

**INVENTORY MANAGEMENT PRACTICES AND SUPPLY CHAIN  
PERFORMANCE OF CONSTRUCTION FIRMS IN NAIROBI**

**BY**

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**November 2018**

**DECLARATION**

I, the undersigned, declare that this is my original work and has not been presented to any institution or university other than the University of Nairobi for examination.

Signed: \_\_\_\_\_

Date: \_\_\_\_\_

**Chance Hitimana Joseph**

**D61/88395/2016**

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

Signed: \_\_\_\_\_

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## **DEDICATION**

To my late mother, Rachel KARIGIRWA. Rest in peace mother.

## **ACKNOWLEDGMENT**

I would like to express my sincere gratitude to my supervisor, Mr. Ernest O. Akelo for his invaluable mentorship, guidance, support, advice, meaningful comments and encouragement right from the proposal stage to the final product of this thesis. Let me also hasten to extend my deepest appreciation to Mr. Chirchir, whose guidance and meaningful comments enhanced the success of this paper.

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Above all, I must thank Almighty Lord for his gift of life and through him I am victorious.

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## **ABBREVIATIONS AND ACRONYMS**

**ANOVA:** Analysis of Variance

**BORAQS:** Board of Registration of Architects and Surveyors

**EOQ:** Economic Order Quantity

**GDP:** Gross Domestic Product

**JIT:** Just In Time

**KNBS:** Kenya National Bureau of Statistics

**MRP:** Material Requirement Planning

**NCA:** National Construction Authority

**NEMA:** National Environment Management Authority

**PPDA:** Public Procurement and Disposal Act

**SC:** Supply Chain

**SCM:** Supply Chain Management

**VMI:** Vendor Managed Inventory

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## ABSTRACT

Inventory management practices have gained recognition in today's businesses in order to deliver products and services that customers want to a great level of excellence, to keep inventory costs at minimum and to enhance supply chain performance. The study sought to determine inventory management practices employed by construction companies in Nairobi and to establish the effect of inventory management practices on supply chain performance. The descriptive research design was employed. Stratified sampling was used. The study used a questionnaire to gather data, out of 370 questionnaires distributed to respondents only 309 questionnaires were completely filled and returned back. SPSS helped to analyze data. Descriptive statistics were used in determining the inventory management practices adopted by construction firms in Nairobi. Correlation and multiple regression analysis were carried out to establishing the effect of inventory management practices on supply chain performance. The results of this study were that construction firms in Nairobi adopt inventory management practices which include vendor managed inventory, economic order quantity, just in time, and material requirement planning and that these practices positively affect supply chain performance of construction firms in Nairobi. Inventory management practices explained 69.8% ( $R^2= 0.69.8$ ) of the variation in supply chain cost of construction firms in Nairobi, 58.6% ( $R^2= 0.586$ ) of the variation in supply chain flexibility of construction firms in Nairobi, 53.8% ( $R^2= 0.538$ ) of the variation in supply chain reliability of construction firms in Nairobi, and 73.9% ( $R^2= 0.739$ ) of the variation in asset utilization of construction firms in Nairobi. The research concluded that inventory management practices positively impact supply chain performance of construction firms in Nairobi. The study recommends that firms in other sectors to adopt inventory management practices in managing their inventories. The study investigated four inventory management practices, future studies should consider to examine other inventory management practices which were not examined in this study.

# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

The implication of inventory management as a practice was cited as a complex aspect of supply chain management. The impact was indicated and objectively seen through high rating on fulfillment of customer demands and supply chain performance. Inventory management practices have been important in today's businesses such that customer services are delivered to a great level of excellence, inventory costs are kept at minimum and improvement in supply chain performance is achieved (De Leeuw et al., 2011; Rao & Rao, 2009). Stevenson (2009) indicates that the implementation of poor inventory management practices hampers supply chain operations and to a greater extent diminishes customer satisfaction.

The inventory management practices implementation ensure having a proper number of materials or products. Having excessive inventory will consume space, financial resources, and could result in products damage, theft, and expiration. On the other side, small quantity of items in stock can disrupt supply chain operations, which leads to stock out hence customer dissatisfaction (Dimitrios, 2008). Inventories refer to raw material, components, work in progress, finished products and supplies that are in the stocks of business organization to enable supply chain activities in the course of production (Pandey, 2005).

According to Miller (2010) inventory management consists of activities that guarantee goods and services are obtainable by customers at convenient time and place. Inventory management is a coordination of activities such as purchasing, manufacturing and distribution which are exercised in producing products or services that satisfy customers' demands. Inventory management practices will primarily involve identifying the level and settlement of items in stock which are necessary to meet the production schedule to avoid disruption in the production process.

#### 1.1.1 Inventory Management Practices

Dimitrios (2008) inventory management practices have been acknowledged as an essential area of bottlenecks that needs special attention so as concrete results can be

achieved in the supply chain. Inventory management practices, therefore, have to be taken into consideration. The objective when implementing inventory management practices is to enable a smooth flow of items in quantities and at a time they are needed. Inventory management practices are techniques used by firms to manage their stocks. These techniques help in recording, consolidating, tracking, analyzing and reporting at the time material quantity is decreasing or when an excess occurs. These techniques contain JIT, MRP, VMI, EOQ, Reorder Level, and Bar-coding among others.

Stevenson (2010) argues that inventory management practices are models used by firms to control the cash spent on items in stock. The storage, supply and accessibility of items are regulated by inventory management practices in order to avoid excess or shortage in supply (Miller, 2010). Inventory management practices are concerned with the activity which ensures customers obtain product of their choice. It enables coordination of the activities such as purchasing, manufacturing and distribution with the purpose of fulfilling customer's demands. The management of inventories has a greater impact on financial strength and supply chain performance because of its effects on working capital, production and customer services, hence affecting supply chain performance (Vergin, 2012).

### **1.1.2 Supply Chain Performance**

Global and local competition propels firms to make their supply chain competent and effective in order to deliver product or service of high quality to the final user while remaining competitive (Ritchie & Brindley, 2000). Supply Chain involves planning, implementing and controlling the activities of the supply chain with the objective of meeting the demands of clients in an efficient manner (Chopra et al., 2002). It is the coordination of materials, information and financial flows between and among all participating enterprises.

According to Zhang & Okoroafo (2015) supply chain performance is the capability of an organization to cut down on the cost of logistics through the delivery of required product or service at convenient place and time. Supply chain performance is the whole network's capacity to satisfy the final user's needs through providing him or her with product or service on time at minimum cost.

Parker (2000) identifies the purpose of supply chain performance measurement as to detect achievement, detect if needs of clients satisfied, understanding of organizational processes and to reveal where problems and bottlenecks or wastes are and where improvement is essential and guarantee decisions are made on factual basis.

Supply chain performance might be analyzed in terms of supply chain activities and processes which include plan, source, make, deliver and return (Gunasekaran et al., 2004). Supply Chain Operation Reference (SCOR) model has been recognized as an improvement tool to be employed while measuring supply chain performance that is evaluating and monitoring supply chain activities. Kaplan and Norton (1992) suggest the Balance Scorecard as an instrument to evaluate supply chain performance and that of the firm in four aspects: financial, internal business process, customer and learning and innovation aspects.

Stewart (1995) identifies four supply chain performance measures and states that a firm to be superior or competitive must excel in these measures which include delivery performance, flexibility and responsiveness, costs, and asset management. Beamon (1999) in his article found that two supply chain performance measures have been mostly used. And these involve costs and customer satisfaction. Costs involve material expenses and expenses of operations whereas customer satisfaction indicators include lead time, stock out probability and fill rate.

Lead time means time that a customer has to wait until the product is delivered after placing an order. There is a need for firms to reduce their lead time in order to reduce supply chain response time (Gunasekaran et al., 2001). Flexibility means making available product or service to satisfy the personal needs of customers. Responsiveness is the amount of time that is required for an institution to meet client demand or enquiry. Asset management / capacity utilization has a direct impact on the response rate to client's demand. Therefore, evaluating ability helps obtain flexibility, lead time and deliverability gains. Some costs in supply chain are associated with inventories such as opportunity cost, holding cost, deterioration, theft, damage and etc.

