b>Challenges</b>	<b>Frequency</b>	<b>Percent</b>
Low budget allocation	67	32.8
Changes in policies	66	32.4
Poor specifications from users	65	31.9
Delay in lead time	65	31.9
Poor planning	63	30.9
Corrupt practices in providing goods	62	30.4
Tedious tendering process	56	27.5
Staff inadequacy (professionals or experts)	45	22.1
Price fluctuations and delayed payments	44	21.6
Prolonged lead time due to complexity of procurement procedures	41	20.1
Lack of provision of all documents by suppliers	36	17.7
Lack of awareness of the velocity of updated legal framework	32	15.7
Lack of good market surveys	29	14.2
Conflict of interest by top management	27	13.2
Suppliers' collusion hence influencing prices	25	12.3
Lack of automated systems to handle materials	22	10.8
Lack of adequate knowledge of the procurement law from users	21	10.3
Challenge in usage of ICT (e-procurement).	18	8.8

**N=204**

According to the findings in Table 4.7, the respondents indicated that the major challenges faced in the implementation of material acquisition procedures in procuring of materials in their ministries include low budget allocation (32.8%), changes in policies (32.4%), poor specifications from users (31.9%) and delay in lead time (31.9%). The responses indicated that the least challenges faced in the implementation of material acquisition procedures in procuring materials in their ministries included lack of adequate knowledge of procurement laws from users (10.3%) and challenge of the use of the electronic procurement (8.8%). These findings agree with Kleyn *et al.* (2012) findings that the challenges of implementation of material acquisition procedures include lack of finances, weak policies and delayed lead time.

#### **4.3.6 Suggested Ways of Improving Material Acquisition Procedures**

Respondents were further asked to suggest ways of improving material acquisition procedures in their ministries.

**Table 4.8: Ways of Improving Material Acquisition Procedures**

<b>Ways of improvement</b>	<b>Frequency</b>	<b>Percent</b>
Improving of procurement plan	32	15.7
Strengthening of suppliers' relations	31	15.2
Close monitoring of purchases	30	14.7
Securing orders under purchasing procedures	29	14.2
Setting and adhering to lead times	17	8.3
Engaging of professionals and Supplier's enlightenment	17	8.3
Proper guidelines that do not require excess procedures	17	8.3
Training/workshops and awareness programs	13	6.4
Carrying out proper market surveys	13	6.4
Pre-qualifications of suppliers	13	6.4
Setting standard time for response of quotations	13	6.4
Giving accurate specification/ select reliable suppliers	13	6.4
Early periodic/timely review of stock levels	12	5.9
Sensitization of users on the procurement law	11	5.4
Ensuring adherence to procurement planning	10	4.9
Adoption of Better technology/ICT or ERP incorporation of the procedures	9	4.4
Communication throughout the supply chain (upstream &downstream)	9	4.4
Adequate procurement planning and sensitization on the importance of procurement planning	9	4.4
Strict adherence to the procurement policies and guidelines in relation to inventory management	1	0.5

**N=204**

From the findings in Table 4.8, the respondents indicated that the major ways of improving material acquisition procedures in their ministries include improving of procurement plan (15.7%), strengthening of suppliers' relations (15.2%), close monitoring of purchases (14.7%) and securing orders under purchasing procedures (14.2%). These findings are in line with Ndolo and Njagi (2014) argument that to improve material acquisition procedures public institutions should strengthen their relationships with suppliers and closely monitor the purchases.

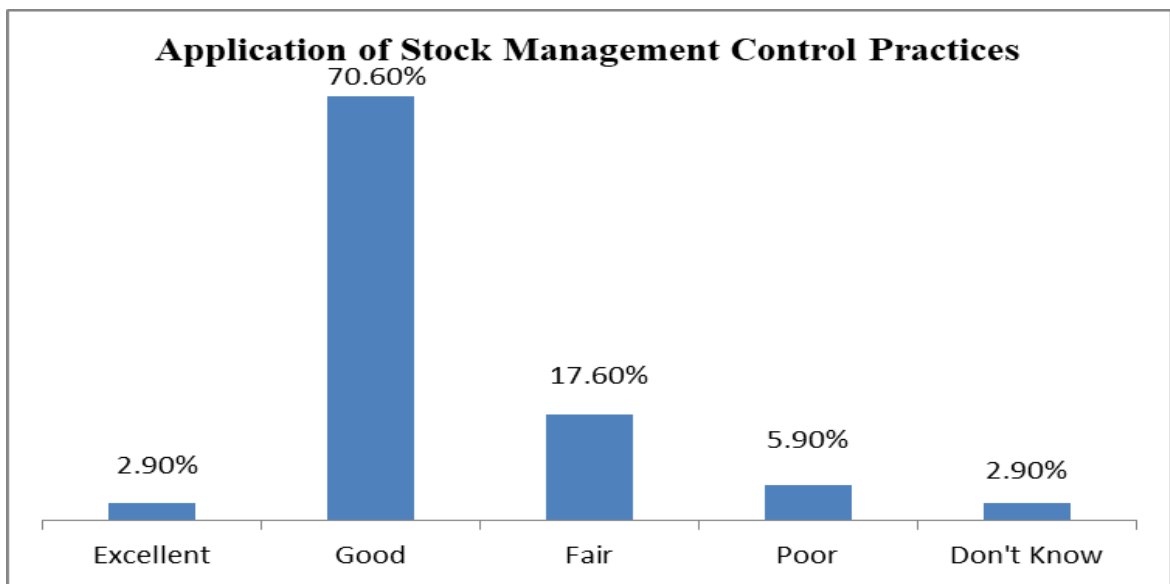


#### 4.4 Stock control management procedures

The second objective of the study was to examine the effect of stock control management procedures on inventory management performance in government ministries in Kenya.

##### 4.4.1 Application of Stock control management procedures

Respondents were asked to indicate the application of stock control management procedures in the management of stock control in their ministries. The results are as indicated in Figure 4.4.



**Figure 4.4: Application of Stock control management procedures**

The study findings reveal that most of the respondents (70.6%) indicated that the application of stock control management procedures in the management of stock control in their ministries was good. This implies that most government ministries in Kenya follow stock control management procedures in the management of stock control. These findings are contrary to Kanagaraju and Baskaran (2012) findings that most public institutions experience under stocking or overstocking.

#### 4.4.2 Aspects that Lead to Adherence/ Non-Adherence to Stock control management procedures

The respondents were asked to rate various aspects that lead to adherence / non adherence to stock control management procedures on management of stock control in their ministries. The aspects were on a scale of strongly disagree to strongly agree.

**Table 4.9: Aspects that Lead to Adherence/ Non-Adherence to Stock control management procedures**

	<b>Strongly Disagree (%)</b>	<b>Disagree (%)</b>	<b>Neutral (%)</b>	<b>Agree (%)</b>	<b>Strongly Agree (%)</b>	<b>Mean</b>	<b>Std. Deviation</b>
Determined stock level	1.5	2.9	11.8	48.5	35.3	4.132	.840
Set lead time		8.8	14.7	36.8	39.7	4.073	.946
Security and safety of stores	2.9	4.4	4.4	61.8	26.5	4.044	.867
Stock taking and verification	2.9	2.9	7.4	52.9	33.8	4.117	.885

Table 4.9 indicate determined stock level influence adherence/ non adherence to stock control management procedures with high percentage, followed by set lead time, security and safety of stores and stock taking and verification. These findings agree with Ahmad *et al.* (2015) who highlighted the importance of determination of stock levels, setting lead time, security and safety of stores and stock taking and verification in stock control.

#### 4.4.3 Stock control management procedures and Inventory Management Performance

The study sought to evaluate the effect of stock control management procedures on inventory management performance.

**Table 4.10: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.533	.284	.281	.55602

a. Predictors: (Constant), Stock control management procedures

Table 4.10 reveal that there is a relatively strong positive relationship (R=0.533) between the variables. The study also revealed that 28.4% of inventory management performance in government ministries in Kenya could be explained by stock control management procedures in place.

The ANOVA findings reveal that at 95% confidence level, stock control management practices produce statistically significant values and can be relied on to inventory management performance.

**Table 4.11: Analysis of Variance**

Model		Sum of Squares	Degrees of Freedom	Mean Square	F-calculated	P-value
1	Regression	24.779	1	24.779	80.152	.000
	Residual	62.450	202	.309		
	Total	87.229	203			

a. Dependent Variable: Inventory Management Performance

b. Predictors: (Constant), Stock control management procedures

Table 4.11 shows that the F-critical (1, 202) was 3.92 while the F-calculated was 80.152. This shows that F-calculated was greater than the F-critical and hence there is a linear relationship between the two variables. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of stock control management procedures on inventory management performance.

From this study it is evident that at 95% confidence level, stock control management procedures produce statistically significant values for this study (high t-values,  $p < 0.05$ ).

**Table 4.12: Regression Coefficients**

Model		Unstandardized Coefficients		Standardized Beta	T	Sig.
		B	Std. Error			
1	(Constant)	1.493	.292		5.111	.000
	Stock control management procedures	.622	.069	.533	8.953	.000

a. Dependent Variable: Inventory Management Performance

Table 4.12 further reveals that, holding stock control management procedures constant, inventory management performance will be measured at 1.493. In addition, the Beta coefficient was 0.622. This shows that a unit increase in stock control management procedures would lead to a 0.622 increase in inventory management performance. The relationship is significant as the P-value (0.000) was less than the significance level (0.05). Therefore, we can accept the alternative hypothesis that “there is a positive significant relationship between stock control management procedures and inventory management performance in government ministries in Kenya”.

