

**INVENTORY MANAGEMENT PRACTICES AND PERFORMANCE  
OF CONSUMER GOODS MANUFACTURING FIRMS IN NAIROBI  
KENYA**

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OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF  
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**DECLARATION**

**STUDENT’S DECLARATION**

This is to declare that this research project is my original work that has not been presented to any other university or institution of Higher Learning for examination and no part of this project should be reproduced without prior permission of the author and/or University of Nairobi.

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**SUPERVISOR’S DECLARATION**

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

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## **ABBREVIATIONS AND ACRONYMS**

<b>ANOVA</b>	Analysis of Variance
<b>EOQ</b>	Economic Order Quantity
<b>JIT</b>	Just-in-time
<b>OECD</b>	Organization for Economic Co-operation and Development
<b>PwC</b>	PricewaterhouseCoopers
<b>SPSS</b>	Statistical Package for Social Sciences
<b>VMI</b>	Vendor Managed Inventory

## **DEDICATION**

This project is dedicated to my parents Joshua Kinyua Riria and Gladys Kinyua. This is for their sacrifices in educating me and instilling in me all the appetite that I have for knowledge. Also, I would like to thank my wife, Doreen Gacheri, and my son, Hermlin Muthomi, for their patience throughout this period.

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## ABSTRACT

The purpose of this research study was to establish the inventory management practices and performance of consumer goods manufacturing firms in Kenya. The research objectives of the research study were to establish the extent to which inventory management practices are implemented by consumer goods manufacturing firms in Kenya; to determine the impact of inventory management practices on operational performance of consumer goods manufacturing firms in Kenya; and, to establish the challenges faced by consumer goods manufacturing firms in the implementation of inventory management practices in Kenya. The research study was conducted via a descriptive research design. The research study adopted a census sampling technique in which all 15 large-scale consumer goods manufacturing firms operating in Nairobi County were selected. The sample size of the respondents was 60 of which 54 were deemed useful for the research. The data was analyzed based on descriptive statistics in which SPSS version 20 was used. The research study found out that: an increase in one unit of ABC leads to an increase in operational performance of consumer goods manufacturing firms by a factor of 0.11; an increase in one unit of JIT leads to an increase in operational performance of consumer goods manufacturing firms by a factor of 0.16; a unit increase in EOQ leads to an increase in the level of operational performance of consumer goods manufacturing firms by a factor of 0.88; a unit increase in VMI leads to an increase in operational performance of consumer goods manufacturing firms by a factor of 0.7; a unit increase in Bar-coding leads to an increase in operational performance of consumer goods manufacturing firms by a factor of 0.41; and, a one unit increase in Simulation leads to an increase in operational performance of consumer goods manufacturing firms by factor of 0.35. The research study established that EOQ has more impact on operational performance of consumer goods manufacturing firms in Kenya relative to other inventory management practices studied. The research concluded that inventory management practices impact significantly the operational performances of consumer goods manufacturing firms in Kenya. The implementation of an effective inventory management practices leads to many benefits in a firm, including ensuring optimal production, meeting the assembly targets and on-time delivery, which are all associated with operational efficiency. While there are different inventory management practices, the findings of this research study establish that consumer goods manufacturing companies are more likely to benefit from Economic Order Quantity model, Vendor Managed Inventory and Bar-coding. This research study recommends that consumer goods manufacturing firms should embrace effective inventory management practices. This is because an effective management of inventories has an overall impact on enhancing operational performance of a firm, including a guarantee of on-time delivery, ensuring optimal production levels are met, and making sure that assembly targets are met, which, consequently, leads to a reduction of the reorder and holding costs

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background

Inventory is a significant constituent of a firm and ought to be managed prudently considering that it ties up a substantial percentage of an organizational capital. The main objectives of firms are to boost productivity with fewer resources while also enhancing quality (Nsikan, Etim & Uduak, 2015). There are a number of methods that enable a firm to accomplish these objectives; however, the key and usually “hidden” technique is to trim down firm inventory. The Inventory Management' implies supervision and control of the ordering, storage, as well as use of components that a firm used in the process of producing items it sold over and above supervision and control of quantities of the finished products. As opined by Muhayimana (2015), the inventory of a firm is one of its chief resources and embodies a venture that is tied up till the article is sold or used in producing the final merchandise. Furthermore, it costs finances to store, track as well as to insure inventory. Inventories, which are mismanaged, are likely to create considerable financial problems for a firm, whether the mismanagement leads to an inventory surplus or shortage (Luthubua, 2014). Flourishing inventory management is associated with the creation of a purchase plan that guarantees items are available the moment they are in need in addition to keeping the track of existing inventories and their use.

Inventory is denoted as the sum of goods or materials held in a store or any other place at a specific time. The owners of stores should understand the exact number of items that are held in their stores for the purpose of placing orders or controlling losses. According to Baron, Berman and Perry (2010), the managers of manufacturing firms should understand the number of units of their products available for various customers' orders. In this regard, all types of businesses rely on an inventory count to offer answers. There are diverse ways that organizations can handle their inventory, but it all depends on what kind of business enterprise it is. For instance, a manufacturer of food that produce canned fruit may take into consideration every single piece of that canned fruit in its inventory. The materials utilized to make the can, the labels, the fruit, as well as the sugary filling might all be part of the general examination of inventory (Ogoye, 2014). Keeping track of inventory might

be an intricate process. The word for watching inventory is known as logistics. Logistics is a comprehensive process by which the entire inventory is tracked and logged (Wagner, Andreas & Eckhard, 2010). A number of different persons are involved in logistics. This can comprise everything from the owner of the business to the transportation firm that distributes the goods to the manufacturing plant using complex systems, including barcode integration.

Certainly, as informed by Cachon and Olivares (2010), inventory is also significant on the checks and balances side. Accountants examine inventory counts so as to be sure that deception or embezzlement is not happening. This also serves as a backing to check and ensure that everything is strategically placed and nothing that is unusual is taking place. There are a number of books that have been written regarding how to reconcile inventories, keeping an accurate store counts, reasons that faults happen, tools to utilize in helping to ensure inventories are delivered on time at the right place, and are of the right quantities and quality. After learning the diverse forms of inventory and the significance of ensuring it is logged appropriately, Lysons and Farrington (2012) inform that the process of tracking such inventory should be reasonably modernized and simple, giving a firm a cost-effective and competitive advantage. In this respect, the purpose of inventory management is to reduce the sum costs linked with investment in inventory. Since inventory is a reversible investment, which continually oscillates in size, the inventory decisions usually deliberate on formative of the optimal level of inventory. An effective inventory management is one that embodies high inventory turnover, as well as minimizing the overall costs associated with inventory management.

### **1.1.1 Inventory Management Practices**

Inventory management practices refer to the models that are used to manage the firm's inventory. These models are used to record, consolidate, track, analyze and report when the inventories are going down or there is an excess. These models include among them; Just-in-Time (JIT), Materials Requirement Planning (MRP), Vendor Managed Inventory (VMI) and Barcoding among others. Inventory management is not aspect a large number of experts take pleasure in thinking about, including those working in this area. That is one of the primary reasons it is useful to employ best practices that are confirmed to simplify

the processes of inventory management. Making an otherwise burdensome, time consuming, and exasperating process simple and extra effective will save individuals working in this area from nuisance; it would further make sure the workers are on task and processes of a firm flow effortlessly, which have the consequence of boosting the bottom line of a business. Inventory management is not an aspect which is restricted to a warehouse. The manufacturing firm also benefits from an effective inventory management as far as maintenance, fixing, and operations equipment are concerned (Muhayimana, 2015).

Inventory management practices can be described as the system adopted by a firm to manage the investment made in a stock (Stevenson 2010). The inventory management practices are concerned with the recording as well as monitoring of level of inventory, projecting demand in the future in addition to making decision when to order and how it should be ordered (Adeyemi and Salami, 2010). According to Miller (2010), inventory management is associated with all activities established to guarantee that customers access a specific product or service. It enables the coordination of the activities purchasing, manufacturing along with distribution in order to meet the marketing needs of ensuring that products are availed to a consumer. The following indicates inventory management practices: Economic Order Quantity (EOQ), Materials Requirement Planning MRP, Just-in-Time JIT and Vendor Managed Inventory (VMI).

### **1.1.2 The Firm's Operational Performance**

The firm's operational performance is calculated in opposition to standard or prescribed indicators of effectiveness, efficiency and environmental responsibility, such as cycle time, productivity, waste reduction, and regulatory compliance as indicated by Salami and Adayami (2010). In order to improve operational efficiency an organization has to measure both the input and the output side of the inventory management (Abdel-Maksoud, Asada & Nakagawa, 2008).

The major goal of organizations is to reduce the costs associated with the inventory management, which would impact positively the overall performance of an organization. In this study, the main goal of the researcher was to find out how inventory management techniques employed by consumer goods manufacturing firms in Kenya impact the

performance of such organizations in terms of optimal production, efficiency, production targets, on time delivery, as well as quality (Oketch, 2000; Dess& Robinson, 2014).

### **1.1.3 Consumer Goods Manufacturing Firms in Nairobi**

Consumer goods manufacturing firms refer to the type of firms that produce goods which are consumed on a daily basis by an average consumer. The goods that are included in this category comprises of those goods that need to be replaced on a more frequent basis in relation to those that are usable for a longer period of time. Whilst consumer goods market symbolizes a market that would always have customers, this market is very competitive owing to high market saturation, as well as the low switching costs amongst customers. As far as economics is concerned, consumer goods relates to tangible commodities which are produced and consequently bought to gratify the current wants as well as the perceived needs of a customer . The consumer goods are categorized into three classes, that is, durable goods, nondurable goods, as well as services (Cheruiyot, 2013; KPMG, 2016).