### **1.1.3 Construction Firms in Kenya**

According to the Kenya National Bureau of Statistics, the construction industry of Kenya adds 7 % to the gross domestic product (GDP), this shows that construction industry in Kenya has improved. Mbiti (2008) reported that 10, 000 people and above are employed by construction firms in Nairobi who are supposed to construct facilities for their customers by following quality standards and completing the work on time.

Construction firms are classified into five classes depending on the nature of works and categorized into seven categories according to the contract value. The first class is building works, second class is road works, third class is water works, fourth class is electrical engineering service and the last class is mechanical engineering service. The Kenyan construction industry has four categories of stakeholders which include: Investors, Contractors, Suppliers, and Consultants. The construction firms are regulated among others by the BORAQS, the PPDA Act 2015, the Physical Planners Act (CAP 286), NEMA and NCA. The quality control and supervisory levels of the construction firms involve Architects and quantity surveyors under BORAQS, Engineers under ERB, and Environmental Audit Experts under NEMA among many others.

### **1.2 Research Problem**

The concept of inventory management practices has not been an exception for construction firms to streamline their supply chain performance. In this regard, inventory management practices have been applied by firms which have contributed to the success in the supply chain performance. The practices implemented as reported in previous studies include just-in-time practice, material requirement planning practice, stock levels maintenance practice and vendor managed inventory practice, they have been highlighted to be the control methods in place practiced in managing stock within the supply chain performance (Onyango, 2017; Wanyonyi, 2016; Kamakia, 2015).

Atnafu & Balda (2018) investigated the influence of inventory management on firm's level of competitiveness found evidence in support of the fact that proper inventory practices can increase competitiveness and economic development of SMEs in enterprises in Ethiopia. From this study, it could be concluded that both training and adoption of effective inventory management practices are necessary for

the economic growth of firms. A similar study in the United States looked at the rapport between inventory leanness and firm's performance, found that a solid affirmative connection between the two variables. In other words, a leaner inventory policy is necessary for the firm's performance (Eroglu & Hofer, 2011).

Otchere et al. (2016) assessed inventory management practices in Weir Minerals West Africa Limited in Ghana. Using both quantitative and qualitative data and a purposive sampling technique involving 14 employees, the paper found that the major constraint to firm growth is improper effectiveness and efficiency in inventory management practices in their day to day operations. It was therefore recommended that firms should adopt proper inventory management practices such as just in time, vendor managed inventory practices among others.

Onyango (2017) studied the link connecting inventory management practices on the supply chain performance of some fast moving consumer goods manufacturing firms in Kenya. This study found an affirmative link between inventory management practices and supply chain performance. Wanyonyi (2016) studied inventory management practices and service delivery on major supermarkets in Kenya, identified four mostly used inventory management practices by Major Supermarkets in Kenya. The four included the vendor managed inventory, just in time, economic order quantity as well as the A-B-C model but the just in time was the most commonly used with vendor managed inventory being the second. Kamakia (2015) studied inventory management and supply chain performance of petroleum marketing firms in Nairobi found that inventory management systems cause an improvement on the supply chain performance and that petroleum Firms in Nairobi use inventory management practices such as EOQ, JIT and VIM among others.

The cited studies have focused exclusively on the inventory management practices of supermarkets, Manufacturing Firms and Petroleum industries without due regards to the supply chain performance of the construction firms. This knowledge gap therefore remains an empirical issue that needs investigation. Against this backdrop, this study seeks to empirically examine the impact of inventory management practices and supply chain performance of construction firms in Nairobi by responding to such research questions:

What are the inventory management practices implemented by construction firms in Nairobi?

What is the effect of inventory management practices on supply chain performance of construction firms in Nairobi?

### **1.3 Objectives of the Study**

These included

- i) To identify inventory management practices adopted by construction firms in Nairobi
- ii) To determine the effect of inventory management practices on supply chain performance of construction firms in Nairobi

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

This study will be of great importance to all stakeholders in the construction sector in Kenya. It will inform the players in the construction sector on the inventory management practices and supply chain performance. The supply chain and procurement professionals will benefit from this study by understanding how inventory management practices affect the supply chain performance hence overall performance of the firm. Other firms will as well benefit from this study by understanding to which extent inventory management practices influence the supply chain performance of firms. This study will serve as a reference to academicians and researchers for future studies in the ground of inventory management practices and supply chain performance and other related fields.



## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This segment is composed of three main sections. The first section is composed of a review of the theoretical literature. The key issues explored in the theoretical literature are resource based theory, system theory, inventory management practices and supply chain performance measures while the next section reviews related studies on the topic. The chapter concludes with a summary of the empirical literature.

#### 2.2 Theoretical Review

This section will discuss Resource Based Theory and System Theory to give more insights on supply chain performance.

##### 2.2.1 Resource Based Theory

Firms gain competitive advantage from the resources they possess. In other words, the firm's competitive advantage is generated dependently on what unique internal resources a firm possesses (Barney, 1991; Peteraf, 1993). Mentzer et al. (2004) group firm's resources in two categories as tangible and intangible. Knowledge is described as intangible resources and as an important production factor in firms. Tangibility is what affects the ability of the organizations to compete with other firms. Competitive advantages help an organization to maximize profits (Barney, 1991; Wernerfelt, 1984).

Inventories being among important assets of the organization, if managed well through inventory management practices the organization can achieve competitive advantage thereby reducing costs of operations and being able to adapt its operations to the ever changing demands of customers.

##### 2.2.2 Systems Theory

Martinelli (2001) explains systems theory in terms of a unified whole rather than a function of its sub- units which make up the whole. In other words, the success of the whole depends on the sub-units. Steele (2003) on the other side, concentrated on the association among subsystems in order to understand the functioning of an organization. This in turn depends on the environment in which it operates. (Mason,

2007) identifies these environmental elements as: agents, shareholders and other factors beyond the organization's control

To improve supply chain performance, there is a need for close collaboration among supply chain members which could be suppliers or customers, for supply chain performance relies on the performance of its members. System theory becomes relevant in the sense that the supply chain should be seen and managed as a system to benefit the whole supply chain and not only one organization's supply chain.

### **2.3 Inventory Management Practices**

The study focused on VIM practice, EOQ practice, JIT practice, and MRP practice as suggested by various studies being control methods in inventory management.

Tang (2006) the buyer gives the sellers data and then the supplier uses this information to monitor the inventory levels of the buyer and make new orders on his behalf. Since the supplier is given the role of tracking stock then information is given to him enabling him to track the inventory level of the buyer. In this particular case, Kang & Kim (2012) argue that it is incumbent on the supplier to ensure that the stock of his client is replenished at appropriate times in order to avoid stock depletion. VMI permits to create healthy relationship among partners which in turn leads to supply chain responsiveness (Holweg et al., 2005).

Mandal (2012) demand for a given product fixed annually and new orders are delivered in full when inventory reaches zero. The economic order quantity, frequently denoted as EOQ, pursues to create an equilibrium between holding and ordering costs. According to Salawati et al. (2012) economic order quantity is the number of units ordered that reduce carrying cost and ordering cost. This inventory practice is mostly applied where yearly inventory for a firm is to be established. This model is a conservative method for purchasing materials. The model can lead to large sized orders placement as originally conceptualized by Harris (1915).

Just in Time was developed in Japan and is usually applied in the manufacturing sector. Mainly, it involves ordering of materials and other raw materials in the quantities needed in order to attain the required level of production. These materials or products are received or delivered just in time they are required. This practice minimizes waste and cost and shortens lead time. According to Hutchins (1999), Just

in Time is seeks not to have inventories or carry a minimum level of inventories within the whole supply chain. The model can be applied to the manufacturing process within any company as it is also being adapted within service organizations (Hay, 1998).

Material requirement planning achieves its goal through getting its contents from production. Works in reverse from a production plan to determine what material is needed, the quantity needed and time in order to meet production plan. MRP turns production plan into material requirement plan. Thus, MRP answers the following questions what material is required? In what quantities? And at what time? (Stevenson, 2009).

#### **2.4 Supply Chain Performance Measures**

Supply chain performance refers to as the extent to which a supply chain satisfies customer needs relating to performance indicators at any point in time and at what total supply chain cost (Vand der Vorst, 2006). According to Neely et al. (2005) performance evaluation is a procedure of measuring efficiency and effectiveness of an activity. Cost, flexibility, responsiveness, reliability and asset or capacity utilization are discussed below as supply chain performance measures.