Using the unstandardized coefficients shown in Table 4.12, the following equation applies:

$$Y = 1.493 + 0.622X_1$$

Where; Y represents inventory management performance and  $X_1$  represents stock control management procedures

#### **4.4.4 Challenges Faced in the Implementation of Stock control management procedures**

The respondents were asked to indicate the challenges they face in implementing stock control management procedures in their ministries. Results are presented in table 4.13.

**Table 4.13: Challenges Faced in the Implementation of Stock control management procedures**

	<b>Frequency</b>	<b>Percent</b>
Changes in demand	23	11.3
Using the manual ways of issuing the stocks	18	8.8
Poor records keeping	18	8.8
Poor supervision	18	8.8
Unplanned requirements due to unplanned events	16	7.8
Longer lead time	15	7.4
Bureaucracy in the process of securing an order and stock theft	15	7.4
Long/poor/ unpredictable lead time	15	7.4
Resources availability	12	5.9
Lack of qualified personnel	11	5.4
Too much stock in the warehouse	9	4.4
Poor stock records keeping	8	3.9
Lack of proper policy guidelines	7	3.4
Lack of team work among employees	4	2.0
Inaccurate forecasting and mismanagement of inventory	3	1.5
Inconsistency in stock taking	2	1.0
Non-adherence to EOQ leading to overstocking and under-stocking	2	1.0
Inadequate funding hence under-stocking	1	0.5

**N=204**

From the findings in Table 4.13 above, the respondents indicated that the major challenges faced in the implementation of stock control management procedures in their ministries include changes in demand (11.3%), using the manual ways of issuing the stocks (8.8%), poor record keeping (8.8%) and poor supervision (8.8%). These findings

agree with Purchasing and Stock Control (2013) report that indicates that efficient control means that funds are not tied up unnecessarily, the threat of stock losses is reduced and the quality of the products and services is maintained thus ensuring that there is sufficient stock to meet the demands of customers.

#### 4.4.5 Suggested Ways of Improving Stock control management procedures

The respondents were further asked to suggest ways of improving stock control management procedures in inventory management in their ministries. The results are shown in table 4.14.

**Table 4.14: Ways of Improving Stock control management procedures**

<b>Ways of improvement</b>	<b>Frequency</b>	<b>Percent</b>
The adoption of automation systems	43	21.1
Proper records management	42	20.6
Physical count of inventory	42	20.6
Sourcing of reliable (competent) supplies	36	17.7
Use of Just in time deliveries	36	17.7
Reorder levels should be set in the system so as to be able to update the officer on the position of an item to be ordered.	35	17.2
Proper record management	23	11.3
Safeguard and safety of stores to avoid shortages	23	11.3
Regular stock taking	22	10.8
Adoption of technological procedures	22	10.8
Training and awareness procedures	22	10.8
Creating stock management system	17	8.3
Educating employee on importance of team work	17	8.3
Come up with clear procedure on audit of inventory	12	5.9
Having smart and effective inventory management software	11	5.4
Maintaining optimal inventory levels	7	3.4
Coding system and automation/ERP installation	4	2.0
Strict adherence to EOQ principle	3	1.5
Ensuring suppliers adhere to set lead times	2	1.0
Sensitization of users on requisitioning procedures according to PPAD act	2	1.0
Adopting an electronic method of issuing and receiving stock	1	0.5
Adhering to lead time and reorder level.	1	0.5

N=204

Table 4.14 shows the respondents indicated that major ways of improving stock control management procedures in their ministries include the adoption of automation systems (21.1%), proper records management (20.6%) and physical count of inventory (20.6%). These findings concur with Buyukkaramikli, Ooijen and Bertrand (2015) argument that the alternative to holding stock is to operate a just in time (JIT) policy where stock arrives just as and when it is needed.

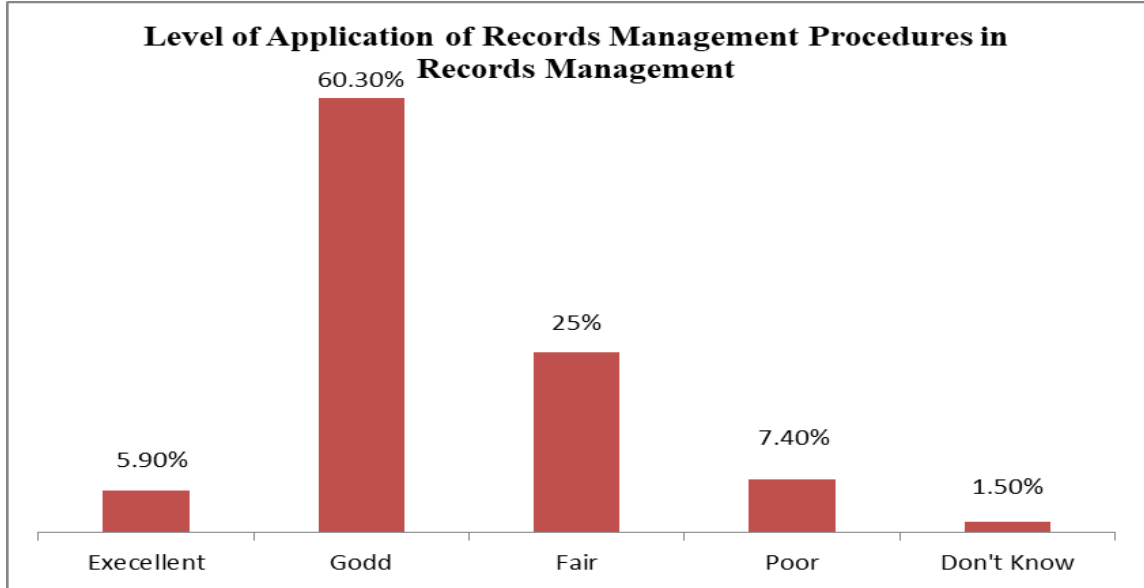
Other ways include, safeguard and safety of stores to avoid shortages (11.3%), regular stock taking (10.8%), adoption of technological procedures (10.8%), training and awareness procedures (10.8%), creating stock management system (8.3%), educating employee on importance of team work (8.3%), come up with clear procedure on audit of inventory (5.9%), having smart and effective inventory management software (5.4%), maintaining optimal inventory levels (3.4%), coding system and automation/ERP installation (2.0%), strict adherence to EOQ principle (1.5%), ensuring suppliers adhere to set lead times (1.0%), sensitization of users on requisitioning procedures according to PPAD act (1.0%), adopting an electronic method of issuing (0.5%) and receiving stock and adhering to lead time and reorder level (0.5%). These findings concur with Buyukkaramikli, Ooijen and Bertrand (2015) findings that to improve stock control management procedures public institutions need to adopt electronic records management.

#### **4.5 Records Management Procedures**

The third objective of this study was to determine the effect of records management procedures on inventory management performance in government ministries in Kenya.

##### **4.5.1 Level of Application of Records Management Procedures in Records Management**

The respondents were further asked to indicate the level of application of records management procedures in their ministries. The results are shown in Figure 4.5.



**Figure 4.5: Level of Application of Records Management Procedures in Inventory Management**

The study findings reveal that 60.3% of the respondents reported that the application of records management procedures in records management in their ministry was good. This implies that most of the government ministries in Kenya follow records management procedures. According to Rembe (2010), proper records management ensures that information is available when and where it is needed, in an organized and efficient manner, and in an appropriate environment.

#### **4.5.2 Application of Records Management Procedures on Records Management**

Respondents were further asked to rate the application of records management procedures in inventory management in their ministries.



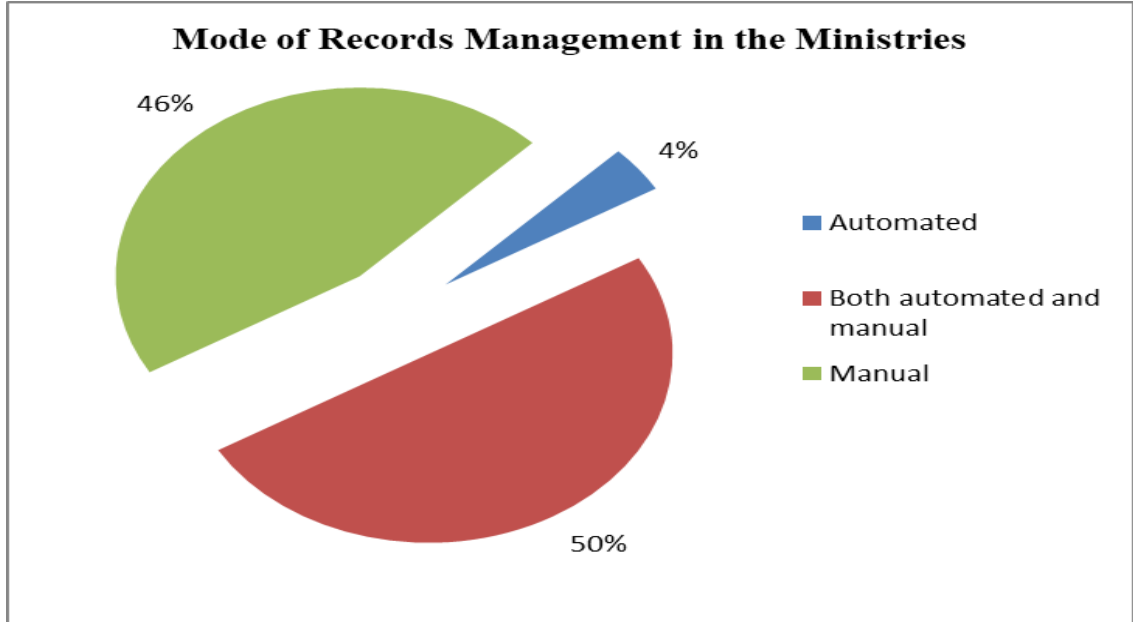
**Table 4.15: Application of Records Management Procedures on Records Management**