The consumer durable goods are usually associated with a significant life span, mostly three years or more; however, that are businesses that classify goods with life spans of a lesser period, such as one year. Similar to capital goods- capital goods usually include tangible items such as buildings and machinery that are normally utilized in the production of other products or services- the utilization of the durable products is spread over the life span of the product, which is inclined to create demand for a number of maintenance services. The associations in the utilization, as well as conservation pattern of goods that are durable and capital infrequently have a depressing separating line between the two. The durability and the customarily higher price of durable goods commonly lead consumers to postpone expenditures on such goods; this is the reason why the durables are mainly unstable or cost reliant on constituent of consumption. Pervasive cases of consumer durable goods comprise furniture and household appliances (Argan& Van Weele, 2010; PwC, 2016).

Consumer nondurable goods are usually bought for instantaneous or more or less pressing consumption, and have a life span within a range of three years or less. Widespread examples of these include food, beverages and clothing among others. On other hand, consumer services refer to intangible goods or actions which are characteristically

produced and consumed concurrently. Firms that engage in the production of consumer goods are commonly referred to as consumer goods manufacturing firms.

## **1.2 Research Problem**

The inventory management practices that are implemented by organizations are associated with various advantages and disadvantages. As such, Agus and Noor (2006) argue that it is critical to evaluate how an organization is impacted by various inventory management techniques in order to advise the most suitable technique. In the same line of argument, Githendu, Nyamwange and Akelo (2008) provide that most of the Kenyan firms face operational and financial difficulties owing to selecting inappropriate inventory management technique or lack of adequate information as regards how to implement effectively such techniques. The failure to choose appropriate inventory management practices or integrating relevant information in the process of implementing these practices in the most effective way usually lead to poor performance of organizations. Bicheno (1996) accentuates that the growth of organizations is mainly dependent on the consistent positive performances of the organizations.

A number of researches have established that fast moving consumer goods are very volatile and need to be replaced quickly; on the other hand, durable consumer goods, such as an automobile model, can become outdated thus representing a high risk to the manufacturer (PwC, 2016; OECD, 2012). Furthermore, as informed by Deloitte (2014), more than two-hundred million or twenty percent of Africans are aged between fifteen and twenty-four years, and that the demographic is expected to grow to three-hundred and twenty-one million by 2030. This means that there will be an increase in demand for consumer goods because the middle class, which highly depends on consumer goods, is currently joined by a large percentage of young Africans. According to Global Edge (2016), the top industry in Kenya is that of Small-scale consumer goods, which majorly focus on plastic, batteries, furniture, textiles and clothing among other products, such as soap, cigarettes and flour. Other small-scale consumer goods produced in Kenya include horticulture, agricultural products and oil refining. This indicates that Kenya's economy highly depends on consumer goods manufacturing firms. These factors emphasize why it is crucial to choose the consumer goods manufacturing firms as the study ground.

Kemuma (2011) established that vendor managed inventory practice has more impact on the operational performance of a firm; however, this research only focused on NGOs operating in Kenya. On the other hand, Kitheka (2010) found out that inventory management automation impacts positively the performance of supermarkets. Nonetheless, other than focusing on consumer goods manufacturing firms in Kenya, Kitheka (2010) paid attention to consumer services firms in Kenya.

On the other hand, whilst Muhayimana (2015) paid a special attention to consumer goods manufacturing firms, in which the results showed that inventory management techniques play a major role in reducing costs and helping to meet the demand of customers, the study was conducted in the context of the Rwandese market. Furthermore, the research by Nsikan, Etim and Uduak (2015) established that scientific inventory management practices help to address more effectively material shortages, product stock outs, as well as components pile up and related costs; however, this study was carried out among consumer goods manufacturing firms (specifically, flour milling firms) operating in Lagos, Nigeria. According to Luthubua (2014), consumer goods manufacturing firms operating in Kenya contribute significantly to the Kenya economic growth despite of problems encountered in inventory management. The significance of inventory management practices among consumer goods manufacturing firms, as well as lack of thorough research regarding the inventory management techniques that are embraced by consumer goods manufacturing firms in Kenya and the impact of these techniques on the performances of similar firms in the Kenyan context, reinforces the need of carrying out this research. This research study was focused on addressing the following research question: what is the impact of inventory management practices and performance of consumer goods manufacturing firms in Nairobi, Kenya?

### **1.3 Research Objectives**

The overall objective of this study was to examine how consumer goods manufacturing firms make use of various inventory management practices to develop certain sets of operational capabilities. The following specific objectives were considered:

- i. Establish the extent to which inventory management practices are implemented by consumer goods manufacturing firms in Nairobi.

- ii. Determine the impact of inventory management practices on operational performance of consumer goods manufacturing firms in Nairobi.
- iii. Establish the challenges faced by consumer goods manufacturing firms in the implementation of inventory management practices.

#### **1.4 Value of the Study**

Inventory management form an important part of the organization's plan. It is for this primary reason that utmost care must be taken into consideration to make sure that efficient and effective inventory management are adopted. The results of this study would be a useful tool to the following:

##### **Management of the Consumer Goods Manufacturing Organizations**

The results of this study are significant since it would inform consumer goods manufacturing organizations regarding efficiency and effectiveness of inventory management, as well as recommend actions for improvement. The study would also help consumer goods manufacturing organizations to plan and control manufacturing processes in the implementation of the project, as well as guaranteeing efficient utilization of resources.

##### **Government**

Through the study, the government may advice the various manufacturing on the best way to manage inventory to ensure self-sustainability in making sound financing and investment decision as well as to safeguard the health of its citizens from food poisoning and other atrocities within Kenya. The findings may also be useful to the Ministry of trade considering that it would enable the ministry to know how the raw materials are converted into the final products and how they can reach the final consumer in the best condition possible.

##### **Academicians and Scholars**

The research's results would provide practical basis upon which further researches in the areas of inventory management would be carried out. The research study may also contribute to area of operations management as well as to the supply chain.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter is focused on providing the theoretical models that are related to the topic of the research study. The chapter also presents the findings of the past researches in regards to the impact of inventory management practices and performance of organizations, with a special attention paid to consumer goods manufacturing firms.

#### **2.2 Theoretical Review**

With respect to the theoretical literature, a number of inventory management best practices (including, vendor managed inventory, just in time, forecasting, collaborative planning and replacement, automatic replenishment, as well as material requirement planning) thrive. However, the empirical evidence has shown that there is restricted knowledge and appreciation of such practices, their method of operation, as well as the practical significance in the Kenyan manufacturing industry. The lack of knowledge and partial adoption of these forward-looking techniques in the area of inventory management may explain the significant increase in the wastage of raw material, longer lead-time, loss of sales, the shortage of products, the penalty of backorder, increasing production cost, and issues of low quality presently devastating the industry. Therefore, there seems to be an enormous barrier of difference between theoretical inventory management and the practical approach in light of the manufacturing industry, and the necessity to link the gap of theory and practice is imperative. Therefore, the following theories discuss inventory management practices.

##### **2.2.1 Strategic Choice Theory**

The strategic choice theory points out the link between the choices of management and the performance of a firm as well as relations of the firm's internal and external environment. The theory emphasizes on the magnitude of the decisions made by management on the performance of firm (Child, 1972). Campling and Michelson (1998) established a strategic choice model that demonstrates the inter-reliance between the environment and organizations, actions and general business performance. The model focus on attaining a

higher performance level so as to enhance efficiency especially in the face of limited resources; however, the strategic theory was unsuccessful in giving a more importance on contextual aspects, including environment, technology as well as the degree of operation into account and merely considered how the structure of a firm help in the performance of a business.

Inventory management techniques are among the choices that the management considers while making decisions as regards how to improve the performance of an organization. This research study aimed at helping us understand the choices of inventory management techniques that are made by managers in order to improve the organizational performance of consumer goods manufacturing firms in terms of profitability, quality, efficiency, optimal production, production targets and on time delivery.

### **2.2.2 Transaction Cost Analysis**

Transaction Cost Analysis (TCA) is a theory that guarantees expenses of the supply chain are maintained to a minimal level (Hall dorsson et al., 2007). TCA is widely adopted in a number of areas, specifically in the study of economics and organizational structures and performance. In the beginning of 1970s, the mathematicians and economist, Williamson, integrated TCA into the model of general equilibrium and established his transaction costs economics in the novel theory of an organization. Williamson (1981) argues that firms can reduce their costs of transaction via vertical integration, as well as enhancing the degree of trust simultaneously. This type of integration is likely to decrease the expenses of inventory management whilst escalating the service level of the internal and external customers even as releasing capital to be utilized in other quarters of a business.

The reduction of costs, which include the transaction costs experienced across the supply chain, is one of the key objectives of an organization. Commonly, the reduction of transaction costs results in an increase in the level of profitability. On the other hand, as explicated previously, the inventory management techniques are expected to play a major role in enhancing the efficiency of the supply chain management. Since one of the performance measurements in this study is profitability, this study aimed at helping us to understand whether inventory management techniques adopted by consumer goods manufacturing firms lead to an enhanced profitability.

### **2.2.3 Theory of Economic Order Quantity (Wilson's EOQ Model)**

Coleman (2002) and Ogbo (2011) delineate the EOQ model as one that is focused on ordering portions that minimize the stability of the cost between the inventories holding costs and the re-order costs. On the other hand, Ogbo (2011) defined the EOQ model as assumptions that are critical to compute EOQ as provided: the costs of holding a stock are known, and are considered constant; there are ordering costs which are perceived to be constant; the level of demand is known and is regarded to be constant; that the lead time cycle is well-known and considered constant; the price per unit is also considered constant; the replenishments made immediately, the entire batch is delivered promptly and that the stock-outs are not allowed. One challenge of EOQ is that it tends to ignore the necessity to have shield stocks, which are preserved in order to cater for deviations during lead-time and demand making, and as such, it makes it complex to be practiced. The EOQ model demands that for each item that is preserved in a store, it is critical to establish the point of ordering, which is considered the most cost operative quantity of ordering. The model makes an assumption that all other variables are constant and disregards the fact that uncertainties are frequent and ordinary in all firms. For instance, uncertainty comprises of change in the level of demand, damage while transporting an item and holdups during the delivery process. In this case, uncertainty in the level of demand would consequently compel EOQ to be attuned so as to shield against uncertain business situation.