Schary & Skojtt-Larsen (2001) say that income and expenses depict the supply chain performance. They believe that cost informs more on supply chain performance than any other source. Byrne & Heavy (2006) group supply chain cost into 5 categories, that is transportation price, order processing, production set up rate, material expense and back order charge. Transportation charge is incurred when moving finished product or raw material or components from the production facility to a distribution center or from a supplier to the production facility, order processing cost is cost incurred in the event of processing the orders, set up cost is the cost in relation with an order being set up in the processing areas, cost of holding inventories refers to the expenses associated with labor, storage and costs of the goods damaged. Durlinger (2012) notes that the cost of holding inventories can be reduced by minimizing expenditures on the stocks and this would result in increased performance in the supply chain.

Sethi & Sethi (1990) defined flexibility as a system's adaptability to changes brought up by the environment. According to Lummus et al. (2003) flexibility is a significant

aptitude that facilitates firm to alter processes, capacities and operations to benefit from occasions that rise from the environment/ marketplace. This implies that flexibility can be viewed as an ability to respond to uncertainty effectively to avoid loss of time, cost thereby making product or service available to satisfy personal demands of clients. Flexibility is seen as an ability to deliver products or services that satisfy customers' individual choices (Gunasekaran et al., 2004).

Product availability is one of the factors of customer service. Customer service factors involve product availability, delivery speed and delivery reliability (Dornier et al., 1998). Once a product is available and delivered to the customer, it contributes to the firm's margin and boosts supply chain performance. For it said that a product in the hands of end users benefits the firm than a product which is out of stock or stoked in the store.

Responsiveness can be said to refer to as supply chain capacity to provide customer with products or services of their choice at the time they need them. Gunasekaran et al. (2008) responsive supply chain is a connection of firms that are able to produce products or services that satisfy personal wants of consumers in a competitive environment thereby responding rapidly and economically to varying demands of customers. Responsive supply chain features include agility and flexibility (Christopher, 2000). Agility is an ability for a firm to react quickly to the changing demands of customers, both in quantities and preferences.

Shirmohammadi (2002) defines reliability as the aptitude of an organization to run or function without disruption in its operations over a period. In this sense supply chain reliability refers to as the supply chain's capability to provide the right product of right quality and in appropriate quantity at the correct place, at an accurate time and at an exact price to customers. Reliability is the assurance that a firm will continue to deliver products or services which are required by consumers at the appropriate time.

Klammer (1996) capacity has been assessed in various ways by different people. For instance, the financial manager may assess capacity of a plant in terms of equipment it has while an operational manager may assess capacity by worker efficiency. Sakia (2012) defined capacity utilization as the percentage of total output compared to designed capacity.

## **2.5 Empirical Review**

Atnafu & Balda (2018) investigated the importance of inventory management practices on firm's effectiveness and organizational performance: empirical evidence from SMEs in Ethiopia and concluded that the higher the levels of inventory management practices the higher the level of performance and competitiveness. Similarly, competitive advantage was found to have important effects on the performance of the organizations. This survey collected primary data from 188 SMEs in Ethiopia which operate in the manufacturing sub-sector. As a result, this study finds that training and promoting inventory management practices would increase performance hence economic growth and development.

Osei-Mensah (2016) investigated the impact of inventory management practices on service delivery and particularly at St Martin's hospital. This study interviewed 90 respondents with 60 being staff and 30 patients. The findings of the study showed that short cycle deliveries lead to an accurate forecast of supplier delivery times as well as materials requirements planning systems in the hospital. The study also revealed the application of technology on the management of the inventory and partnerships. Patient derived their satisfaction from hospital's reliability and 24-hour service, healthcare service and physical appearance of healthcare service. Therefore the inventory management systems were positively related to the performance of the hospital.

By mainly focusing on US manufacturing firms for the period 2003-2008, Eroglu & Hofer (2011) assessed the impact of inventory leanness on firm's performance and established leaner inventory management positively affects performance. Using leanness as an indicator of inventory management, they established that leanness had a positive impact on profit margins.

Otchere et al. (2016) studied assessing the inventory management practices in Weir Minerals West Africa Limited in Ghana. Using both quantitative and qualitative data and a purposive sampling technique involving 14 employees, the paper found that the major constraint to firm growth is the improper effectiveness and efficiency in inventory management practices in their day to day operations. It was therefore recommended that firms should adopt proper inventory management practices such as just in time, vendor managed inventory practices among others.

Abuya & Shale (2018) investigated on the importance of inventory management practices on performance of the hospitality industry in Kenya, inventory management practices are positively impactful on the performance of the hospitality industry in Kenya. This leads to the recommendation that transparency and accountability should be ensured in the procurement practices and that information communication technologies should be applied in inventory management in the hospitality industries.

Musau, Namusonge & Ngeno (2017) sought to investigate the role of inventory management practices on performance among the textile manufacturing firms in Kenya. The results of this study indicated that the use of inventory management practices was found to be positive to the performance of the textile industry in Kenya. This survey employed primary data which was collected from the textile manufacturing firms in Kenya. The study also found out that the firms had recognized the importance of the inventory management practices and therefore the adoption in their supply chain.

Onyango (2017) studied the association linking inventory management practices on the supply chain performance of FMCG manufacturers in Nairobi, sought to identify inventory management practices implemented by FMCG manufacturers in Nairobi, found out that FMCG manufacturers in Nairobi use inventory management practices such as JIT, VMI, RoL, EOQ, ERP, and MRP and that these practices positively impact supply chain performance of FMCG manufacturers in Nairobi. The study suggests that FMCG manufacturers should increase the use of Just in Time practice in order to reduce wastes in the production process. The study also suggests that every manufacturing firm should implement vendor managed inventory practice to automate stock tracking. Lastly, the study suggests that manufacturing firms should set reorder points to ensure that their stocks are replenished every time they go below the set reorder points.

Wanyonyi (2016) studied inventory management practices and service delivery on Major supermarkets in Kenya found out that the supermarkets in Kenya used mainly four inventory management practices. The four included VMI, JIT, EOQ, and A-B-C model but the just in time, was the most commonly used with vendor managed inventory being the second. The findings indicated that inventory management

systems led to the improvement in the relationship with suppliers and which implied that products were more available in the supermarkets. This, therefore, led to increased performance in the performance of the Kenyan supermarkets.

According to Kamakia (2015) studied inventory management and supply chain performance of petroleum marketing firms in Nairobi observed that all the surveyed petroleum firms in Nairobi use inventory management systems which clearly showed that they improved their supply chain performance. The study arrived at a conclusion that inventory management systems cause an improvement on the supply chain performance. The research selected a sample size of 66 form a sample frame of 114. Random selection was used. From correlation analysis, it was established that the performance of the supply chain is well described by the inventory management systems of the firms. The study recommended that the Petroleum firms should invest in the management systems as well as modernization since this would facilitate inventory management such as Vendor Managed Inventory.

## **2.6 Summary of the Literature Review**

Review of empirical literature has established that different inventory management practices in different firms include Vendor Managed Inventory, Economic Order Quantity, Just In Time and Reorder Level and that the application of these practices has led to increased performance in the supply chain and hence the profitability in different firms such as in manufacturing, NGOs, textile, hospitals, airlines, and so on.

The mentioned studies have focused on the inventory management practices on the sectors such as supermarkets, Manufacturing Firms, Petroleum industries, etc. There is no study that has examined the influence of inventory management practices specifically in construction industry in Kenya. This leaves a gap in the inventory management practices applied in the construction industry and their effect on the supply chain performance.

## 2.7 Conceptual Framework

### Independent variables

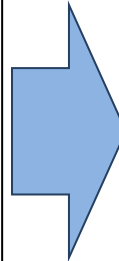
#### Inventory Management Practices

- Vendor Managed Inventory
- Economic Order Quantity
- Just In Time
- Material Requirement Planning

### Dependent variable

#### Supply Chain Performance

- Cost
- Flexibility
- Responsiveness
- Reliability
- Asset utilization



Source: Author (2018)

Figure 2. 1: Conceptual Model



## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Information about the research design, population and sample design for the study was addressed in this chapter as well as the procedures for data gathering, analysis and presentation.