		<b>Strongly Disagree (%)</b>	<b>Disagree (%)</b>	<b>Neutral (%)</b>	<b>Agree (%)</b>	<b>Strongly Agree (%)</b>	<b>Mean</b>	<b>Std. Deviation</b>
Opening of procurement file	1.5			7.4	54.4	36.8	4.250	.716
Recording relevant information	0.0	1.5		7.4	57.4	33.8	4.235	.645
Proper Records Storage	0.0	4.4		8.8	44.1	42.6	4.250	.794
Retrieval of records	1.5	2.9		10.3	52.9	32.4	4.117	.816

Table 4.15 show that, recording of relevant information was applied in inventory management in most (57.4%) government ministries. This was followed by opening of procurement files (54.4%), retrieval of records (52.9%) and proper records storage (44.1%). These findings agreed with Chan and Prakash (2012) who contend that good record keeping practices enable speedy and efficient access to and sharing of information.

#### **4.5.3 Mode of Records Management in Ministries**

The respondents were requested to indicate the modes of record management used in their ministries. The results are as shown in Figure 4.6.



**Figure 4.6: Mode of Records Management in the Ministries**

The study findings revealed that 50% of the respondents indicated that their ministries were using both automated and manual records management. This clearly indicates that most of the government ministries were using both automated and manual records management. These findings concur with Khmelnitsky and Singer (2015) findings that most public institutions are still using manual record keeping methods, despite several recommendations to automate records management.

#### **4.5.4 Levels of Automation of Records Management Activities**

The respondents were further asked to rate the level of application of records management activities in their ministries.

**Table 4.16: Levels of Automation of Records Management Activities**

	<b>Less than 25%</b>	<b>25%</b>	<b>50%</b>	<b>75%</b>	<b>100%</b>	<b>Mean</b>	<b>Std. Deviation</b>
Opening of procurement file	13.2	23.5	35.3	20.6	7.4	2.852	1.117
Recording of relevant information	4.4	29.4	19.1	38.2	8.8	3.176	1.086
Proper records storage	2.9	32.4	26.5	26.5	11.8	3.117	1.080
Retrieval of records	5.9	33.8	22.1	26.5	11.8	3.044	1.146

Table 4.16 shows that the level of automation of recording of relevant information, proper records storage, retrieval of records and opening of procurement file were 50%. These findings are contrary to PPOA (2007), report that as part of an e-procurement drive, the PPOA developed web-based system for collecting and disseminating procurement information, including tender invitations, requests for proposals, and contract award information for all National government contracts.

#### **4.5.5 Records Management Procedures and Inventory Management Performance**

The study sought to evaluate the effect of records management procedures on inventory management performance.

**Table 4.17: Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.403	.162	.158	.60152

a. Predictors: (Constant), Records management procedures

Table 4.17 reveal that there is a relatively strong positive relationship ( $R=0.403$ ) between the variables. The study also revealed that 16.2% of inventory management performance in government ministries in Kenya could be explained by records management procedures in place.

The ANOVA findings reveal that at 95% confidence level, records management procedures produce statistically significant values and can be relied on to inventory management performance.

**Table 4.18: Analysis of Variance**

<b>Model</b>	<b>Sum of Squares</b>	<b>Degrees of Freedom</b>	<b>Mean Square</b>	<b>F-calculated</b>	<b>P-value</b>	
1	Regression	14.139	1	14.139	39.076	.000
	Residual	73.090	202	.362		
	Total	87.229	203			

a. Dependent Variable: Inventory Management Performance

b. Predictors: (Constant), Records management procedures

The F- critical (1, 202) was 3.92 while the F-calculated was 39.076 as shown in Table 4.18 above. This clearly indicates that F-calculated was greater than the F-critical and hence the linear relationship between the two variables (records management procedures and inventory management performance). In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of records management procedures on inventory management performance.

From this study it was evident that at 95% confidence level, records management procedures produce statistically significant values for this study (high t-values,  $p < 0.05$ ).

**Table 4.19: Regression Coefficients**

Model	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	2.629	.237		11.112	.000
1 Records management procedures	.384	.061	.403	6.251	.000

a. Dependent Variable: Inventory Management Performance

Table 4.19 indicates that holding records management procedures constant, inventory management performance will be measured at 2.629. In addition, the Beta coefficient ( $\beta_1$ ) was 0.384. This shows that a unit increase in records management procedures would lead to a 0.384 increase in inventory management performance. The relationship is significant as the P-value (0.000) was less than the significance level (0.05). Therefore we can accept the alternative hypothesis that “there is a positive significant relationship between records management procedures and inventory management performance in government ministries in Kenya”.

Using the unstandardized coefficients shown in Table 4.19 above the following equation applies:

$$Y = 2.629 + 0.384X_1$$

Where; Y represents inventory management performance and  $X_1$  represents records management procedures

#### 4.5.6 Challenges Faced in the Implementation of Records Management Procedures

The respondents were further asked to indicate challenges faced in their ministries in the implementation of records management procedures.

**Table 4.20: Challenges Faced in the Implementation of Records Management Procedures**

	<b>Frequency</b>	<b>Percent</b>
Use of manual records	21	10.3
Lack of proper planning and records management	20	9.8
Too many officers handling the records	18	8.8
Lack of staff interest in records maintenance	16	7.8
Too much paper work	12	5.9
Staff not trained on records management	11	5.4
Poor record management training	8	3.9
Poor filing systems and wrong placement of documents	7	3.4
Lack of space to keep manual records	4	2.0
Long time in retrieval of records	3	1.5
Reluctance to change with technology	2	1.0
Lack of proper training	2	1.0
Improper policy put in place to guide technological inclusion	2	1.0
Sabotage by employee	1	0.5
Bulky documents	1	0.5
Filing mistakes by officers	1	0.5
Poor referencing of case files.	1	0.5

**N=204**

Table 4.20 show that majority of the respondents were of the opinion that major challenges faced in the implementation of records management procedures in their ministries include use of manual records (10.3%), lack of proper planning (9.8%) and records management (8.8%) and too many officers handling the records (7.8%). These findings are in agreement with Rembe (2010) findings the main challenges in the implementation of records management procedures include lack of adoption of information technology, poor planning and having too many officers handling the records.

#### 4.5.7 Suggested Ways of Improving Records Management Procedures

Respondents were further requested to suggest ways of improving records management procedures in ministries. Results are presented in table 4.21

**Table 4.21: Suggested Ways of Improving of Records Management Procedures**

	<b>Frequency</b>	<b>Percent</b>
Automation of records keeping	23	11.3
Training all the employees on records management	21	10.3
Appointing a specific member to handle records	19	9.3
Setting policies and standards on record management	19	9.3
Assigning responsibilities and authorities	14	6.9
Training staff on records management/ management of inventory	8	3.9
Employing of skilled personnel to manage records, use of more technology	7	3.4
Centralization of records	6	2.9
Ensuring continuous implementation of record management practices	3	1.5
Improving compliance with statutory regulatory records requirement	1	0.5
Use of database management systems	1	0.5
Proper policy on dispatch	1	0.5
Disposal and storage	1	0.5
Quality referencing of records and case files	1	0.5

**N=204**

The respondents indicated that main ways improving of records management procedures include; automation of record keeping (11.3%), training all the employees on records management (10.3%), appointing a specific member to handle records (9.3%) and setting policies and standards on record management (9.3%). These findings agree with Khmel'nitsky and Singer (2015) findings that the benefits of an effective records and information management program include compliance with legal retention requirements, faster retrieval of information, space savings, fewer lost or misfiled records, and reduction of expenditures for records filing equipment are just a few of the benefits that good records management can help achieve as presented in Table 4.21.