Due to doubts experienced in business environment, adjusted economic order quantity is an EOQ model that should be adopted in the event fluctuation in demand is a widespread phenomenon in this study, it was crucial to understand to what extent EOQ model is implemented by consumer goods manufacturing firms in Nairobi, as well as the impact of EOQ model on performance of consumer goods manufacturing firms in Nairobi.

### **2.3 Inventory Management Practices**

The inventory management techniques that are universally adopted by firms include Economic Order Quantity (EOQ) model, ABC model, Vendor Managed Inventory (VMI) and Just-In-Time model. Yet, this research study focused on Simulation, Economic Order Quantity (EOQ) model, Bar-coding, Just-In-Time model, ABC model and Vendor Managed Inventory (VMI) because, as emphasized by Agus and Noor (2006), these

inventory management practices enable a practitioner respond quickly to reduced inventory levels.

### **2.3.1 Economic Order Quantity (EOQ) Model**

The economic order quantity, which is also recognized as the Wilson EQQ model, is an inventory management technique that identified the most favorable quantity to order, which is in line with minimizing the total variable expenses that are needed to order as well as to hold inventories (Lee, 2002). Economic Order Quantity denotes the optimal ordering level of an inventory which helps in the minimization of expenses. This inventory management approach (EOQ) makes the assumption that the demand for an item is well-known, the lead time is well-known and constant, that the receipt of an order happens immediately, the discounts of quantity are not computed as part of the model and that inventory's shortages do not happen. The EOQ graphs demonstrate the association between the costs of ordering, the expense of holding inventories and the economic order quantity (Nair, 1995).

### **2.3.2 Just in time (J.I.T) Model**

The Just in Time is an inventory management practices with the objective of maintaining just sufficient material at the right place and at the right time in order to make first the right quantities of inventories (Carlson, 2002). This concept was established by manufacturing businesses in Japan in which inventories are acquired only when demanded in a business for the purpose of production and this focused on enhancing the return on investment of a firm through the reduction of in-process inventory and its associated costs (Schonsleben, 2000).

In this system, the supplier has the responsibility of delivering the workings and part to the assembly line “Just in Time” to be assembled. Other names for just in time system is Zero stock inventory and production (Lazaridis & Dimitrios, 2005)

For the just in time method to work successfully the quality of the parts must be very high because defective materials could up halt the operations of the assembly line, there must be dependable relationships and smooth co-operation with suppliers, ideally this implies

that the supplier should be located near to the firm with dependable transportation available (Konke, 2003).

Just in time inventory management system helps in reducing inventory costs by avoiding carriages of excess inventories and mishandling of raw materials. According to Kortz (2003), Just in time purchasing recognizes high costs associated with holding high inventory level and as such it has become important in most organizations to order inventory just in time of production so as to cut costs of holding inventory like storage lighting, heating, security, insurance and staffing (Dimitrios, 2008).

### **2.3.3 ABC Analysis**

This inventory control approach is based on the doctrine that a small portion of the items might characteristically represent the bulk of the value of money of the total inventory utilized in the process of production, whilst a comparative number of items can be from a small fraction of the financial value of stores (Flores& Clay, 2012)

ABC analysis is sound recognized categorization technique as far as the pareto principle is concerned, whose main purpose is for establishing the items that should be prioritized in the management of an inventory (Ramanathan 2006). Flores and Whyback (2007) is of the view that ABC analysis is a method for prioritizing inventories. Inventories are classified into 3 sub-classes, including A, B and C. A large portion of the efforts of management are utilized on administering A Items A, B in-between and C items get the least attention.

### **2.3.4 Vendor Managed Inventory (VMI)**

Management of inventory supply determines the way an organization will propel itself to high performance effectiveness and competence. Many firms have resulted to VMI systems which assist the provider to monitors clientele inventory usage. Through the VMI system customers can avoid stock outs since the supplier will already have replenished the stocks and also there will be no costs related to handling of inventory since the supplier will know the quantity that is needed and which product will be put on the shelves. The input phase here is communication which should be of good intention from the beginning of business and should bring about a positive relation between the supplier and the customer (Frahm, 2003).

### **2.3.5 Bar-coding**

Bar-coding is the most popular used method of tracking a product for purposes of understanding the level of inventory, reorder and deliveries or sales; this enables to avoid issues of stock outages or overstocking. Bar-coding helps to track a particular item at any specific time. The staffs in the stores along with overseers can use bar-coding systems to ensure that work orders are linked, and that the purchase orders are thoroughly linked to the level of stock which is replenished, and that all auxiliary parts in addition to equipments are tracked. Once items leave the store, they are instantly recorded in the system thus making it possible to understand which stock is running low and the items to be placed. So as to guarantee that the data processed by the barcode is helpful, the ERP (Enterprise Resource Planning) system, utilized as the pillar for the bar-coding system, has to be precise at the moment of roll-out in order to ensure the data is significant and effortlessly analyzed (Eroglu, Brent and Waller, 2011).

### **2.3.6 Simulation**

The uses of simulation in inventory management usually occur for purpose of responding to the wish for a proper decision making process that would take into consideration the complexities and variances within the environment of a system. A majority of simulation researches regarding inventory systems endeavored to establish the most appropriate arrangement for the inventory system in order to attain the predetermined goals. A small number of simulation models were established to address the inventory system optimization. A number of researches used simulation to establish an inventory control approach associated with tracking signals to assess performance. The other established models aimed at special situations of inventory state (Eckert, 2007).

Badri (1993) established a simulation based decision-support system for controlling and managing inventory by taking into consideration the impact of changes in demand, the point of reordering, the control of the stock level, period between the reviews, as well as the lead time. Nonetheless, the approach took into consideration just the case of one product inventory model. In this research, the replica established by Badri (1993) was expanded to integrate a generalized multi-product inventory system. The model recognizes all important expenses: cost associated with purchase, expenses relating to ordering, the

holding inventory's expenses, the expense related to back ordering, as well as the cost of reviews, and cost associated with the lost sales.

## **2.4 Empirical Literature Review**

Akelo (2011) focused on establishing the impact of inventory management practices on performance of Non-Governmental Organizations. By targeting ten Non-Governmental Organizations situated in Nairobi County, the research study focused on a total sample of seventy respondents. According to the analysis of the data via descriptive statistics, the study recognized that a unit in ABC Analysis would lead to an increase in operational performance of Non-Governmental Organizations by a factor of 0.683 whilst a unit increase in Economic Order Quantity leads to an increase in operational performance of Non-Governmental Organizations by a factor of 0.702. On the other hand, a unit increase in Demand focus inventory leads to an increase in operational performance of Non-Governmental Organizations by a factor of 0.699. Finally, Akelo (2011) argued that a unit increase in automatic replenishment leads to an increase in operational performance of Non-Governmental Organizations by a factor of 0.612. While this research study provides significant information on the impact of inventory management practices on organizational performance, this research study only focused on Non-Governmental Organizations in Nairobi County. As such, it does not provide answer to the impact of inventory management on the performance of consumer goods manufacturing firms in Nairobi County.

Kitheka (2010) focused on evaluating the extent of inventory management automation and to determine the impact of inventory management automation with respect to the performance of supermarkets in Western and Nyanza provinces, Kenya. Based on a survey design, in which the researcher targeted all supermarkets (eleven operational supermarkets) in Kakamega, Bungoma and Kisumu, Kitheka (2010) established that inventory management automation impacts positively on the performance of supermarkets. However, instead of focusing on consumer goods manufacturing firms in Kenya, Kitheka (2010) focused on consumer services firms in Kenya.

Muhayimana (2015) focused on highlighting and determining the contribution of inventory management techniques on better management of manufacturing firms. Muhayimana (2015) used Sulfo Rwanda Ltd, which deals with manufacturing of consumer goods and located in Kigali City and, as a case study. The purposive sampling technique was employed so as to ensure that only individuals who are able to provide relevant information regarding the research topic were included in the sample of the study. Through purposive sampling technique, fourteen respondents were selected. The study found out that inventory management practices have a significant impact on firm's performance, especially on cost reduction. The research also established that inventory management enable firms to meet the demands of customers more effectively as instances of unevenness in regards to meeting customers' demand is reduced. While the research study focused on consumer goods manufacturing firms, this research study chose a small sample (14 respondents from one firm); furthermore, the research was not carried out in Nairobi, Kenya. Therefore, besides failing to answer more reliably the impact of inventory management practices on performance of consumer goods manufacturing firms due to small sample, the results of the study are not applicable in Nairobi since the study was carried out in Kigali, Rwanda.

Nsikan, Etim and Uduak (2015) are among the researchers who also carried out a research in regards to the impact of inventory management practices on the performance of firms. In particular, Nsikan, Etim and Uduak (2015) aimed at establishing the inventory management practices in flour milling manufacturing firms and their effects on operational performance. In this regard, five flour manufacturing firms were selected from which one-hundred and fifty respondents were further chosen to answer the research questions of the research study. The results of the study showed that with the exclusion of large assembly firms, a majority of the medium-sized flour milling firms use different inventory management strategies from the scientific models. However, most of the inventory management techniques were based on changing customers' demand, the current industry practices, forecasted estimates, and available production capacity. The research also reveals that firms that adopt scientific inventory management techniques are more effective in enabling the attainment of enhanced performance, especially via capacity reduction, improved service level and reduced lead time. While this study provides significant

information regarding the impact of inventory management practices on performance of consumer goods manufacturing firms, this research study is less reliable as it focused on one type of consumer goods manufacturing firms, that is, flour milling firms. Furthermore, the research results are not applicable in Nairobi, Kenya as the research study was carried out in Lagos, Nigeria.