#### **3.2 Research Design**

The study employed descriptive research design since the study was interested in answering a question like 'what is'. The descriptive research design is used to answer the question of who, what, where and how associated with a particular research question. Dulock (1993) says the purpose of descriptive research design is to depict o variables or define whether there is a relationship among variables. According to Kothari (2004), the main feature of descriptive research design is that the researcher cannot manipulate variables but only reports of what has occurred or what is occurring can be done.

#### **3.3 Target Population**

The target population of the study was all registered construction firms in Nairobi operating in building works, road works and water works. From the website of the National Construction Authority, they are 11,483 of them. (Appendix II)

#### **3.4 Sampling Design**

This paper employed a stratified random sampling method in selecting respondents from three categories of construction firms which are building works, road works and water works. From the table for determining sample size by Krejcie & Morgan, a target population ranging from 10,000 to 14,000 their sample size is 370. The study used 370 construction firms in Nairobi as the sample size.

#### **3.5 Data Collection**

This study used primary data which was gathered through a questionnaire. The questionnaire was composed of 3 sections. Section A collected data regarding demographic information of the firms, section B had statements on inventory management practices used by construction firms in Nairobi and the last section, C

had statements on supply chain performance. The questionnaire was distributed to respondents through “drop and pick” later method. The respondents were the procurement managers or warehouse managers of the firms or their equivalents.

### **3.6 Data Analysis**

Data was analyzed by using the Statistical Package for the Social Sciences, SPSS in short. Descriptive statistics were employed to identify the inventory management practices deployed by construction firms in Nairobi whereas regression and correlation analysis was used to define the impacts of inventory management practices on supply chain performance of construction firms in Nairobi. The regression analysis equation was of the form:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$$

Where,

Y= Supply Chain Performance

$\alpha$  = constant, Y-intercept, which is the value of Y when X( $X_1$ ,  $X_2$ ,  $X_3$ , and  $X_4$ ) is zero

$\beta_1$ ,  $\beta_2$ ,  $\beta_3$ , and  $\beta_4$  = coefficient associated with variables

$X_1$  = VMI

$X_2$  = EOQ

$X_3$  = JIT

$X_4$  = MRP

$\epsilon$  = Error term

## CHAPTER FOUR

### DATA ANALYSIS, FINDINGS AND DISCUSSION

#### 4.1 Introduction

This segment discusses data analysis, outcomes of the study and enlightenment of the outcomes. The outcomes are in tables.

#### 4.2 The Response Rate

370 questionnaires were dispatched to the respondents to be filled and 309 questionnaires were completely filled and returned back, 61 questionnaires which some of them were not totally completed and others were not given back. A response rate of 84% was reached. Gordon (2000) believes that 60% of the response rate to be minimal, 70% appropriate, 80% good and 90% excellent.

#### 4.3 Demographic Information

Information about the nature of works and years of operating of respondent's organizations was collected and descriptive statistics that is frequency was used to analyze data collected.

##### 4.3.1 Business Description

**Table 4. 1 Business Description**

Business description	Frequency	Percent
Building works	186	60.2
Road works	77	24.9
Water works	46	14.9
Total	309	100.0

**Source:** Researcher (2018)

From table 4.1, respondents from construction firms dealing in building works were the majority and represented 60.2%. 24.9% of respondents were from construction firms dealing in road works and 14.9% of respondents were from water works construction firms. This shows that many construction firms dealing in building works operate in Nairobi as compared to others such as road works and water works.

### 4.3.2 Years of Operating

**Table 4. 2 years of Operating**

Years	Frequency	Percent
Less than a year	12	3.9
1-5 years	30	9.7
6-10 years	59	19.1
11-15 years	126	40.8
Above 15 years	82	26.5
Total	309	100.0

**Source:** Researcher (2018)

The findings from table 4.2, show that 40.8% of respondents were from organizations that have been in operations between 11-15 years and 26.5% of respondents were from organizations that have been in operations beyond 15 years. It can be concluded that respondents from these organization had knowledge in the area of inventory management practices.

### 4.4 Inventory Management Practices

This study had two goals and first, to determine the inventory management practices employed by construction firms in Nairobi. Descriptive statics was carried out.

The respondents were asked to specify the level to which they agreed with the statement on the inventory management practices used in their organizations. A Likert scale was used where 1 implied strongly disagree, 2 disagree, 3 neutral, 4 agree, 5 strongly agree.

**Table 4. 3 Inventory Management Practices**

Inventory management practices	Mean	Std. Deviation
<b>Vendor Managed Inventory</b>		
Your organization collaborates with suppliers	4.23	.677
Suppliers tracks your inventory level and makes order for you	3.86	.706
Software is used to monitor your inventory levels	4.11	.769
<b>Economic Order Quantity</b>		
A fixed order quantity is placed anytime inventory goes down	3.96	.762
Fixed order quantity minimizes holding cost and ordering cost	4.03	.795
<b>Just In Time</b>		
Items are ordered at the time they are needed	4.22	.641
Your organization keeps minimum levels of inventory	3.94	.854
<b>Material Requirement Planning</b>		
Organization uses material requirement planning to establish demand	3.78	.697

**Source:** Researcher (2018)

The scale was a five-point Likert scale, ranging from 1= strongly disagree to 5= strongly agree. The mean values were ranging from 3.86 to 4.23, this meant agree. As indicated on the Likert scale, 4 implied agree.

The outcomes in table 4.3, respondents agreed that construction firms in Nairobi use vendor managed inventory to collaborate with suppliers (M=4.23, SD=0.677), they agreed as well that vendor managed inventory is used by suppliers to track inventory levels of construction firms in Nairobi (M=3.86, SD=0.706), and lastly, they agreed that construction firms in Nairobi use a software to monitor their inventory levels (M=4.11, SD=0.769). Concerning economic order quantity, it was found that respondents agreed that in construction firms in Nairobi, a constant order quantity is placed anytime their inventory goes down (M=3.94, SD= 0.762). They also agreed that the fixed order quantity minimizes holding cost and ordering cost (M=4.03, SD= 0.795). Respondents agreed that just in time is used by construction firms in Nairobi through ordering items at the time they are needed (M=4.22, SD= 0.641). They have agreed as well that construction firms in Nairobi keep minimum levels of inventory (M=3.94, SD=0.854). Material requirement planning is used by construction firms in Nairobi through establishing their demands from material requirement planning. As agreed by respondents (M=3.78, SD=0.697).

These results are in accordance with the study of Kamakia (2015), who studied on inventory management and supply chain performance of petroleum marketing firms in Nairobi, one of the objectives was to determine the inventory management techniques of petroleum marketing firms in Nairobi, it was found that petroleum marketing firms in Nairobi adopt inventory management techniques and these include economic order quantity (M=4.253, SD= 0.874), just in time (M=4.045, SD=0.541), vendor managed inventory (M=3.985, SD=0.461), material requirement planning (M=3.874, SD=0.825) and among others.

#### 4.4.1 Summary of inventory management practices

Respondents were asked to appropriately tick the level to which the inventory management practices are used in their institution. Using the scale 1 implied no extent, 2 little extent, 3 moderate, 4 great extent, 5 very great extent

**Table 4. 4 Summary of inventory management practices**

Inventory management practices	Mean	Std. Deviation
VMI	4.11	.555
EOQ	4.08	.679
JIT	4.03	.742
MRP	4.10	.599

**Source:** Researcher (2018)

From table 4.4, Vendor managed inventory (M=4.11, SD=0.555), economic order quantity (M=4.08, SD=0.679), just in time (M=4.03, SD=0.742), and material requirement planning (M=4.10, SD=0.599). Looking at the mean, it is clear that construction firms in Nairobi use inventory management practices to a great extent. On the used scale, 4 implied great extent.

Kamakia (2015) found that petroleum marketing firms in Nairobi use inventory management practices, these involve economic order quantity, vendor managed inventory, material requirement planning, just in time, ABC analysis, and among others.

#### 4.5 Supply Chain Performance

The last goal of this research was to define the effect of inventory management practices on supply chain performance of construction firms in Nairobi. Descriptive statistics, regression and correlation analysis were employed towards this objective.