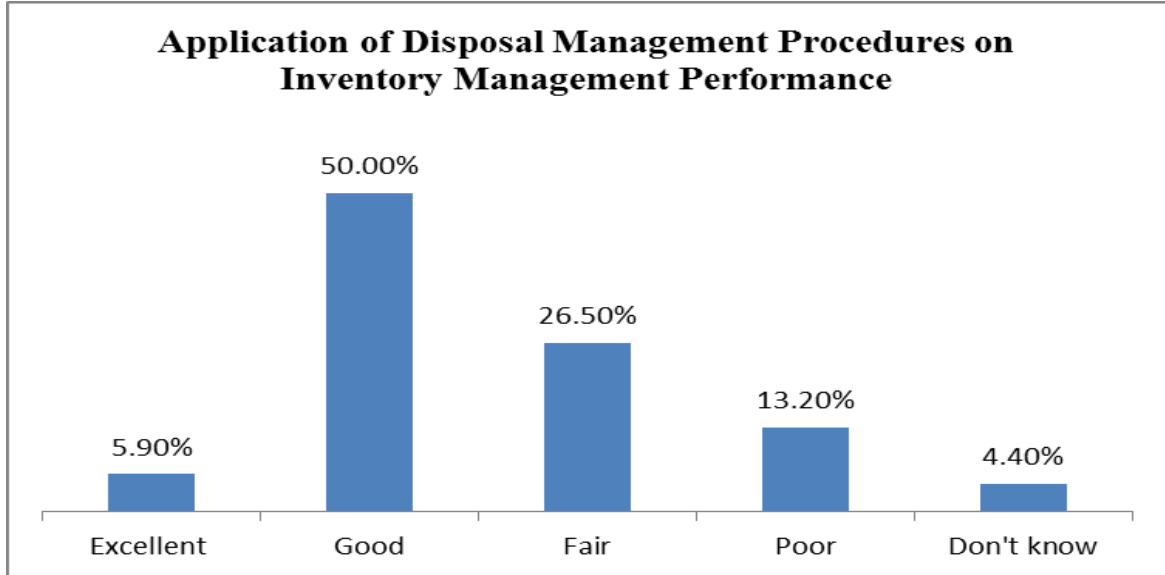
#### **4.6 Disposal Management Procedures**

The forth objective of this study was to examine the effect of disposal management procedures on inventory management performance in government ministries in Kenya.

##### **4.6.1 Application of Disposal Management Procedures on Inventory Management Performance**

Respondents were further asked to indicate the level of application of disposal management procedures in inventory management performance in their ministries. The results are shown in Figure 4.7.





**Figure 4.7: Application of Disposal Management Procedures on Disposal Management**

According to the findings, 50% of the respondents indicated that the application of disposal management procedures in disposal management was good. This implies that most of the government ministries were applying disposal management procedures in disposal management. These findings are contrary to Nyamamba (2010) argument that public institutions in Kenya experience challenges in the disposal of assets. The findings are also contrary to Kagendo (2016) argument that the government corridors are filled with assets claimed to be awaiting disposal and the way they are stored or handled seem to be regrettable to the public who are the contributors of the public funds, which are used to purchase the assets.

#### **4.6.2 Aspects that Contribute to Adherence of Disposal Management Procedures**

The respondents were asked to rate aspects of disposal management that contribute to adherence of disposal management procedures on inventory management.

**Table 4.22: Aspects that Contribute to Adherence of Disposal Management Procedures**

	<b>Strongly Disagree (%)</b>	<b>Disagree (%)</b>	<b>Neutral (%)</b>	<b>Agree (%)</b>	<b>Strongly Agree (%)</b>	<b>Mean</b>	<b>Std. Deviation</b>
Selection of items to be disposed	2.9	2.9	11.8	41.2	41.2	4.147	.945
Determined reserved price and disposal method	1.5	2.9	19.1	42.6	33.8	4.044	.883
Keeping of Inventory register	1.5	2.9	16.2	39.7	39.7	4.132	.891
Comprehensive disposal process	4.4	4.4	5.9	42.6	42.6	4.147	1.020
Disposal is done at the specified time	5.9	5.9	19.1	35.3	33.8	3.852	1.130
Stock disposed off is collected within the specified time	5.9	10.3	20.6	38.2	25.0	3.661	1.135
Value for money is achieved when disposing off stores	8.8	8.8	20.6	35.3	26.5	3.617	1.216
Environmental Friendly disposal procedures	8.8	1.5	19.1	35.3	35.3	3.867	1.177

Table 4.22 shows that selection of items to be comprehensive process contributes to adherence of disposal management procedures to a greater extent (42.6%) in comparison to other parameters under study. This was followed by selection of items to be disposed (41.2%) and keeping of inventory register (39.7). These findings concur with Thai (2001) findings that comprehensive disposal process, selection of items to be disposed and keeping of inventory register play a major role in the adherence of disposal management procedures.

#### 4.6.3 Disposal Management Procedures and Inventory Management Performance

The study sought to evaluate the effect of disposal management procedures on inventory management performance.

**Table 4.23: Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.708	.502	.499	.46376

a. Predictors: (Constant), Disposal management procedures

Table 4.23 reveal that there is a very strong positive relationship ( $R=0.708$ ) between the variables. The study also revealed that 50.2% of inventory management performance in government ministries in Kenya could be explained by disposal management procedures in place.

The ANOVA findings reveal that at 95% confidence level, records management procedures produce statistically significant values and can be relied on to inventory management performance.

**Table 4.24: Analysis of Variance**

<b>Model</b>	<b>Sum of Squares</b>	<b>Degrees of Freedom</b>	<b>Mean Square</b>	<b>F-calculated</b>	<b>P-value</b>
1 Regression	43.783	1	43.783	203.571	.000
Residual	43.446	202	.215		
Total	87.229	203			

a. Dependent Variable: Inventory Management Performance

b. Predictors: (Constant), Disposal management procedures

The F-critical (1, 202) was 3.92 while the F-calculated was 203.571 as shown in Table 4.24 above. This shows that F-calculated was greater than the F-critical and hence the linear relationship between the two variables. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of disposal management procedures on inventory management performance.

From this study it was evident that at 95% confidence level, disposal management procedures produce statistically significant values for this study (high t-values,  $p < 0.05$ ).

**Table 4.25: Regression Coefficients**

<b>Model</b>	<b>Unstandardized Coefficients</b>		<b>Standardized Coefficients</b>	<b>t</b>	<b>Sig.</b>
	<b>B</b>	<b>Std. Error</b>	<b>Beta</b>		
(Constant)	.971	.221		4.403	.000
1 Disposal management procedures	.749	.052	.708	14.268	.000

a. Dependent Variable: Inventory Management Performance

Table 4.25 shows that when disposal management is held constant, inventory management performance could be measured at 0.971. In addition, the Beta coefficient was 0.749. This shows that a unit increase in stock control management procedures would lead to a 0.749 increase in inventory management performance. The relationship is significant as the P-value (0.000) was less than the significance level (0.05). Therefore we can accept the alternative hypothesis that “there is a positive significant relationship between disposal management procedures and inventory management performance in government ministries in Kenya.

Using the unstandardized coefficients shown in Table 4.25, the following equation applies:

$$Y = 0.971 + 0.749X_1$$

Where; Y represents inventory management performance and  $X_1$  represents disposal management procedures

#### **4.6.4 Challenges Faced in the implementation of disposal management procedures**

Respondents were further asked to indicate the challenges faced in the implementation of disposal management procedures in their ministries. The results are presented in table 4.26

**Table 4.26: Challenges faced in the Implementation of Disposal Management Procedures**

<b>Challenges</b>	<b>Frequency</b>	<b>Percent</b>
Conflict of interest between staff	13	6.4
Lack of scrap value for items to be disposed	12	5.9
Lack of interest in disposing items	12	5.9
Lack of disposal management	11	5.4
Lengthy procedures in the disposal	5	2.5
Lack of information by those willing buyers	5	2.5
Lack of proper space for putting the intended items to be disposed for ease of viewing	3	1.5
Ethical issues in the disposal of items	2	1.0
Lack of good records of items	2	1.0
Lack of knowledge on disposal methods	2	1.0
Lack of transparency	2	1.0
Accumulation of disposable stock	2	1.0
Difficulty in choosing the best method of disposal	1	0.5
Poor disposal plans occasioned by poor disposal record compilation	1	0.5
Non-adherence to the proper disposal procedures and plan set out in PPAD 2015	1	0.5
Lack of cooperation from other departments	1	0.5

**N=204**

In table 4.26 the respondents indicated that the major challenges faced in the implementation of disposal management procedures in government ministries include; conflict of interest between staff (6.4%), lack of scrap value for items to be disposed (5.9%) and lack of interest in disposing items (5.9%). These findings complement the findings of Nyamamba (2010), who contends that decisions by the stakeholders to

dispose-off properties takes long and the procedures are bureaucratic and one wonders if they end up recovering enough salvage value after selling off these obsolete items.

#### 4.6.5 Suggested Ways of Improving Disposal Management Procedures

Respondents were requested to suggest ways of improving of disposal management procedures in government ministries. The results are presented in table 4.27.