A different study signifying a positive correlation between inventory management and performance was that of Eroglu and Hofer (2011), which used the Empirical Leanness Indicator (ELI) as a measurement for inventory management. Eroglu and Hofer (2011) argued that inventory leanness is the most effective inventory management instrument. According to Eroglu and Hofer (2011), lean production regards inventory as a form of waste that should be reduced, and has currently become one and the same with good inventory management. Eroglu and Hofer (2011)'s study on USA manufacturing firms, within the period of between 2003 and 2008, established that leanness impacts on the profitability of a firm.

According to Eroglu and Hofer (2011), firms that are slimmer compared to the industry's average usually experience positive returns to leanness. Eroglu and Hofer (2011) established that the impact of inventory leanness on organizational performance is positive and in general non-linear. Eroglu and Hofer (2011) research also denotes that the impact of inventory leanness is bowl-shaped which is aligned with inventory management theory that there is an optimal degree of inventory leanness beyond which the marginal impact of leanness with respect to financial performance ends up being negative.

The survey of three-hundred and fifty-one management accountants by the National Association of Accountants (NAA) in a cross-section of diverse industries to evaluate the present inventory management techniques in the U.S showed that just in time inventory management approaches are facing increased levels of popularity; the researches also showed that automated time-phased inventory re-order systems are also experiencing increased usability among organizations. The survey furthermore found out that eighty-five percent of the respondents have no plans to revolutionize their inventory techniques and that actual experience in business depended highly compared to the inventory quantitative models. In addition, the research found out that a number of inventory

management approaches, including assessing inventory levels and balancing stock-out costs in relation to expenses associated with higher inventory levels are infrequently used in practice (Romano, 2011).

Lazaridis and Dimitrios (2005) highlighted the significance of firms maintaining their inventory at an optimum level by assessing the relation between corporate profitability and working capital management, and emphasized that its mismanagement would result in extreme tying up of money at the expense of cost-effective operations. A related research by Rehman (2006) concluded that there is a strong negative relation between the daily inventory turnover and the profit of companies.

Sushma and Phubesh (2007), with respect to the study of twenty-three Consumer Electronics Industry firms in India found out that firm's inventory management practices played a major role in the income performance.

Lazaridis and Dimitrios (2005) in their study of one-hundred and thirty-one firms, listed on Athens Stock Exchange, established that mismanagement of inventories leads to tying up high levels of capital at the expense of cost-effective operations; Lazaridis and Dimitrios (2005) recommended that the management can create value for organizations by ensuring inventories are maintained at optimal levels.

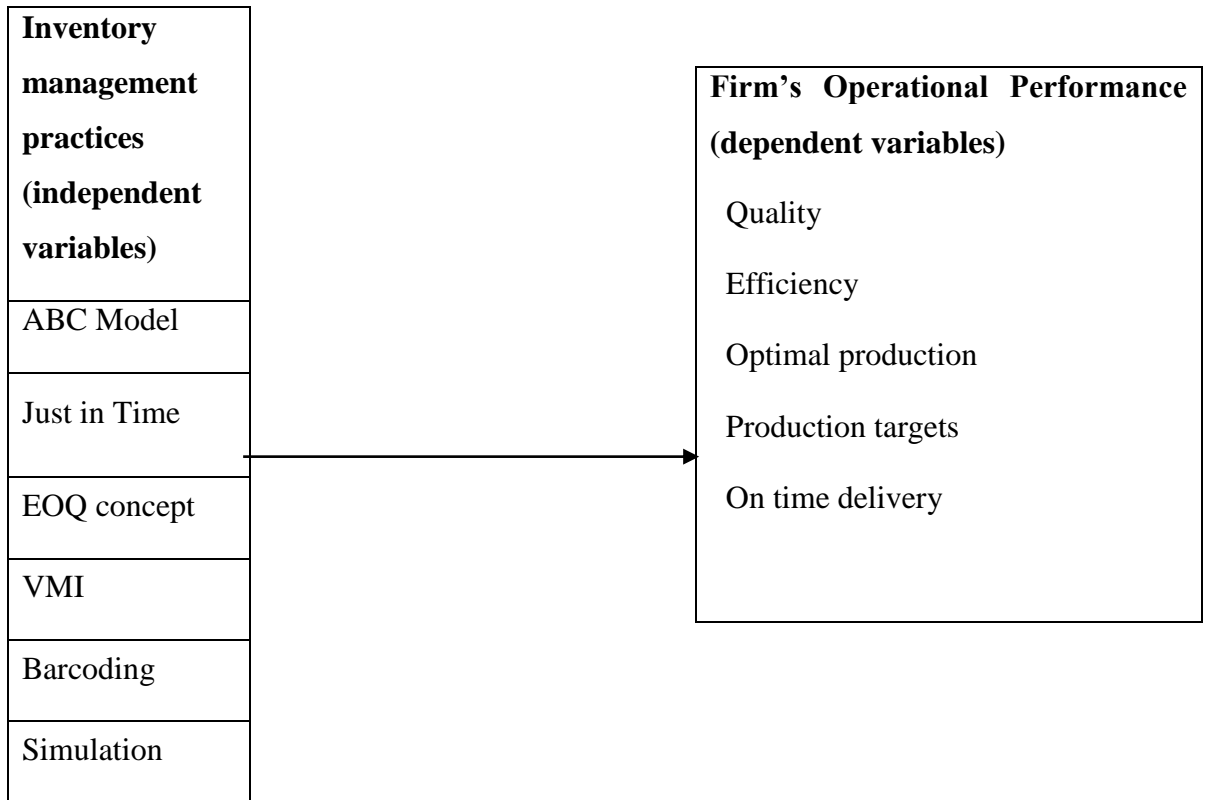
Also, Rajeev (2008), a study of ninety-one Indian Machine Tool Enterprises to assess the association between inventory management approaches and inventory expenses ascertained that effectual inventory management techniques leads to better inventory performance of firms; furthermore, the effectual inventory management techniques have an ultimate impact on the performance of the general businesses' processes.

Juan and Mertinez (2002), with respect to the study of eight-thousand, eight-hundred and seventy-two small and medium-sized firms in Spain, showed that that the firm's management can create value through minimization of the number of days of inventory. Effectual inventory management techniques enable to enhance the efficiency of operations of an organization. It also enables to improve the customer service, and reduce the expenses associated with inventories and distribution. Finally, it enables businesses track items and their expiration dates consequently balance between availability and demand (Pandey, 2004).

## **2.5 Summary of Literature Review and Knowledge Gaps**

The theoretical models that are chosen in this research study are strategic choice theory, transaction cost analysis and theory of Economic Order Quantity (Wilson's EOQ Model). On the other hand, the literature review shows that Economic Order Quantity (EOQ) model, Just-In-Time model, ABC model and Vendor Managed Inventory (VMI) are commonly used by organizations since they enable a businessperson to respond quickly to reduced inventory levels. Furthermore, this research study has evaluated the past studies in regards to the impact of inventory management practices on the performance of consumer goods manufacturing firms. The past researches indicate that the adoption and effective implementation of inventory management techniques impact positively the performance of consumer goods manufacturing firms. However, there is no specific research that has focused on the impact of inventory management practices on performance of consumer goods manufacturing firms in Nairobi, Kenya. Furthermore, the past researches have either chosen a small sample size or selected one type of consumer goods manufacturing firms, such flour milling firms, thus leading to unreliability of such results as far as generalizing them to the entire industry for consumer goods is concerned. This research study aimed at filling these knowledge research gaps.

## 2.6 Conceptual Model



Source: Author (2016)

Figure 2.1: Conceptual Model

## 2.7 Research Hypothesis

Based on the literature review and conceptual framework, the following hypothesis was established in this research study. The hypotheses were tested.

**H0:** Inventory management practices have no significant impact on the performance of consumer goods manufacturing firms in Nairobi, Kenya.

**H1:** Inventory management practices have a significant impact on the performance of consumer goods manufacturing firms in Nairobi, Kenya.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter aimed at discussing the research method that was employed in carrying out the study at selected consumer goods manufacturing organizations in Kenya to determine factors affecting them. This chapter consists of the research design, target population, sampling design, and data collection methods, data analysis and the model to be used in order to get proper and maximum information related to the subject under study.

#### **3.2 Research Design**

Descriptive research design was used. Descriptive survey was preferred in this study since this research design is effectively used to obtain information concerning the current status of phenomena. The purpose of the descriptive survey methods was to describe” what exists” at present with respect to situational variables (Cooper & Schindler, 2006). This research design was useful because it allowed for comparative analysis.

#### **3.3 Targeted Population**

The target population of the study was all consumer goods manufacturing firms located in Nairobi, Kenya. The research mainly targeted 15 large-scale consumer goods manufacturing firms that have plants, warehouses or offices situated in Nairobi County. The research study aimed at conducting a census sampling to sample 15 procurement managers; on the other hand, a simple random sampling method was aimed at sampling 6 junior procurement personnel from each consumer goods manufacturing firm. In total, the total sample size of the respondents was expected to be 60. As such, 60 respondents were expected to answer the questionnaire.

#### **3.4 Data Collection**

This research study used primary data to meet the three objectives that are established at chapter one. For the purpose of collecting primary data, the researcher uses a semi-structured questionnaire. The questions were structured in such a manner as to elicit the opinions of the respondents in the most effective way. In particular, the questionnaires were structured in terms of likert scale measurements, which provided the respondents an

opportunity to provide their varied views on diverse aspects of inventory management practices and organizational performance. A self-administered questionnaire was delivered to each respondent after which it was picked within a period of one week. Once the questionnaires were received, they were coded and edited for completeness and consistency.