Respondents were required to rate the performance level of their firm's supply chain performance. The scale used 1 implied not very good, 2 average, 3 good, 4 very good, 5 excellent.

**Table 4. 5 Supply Chain Performance Level**

Supply chain performance measures	Mean	Std. Deviation
Percentage of defects during production or construction	3.38	.877
Service delivery speed	4.07	.713
Service delivery reliability	4.09	.736
Production/ construction cost	4.03	.709
The flexibility of the process to respond to new demands	4.32	.746
Inventory turns or sales	4.02	.693
Production or construction lead time	3.31	1.123
Costs associated with held inventories	3.93	.865

**Source:** Researcher (2018)

The mean values were ranging from 3.31 to 4.32, where 3.31 meant good and 3.38 to 4.32 meant very good.

From the table 4.5, results indicate that the use of inventory management practices in construction firms in Nairobi leads to good performance in terms of percentage of defects during construction (M=3.38, SD=0.877), and construction lead time (M=3.31, SD=1.123). Very good performance in terms of service delivery speed, service delivery reliability, production or construction cost, flexibility of the process to respond to new demands, inventory turns or sales and costs associated with held inventories (M=4.07, SD=0.713), (M=4.09, SD=0.736), (M=4.03, SD=0.709), (M=4.32, SD=0.746), (M=4.02, SD=0.693) and (M=3.93, SD=0.865) respectively in supply chain performance of construction firms in Nairobi.

#### **4.6 Correlation Analysis**

Correlation analysis was done in identifying the influence of inventory management practices on supply chain performance of construction firms in Nairobi.

From the results below, the study concluded that inventory management practices positively impacts on supply chain performance of construction firms in Nairobi. This is shown by positive correlation coefficients whereby vendor managed inventory ( $r = 0.698, p = .000$ ), economic order quantity ( $r = 0.703, p = .000$ ), just in time ( $r = 0.715, p = .000$ ), and material requirement planning ( $r = 0.554, p = .000$ ). This means

that inventory management practices are positively correlated to supply chain performance of construction firms in Nairobi and that an adjustment in inventory management practices will proportionately result in an adjustment in supply chain performance.

The results were in line with Wanyonyi (2017) who studied inventory management and service delivery of major supermarkets in Kenya. The study concluded that inventory management practices were positively correlated with the service delivery of major supermarkets in Kenya.



**Table 4. 6 Correlation Matrix**

		Supply Chain Performance	Vendor managed inventory	Economic order quantity	Just in time	Material requirement planning
Supply Chain Performance	Pearson Correlation	1	1			
	Sig.(2-tailed)	309				
	N	.698**				
Vendor managed inventory	Pearson Correlation					
	Sig. (2-tailed)	.000				
	N	309				
Economic order quantity	Pearson Correlation	.703**	.902**	1		
	Sig. (2-tailed)	.000	.000			
	N	309	309	309		
Just in time	Pearson Correlation	.715**	.680**	.801**	1	
	Sig. (2-tailed)	.000	.000	.000		
	N	309	309	309	309	
Material requirement planning	Pearson Correlation	.554**	.582**	.860**	.688**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	309	309	309	309	309

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

**Source:** Researcher (2018)

#### 4.7 Regression Analysis

The regression analysis was employed in analyzing the impact of inventory management practices on supply chain performance of construction firms in Nairobi.

**Table 4. 7 Model Summary for Cost**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.836	.698	.402	.5351

Predictors: (Constant), Material Requirement Planning, Just In Time, Vendor Managed Inventory, Economic Order Quantity

**Source:** Researcher (2018)

From the findings, R Square of 69.8% ( $R^2=0.698$ ), means that inventory management practices justify 69.8% of the variation in supply chain cost of construction firms in Nairobi. This implies that inventory management practices contribute 69.8% in reducing supply chain cost of construction firms in Nairobi.

**Table 4. 8 ANOVA for Cost**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	168.092	4	42.023	175.520	.000
Residual	72.728	304	.239		
Total	240.820	308			

Dependent Variable: Cost

Predictors: (Constant), Material Requirement Planning, Just In Time, Vendor Managed Inventory, Economic Order Quantity

**Source:** Researcher (2018)

The ANOVA outcomes show the regression model was statistically important,  $F(4,304) = 175.520$ ,  $P < .05$ . The study concluded the model was important and suitable for prediction.

**Table 4. 9 Significance of Coefficients for Cost**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2.941	.752		-8.582	.000
Vendor Managed Inventory	.228	.097	.132	2.338	.030
Economic Order Quantity	.366	.080	.117	4.073	.000
Just In Time	.523	.083	.015	5.273	.000
Material Requirement Planning	.190	.081	.133	1.932	.041

Dependent Variable: Cost

**Source:** Researcher (2018)

The coefficient of the independent variables implied that a unit increase in inventory management practices would reduce the cost of construction firms in Nairobi. The constant coefficient ( $B_0 = -2.941$ ,  $P = .000$ ) means the cost that to be carried by construction firms in Nairobi, vendor managed inventory coefficient ( $B_1 = 0.228$ ,  $P = .030$ ) means that an additional unit in vendor managed inventory would reduce supply chain cost by 0.228, economic order quantity coefficient ( $B_2 = 0.366$ ,  $P = .000$ ) means that an additional unity in economic order quantity would reduce supply chain cost of construction firms in Nairobi by 0.366, just in time coefficient ( $B_3 = 0.523$ ,  $P = .000$ ) means that an additional unit in just in time would reduce supply chain cost of construction firms in Nairobi by 0.523, material requirement planning coefficient ( $B_4 = 0.190$ ,  $P = .000$ ) means that an additional unit in material requirement planning would reduce supply chain cost of construction firms by 0.190.

The regression model of cost =  $-2.941 + 0.228VMI + 0.336 EOQ + 0.523 JIT + 0.190 MRP$ .

**Table 4. 10 Model Summary for Flexibility**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.766	.586	.561	.61454

Predictors: (Constant), Material Requirement Planning, Economic Order Quantity, Vendor Managed Inventory, Just In Time

**Source:** Researcher (2018)

The results show that R square ( $R^2 = 0.586$ ) is 58.6% which means that inventory management practices justify 58.6% of the variation of supply chain flexibility of construction firms in Nairobi. The implication of this is that inventory management practices lead to 58.6% supply chain flexibility of construction firms in Nairobi.

**Table 4. 11 ANOVA for Flexibility**

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	100.5007	4	25.125	108.29	.000
Residual	70.7813	304	.232		
Total	171.282	308			

Dependent Variable: Flexibility

Predictors: (Constant), Material Requirement Planning, Economic Order Quantity, Vendor Managed Inventory, Just In Time.

**Source:** Researcher (2018)

From the results, the study concluded that the regression model was statistically significant, this was supported by  $F(4,304) = 108.29$ ,  $P < .05$ . Thus, the Regression model is suitable for prediction purpose.

**Table 4. 12 Significance of Coefficients for Flexibility**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.726	.300		7.34	.000
Vendor Managed Inventory	.316	.073	.356	3.805	.000
Economic Order Quantity	.012	.063	.495	1.925	.04
Just In Time	.419	.058	.378	4.78	.000
Material Requirement Planning	.264	.071	.109	2.909	.005

Dependent Variable: Flexibility

Predictors: (Constant), Material Requirement Planning, Economic Order Quantity, Vendor Managed Inventory, Just In Time

**Source:** Researcher (2018)

The results in table 4.12, indicate constant coefficient ( $B_0 = 0.726$ ,  $P = .000$ ) which implies the value of supply chain flexibility when all the independent variables are equal to zero, vendor managed inventory coefficient ( $B_1 = 0.316$ ,  $P = .000$ ) means that an additional unit in vendor managed inventory would increase supply chain flexibility of construction firms in Nairobi by 0.316, economic order quantity coefficient ( $B_2 = 0.012$ ,  $P = .04$ ) means that an additional unit in economic order quantity would lead to an increase of 0.012 in supply chain flexibility of construction firms in Nairobi, just in time coefficient ( $B_3 = 0.419$ ,  $P = .000$ ) means that an additional unit in just in time would lead to an increase of 0.419 in supply chain flexibility of construction firms in Nairobi, material requirement planning coefficient ( $B_4 = 0.264$ ,  $P = .005$ ) means that an additional unit in material requirement planning would result in an increase of 0.264 in supply chain flexibility of construction firms in Nairobi.