**Table 4.27: Suggested Ways of Improving of Disposal Management Procedures**

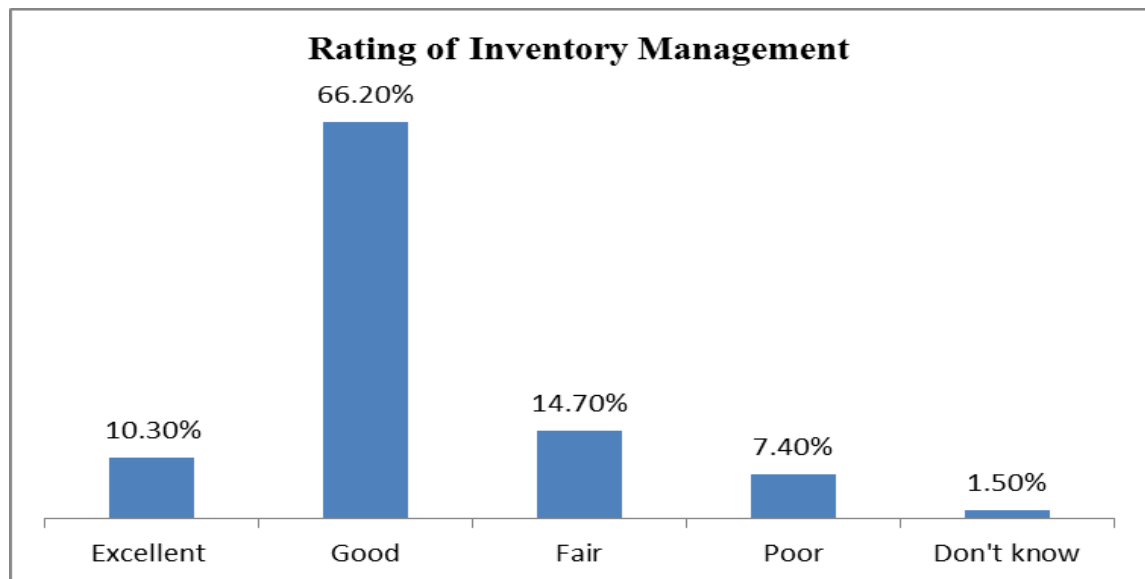
<b>Ways</b>	<b>Frequency</b>	<b>Percent</b>
Involvement of national archives officers	12	5.9
Having a set time for disposal	12	5.9
Development of a disposal plan	11	5.4
Quick disposal of items to avoid pile up	9	4.4
Giving proper information to those willing to buy the items through advertisements	8	3.9
Automation of records	7	3.4
Employing of skilled personnel	6	2.9
Frequent disposal to get money back	6	2.9
Frequent inspection of assets	6	2.9
Workshop training and awareness programs	6	2.9
Keeping proper register of all materials and equipment	5	2.5
Avoid accumulation of disposable stock	4	2.0
Periodic disposal to save on time and space of storage	1	0.5
Proper reducing of the disposal cycle	1	0.5
Segregation of items	1	0.5

**N=204**

The respondents indicated that main ways of improving disposal management procedures in government ministries include involvement of national archives officers (5.9%), having a set time for disposal (5.9%), development of a disposal plan (5.4%), quick disposal of items to avoid pile up (4.4%) and giving proper information to those willing to buy the items through advertisements (3.9%). These findings are in line with Thai (2001) findings that to improve disposal management public institutions should set time for disposal, develop a disposal plan and give proper information to those willing to buy the items through advertisements.

#### 4.7 Inventory Management Performance

Respondents were asked to rate inventory management in their ministry. The results are shown in Figure 4.9.



**Figure 4.8: Rating of Inventory Management**

From the findings, 66.2% of the respondents rated inventory management in their ministry as good. This implies that most government ministries were faring well in inventory management despite the challenges faced.



#### 4.7.1 Aspects of Inventory Management Performance

Respondents were further asked to rate various aspects of inventory management performance in their ministries.

**Table 4.28: Aspects of Inventory Management Performance**

	<b>Strongly Disagree (%)</b>	<b>Disagree (%)</b>	<b>Neutral (%)</b>	<b>Agree (%)</b>	<b>Strongly Agree (%)</b>	<b>Mean</b>	<b>Std. Deviation</b>
Value for money earned	5.9	5.9	16.2	48.5	23.5	3.779	1.057
Smooth flow of goods and services	5.9	8.8	16.2	50.0	19.1	3.676	1.065
Efficiency of service delivery	5.9	7.4	14.7	45.6	26.5	3.794	1.094

In Table 4.28, the respondents rated value for money earned (48.5%), smooth flow of goods (50.0%) and services and efficiency of service delivery (45.6%) as good. This implies that government ministries were faring well in value for money earned, smooth flow of goods and services and efficiency of service delivery. These findings agree with Sople (2008) findings that the main measures of inventory management performance include value for money earned, smooth flow of goods and services and efficiency of service delivery.

#### 4.7.2 Challenges Faced in Improving Inventory Management Performance

Respondents were also asked to indicate the challenges faced in improving inventory management performance in government ministries. The results are presented in table 4.29.

**Table 4.29: Challenges Faced in Improving Inventory Management Performance**

<b>Challenges</b>	<b>Frequency</b>	<b>Percent</b>
Proper management of stores	17	8.3
Lack of space	16	7.8
Overstocking	16	7.8
Performing effective inventory control on all parts of the inventory	15	7.4
Difficulty in calculating safety stock levels	15	7.4
Under-skilled personnel	14	6.9
Resistance from officers	14	6.9
Reluctance to change in respect with ICT adoption	11	5.4
Bureaucracy by officers with vested interest	10	4.9
Poor record keeping/management	8	3.9
Use of traditional methods	8	3.9
Lack of appropriate storage facility	8	3.9
Unexpected demands	8	3.9
Poor stock control	5	2.5
Delayed lead time	4	2.0
Limited monetary facilitation	3	1.5
Matching of budget and releasing finances is not done	3	1.5
Inventory management is not captured in IFMIS	2	1.0
Lack of accountability	1	0.5
Lack of interest by staff	1	0.5
Ignorance by some staff of the importance	1	0.5

**N=204**

in Table 4.29, the respondents indicated that major challenges faced in improving inventory management performance in government ministries include: Proper management of stores (8.3%), lack of space (7.8%), overstocking (7.8%), performing effective inventory control on all parts of the inventory (7.4%), difficulty in calculating safety stock levels (7.4%), under-skilled personnel (6.9%), resistance from officers (6.9%), reluctance to change in respect with ICT adoption (5.4%), bureaucracy by officers with vested interest, poor record keeping/management (4.9%), use of traditional methods (3.9%), poor stock control (2.5%), delayed lead time (2.0%), matching of budget and releasing finances is not done (1.5%), inventory management is not captured in IFMIS (1.0%), lack of accountability (0.5%), lack of interest by staff (0.5%) and ignorance by some staff of the importance (0.5%). These findings agree with Buyukkaramikli, Ooijen and Bertrand (2015) findings that the main challenges facing the improvement of inventory management performance in public institutions include bureaucracy by officers with vested interest, poor management of stores, overstocking, under-skilled personnel and reluctance to change in respect with ICT adoption.

#### **4.7.3 Suggested Ways of Improving of Inventory Management Performance**

The respondents were further asked to suggest ways of improving of inventory management performance in their ministries. The results are presented in table 4.30.

**Table 4.30: Ways of Improving of Inventory Management Performance**

<b>Suggested Ways</b>	<b>Frequency</b>	<b>Percent</b>
Improving on the stock taking	12	5.9
Automation stock records putting for better re-order level	11	5.4
Just in time delivery	11	5.4
Utilization and management of warehouse	8	3.9
Ideal allocation in stock inventory	8	3.9
Proper coordination during tendering	6	2.9
Sensitization of the prospective suppliers to be done to get those with stable financial capabilities	5	2.5
Employing skilled personnel	4	2.0
Use of standard documents in issuing records	3	1.5
Adoption of ICT in inventory management in the ministry	3	1.5
Training	2	1.0
Ensuring that there is adequate storage equipment	1	0.5
Clear communication between users and procurement on deliverables	1	0.5
Enhancing planning	1	0.5
Provision of adequate funding	1	0.5
Adherence to inventory management best practices such as EOQ to avoid overstocking /under stocking	1	0.5

**N=204**

Table 4.30, show ways of improving of inventory management performance in their ministry which include; improving on the stock taking (5.9%), automation stock records putting for better re-order level (5.4%) and just in time delivery (5.4%). These findings are in line with Ranganatham (2014) findings that the best ways to improve inventory management performance in public institutions include automation stock records putting for better re-order level, just in time delivery, utilization and management of warehouse, ideal allocation in stock inventory and proper coordination during tendering.

#### **4.8 Inferential Statistics**

This section presents findings of reliability analysis, correlation analysis and regression analysis per independent variable and multivariate regression analysis.

##### **4.8.1 Reliability Analysis and Internal Consistency**

The questionnaires' reliability was statistically measured by measuring the internal consistency using Cronbach's alpha coefficient. The coefficient is a measure of internal consistency and is used to test the internal reliability of the measurement instrument. A reliability coefficient of 0.7 and above was considered acceptable in this study while a Cronbach alpha coefficient below 0.7 was considered low and hence necessitated changes in the research instrument. The results are presented in table 4.31

**Table 4.31: Cronbach's Alpha Reliability Coefficient**

	<b>N</b>	<b>Cronbach's Alpha</b>
Material acquisition procedures	204	.919
Stock control management procedures	204	.878
Records management procedures	204	.870
Disposal management procedures	204	.871
Inventory management performance	204	.730

Table 4.31 shows material acquisition procedures had a Cronbach's alpha Reliability Coefficient of 0.919, stock control management procedures had 0.878, records management procedures had 0.870, disposal management procedures had 0.871 and inventory management performance had 0.730. This indicates that the research instrument was reliable and acceptable for the purposes of the study and hence no changes were required.