### **3.5 Data Analysis**

This research study used quantitative method to analyze primary data in order to meet the three research objectives. In particular, the statistical package for social science (SPSS) version 20 was employed. The information to be obtained was presented in terms of frequencies and percentages. Tables were used to present the data. The quantitative data were interpreted and inferences made and presented descriptively using graphs, tables and ratios. This technique gives simple summaries about the sample data and present quantitative descriptions in a manageable form. The statistical significance of the data was measured based on 5% level of significance in which the results obtained were assumed to be statistically significant if alpha is less than 0.05.

However, objective two, which aimed at determining the impact of inventory management practices on organizational performance of consumer goods manufacturing firms in Nairobi, was assessed further using regression model. The regression model shows the relationship between organizational performance and the inventory management practices of consumer goods organizations. The coefficients show the weight each has in the final product (operational performance) and if they are positively or negatively related.

#### **Equation 1: Regression Model**

$$OP = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \epsilon$$

OP; operational performance

Where;  $\alpha_0, \alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6$ —this measures a coefficient or weight of each variable on operational performance

$X_1$  ABC analysis,  $X_2$  Just In Time,  $X_3$  Economic Order Quantity,  $X_4$  Vendor Managed Inventory (VMI),  $X_5$  Bar-coding,  $X_6$  Simulation

## CHAPTER FOUR

### DATA ANALYSIS, RESULTS AND DISCUSSION

#### 4.1 Introduction

This chapter focused on presenting the findings of the study, as well as analyzing such findings so as to enable the user of the study to understand at an in-depth level the results regarding the research topic, that is, inventory management practices and performance of consumer goods manufacturing firms in Nairobi County, Kenya. In the first section, the chapter focuses on providing the demographic data regarding the respondents while the second section provides the findings of the specific objectives of the research study. Based on SPSS version 20, the data was analyzed based on descriptive statistics, including graphic presentation methods, such as pie charts, as well tables, frequencies, mean, standard deviation and skewness.

The research objectives established at chapter one and which are to be met in this chapter, include:

- i. Establish the extent to which inventory management practices are implemented by consumer goods manufacturing firms in Nairobi.
- ii. Determine the impact of inventory management practices on operational performance of consumer goods manufacturing firms in Nairobi.
- iii. Establish the challenges faced by consumer goods manufacturing firms in the implementation of inventory management practices.

#### 4.2 The Response Rate of the Study

While a total of 60 respondents were targeted in study, whom included procurement managers and junior procurement officers, only 54 respondents were able to return complete questionnaires, which were deemed sufficient to carry out an analysis on the data. This resulted in a response rate of 90%. This response rate was considered sufficient to establish conclusions regarding the research study. Based on the research by Cooper and Schindler (2006), a response rate of fifty percent is sufficient to carry out an analysis and report the results, however, a rate of sixty percent is considered good while that of seventy

percent or more is deemed exceptional. In this regard, the response rate of this study was outstanding.

### 4.3 Demographic Data

The demographic data is crucial to understand whether the given sample of the respondents in a specific research study represents sufficiently the target population. The demographic data also enables the researcher to find out the suitability of the respondents in providing answers to the research questions for the purpose of generalizing the results of the study. In this research study, the demographic data consisted that of gender, age, level of education and working tenure.

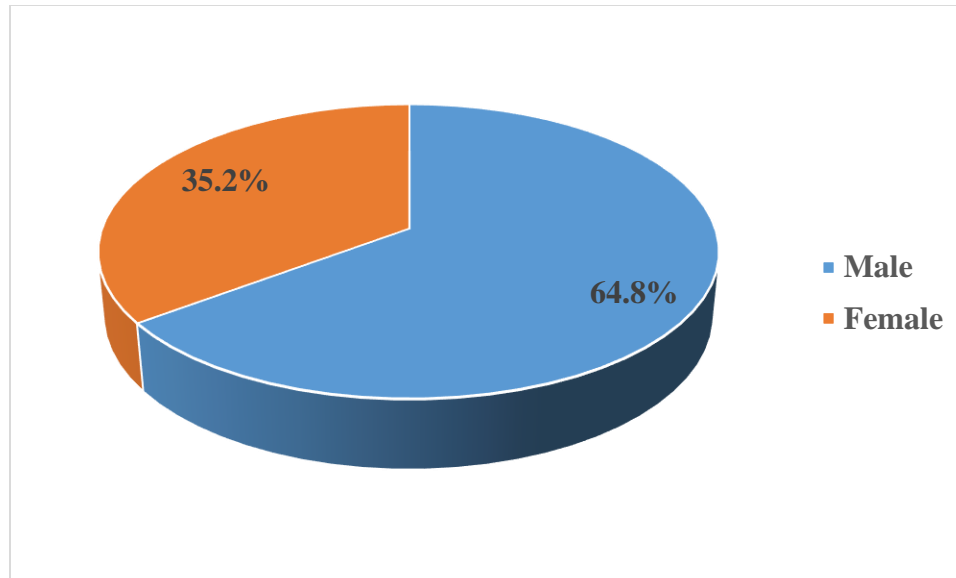
#### 4.3.1 Gender

**Table 4.1: Gender**

Gender	Frequency	Percent
Male	35	64.8
Female	19	35.2
Total	54	100.0

**Source: Research Data**

The respondents were asked to indicate their gender in the questionnaire. According to Table 4.1, there were more male (64.8%) than female (35.2%) respondents in the study. This can be an indication that the consumer goods manufacturing firms in Nairobi County are more inclined to employ more male than female persons, especially in the procurement department. Figure 4.1 emphasizes graphically the fact that the procurement departments of the consumer goods manufacturing firms in Nairobi County in Kenya are highly dominated by male employees. However, given that both genders were involved in the study, it is arguable that the results of the research study did not experience gender biasness.



**Figure 4.1: Gender**

**Source: Research Data**

#### 4.3.2 Age

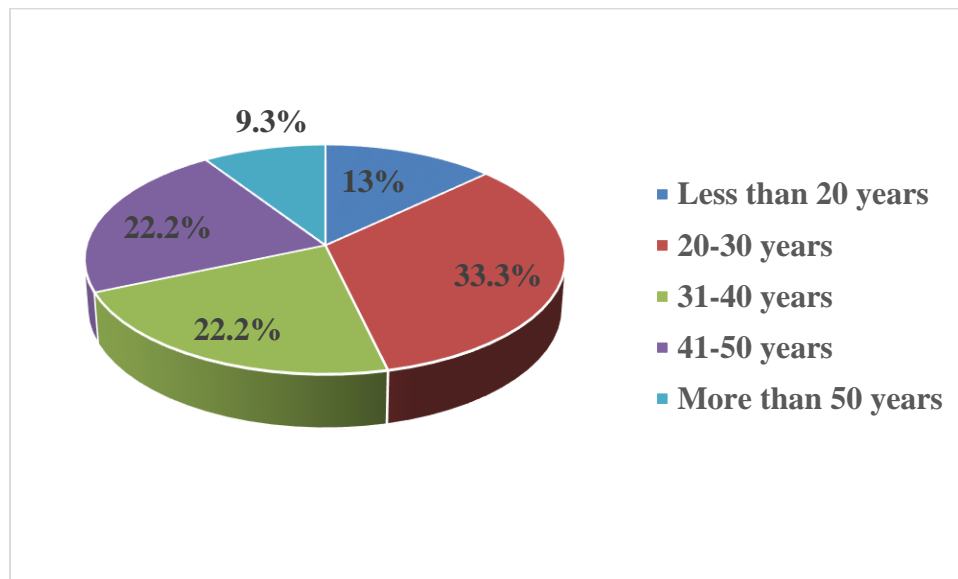
**Table 4.2: Age**

Age	Frequency	Percent
Less than 20 years	7	13.0
20-30 years	18	33.3
31-40 years	12	22.2
41-50 years	12	22.2
More than 50 years	5	9.3
Total	54	100.0

**Source: Research Data**

Based on Table 4.2, most of the respondents were aged between 20 and 30 years (33.3%). There were equal number of respondents in the age category of 31-40 years (22.2%) and 41-50 years (22.2%). There were few respondents in the age category of less than 20 years (13.0%) and fewest in the age category of more than 50 years (9.3%). This can be an

indication that a majority of personnel working in the procurement department in consumer goods manufacturing firms in Nairobi County, Kenya are concentrated in the age group of between 20 and 50 years. However, the fact that a majority of them are in the category of 20-30 years, it can be indication that firms are currently embracing a relatively young age group as this age group seems to be well equipped with up-to-date knowledge with respect to the aspect of managing inventories, especially inventory management techniques associated with the latest technology in the market. However, given the fact that all age categories were represented in this study, the results of the study are considered to be significant for generalization purposes as individuals who were recently educated in the field of inventory management and those with a high level of experience were able to participate in the study. The graphical presentation of data regarding age group of respondents is shown in Figure 4.2.