Supply chain flexibility =  $0.726 + 0.316 \text{ VMI} + 0.012 \text{ EOQ} + 0.419 \text{ JIT} + 0.264 \text{ MRP}$ .

**Table 4. 13 Model Summary for Reliability**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.734	.538	.420	.5901

Predictors: (Constant), Material Requirement Planning, Just In Time, Vendor Managed Inventory, Economic Order Quantity

**Source:** Researcher (2018)

From the findings, R Square was 53.8% ( $R^2 = 0.534$ ), which means that inventory management practices justify 53.8% of the variation in supply chain reliability of construction firms in Nairobi. The implication of this is that inventory management practices contribute 53.8% to supply chain reliability of construction firms in Nairobi.

**Table 4. 14 ANOVA for Reliability**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	91.602	4	22.900	65.586	.000
Residual	77.861	304	.348		
Total	169.463	308			

Dependent Variable: Reliability

Predictors: (Constant), Material Requirement Planning, Just In Time, Vendor Managed Inventory, Economic Order Quantity

**Source:** Researcher (2018)

From the results, the study concluded that the regression model was statistically significant and it was fit for prediction purpose. This was seconded by  $F(4,304) = 65.586, P < .05$ .

**Table 4. 15 Significance of Coefficients for Reliability**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.878	.470		10.390	.000
Vendor managed inventory	.302	.061	.096	5.691	.000
Economic order quantity	.269	.050	.078	3.378	.005
Just in time	.409	.052	.118	7.084	.000
Material requirement planning	.036	.070	.040	1.06	.481

Dependent Variable: Reliability

**Source:** Researcher (2018)

From the above table, constant coefficient ( $B_0 = 2.878, P = .000$ ) which means that supply chain reliability would be equal to 2.878 when independent variables are all equal to zero, vendor managed inventory coefficient ( $B_1 = 0.302, P = .000$ ) means that a unit increase in vendor managed inventory would result into an increase of 0.302 in supply chain reliability of construction firms in Nairobi, economic order quantity coefficient ( $B_2 = 0.269, P = .005$ ) means that a unit change in EOQ would result in a change of 0.269 in supply chain reliability of construction firms in Nairobi, and just in time coefficient ( $B_3 = 0.409, P = .000$ ) means that a unit change in JIT would result in a change of 0.409 in supply chain reliability of construction firm in Nairobi.

Supply chain reliability =  $2.878 + 0.302 \text{ VMI} + 0.269 \text{ EOQ} + 0.409 \text{ JIT} + 0.034 \text{ MRP}$ .

**Table 4. 16 Model Summary for Asset Utilization**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	.860	.739	.684	.6275

Predictors: (Constant), Material Requirement Planning, Just In Time, Vendor Managed Inventory, Economic Order Quantity

**Source:** Researcher (2018)

The results in the above indicate R Square of 73.9% ( $R^2 = 0.739$ ), which implies that inventory management practices justify 73.9% of the variation in asset utilization of

construction firms in Nairobi. The study concluded that inventory management practices improve asset utilization in construction firms by 73.9%.

**Table 4. 17 ANOVA for Asset Utilization**

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	187.654	4	46.914	215.054	.000
Residual	66.411	304	.218		
Total	254.065	308			

Dependent Variable: Asset Utilization

Predictors: (Constant), Material Requirement Planning, Just In Time, Vendor Managed Inventory, Economic Order Quantity

**Source:** Researcher (2018)

From the outcomes, the study concluded that the regression model was statistically significant and it was fit for prediction. This was seconded by  $F(4,304) = 215.054, P < .05$ .

**Table 4. 18 Significance of Coefficients for Asset Utilization**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.714	.049		10.657	.000
Vendor managed inventory	.265	.065	.055	3.050	.000
Economic order quantity	.157	.053	.162	2.953	.013
Just in time	.424	.055	.222	4.041	.000
Material requirement planning	.247	.053	.151	3.750	.000

Dependent Variable: Asset Utilization

**Source:** Researcher (2018)

From results, the constant coefficient ( $B_0 = 0.714, P = .000$ ) means that asset utilization will have the same value of 0.714, when the four inventory management practices are equal to zero, vendor managed inventory coefficient ( $B_1 = 0.265, P = .000$ ) means that a unit increase in vendor managed inventory would result into an increase of 0.265 in asset utilization of construction firms in Nairobi, economic order quantity coefficient ( $B_2 = 0.157, P = 0.013$ ) means that a unit increase in economic order would result in an increase of 0.157 in asset utilization of construction firms in Nairobi, just in time coefficient ( $B_3 = 0.424, P = .000$ ) means that a unit increase in just in time would result in an increase of 0.424 in asset utilization of construction firms in Nairobi, and material requirement planning coefficient ( $B_4 = 0.247, P = .000$ ) means that a unit

increase in material requirement planning would result in an increase of 0.247 in asset utilization of construction firms in Nairobi.

$$\text{Asset Utilization} = 0.714 + 0.265 \text{ VMI} + 0.157 \text{ EOQ} + 0.424 \text{ JIT} + 0.247 \text{ MRP}.$$

#### **4.8 Discussion of the Findings**

It was found that construction firms in Nairobi use vendor managed inventory to a great extent (M= 4.11, SD= 0.555) in collaborating with their suppliers, tracking and monitoring their inventory levels. The outcomes were in similarity with the study by Onyango (2017) that manufacturing firm employ vendor managed inventory to collaborate with their suppliers and to track their inventory levels automatically.

The study discovered that construction firms in Nairobi use economic order quantity to a great extent (M= 4.08, SD= 0.679) through placing an order of fixed quantity anytime their levels stock go down and that it is efficient in terms of holding and ordering costs by adopting economic order quantity. This is supported by Salawati et al. (2012) who believe that EOQ is the number of units ordered which reduce carrying and ordering costs.

The study further discovered that construction firms in Nairobi use just in time to a great extent (M= 4.03, SD= 0.742) through order items at the exact time they needed and that they maintain minimum inventories in their stocks. The study also found that construction firms in Nairobi use material require planning to a great extent (M= 4.10, SD= 0.599) to establish demands. In summary, the results show that construction firms in Nairobi use to a great extent VMI, EOQ, JIT, and MRP.

Furthermore, it was found that use of inventory management practices by construction firms in Nairobi lead to good performance with regard to percentage of defects during construction (M= 3.38,SD= 0.877) and construction lead time (M= 3.31,SD= 1.123). Very good performance is achieved through service delivery speed (M= 4.07, SD= 0.713), service delivery reliability (M= 4.09, SD= 0.736), construction cost (M= 4.03, SD= 0.709), flexibility of the process to respond to new demands (M= 4.32, SD=0.746), inventory turns or sales (M= 4.02, SD= 0.693), and cost associated with held inventory (M= 3.93, SD= 0.865).

Additionally the study discovered that inventory management practices which include VMI, EOQ, JIT and MRP were good predictors of supply chain performance in



construction firms in Nairobi. In supply chain cost, the inventory management practices explained 69.8% ( $R^2 = 0.698$ ) of the variation in the supply chain of construction firms and the regression model was concluded statistically significant with  $F(4,304) = 175.520$ ,  $P < .05$ . Inventory management practices explained 58.6% ( $R^2 = 0.586$ ) of the variation in the supply chain flexibility of construction firms in Nairobi, the regression model was statistically significant with  $F(4,304) = 108.29$ ,  $P < .05$ . Additionally, inventory management practices justified 53.8% ( $R^2 = 0.538$ ) of the variation in the supply chain reliability of construction firms in Nairobi, the regression model was significant with  $F(4,304) = 65.586$ ,  $P < .05$ . Lastly, inventory management practices explained 73.9% ( $R^2 = 0.739$ ) of variation in asset utilization of construction firms in Nairobi, the model was statistically significant with  $F(4,304) = 215.054$ ,  $P < .05$ .