#### 4.8.2 Tests of Normality

Multiple regression analysis assumes that variables have normal distributions. Non-normally distributed variables can distort relationships and significance tests. In this study normal distribution of data was tested by use of Shapiro Wilk Test. The Shapiro–Wilk test is a test of normality in frequentist statistics. The null-hypothesis of this test is that the population is normally distributed. Thus if the p-value is less than the chosen Cronbach Alpha level as presented in Table 4.31, then the null hypothesis is rejected and there is evidence that the data tested did not form a normally distributed population. In other words, the data was not normal. On the contrary, if the p-value is greater than the chosen alpha level, then the null hypothesis that the data came from a normally distributed population cannot be rejected. The results are presented in table 4.32

**Table 4.32: Shapiro-Wilk Test**

	<b>Statistic</b>	<b>Df</b>	<b>Sig.</b>
Material acquisition procedures	.947	204	.432
Stock control management procedures	.926	204	.387
Records management procedures	.927	204	.389
Disposal management procedures	.935	204	.401
Inventory management performance	.836	204	.235

Table 4.32 shows that material acquisition procedures (p-value=0.432), stock control management procedures (p-value=0.387), records management procedures (p-value=389), disposal management procedures (p-value =401) and inventory management performance (p-value=235) were normally distributed. This shows that the four independent variables and the dependent variable were normally distributed.

### **4.8.3 Correlation Analysis**

The correlation coefficient is a measure of linear association between two variables. Values of the correlation coefficient are always between -1 and +1. A correlation coefficient of +1 indicates that two variables are perfectly related in a positive linear sense, a correlation coefficient of -1 indicates that two variables are perfectly related in a negative linear sense, and a correlation coefficient of 0 indicates that there is no linear relationship between the two variables. A correlation coefficient of between 0.0 and 0.19 is considered to be “very weak”, between 0.20 and 0.39 is considered to be “weak”, between 0.40 and 0.59 is considered to be “moderate”, between 0.60 and 0.79 is considered to be “strong” and between 0.80 and 1.0 is considered to be “very strong”.

The researcher carried out correlation analysis between the variables of the study using Pearson product-moment correlation coefficient. Correlation Coefficient was used to test whether there existed interdependency between independent variables and also whether the independent variables were related to the dependent variable. To conduct correlation analysis, the researcher averages for each of the variables were computed from the Likert questions creating new variables as per the independent variables.

**Table 4.33: Correlation Coefficients**

		<b>Inventory Management Performance</b>	<b>Material Acquisition procedures</b>	<b>Stock control management procedures</b>	<b>Records management procedures</b>	<b>Disposal management procedures</b>
Inventory Management Performance	Pearson Correlation Sig. (2- tailed) N	1  204				
Material Acquisition procedures	Pearson Correlation Sig. (2- tailed) N	.647**  .000 204	1  204			
Stock control management procedures	Pearson Correlation Sig. (2- tailed) N	.533**  .000 204	.543**  .000 204	1  204		
Records management procedures	Pearson Correlation Sig. (2- tailed) N	.403**  .000 204	.427**  .000 204	.479**  .000 204	1  204	
Disposal management procedures	Pearson Correlation Sig. (2- tailed) N	.708**  .000 204	.677**  .000 204	.538**  .000 204	.509**  .000 204	1  204

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



Table 4.33 shows that there is a strong positive correlation between inventory management performance and material acquisition, ( $n=204$ ,  $r = 0.647$ ,  $p < 0.01$ ), two tailed, implying that inventory management performance is affected by material acquisition procedures. The findings also show that there is a positive moderate relationship between inventory management performance and stock control management procedures ( $n=204$ ,  $r = 0.533$ ,  $p < 0.01$ ) and between inventory management performance and records management procedures ( $n=204$ ,  $r = 0.403$ ,  $p < 0.01$ ). The findings further reveal that there is a very strong positive relationship between inventory management performance and disposal management procedures and inventory management performance as presented at ( $n=204$ ,  $r = 0.708$ ,  $p < 0.01$ ). The findings therefore imply that inventory management performance has the strongest relationship with disposal management procedures in government ministries in comparison with material acquisition procedures, stock control management procedures and records management procedures.

#### **4.8.4 Regression Analysis**

A correlation coefficient indicate the relationship between variables, it does not imply any causal relationship between variables and hence the need for further statistical analysis such as regression analysis to help establish specific nature of the relationships. In this section, regression analysis for each independent variable and the dependent variable will be conducted. The aim of this analysis is to identify those variables simultaneously associated with a dependent variable and to estimate the separate and distinct influence of each variable on the dependent variable. This will then be followed by the multiple regression analysis for all the independent variables and the dependent variable.

The R-Squared is the variance proportion in the dependent variable that can be explained by the independent variable: the larger the R-squared the larger the effect of the independent variable on the dependent variable. The R Square can range from 0.000 to 1.000, with 1.000 showing a perfect fit that indicates that each point is on the line.

The analysis of variance is used to determine whether the regression model is a good fit for the data. It also gives the F-test statistics; the linear regression's F-test has the null hypothesis that there is no linear relationship between the two variables.

The coefficients or beta weights for each variable allows the researcher to compare the relative importance of each independent variable. In this study the unstandardized coefficients and standardized coefficients are given for the multiple regression equations. However discussions are based on the unstandardized coefficients.

**Table 4.34: Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.754	.568	.559	.43513

a. Predictors: (Constant), Disposal management procedures, Records management procedures, Stock control management procedures, Material Acquisition procedures

Table 4.34 presents the R-squared for the relationship between the four independent variables (material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures) and inventory management performance. The findings reveal that the four independent variables combined can explain 56.8% of inventory management performance of government ministries in Kenya.

The ANOVA findings reveal that at 95% confidence level, the variables produce statistically significant values and can be relied on to inventory management performance.

**Table 4.35: Analysis of Variance**

<b>Model</b>	<b>Sum of Squares</b>	<b>Degrees of Freedom</b>	<b>Mean Square</b>	<b>F-calculated</b>	<b>P-value</b>
1 Regression	49.550	4	12.387	65.424	.000
Residual	37.679	199	.189		
Total	87.229	203			

a. Dependent Variable: Inventory Management Performance

b. Predictors: (Constant), Disposal management procedures , Records management procedures, Stock control management procedures , Material Acquisition procedures

The F-critical (4, 199) was 3.92 while the F-calculated was 65.424 as shown in Table 4.35 above. This shows that F-calculated was greater than the F-critical and hence there is a linear relationship between the independent variables and the dependent variable. In addition, the p-value was 0.000, which was less than the significance level (0.05). Therefore, the model can be considered to be a good fit for the data and hence it is appropriate in predicting the influence of the four independent variables on the dependent variable (inventory management performance).

**Table 4.36: Regression Coefficients**

	Unstandardized		Standardized	t	Sig.
	Coefficients		Coefficients		
	B	Std. Error	Beta		
(Constant)	.354	.253		1.403	.162
Material Acquisition procedures	.248	.063	.261	3.940	.000
Stock control management procedures	.177	.070	.152	2.542	.012
Records management procedures	-.014	.054	-.014	-.253	.801
Disposal management procedures	.483	.072	.457	6.697	.000

Table 4.36 shows that inventory management performance will be have an in index of 354 when all the independent variables are held constant. In addition, the Beta coefficient ( $\beta_1$ ) was 0.248, which shows that a unit increase in material acquisition procedures would lead to a 0.248 increase in inventory management performance. The relationship is significant as the P-value (0.000) was less than the significance level (0.05).

In addition, the Beta coefficient ( $\beta_2$ ) for the relationship between Stock control management procedures and inventory management performance was 0.177, which shows that a unit increase in stock control management procedures would lead to a 0.177 increase in inventory management performance. The relationship was significant as the p-value (0.012) was less than the significance level (0.05).

Further, the Beta coefficient ( $\beta_3$ ) for the relationship between records management procedures and inventory management performance was -0.014. This shows that a unit increase in records management procedures would lead to 0.014 decreases in inventory management performance. However, the relationship was not significant as the p-value (0.801) was more than the significance level (0.05).

Lastly, the Beta coefficient ( $\beta_4$ ) for the relationship between Disposal management procedures and inventory management performance was 0.483. This shows that a unit increase in Disposal management procedure would lead to a 0.483 increase in inventory management performance. The relationship was found to be significant as the p-value (0.000) was less than the significance level (0.05).

Using the unstandardized coefficients shown in Table 4.36, the following equation applies:

$$Y = 0.354 + 0.248X_1 + 0.177X_2 - 0.014X_3 + 0.4832X_4$$

Where; Y represents Inventory management performance in Kenya public sector,  $X_1$  represents material acquisition procedures,  $X_2$  represents stock control management procedures,  $X_3$  represents records management practices, and  $X_4$  represents disposal management procedures.

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter comprises of three main sections that were guided by the specific objectives and study hypotheses. The first section is the study summary, followed by conclusions and recommendations for policy, recommendations for enhancing inventory management performance in the government ministries in Kenya and suggestions for further research.

#### **5.2 Summary of Major Findings**

##### **5.2.1 Effect of Material Acquisition Procedures on Inventory Management Performance**

From the descriptive statistics, the study established that the application of material acquisition procedures in obtaining materials in most government ministries was good. The study also found that the most commonly used tendering method in procuring of materials in government ministries in Kenya was open tendering followed by request for quotations while restrictive tendering and direct procurement are rarely used. The study also established that need identification of goods, delivery of goods, procurement method used and selection of suppliers influence inventory management performance in ministries.