**Figure 4.2: Age**

**Source: Research Data**

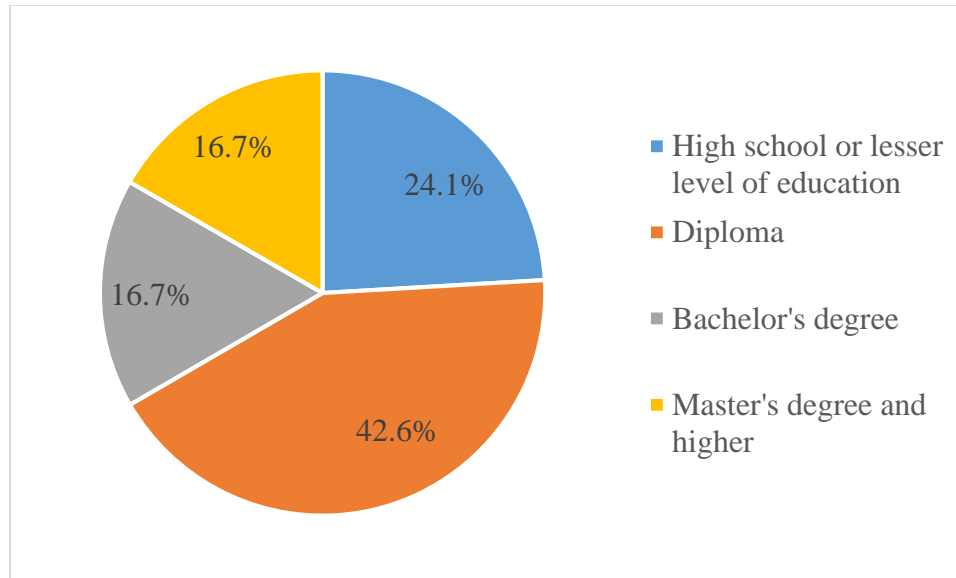
### 4.3.3 Level of Education

**Table 4.3: Level of Education**

<b>Level of Education</b>	<b>Frequency</b>	<b>Percent</b>
High school or lesser level of education	13	24.1
Diploma	23	42.6
Bachelor's degree	9	16.7
Master's degree and higher	9	16.7
Total	54	100.0

**Source: Research Data**

Table 4.3 indicates that a majority of the respondents have diploma (42.6%) followed by those with high school or lesser level of education. There were equal numbers of respondents with Bachelor's degree (16.7%) and Master's degree and higher (16.7%). However, considering the fact that respondents with diploma and higher level of education represented 76% of the total respondents, it is apparent that a majority of the respondents were well educated and able to respond to the questionnaires without difficulties. Nonetheless, since firms aim at reducing costs while enhancing efficiency and quality, the employment of a majority of employees with diploma by consumer goods manufacturing firms in Nairobi County, Kenya can lead to the conclusion that employees with diploma are equipped with effective practical skills regarding inventory management while at the same demanding lesser pay, and as such, they are favored in this industry in Nairobi County, Kenya; however, further research is required to justify this conclusion. The graphical representation of the data regarding level of education is shown in Figure 4.3.



**Figure 2.3: Level of Education**

**Source: Research Data**

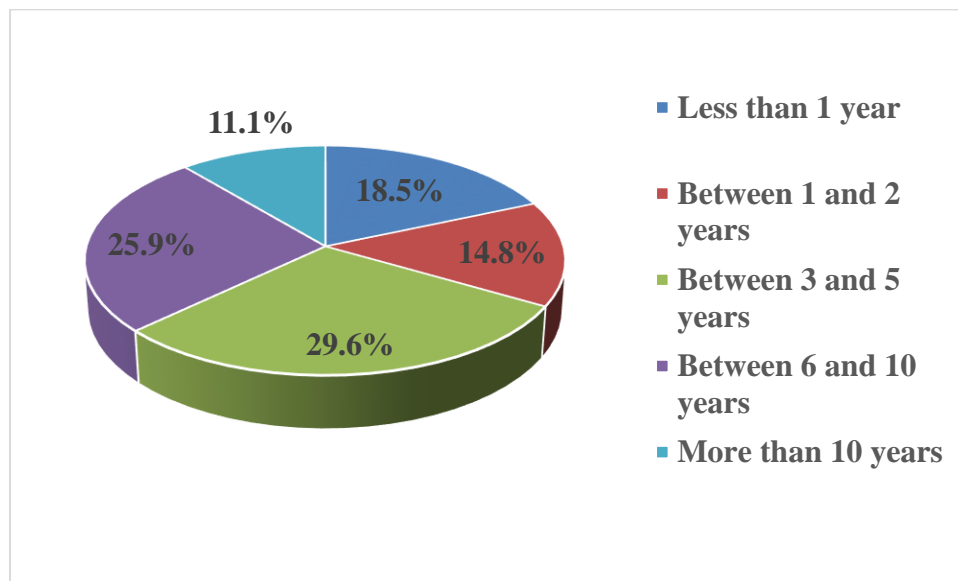
#### 4.3.4 Working Tenure

**Table 1.4: Working Tenure**

Working Tenure	Frequency	Percent
Less than 1 year	10	18.5
Between 1 and 2 years	8	14.8
Between 3 and 5 years	16	29.6
Between 6 and 10 years	14	25.9
More than 10 years	6	11.1
Total	54	100.0

**Source: Research Data**

As provided by Table 4.4, a majority of the respondents in their respective firms had worked for a period of between 3 and 5 years (29.6%). They were followed by those who have worked for a period of between 6 and 10 years (25.9%). Those with working experience of lesser than one year in their present firms were 18.5% while respondents who have worked for a period of between 1 and 2 years in their current firms were 14.8%. This leads to the conclusion that at least more than 66% of the respondents had a working experience of at least 3 years in their current firms, which shows that most of the respondents had adequate knowledge regarding the inventory management practices practiced in their respective firms; it is arguable that this level of knowledge enabled them to respond to the research questions in a more sufficient way. The graphical data regarding the working tenure of the respondents is displayed in Figure 4.4.



**Figure 4.4: Working Tenure**

**Source: Research Data**

## 4.4 Inventory Management Practices and Performance of Consumer Goods Manufacturing Firms

### 4.4.1 The Implementation of Inventory Management Practices

This section aims at meeting the first objective of the research study. In particular, this section aims at establishing the extent to which inventory management practices are implemented by consumer goods manufacturing firms in Nairobi. The respondents were required to state the extent to which they used a number of inventory management practices provided in the questionnaire within a scale of one to five. The results in terms of descriptive statistics in relation to the extent in which diverse inventory management practices are implemented among consumer goods manufacturing firms in Nairobi County are shown in Table 4.5.

**Table 4.2: Implementation of Inventory Management Practices**

Inventory Management Practices	N	M	SD	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error
EOQ	54	4.57	0.838	-2.642	0.325
Bar-coding	54	4.35	0.974	-1.916	0.325
VMI	54	4.31	1.079	-1.607	0.325
Simulation	54	4.22	1.176	-1.462	0.325
JIT	54	3.87	0.953	-1.5	0.325
ABC model	54	3.24	1.302	-0.68	0.325

**Input:** M- Mean; SD - Standard Deviation

**Source:** Research Data

Based on the results of Table 4.5, Economic Order Quantity, with a mean of 4.57 and standard deviation of 0.838, indicates that EOQ is implemented to a very large extent by consumer goods manufacturing firms in Kenya. On the other hand, with a mean of 4.35

and standard deviation of 0.974, Bar-coding is used to a large extent by consumer goods manufacturing firms in Kenya. This is followed very closely by Vendor Managed Inventory (M=4.31, SD=1.079), which is also used to a large extent by consumer goods manufacturing firms in Kenya. In the fourth place, is simulation (M=4.22, SD=1.176), which is implemented to a large extent by consumer goods manufacturing firms in Kenya. Furthermore, Just in Time (M=3.87, SD=0.953) is similarly implemented to a large extent by consumer goods manufacturing firms in Kenya. However, ABC model (M=3.24, SD=1.302) is implemented to a moderate extent by consumer goods manufacturing firms in Kenya.

The results of this study are aligned with the research findings of Akelo (2011) who found out that Economic Order Quantity technique is used to a very large extent by organizations. According to Ogbo (2011), Economic Order Quantity approach is more efficient in reducing reorder and holding costs, and as such, it is highly adopted by a majority of organizations. According to Pandey (2004) Juan and Mertinez (2002), the major objective of a firm is to enhance quality while at the same reducing the costs of operation. As such, an inventory management technique that is highly effective in reducing operational costs, including holding and re-order costs, would be prioritized by a firm. Economic Order Quantity enables to identify the level of inventory at which to order, as well as how much to order.

According to Eroglu, Brent and Waller (2011), bar-coding is highly favored since it enables the computerized computation of the level of inventory as orders are tracked as they move in or leave the store, and therefore, bar-coding technique can identify more accurately and quickly levels of inventory that demand replenishing; this is the reason why bar-coding is currently adopted by most firms as such the management seek to integrate technology into the firm's processes and systems. According to Frahm (2003), vendor managed inventory systems usually enable a supplier to monitor the inventory usage by customers; it thus reduces overinvestment in inventory and high holding costs while ensuring shortages are not experienced, and therefore, emerges among the most effective inventory management techniques. However, a high level of coordination between the supplier and retailer is usually required to ensure a more effective management of inventory in a firm.

#### 4.4.2 The Impact of Inventory Management Practices on Operational Performance

This section of the research study is aimed at meeting the second research objective. The second research objective was to determine the impact of inventory management practices among consumer goods manufacturing firms in Nairobi. The respondents were needed to state the degree (based on a scale of one to five) of impact of inventory management practices on various aspects, including production, assembly targets and on time delivery. The findings of the research in relation to research objective two are provided in Table 4.6 based on descriptive statistics.

**Table 4.3: The Impact of Inventory Management Practices on Operational Performance**

Impact of Inventory Management Practices on Operational Performance	N	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error
Inventory management practices enable meet assembly targets	54	4.57	0.57	-0.937	0.325
Inventory management practices enable optimal production	54	4.37	0.653	-0.552	0.325
Inventory management practices ensure on time delivery	54	4.07	0.723	-0.113	0.325
Inventory management practices augment efficiency	54	3.78	0.883	-0.394	0.325
Inventory management practices enhance quality	54	3.54	0.966	-0.109	0.325

**Input:** M- Mean; SD - Standard Deviation

**Source: Research Data**

With respect to the research findings, the respondents strongly agreed that inventory management practices enable to meet assembly targets ( $M=4.57$ ,  $SD=0.570$ ). The respondents agreed that inventory management practices enable optimal production ( $M=4.37$ ,  $SD=0.653$ ). The respondents also agreed that inventory management practices ensure on-time delivery ( $M=4.07$ ,  $SD=0.723$ ). Similarly, the respondents agreed that inventory management practices augment efficiency ( $M=3.78$ ,  $SD=0.883$ ). Even though inventory management practices impacts less on quality, still the respondents agreed that it really impacts on the same ( $M=3.78$ ,  $SD=0.966$ ).