The outcomes of this study were in accordance with Onyango (2017) who studied inventory management practices and supply chain performance of fast moving consumer goods manufacturers in Nairobi. The goals included to define the inventory management practices used by fast moving consumer goods manufacturers and establish their impact on supply chain performance. This research used descriptive research design, 51 fast moving consumer goods manufacturers constituted the sample size. Descriptive statistics were used to determine inventory management practices employed by fast moving consumer goods manufacturers and correlation and ordinary linear square was employed to establish the influence of inventory management practices on supply chain performance of fast moving consumer goods manufacturers. It was found that fast moving consumer goods manufacturers use VMI, EOQ, JIT, RoL, MRP and ERP as inventory management practices and that they have a positive impact on supply chain performance.

## CHAPTER FIVE

### SUMMARY, CONCLUSION AND RECOMMENDATIONS

#### 5.1 Introduction

This section contains an overview of the outcomes, conclusion, recommendations, limitations and areas for further research.

#### 5.2 Summary of the Findings

This study had two purposes which included to define inventory management practices used by construction firms in Nairobi and to identify the impact of inventory management practices on supply chain performance. The descriptive research design was employed and data was gathered through a semi-structured questionnaire. The target population was 11,483 construction firms and number of observation of 370 of them was reached through stratified method. Statistical package for social science was used to analyze data.

Descriptive statistics were used in objective one and it was found that construction firms in Nairobi use inventory management practices to a great extent this was supported by the means value of inventory management practices which involve VMI, EOQ, JIT, and MRP.

Objective two was attained by the use of correlation and regression analysis and findings were that inventory management practices have an affirmative influence on supply chain performance. This was proven by a positive correlation between inventory management practices and supply chain performance and models were concluded statistically significant.

#### 5.3 Conclusion

It was concluded that construction firms in Nairobi use inventory management practices to a great extent and this involves VMI, EOQ, JIT, and MRP and that positively affect supply chain performance. Inventory management practices explained 69.8% ( $R^2 = 0.69.8$ ) of the variation in supply chain cost of construction firms in Nairobi, 58.6% ( $R^2 = 0.586$ ) of the variation in supply chain flexibility of

construction firms in Nairobi, 53.8% of the variation in supply chain reliability of construction firms in Nairobi, and 73.9% ( $R^2= 0.739$ ) of the variation in asset utilization of construction firms in Nairobi.

#### **5.4 Recommendation**

From the findings, it was depicted that the adoption of inventory management practices leads to a helpful effect on supply chain performance of construction firms in Nairobi. The study recommends firms in other sectors to implement inventory management practices in the course of managing their stocks.

#### **5.5 Limitations**

The study drew conclusions on basis of data collected from construction firms in Nairobi County. Therefore, the results cannot be applied to other construction firms in other Counties. The study examined only four inventory management practices which include VMI, EOQ, JIT and MRP. Financial resource and time were limited.

#### **5.6 Suggestions for Further Research**

The study sought to identify the inventory management practices used by construction firms in Nairobi County. The same study can be investigated in other counties and in other sectors apart from the construction sector. The studies examined four inventory management practices, future studies should consider to examine other inventory management practices such as warehouse management system and new technologies that facilitate inventory management.

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## APPENDICES

### Appendix I: Questionnaire

#### Introduction

This questionnaire has been designed for the sole purpose of collecting data on the effect of inventory management practices and supply chain performance of Construction firms in Nairobi. The data collected will be treated with a very high degree of confidentiality and it is meant for academic purpose only.

#### Section A: General Information

1. Business description of your organization:

Building works  Road works  Water works

2. Years of operating

Less than a year  1-5 years  5-10 years  10-15 years

Above 15 years

#### Section B: inventory management practices used in construction firms in Nairobi

- i) Extent of Inventory management practices used in Construction firms in Nairobi

Please indicate by ticking (✓) the extent to which the following inventory management practices are used in your organization, using the following scale **1=no extent, 2=little extent, 3=moderate, 4=great extent, 5= very great extent**

No	Inventory management practices	1	2	3	4	5
1	Vendor Managed Inventory					
2	Economic Order Quantity					
3	Just in Time					
4	Material Requirement Planning					
	<b>Others, please specify</b>					

- ii) Using the below Likert scale, indicate the extent to which you agree with the statements on the inventory management practices used in your organization. **1 = Strongly disagree, 2 = Disagree, 3 = Moderate, 4 = Agree, 5 = Strongly agree**

No	Statements	1	2	3	4	5
1	<b>Vendor Managed Inventory</b>					
	Your organization collaborates with suppliers					
	Supplier tracks your inventory level and makes order for you					
	Software is used to monitor your inventory levels					
2	<b>Economic Order Quantity</b>					
	A fixed order quantity is place anytime inventory level goes down					
	The order quantity minimizes holding cost and ordering cost					
3	<b>Just In Time</b>					
	Some items are ordered at the time they are needed					
	Your organization keeps minimum levels of inventory					
4	<b>Material Requirement Planning</b>					
	Your organization uses material requirement planning to establish demand					

**Section C: Supply Chain Performance of construction firms in Nairobi**

- i) Please rate the performance level of your firm’s supply chain. Use the following scale **1= Not Very Good, 2 =Average, 3 = Good, 4 = Very Good, 5 = Excellent**

Supply chain performance statements	1	2	3	4	5
Percentage of defects during production/ construction					
Service delivery speed					
Service delivery reliability					
Production/ construction costs					
The flexibility of the process to respond to new demands					
Inventory turns/ sales					
Production/ construction lead time					
Costs associated with held inventories					

- ii) In your opinion, would you recommend other firms to adopt inventory management practices? Give reasons:

.....  
 .....  
 .....

**Thank you for your co-operation.**

## Appendix II: List of Construction Firms in Nairobi

	<b>Firm's name</b>	<b>Works</b>
1	AMG Sagirin Limited	BUILDING WORKS
2	Bluesky General Construction Ltd	BUILDING WORKS
3	DEBROSE CONSTRUCTION Company Limited	BUILDING WORKS
4	Dymarote Enterprises	BUILDING WORKS
5	FLOLIZZ CONTRACTORS LIMITED	BUILDING WORKS
6	Kirti Enterprises Limited	BUILDING WORKS
7	MOWENS AGENCIES	BUILDING WORKS
8	Ngunya Building & General Contractors Ltd	BUILDING WORKS
9	PINDORIA HOLDINGS LTD	BUILDING WORKS
10	Taxan Investment Limited	BUILDING WORKS
11	SOMENI INDUSTRIES LTD	BUILDING WORKS
12	Brand Construction	BUILDING WORKS
13	Zulfa Construction Company Ltd	BUILDING WORKS
14	YOMASON CONTRACTORS LIMITED	BUILDING WORKS
15	Alas Construction Ltd	BUILDING WORKS
16	Ray Engineering & Construction International Limited	BUILDING WORKS
17	Jaxoo.com (K) Limited	BUILDING WORKS
18	TERRACRAFT (K) LIMITED	BUILDING WORKS
19	Bricarl Construction Solutions K Ltd	BUILDING WORKS
20	Ogitco Invest Construction Co Limited	BUILDING WORKS
21	E-CONTRACTORS LTD	BUILDING WORKS
22	Markwell Services Limited	BUILDING WORKS
23	SOLITON TELMEC LIMITED	BUILDING WORKS

24	SEVEN ELEVEN CONSTRUCTION CO. LTD	BUILDING WORKS
25	Randis Construction Co Limited	BUILDING WORKS
26	PEMJI DUNGAR & SONS	BUILDING WORKS
27	Shree Hari Construction & Transport Company Limited	BUILDING WORKS
28	ECOENG LTD	BUILDING WORKS
29	Jiangxi Water & Hydropower Construction Kenya Ltd	BUILDING WORKS
30	HALANE CONTRUCTION CO. LTD	BUILDING WORKS
31	BLOOTEX LIMITED	BUILDING WORKS
32	Bridgitta Enterprises	BUILDING WORKS
33	Wood Products (K) Limited	BUILDING WORKS
34	FASTRACK INVESTMENTS (K) LIMITED	BUILDING WORKS
35	PACIFIC GENERAL WORKS LIMITED	BUILDING WORKS
36	MAKAM TECHNICAL SERVICES	BUILDING WORKS
37	Bizwise Enterprises Limited	BUILDING WORKS
38	Fojen Enterprises Limited	BUILDING WORKS
39	Gidbong General Construction	BUILDING WORKS
40	Brisma Africa Ltd	BUILDING WORKS
41	Atticon Limited	BUILDING WORKS
42	BURQA INVESTMENT CO LIMITED	BUILDING WORKS
43	Mell Court Ltd	BUILDING WORKS
44	MARDAN ELECTRICAL WORKS	BUILDING WORKS
45	Royal contractors Limited	BUILDING WORKS
46	Brownbuilt Engineering & Construction Ltd	BUILDING WORKS
47	Bema Drillers & Construction Co	BUILDING WORKS
48	Geo-spatial research International Company Limited	BUILDING