From the correlation analysis, the study found that there is a positive relationship between material acquisition procedures and inventory management performance in government ministries in Kenya. The regression analysis results also indicated that material acquisition procedures positively and significantly influence inventory management performance in government ministries in Kenya. The study found that a unit increase in material acquisition procedures would lead to a 0.616 increase in

inventory management performance. In relation to the challenges faced in the implementation of material acquisition procedures, the study found that most common challenges include low budget allocation, changes in policies, poor specifications from users and poor planning.

### **5.2.2 Effect of Stock control management procedures on Inventory Management Performance**

From the descriptive statistics, the study established that application of stock control management procedures in the management of stock control in most government ministries in Kenya was good. The study also established that determined stock level, set lead time, security and safety of stores and stock taking and verification influence the adherence/ non adherence to stock control management procedures.

From the correlation analysis, the study found that there is a positive relationship between stock control management procedures and inventory management performance in government ministries in Kenya. The regression results showed that stock control management procedures positively and significantly influence inventory management performance in government ministries in Kenya. The study found that a unit increase in stock control management procedures would lead to a 0.622 increase in inventory management performance.

The study also revealed that major challenges faced in the implementation of stock control management procedures include changes in demand, using the manual ways of issuing the stocks and poor record keeping.

### **5.2.3 Effect of Records Management Procedures on Inventory Management Performance**

From the descriptive statistics, the study found that the application of records management procedures in records management in most government ministries was good. The study also found that opening of procurement file, proper records storage,

relevant information and retrieval of records were used in records management. The study revealed that most of the government ministries were using both automated and manual records management. The levels of automation of recording of relevant information, proper records storage, retrieval of records and opening of procurement file in most government ministries were 50%.

From the correlation analysis, the study found that there is a positive relationship between records management procedures and inventory management performance in government ministries in Kenya. The regression results indicated that records management procedures positively and significantly influence inventory management performance in government ministries in Kenya. The study established that a unit increase in records management procedures would lead to a 0.384 increase in inventory management performance.

Regarding challenges faced in the implementation of records management procedures, the study found that the most common challenges included use of manual records, lack of proper planning and records management and too many officers handling the records.

#### **5.2.4 Effect of Disposal Management Procedures on Inventory Management Performance**

From the descriptive statistics, the study found that the application of disposal management procedures in disposal management in most government ministries was excellent. The study also established that the selection of items to be disposed contribute to adherence of disposal management. It also established that keeping of inventory register, comprehensive disposal process, determination of reserved price and disposal method, environmental friendly disposal procedures, disposal of goods at the specified time, collection of the stock disposed within the specified time and achieving of value for money when disposing off stores contributes to adherence to disposal management.



From correlation analysis, the study found that there is a positive relationship between disposal management procedures and inventory management performance in government ministries in Kenya. The regression results indicated that disposal management procedures positively and significantly influence inventory management performance in government ministries in Kenya. The study also established that a unit increase in disposal management procedures would lead to a 0.622 increase in inventory management performance.

In relation to the challenges faced in the implementation of disposal management procedures, the study found that the most common challenges include conflict of interest between staff, dishonesty, lack of scrap value for items to be disposed and lack of interest in disposing items.

### **5.3 Conclusion**

This study concludes that there is a positive and statistically significant relationship between material acquisition procedures and inventory management performance in government ministries in Kenya. The most commonly used tendering method for procuring materials in government ministries in Kenya was open tendering followed by request for quotation. This study also found that there is need for identification of goods, determination of procurement, selection of supplier and delivery of goods influence inventory management performance in government ministries in Kenya.

The study also concludes that there is a positive and statistically significant relationship between stock control management procedures and inventory management performance in government ministries in Kenya. As pertains to application of stock control management procedures the study established that determination of stock level, set lead time, security and safety of stores and stock taking and verification influence inventory management performance in government ministries in Kenya to a great extent.

The study further concludes that there is a positive and significant relationship between records management procedures and inventory management performance in government ministries in Kenya. The study revealed that most of the government ministries were using both automated and manual records management with full automation standing at only 4%. In addition, the opening of procurement file, recording of relevant information, proper records storage and retrieval of records influence inventory management performance in Government ministries in Kenya. The challenges experienced in records management procedures included non-automation of records management procedures and lack of capacity among staff to undertake proper and accurate records management.

It is also notable that there is a positive and significant relationship between disposal management procedures and inventory management performance in government ministries in Kenya. Various aspects that contribute to adherence of disposal management include keeping of Inventory register, comprehensive disposal process, determined reserved price and disposal method, environmental friendly disposal procedures, disposal goods at the specified time, collection of the stock disposed within the specified time and achieving value for money when disposing off stores.

## **5.4 Recommendations**

This section presents recommendations related to policy and management of the government ministries as well as areas for further research:

### **5.4.1 Recommendations for Policy**

#### **5.4.1.1 Material Acquisition Procedures**

The study found that frequent change in policies was one of the main challenges facing the implementation of material acquisition procedures in acquiring materials. Since the Government keeps on revising policies and formulating new ones, this study recommends that policy makers should ensure that formulation of policies and revision

of policies is in line with the existing policies and make sure that there will be a smooth transition without affecting material acquisition.

The study established that complexity of procurement procedures was negatively affecting the implementation of material acquisition procedures. This study recommends that policy makers/the Government of Kenya should come up with policies to enhance efficiency in the procurement process by reducing bureaucracy and time taken to pay the suppliers.

This study determined that on numerous occasions, appropriate policies in regard to material acquisition were in place but not implemented. This study therefore recommends that the Government strengthens monitoring and evaluation of these policies to ensure compliance.

#### **5.4.1.2 Stock Control Management Procedures**

As pertains to stock control management procedures, a manual should be developed to guide the automation of systems to regulate inventory levels. This will help in ensuring efficiency in stock monitoring.

In addition, a Just In Time (JIT) policy should also be developed to regulate stock levels because stock arrives just and when it is needed. This will help in ensuring that there are no stock outs or overstocking.

#### **5.4.1.3 Records Management Procedures**

The study realized that one of the reasons hindering the automation of records management procedures was improper policy put in place to guide technological inclusion. This study therefore suggests that the Government as well as policy makers should develop policies to enhance and speed up the technological inclusion in all public institutions by use of policies guiding the records management procedures and training of staff.

#### **5.4.1.4 Disposal Management Procedures**

The study found that challenges facing the implementation of disposal management procedures included conflict of interest, lack of a permanent assets register, lengthy procedures in the disposal process and lack of scrap value for items to be disposed. This study recommends that the Government of Kenya policy makers should formulate policies that guide the disposal procedures and the calculation of the scrap value of assets.

The study also recommends that the Government should set up an independent department to handle disposal management matters for all the ministries. This department will ensure that disposal of assets is done at the appropriate time and that the Government

#### **5.4.2 Recommendations for Management**

##### **5.4.2.1 Material Acquisition Procedures**

As pertains to material acquisition procedures, the study established that procurement departments in various Government ministries received minimal budgetary allocation thus negatively affecting implementation of material acquisition procedures. The study therefore recommends that the departments should receive adequate funding from the Government to oversee their operations.

The study also found that staff inadequacy and lack of adequate knowledge on the how to raise requisitions with proper specifications among the staff affected the implementation of material acquisition procedures. This study recommends that the Government of Kenya should consider sponsoring heads of various departments in various ministries to undergo training on how to raise requisitions for their user departments. The study also recommends that the Government should provide constant and frequent trainings to equip supply chain management staff with the skills that they require in material acquisition.

#### **5.4.2.2 Stock Control Management Procedures**

In regards to stock control management procedures, the study found out that supply chain departments were having a challenge of overstocking and poor records keeping. It was also established that there was inaccurate forecasting and mismanagement of inventory among Government ministries. With proper record keeping and management, Government ministries can adopt Just in Time technique so as to avoid overstocking, improve forecasting and inventory management. It is paramount for Government ministries to automate their stock records.

The study also recommends that the Government should undertake continuous capacity building of Supply Chain Management staff so that the officers can keep abreast with the dynamic stock control management procedures.

#### **5.4.2.3 Records Management Procedures**

In relation to records management, the study found that staffs were not well trained on records management and there were poor filing systems. In addition, records keeping in most ministries were still manual and the department was characterized by lack of space to keep manual records and long time in retrieval of records. The ministries should therefore make efforts to automate record keeping.

The Government should continually build the capacity of records management staff on records storage, referencing and retrieval.

#### **5.4.2.4 Disposal Management Procedures**

As pertains to disposal management procedures, the study found that there were ethical issues in the disposal of items and lack of transparency. This study therefore suggests that the ministries should ensure that disposal procedures are made public so as to enhance accountability and transparency. This will help to pass on timely and accurate information to the willing buyers.

The study findings revealed that many Government ministries lacked proper fixed asset management systems thus creating a loophole for mismanagement of assets. From the study findings it is therefore recommended that all Government ministries adopt fixed asset management systems to ensure proper asset valuation, tagging and bar coding to enable easy tracking of assets and ensure accountability in the event of loss. The fixed asset management system should also provide accurate depreciation of assets to ascertain asset value during disposal.

The study further recommended that the Supply Chain Management process be automated. This is likely to make it easier to track all assets procured, the departments they were procured for and their status.