The findings of this study are aligned with those of Konke (2003) and Lazaridis and Dimitrios (2005) who found out that an effective inventory management technique is more effective in enabling a firm to produce at an optimal level so as to meet the assembly targets. Konke (2003) argue that meeting the assembly targets has an overall effect of reducing operational costs of storage and reordering, eliminating instances of stock outs, and avoiding situations of items' expiry or items being rendered out-of-fashion due to exceeding or going below the assembly targets. This sentiment is supported by Nsikan, Etim and Uduak (2015) who argued that the adoption of a successful inventory management technique would result in the lowest level of operational costs, such as the carrying and reorder costs, which are common among firms that store a higher level of inventory than the level of consumers' demand or reorder more frequently to meet the customers' demand.

A more effective inventory management leads to proper tracking of the level of inventories, and as such, the management is enabled to balance between the level of inventory and customers' demand. Based on the sentiments by Eroglu and Hofer (2011) and Pandey (2004), underproduction may lead to underutilization of labor, machine and other production resources, as well as disable a firm to take advantage of economies of scale; it also leads to stock outs and therefore, missed opportunities related to sales. On the, overproduction may cause problems, such as unprecedented high levels of holding costs or expiry of stored items. An effective inventory management technique is highly useful in addressing such problems. This is the reason why inventory management practices are common among the assembly units of motor vehicle manufacturing companies. However, while Lazaridis and Dimitrios (2005) opine that inventory management plays a critical role

in ensuring that products are available to customers on time, Farrington (2012) state that inventory management techniques were majorly developed for the purpose of reducing costs associated with production, reordering and storage of inventories, and as such, has less impact on quality on goods, and therefore, aligned with findings of this study which shows a lesser impact of inventory management practices on enhancement of quality. Even so, various researchers accentuate that inventory management practices enhance quality in the service sector, such as in the restaurant industry, since time delivery is used as a proxy for measurement of quality in the service sector (Kitheka, 2010; Koumanakos, 2008).

#### 4.4.3 The Challenges Faced in Implementation of Inventory Management Practices

This section of the research study met the third objective of the research study, that is, to establish the challenges face by consumer goods manufacturing firms in the implementation of inventory management practice. The results of the research study are provided in Table 4.7.

**Table 4.4: Challenges Faced in Implementation of Inventory Management Practices**

Challenges Faced in Implementation of Inventory Management Practices	N	Mean	Std. Deviation	Skewness	
	Statistic	Statistic	Statistic	Statistic	Std. Error
Financial problems	54	4.76	0.473	-1.788	0.325
Lack of personnel knowledge in implementation process	54	4.35	0.872	-1.828	0.325
Inaccessibility of critical information	54	4.3	0.924	-1.828	0.325
Quick and highly unpredictable changes in market conditions	54	3.93	0.887	-0.525	0.325
Lack of supportive and effective technology	54	3.52	1.145	-0.047	0.325
Poor relationship with suppliers	54	2.56	1.269	0.446	0.325
Lack of information	54	2.2	1.139	0.617	0.325

**Input:** M- Mean; SD - Standard Deviation

**Source:** Research Data

Based on the results of Table 4.7, the respondents strongly agreed that financial problems (M=4.76, SD=0.473) is the major challenge facing consumer goods manufacturing firms with respect to the implementation of inventory management practices. On the other hand, respondents agreed that lack of personnel knowledge in implementation of process (M=4.35, SD=0.872) is a challenge faced by consumer goods manufacturing firms in implementation of inventory management practices. The respondents also agreed that inaccessibility of critical information (M=4.30, SD=0.924) is a challenge faced in implementation of inventory management practices by consumer goods manufacturing firms. Quick and highly unpredictable changes in market conditions (M=3.93, SD=0.887) were also agreed by respondents as a challenge facing the implementation of inventory management practices. Lack of effective and supportive technology (M=3.52, SD=1.145) was also agreed by the research participants as a challenges faced in the implementation of inventory management practices. However, while considered as posing a challenge to the implementation of management practices, poor relationships with suppliers (M=2.56, SD=1.269) is considered to be a moderate challenge in regards to implementation of inventory management practices. The respondents disagreed that lack of information (M=2.20, SD=1.139) is a challenge in implementation of inventory management practices as far as this research is concerned.

These results are in agreement with those of Luthubua (2014), Romano (2011) and Nsikan, Etim and Uduak (2015), which found out that lack of financial resources, is the leading challenge for organizations to implement in a more effective way the inventory management practices. The financial resources are needed to ensure that firms employ experienced and skilled personnel in the procurement unit so that they can manage inventory in the most effective way. The more effective computerized systems for managing inventories, such as Enterprise Resource Planning system, which is associated with bar-coding, are considered relatively expensive. As such, manual systems are still embraced in many organizations, which hinder them from experiencing an effective management of inventories. The lack of personal knowledge is also a major challenge in which most firms continue to rely on unskilled and inexperienced personnel in the management of inventories, which lead to overstocking or under-stocking that culminates to other inventory management predicaments, such as increased holding and reorder costs,

and stock outs. However, Rajeev (2008) argues that with the advent of technology, including the availability of internet and computer storage systems, relevant information for management of inventories is available to firms; nevertheless, the accessibility of such information is a major problem since firms do not have adequate knowledge regarding the most relevant sources of that information.

#### 4.4.4 The Statistical Relationship between Inventory Management Practices and Operational Performance

A regression analysis was used to find out the statistical relationship between inventory management practices and operational performance. The regression analysis, as provided by Cooper and Schindler (2006), is a technique for establishing the statistical relationship between the independent and dependent variables. This relationship is established by the model,  $OP = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \alpha_6 X_6 + \epsilon$ , which shows the relationship between dependent variable (operational performance) and independent variables (inventory management practices), as indicated in chapter three. This research study embraced multiple regression analysis to assess the relationship existing between the independent variables and dependent variable. The six independent variables, which are the inventory management practices, include: ABC model, JIT, EOQ, VMI, Bar-coding and Simulation.

**Table 4.5: Regression Analysis Model Summary with Operational Performance as Dependent Variable**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.718 <sup>a</sup>	.601	.513	.5030059	.101	.883	6	47	.015

a. Predictors: (Constant), Simulation, Bar-coding, JIT, ABC model, VMI, EOQ

**Source: Research Data**

The adjusted R square, which is the coefficient of determination, shows the degree of variation of the dependent variables as a result of change in the predictable variable. The coefficient of determination is a measure used in statistical analysis that examines how well a model explains and predicts the future outcomes or the accuracy of the model. Based on the results of Table 4.8, of Adjusted R Square of 0.513, at least 51.3% of the variation in operational performance is explained by the model. In other words, 51.3% change in operational performance of the consumer goods manufacturing firms is attributable to Simulation, Bar-coding, JIT, ABC model, VMI and EOQ.

R stands for correlation coefficient indicates the relationship between the independent and dependent variables. Based on the results of Table 4.8, there is a strong and positive relationship between operational performance and inventory management practices as illustrated by a correlation coefficient of 0.718. Based on the results of this study, there are 48.7% of other factors that impact operational performance, and such factors should be established by the future researches.

**Table 4.6: Results for ANOVA with Operational Performance as Dependent Variable**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	1.341	6	.223	.883	.015 <sup>b</sup>
Residual	11.892	47	.253		
Total	13.233	53			

a. Dependent Variable: Operational performance

b. Predictors: (Constant), Simulation, Bar-coding, JIT, ABC model, VMI, EOQ

**Source: Research Data**

Based on Table 4.9, the ANOVA test shows that the regression model has a significant impact on operational performance since the p-value (0.015) is less than 0.05 ( $0.015 < 0.05$ ). This shows that the regression model is statistically significant. Since, the regression model, which explains the relationship between the operational performance (dependent

variable) and the inventory management practices (independent variables), is statistically significant, the research study accepts the alternative hypotheses and rejects the null hypotheses.

**Table 4.7: Coefficients of Regression Model with Operational Performance as Dependent Variable**

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
(Constant)	3.794	.855		4.435	.000	2.073	5.515
ABC model	.11	.056	-.230	-1.584	.020	-.200	.024
JIT	.16	.078	.031	.209	.035	-.141	.173
EOQ	.88	.092	.018	.115	.009	-.175	.196
VMI	.73	.069	-.158	-1.055	.009	-.213	.066
Bar-coding	.41	.076	.080	.540	.002	-.111	.193
Simulation	.35	.061	.083	.580	.045	-.087	.157

a. Dependent Variable: Operational performance

b. B: alpha according to my model

**Source: Research Data**

Based on the results of Table 4.10, an increase in one unit of ABC would lead to an increase in the operational performance of consumer goods manufacturing firms by a factor of 0.11. The relationship between ABC and operational performance is statistically significant having been measured at a p-value of 0.02, which is less than 0.05. An increase in one unit

of JIT would lead to increase on operational performance by a factor of 0.16; this relationship is statistically significant since  $p\text{-value} = 0.35 < 0.05$ . On the other hand, a unit increase in EOQ leads to an increase in the level of operational performance by a factor of 0.88; this relationship is statistically significant at  $p\text{-value} = 0.009 < 0.05$ . A unit increase in VMI leads to an increase in operational performance by a factor of 0.7; this relationship is statistically significant since the  $p\text{-value}$  is lower than the significance level of 5%,  $p = 0.009 < 0.05$ . A unit increase in Bar-coding leads to an increase in operational performance by a factor of 0.41, and that such relationship is statistically significant  $p = 0.002 < 0.05$ . Lastly, a one unit increase in Simulation leads to an increase in operational performance by factor of 0.35, a relationship that is established to be statistically significant,  $p = 0.045 < 0.05$ . Overall, however, EOQ (0.88) has the most significant impact on operational performance of consumer goods manufacturing firms while ABC model (0.11) has the least impact.