#### **5.4.3 Areas for Further Research**

This study focused on the effect of public procurement policy framework on inventory management performance in the government ministries in Kenya. Having been limited to government ministries, the findings of this study cannot be generalized to other public institutions in Kenya like parastatals and public universities. This is because government ministries, public universities and other parastatals have different structures and have different inventory needs. The study therefore suggests further studies to investigate whether public procurement policy framework influences inventory management performance in other public institutions in Kenya.

In addition, this study focused on only four aspects of public procurement policy framework namely; material acquisition procedures, stock control management procedures, records management procedures and disposal management procedures. This study therefore suggest other studies to focus on other aspects of public procurement policy framework like ethical practices and how they influence inventory management performance should be conducted. This is because ethical practices is a component of public procurement policy framework, but was not covered in this study.

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## APPENDICES

### Appendix I: Letter of Introduction



**Jomo Kenyatta University of Agriculture and Technology  
School for Entrepreneurship, Procurement & Management  
Department of Entrepreneurship, Technology Leadership and  
Management**

Telegrams "Thika"  
Telephone: 067 52711 ext 2239  
Fax: 067 52164

Office of the Chairman  
P.O. Box 62000  
NAIROBI

Date: 26/04/2016

Ref: JKU/SHRD/ EPD/PhD/14(04)

**To whom it may concern:**

Dear Sir/Madam,

**RE: PhD RESEARCH PROJECT FOR: MR CHARLES K. NDETO (HD433-1940/2010)**

This is to introduce to you Mr. Ndeto who is a student pursuing Doctor of Philosophy course in Business Administration in the Department of Entrepreneurship, Technology Leadership and Management in the School of Entrepreneurship, procurement and Management at Jomo Kenyatta University of Agriculture and Technology.

The student is currently undertaking a research proposal on: "**Effect of Public Procurement Legal and regulatory framework on Inventory Management Performance in Government Ministries in Kenya,**" *in* partial fulfilment of the requirement for the programme.

The purpose of this letter is to request you to give the student the necessary support and assistance to enable him obtain the necessary data for the research. Please note that the information given is purely for academic purposes and will be treated with strict confidence.

Thank you.

Yours faithfully



for **ESTHER WAIGANO, Ph.D.,  
COD, ENTREPRENEURSHIP, TECHNOLOGY, LEADERSHIP AND  
MANAGEMENT DEPARTMENT**



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## Appendix II: Questionnaire

Respondent's Questionnaire on "the effect of public procurement policy framework on inventory management performance in the Government Ministries in Kenya".

### Part I: General Information

1. Name (Optional).....

2. Please indicate your years of service.

1-10

11-20

21-30

31 and above

3. Please indicate your highest level of education

Doctorate

Masters

Undergraduate

Diploma

Certificate

Others, (please specify) .....

3. Kindly state your section in the Ministry

Material Acquisition

Stock Control Management

Records Management

Disposal Management

Others, specify .....

**Part B**

**Section I: Material Acquisition procedures**

1. Please rate the level of application of material acquisition procedures on obtaining of materials in your ministry.

Excellent

Good

Fair

Poor

Don't Know

2. Which of the following tendering method is commonly used in your ministry in procuring of materials?

Open tendering

Request for quotation

Restrictive tendering

Direct procurement

2. To what extent do the following procedures of material acquisition influence inventory management performance in your ministry?

	Strongly agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly disagree (1)
Need identification of goods					
Procurement method determined					
Selection of supplier					
Delivery of goods					

4. Kindly indicate the challenges faced with reference to implementation of material acquisition procedures in procuring of materials.

i. ....

ii. ....

5. Suggest ways of improving material acquisition procedures on inventory management performance

i. ....

ii. ....

**Section II: Stock control management procedures**

1. Please rate the level of application of stock control management procedures on management of stock control.

Excellent

Good

Fair

Poor

Don't Know



2. Please rate the aspects that lead to adherence/ non adherence to stock control management procedures on management of stock control.

	Strongly agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly disagree (1)
Determined stock levels					
Set lead time					
Security and safety of stores					
Stock taking and verification					

3. Kindly indicate the challenges faced with reference to implementation of stock control management procedures on management of stock control.

- i. ....
- ii. ....

5. Suggest ways of improving stock control management procedures on inventory management performance.

- i. ....
- ii. ....

**Section III: Records management procedures**

1. Please rate the level of application of records management procedures on records management.

- Excellent
- Good
- Fair
- Poor
- Don't Know

2. Please rate the application of records management procedures on records management.

	Strongly agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly disagree (1)
Opening of procurement file					
Recording of relevant information					
Proper records storage					
Retrieval of records					

3a). Please indicate the mode of records management in your Ministry.

- Automated
- Manual
- Both automated and manual

b). If automated, please rate the levels of automation of records management activities in your ministry.

	100% Automation	75% Automation	50% Automation	25% Automation	0% Automation
Opening of procurement file					
Recording of relevant information					
Proper records storage					
Retrieval of records.					

4. Please indicate the challenges faced with reference to implementation of records management procedures on records management in Ministry.

- i. ....
- ii. ....

5. Suggest ways of improving of records management procedures procedures on inventory management performance.

- i. ....
- ii. ....

**Section IV: Disposal management procedures**

1. Please rate the level of application of disposal management procedures on disposal management.

- Excellent
- Good
- Fair
- Poor
- Don't Know

3. Please rate the following aspects of disposal management that contribute to adherence of disposal management procedures on disposal management.

	Strongly agree (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly disagree (1)
Selection of items to be disposed					
Determine reserved price and disposal method					
Dispose the items					
Keeping of inventory register					

3. Please rate the following aspects of disposal management procedures that contribute to adherence of disposal management

	Strongly agree (5)	Agree (4)	Neither agree nor disagree(3)	Disagree (2)	Strongly disagree (1)
Comprehensive disposal process					
Disposal is done at the specified time					
Stock disposed-off is collected within the specified time					
Value for money is achieved when disposing-off stores					
Environmental friendly disposal procedures					

4. Please indicate the challenges faced with reference to implementation of disposal management procedures on records management in Ministry.

i. ....

ii.....

5. Suggest ways of improving of disposal management procedures on inventory management performance.

i. ....

ii.....

**Section IV: Inventory Management Performance**

1. How do you rate inventory management in your ministry?

- Excellent
- Good
- Fair
- Poor
- Don't Know

2. Please rate the following aspects of inventory management performance in your ministry?

	Strongly agreed (5)	Agree (4)	Neither agree nor disagree (3)	Disagree (2)	Strongly disagree (1)
Value for money earned					
Smooth flow of goods and services					
Efficiency of service delivery					

3. Kindly indicate the challenges faced with reference to improving inventory management performance in your Ministry.

i. ....

ii. ....

4. Suggest ways of improving of inventory management performance in your ministry.

i. ....

ii. ....

**Thanks for your participation**



### **Appendix III: List of Government Ministries**

The Ministries that will be considered in the population are;

1. Ministry of Interior and Coordination of National Government
2. Ministry of Devolution and planning
3. Ministry of Finance and National Treasury
4. Ministry of Defense
5. Ministry of Foreign Affairs & International Trade
6. Ministry of Education
7. Ministry of Health
8. Ministry of Transport and Infrastructure
9. Ministry of Information , Communication and Technology
10. Ministry of Environment and Natural Resources
11. Ministry of Land Housing and Urban Development
12. Ministry of Sports Culture and Arts
13. Ministry of Labour & East African Affairs
14. Ministry of Energy and Petroleum
15. Ministry of Agriculture, Livestock and Fisheries
16. Ministry of Industrialization and Enterprise development
17. Ministry of Public Service Youth and Gender Affairs
18. Ministry of Tourism
19. Ministry of Mining
20. Ministry of Water and Irrigation.

#### Appendix IV: Population per Ministry

Ministry	Material Acquisition	Stock Control Management	Records Management	Disposal Management	Total
1. Ministry of Interior and Coordination of National Government	8	10	14	8	40
2. Ministry of Devolution and planning	7	11	13	7	38
3. Ministry of Finance and National Treasury	8	9	11	10	38
4. Ministry of Defense	6	11	9	9	35
5. Ministry of Foreign Affairs & International Trade	5	8	15	8	36
6. Ministry of Education	6	7	16	9	38
7. Ministry of Health	7	12	12	7	38
8. Ministry of Transport and Infrastructure	7	10	9	8	34
9. Ministry of Information, Communication and Technology	5	8	12	8	33
10. Ministry of Environment and Natural Resources	6	11	8	9	34
11. Ministry of Land Housing and Urban Development	4	7	11	10	32
12. Ministry of Sports Culture and Arts	6	7	7	7	27
13. Ministry of Labour & East African Affairs	5	9	12	6	32
14. Ministry of Energy and Petroleum	4	11	10	7	32
15. Ministry of Agriculture, Livestock and Fisheries	3	12	13	9	37
16. Ministry of Industrialization and Enterprise development	4	9	12	10	35
17. Ministry of Public Service Youth and Gender Affairs	5	10	9	8	32
18. Ministry of Tourism	5	9	10	10	34
19. Ministry of Mining	5	8	8	5	26
20. Ministry of Water and Irrigation.	6	7	12	4	29
<b>Total</b>	<b>112</b>	<b>186</b>	<b>223</b>	<b>159</b>	<b>680</b>