The results of the regression analysis with respect to the relationship between inventory management practices and operational performance are consistent with those of Lee (2002), Frahm (2003), and Eroglu, Brent and Waller (2011). According to Lee (2002), Economic Order Quantity technique is commonly used by organizations since it is more efficient than other inventory management approaches in enabling a firm to understand when to order and how much to order. Such approach enables firms to plan more effectively with regards to their daily, weekly and monthly level of inventories. The efficiency of the EOQ may explain why this model has a significant impact on the operational performance of consumer goods manufacturing firms. On the other hand, as provided by Frahm (2003), Vendor Managed Inventory is more effective in inventory management in the sense that suppliers can manage vendor's inventory by monitoring both the vendor's level of inventories, as well as observing the consumers' characteristics on a continuous, including their level of demand and brand preference; per se, suppliers are enabled to undertake replenishment of inventories on behalf of vendors on a timely fashion. This saves businesses significant costs that are associated with individual management of inventories by businesses. However, Eroglu, Brent and Waller (2011) argue that in order for Vendor Managed Inventory to be successful, there is a need for an effective communication between a supplier and the vendor. On the other hand, researches indicate that more

advanced technological methods of managing inventories are currently adopted in firms due to their ability to reduce human error and ensure high speed of processing data; this may explain why Bar-coding has a high level of efficiency in ensuring an amplified operational performance (Eroglu, Brent and Waller, 2011; Romano, 2011).

## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATION**

#### **5.1 Introduction**

Chapter five is focused on providing the discussion of the findings, giving the conclusion and recommendation of the research regarding the research objectives.

#### **5.2 Summary of the Research Results**

##### **5.2.1 The Implementation of Inventory Management Practices**

The research study found out that most of the consumer goods manufacturing firms in Nairobi county use to a very large extent economic order quantity. Bar-coding is also used to a very large extent by the consumer goods manufacturing firms in Nairobi County. The respondents provided that Vendor Managed Inventory and Simulation are used to a large extent by consumer goods manufacturing firms in Nairobi County. The Just in Time and ABC were found to be least used by consumer goods manufacturing firms in Nairobi county.

##### **5.2.2 The Impact of Inventory Management Practices on Operational Performance**

The findings of the research study show that inventory management practices had the most impact on enabling consumer goods manufacturing firms to meet assembly targets and experiencing optimum production. The results also showed that inventory management practices ensure on-time delivery and augmentation of efficiency. Based on the results, inventory management practices had the least impact on enhancing quality.

##### **5.2.3 The Challenges Faced in Implementation of Inventory Management Practices**

The findings of the research study established a number of challenges faced in the implementation of inventory management practices. The major challenges, as strongly agreed by the respondents who participated in the study, include financial problems, lack of personnel knowledge and inaccessibility of critical information respectively. However, quick and highly unpredictable market changes and lack of effective and supportive were considered to be moderate challenges facing consumer goods manufacturing firms in implementation of inventory management practices, in that order. Poor relationships with

suppliers and lack of information, in that order, were considered to the least challenges facing the implementation of inventory management among the consumer goods manufacturing firms.

### **5.3 Conclusion**

With respect to the findings of the research study, it is conclusive that inventory management practices impact significantly the operational performances of consumer goods manufacturing companies in Kenya. The implementation of an effective inventory management leads to many benefits in firm, including ensuring optimal production, meeting the assembly targets and on-time delivery, which are all associated with operational efficiency. While there are different inventory management practices, the findings of this research study establish that consumer goods manufacturing companies are more likely to benefit from Economic Order Quantity model, Vendor Managed Inventory and Bar-coding. The specific benefits that consumer goods manufacturing firms would generate from using these specific inventory management practices include, enabling such firms to meet assembly targets, enabling the attainment of an optimum production, guaranteeing on-time delivery, augmentation of efficiency, and to some extent, the enhancement of quality.

### **5.4 Limitations of the Study**

Some of the restrictions that I faced in an attempt to find out inventory management practices and performance of consumer goods manufacturing firms in Nairobi Kenya:

It's time consuming. A research takes a long time to carry out and especially where I had to go from one place to another data collection purpose. In many instances you could move to a branch, hoping to be assisted only to be referred to main office. In many instances these offices are quiet far from the place I am in and hence it consumed a lot of time.

Hostility by the managers of some consumer goods manufacturing firms. This was a major set-back towards data collection since there were some institutions which were not cooperative with data collection. They refused to accept my questionnaires and even if they did it took a while to respond to them.

Expensive. Any kind of research is very expensive to carry out and mine was not exceptional. I had to use a lot of money to commute from one place to another and this proved to be very expensive. Another expense was printing of questionnaires which had to be done and handed over to the various institutions.

### **5.5 Recommendation**

This research study recommends that consumer goods manufacturing firms should embrace inventory management practices since they contribute to enhanced operational performance. This is because an effective management of inventories has an overall impact on enhancing operational performance of a firm, including guarantee of on-time delivery, ensuring optimal production levels are met and making sure that assembly targets are, which, consequently, leads to a reduction of the reorder and holding costs; this has the consequence of enhancing the level of profitability. In particular, this research recommends that Economic Order Quantity approach, Vendor Managed Inventory and Bar-coding should be adopted by consumer goods manufacturing firms as they are established to be more effective in the management of inventories among the consumer goods manufacturing companies. Furthermore, the research study recommends that companies should focus on developing competitive skills for inventory management among their employees, via special training programs, so that such employees can manage more successfully inventories within consumer goods manufacturing firms. In addition, consumer goods manufacturing firms should adopt modern technological systems in the management of inventories, including Enterprise Resource Planning (ERP) systems, which are critical in guaranteeing a high level of efficiency in management of high reorder and holding costs faced by firms in the market.

### **5.6 Suggestion for Further Studies**

Since the research study focused on consumer goods manufacturing firms in Nairobi county, the study suggests that a similar study, that is, the investigation of the inventory management practices and performance of consumer goods manufacturing firms in Kenya, should be carried out in at least more than two counties so as to enhance the generalization and applicability of the research results among consumer goods manufacturing firms in other Kenyan counties.

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## APPENDICES

### Appendix I: Introductory Letter

The Manager

.....

Nairobi- Kenya

Dear Sir/Madam,

#### **Re: Research Study**

I am a student undertaking a Master's degree in Business Administration at the University of Nairobi. I am carrying out a research on "Inventory management practices and performance of consumer goods manufacturing firms in Kenya".

You have been preferred to form part of the study respondents. This is to kindly request you to respond to the questionnaire. The information you provide will be used solely for academic purposes and will be treated with utmost confidentiality.

A copy of the final report will be availed to you upon request. Your assistance will be highly appreciated. Yours sincerely,

**Derrick Mwenda Kinyua**

**MBA, Student**

**University of Nairobi**

## Appendix II: Questionnaire

### Section A: Demographic Data of Respondents

Please, tick (√) on the right answer

1. What is your Gender

Male

Female

2. What is your Age

Lesser than 20 years

20 to 30 years

31 to 40 years

41 to 50 years

More than 50 years

3. What is your level of education?

High school or Lesser Level of Education

Diploma

Bachelor's degree

Master's Degree and higher

4. For how long have you worked in your present firm?

Less than 1 year

Between 1 and 2 years

Between 3 and 5 years

Between 6 and 10 Years

More than 10 years

### **SECTION B: Establish the extent to which inventory management practices are implemented by consumer goods manufacturing firms in Nairobi.**

Please, indicate to what extent you use the following inventory management practices

Input: (1) Not Used At All, (2) Used To A Small Extent, (3) Used To A Moderate Extent,

(4) Used To A Large Extent, (5) Used To A Very Large Extent.

	1	2	3	4	5
ABC Model					
Just in Time					
Economic Order Quantity concept					
Vendor Management Inventory					
Bar-coding					
Simulation					

**SECTION C: Determine the Impact of Inventory Management Practices on operational Performance of Consumer Goods Manufacturing Firms in Nairobi**

Please, state your level of agreement with the following questions

Input: strongly disagree (1), Disagree (2), Neither agree nor disagree (3), Agree (4), Strongly agree (5)

	1	2	3	4	5
Inventory management practices enable optimal production					
Inventory management practices augment efficiency					
Inventory management practices enhance quality					
Inventory management practices enable meet assembly targets					
Inventory management practices ensure on time delivery					

**SECTION D: Establish the Challenges Faced By Consumer Goods Manufacturing Firms in the Implementation of Inventory Management Practices**

Please, indicate to what extent you agree the following are challenges associated with the implementation of inventory management practices

Input: Strongly Disagree (1), Disagree (2), Neither Agree Nor Disagree (3), Agree (4), Strongly Agree (5)

	1	2	3	4	5
Financial problems					
Lack of information					
Inaccessibility of critical information					
Lack of personnel knowledgeable in implementation process					
Quick and highly unpredictable changes in market conditions					
Poor relationship with suppliers					
Lack of supportive and effective technology					

### Appendix III: Consumer Goods Manufacturing Firms in Nairobi, Kenya

Table 1: Consumer Goods Manufacturing Firms in Nairobi, Kenya

<b>Consumer Goods Manufacturing Firms</b>	
<b>Consumer Goods</b>	<b>Consumer Services</b>
BAT Kenya	Car & General (K)
East African Breweries	Deacons East Africa
Eaagads	Kenya Airways
Eveready East Africa	Kakuzi
Sameer Africa	Longhorn Publishers
Kapchorua Tea Firm	Marshalls East Africa
Limuru Tea Co	Nairobi Business Ventures
Mumias Sugar Co	Nation Media Group
Kenya Orchards	Scangroup
Sasini	Standard Group
Unga Group	TPS Eastern Africa
Williamson Tea Kenya	Uchumi Supermarkets
Del Monte Kenya	Express Kenya
Kakuzi Limited	Cooper Motor Corporation(CMC)
Rea Vipingo Sisal Estate	

Source: African Markets (2016).