		WORKS
49	TRESMU INVESTMENT LTD	BUILDING WORKS
50	Benma Investments Co Limited	BUILDING WORKS
51	FRANHEL INVESTMENTS	BUILDING WORKS
52	NOLA LIMITED	BUILDING WORKS
53	Morben Technical Agencies Co Limited	BUILDING WORKS
54	Northscape	BUILDING WORKS
55	Budul Investment Co. Ltd	BUILDING WORKS
56	UJENZIBORA INVESTMENT LTD	BUILDING WORKS
57	ASL LIMITED	BUILDING WORKS
58	ALHILAL CONSTRUCTION COMPANY LIMITED	BUILDING WORKS
59	LAMA ENGINEERING CO. LTD	BUILDING WORKS
60	DIESEL CARE LIMITED	BUILDING WORKS
61	Unibee Construction Limited	BUILDING WORKS
62	Cykka Works Limited	BUILDING WORKS
63	CEVON INVESTMENT LTD	BUILDING WORKS
64	Risona Investment Limited	BUILDING WORKS
65	Build Arch Images	BUILDING WORKS
66	Dayah Construction Co Limited	BUILDING WORKS
67	VONZA BUILDING AND CONSTRUCTION CO LTD	BUILDING WORKS
68	WESTGATE AGENCIES LIMITED	BUILDING WORKS
69	Star Sourcing & Supllies Limited	BUILDING WORKS
70	Seiwa Furniture Interior Designer Limited	BUILDING WORKS
71	Khasir enterprises Limited	BUILDING WORKS
72	Vaishni enterprises Limited	BUILDING WORKS

73	SONATA KENYA LTD	BUILDING WORKS
74	FASALI INVESTMENTS LIMITED	BUILDING WORKS
75	TEPSHA HOLDINGS LTD	BUILDING WORKS
76	Nirav Enterprises	BUILDING WORKS
77	PESTONY LIMITED	BUILDING WORKS
78	BLUE GRAIN INVESTMENT CO LIMITED	BUILDING WORKS
79	BROWNBARK ENGINEERING SYSTEMS LTD	BUILDING WORKS
80	KONACHE INVESTMENT LIMITED	BUILDING WORKS
81	LINKSOFT INTERGRATED SERVICES(E.A) LTD	BUILDING WORKS
82	QUESTWORKS LTD	BUILDING WORKS
83	Golax Investment Co Limited	BUILDING WORKS
84	Bullgraphics & General Supplies	BUILDING WORKS
85	KARACHI HARDWARE & CONSTRUCTION CO LIMITED	BUILDING WORKS
86	WAABERI HARDWARE & CONSTRUCTORS LIMITED	BUILDING WORKS
87	BULTUM CONSTRUCTION & GENERAL SUPPLIES LTD	BUILDING WORKS
88	Marsh Construction Co Limited	BUILDING WORKS
89	Hashim Construction Company Limited	BUILDING WORKS
90	NJORO COMMUNICATION SERVICES LIMITED	BUILDING WORKS
91	Radigo Poa Contractors	BUILDING WORKS
92	Nerry Investment Ltd	BUILDING WORKS
93	Lakole Building Construction	BUILDING WORKS
94	Jonmar Enterprises Limited	BUILDING WORKS
95	Jogang Perfect Eng. Works Ltd	BUILDING WORKS
96	Coaland Engineering Services Limited	BUILDING WORKS
97	Voacom Networks Limited	BUILDING

		WORKS
98	KALZ MANN & CO.	BUILDING WORKS
99	Konyipad Construction & Supplies Co. Ltd	BUILDING WORKS
100	Saben General Enterprises Limited	BUILDING WORKS
101	BUSINESS THREE SIXTY CONSTRUCTION CO LTD	BUILDING WORKS
102	Afcons Africa Ltd	BUILDING WORKS
103	Nuhu Agencies	BUILDING WORKS
104	Collaboration Engineering Solutions & Product Limited	BUILDING WORKS
105	ADAN & SONS CO. LIMITED	BUILDING WORKS
106	ACTS BUSINESS SYSTEMS LIMITED	BUILDING WORKS
107	Escom Ventures Limited	BUILDING WORKS
108	Western Enterprises Limited	BUILDING WORKS
109	Chaju Builders Limited	BUILDING WORKS
110	Inter-link Limited	BUILDING WORKS
111	GENESIS SOLUTIONS LTD	BUILDING WORKS
112	Garvin Holdings Ltd	BUILDING WORKS
113	Cactus Trading Co	BUILDING WORKS
114	Ark Construction Ltd	BUILDING WORKS
115	JD & Soehne Contractors Limited	BUILDING WORKS
116	Aberdares Construction Limited	BUILDING WORKS
117	NILKANTH BUILDERS LIMITED	BUILDING WORKS
118	Zonetrex Limited	BUILDING WORKS
119	C.M. Construction (EA) Limited	BUILDING WORKS?
120	Dapalk Consortium Company Limited	BUILDING WORKS
121	GEM CM CONSTRUCTION LIMITED	BUILDING WORKS

122	CALBEN ENTERPRISES AND ENGINEERING EA LIMITED	BUILDING WORKS
123	SULFA CONSTRUCTION AND SUPPLIES LIMITED	BUILDING WORKS
124	WORLD SYSTEMS ENGINEERING WORKS LIMITED	BUILDING WORKS
125	Sequid Hardware Limited	BUILDING WORKS
126	Calmex Construction Services Ltd	BUILDING WORKS
127	DAMTECH ENTERPRISES LIMITED	BUILDING WORKS
128	TECINA GENERAL CONTRACTORS LIMITED	BUILDING WORKS
129	Hasgab Enterprises Limited	BUILDING WORKS
130	Electrogen Technologies (International) Limited	BUILDING WORKS
131	WIDESCOPE CONSTRUCTION LIMITED	BUILDING WORKS
132	Encapsulated East Africa Limited	BUILDING WORKS
133	China Communications Construction Company Limited	BUILDING WORKS
134	Campbell Constructions Ltd	BUILDING WORKS
135	FULL HOUSE INVESTMENTS LTD	BUILDING WORKS
136	CIVICON LTD	BUILDING WORKS
137	CANARIES HOLDINGS LIMITED	BUILDING WORKS
138	Nelliwa builders & civil engineers Ltd	BUILDING WORKS
139	IOTA excavations & rentals ltd	BUILDING WORKS
140	CANON ALUMINIUM FABRICATORS LIMITED	BUILDING WORKS
141	Frimac General Mercantile Limited	BUILDING WORKS
142	NEW LOOK CONSTRUCTION COMPANY LIMITED	BUILDING WORKS
143	MOMELLA CONTRACTORS LTD	BUILDING WORKS
144	G North & Son Limited	BUILDING WORKS
145	TOP CHOICE SURVEILLANCE LIMITED	BUILDING WORKS
146	Canton Building & Construction Ltd	BUILDING



		WORKS
147	Southtech Engineering Limited	BUILDING WORKS
148	Canton Enterprises Ltd	BUILDING WORKS
149	Fever Group Limited	BUILDING WORKS
150	Patkan Builders Limited	BUILDING WORKS
151	Emkay Builders Limited	BUILDING WORKS
152	Nono Builders Limited	BUILDING WORKS
153	CRJE EAST AFRICA LTD	BUILDING WORKS
154	BOTHEXI CONSTRUCTION CO. LTD	BUILDING WORKS
155	Parklane Construction Ltd	BUILDING WORKS
156	TERAD INVESTMENT LIMITED	BUILDING WORKS
157	Space and Interior Builders Limited	BUILDING WORKS
158	Biogas Power Application Techniques	BUILDING WORKS
159	Connect Soft Kenya Limited	BUILDING WORKS
160	BroadVision Limited	BUILDING WORKS
161	LYN-CENT VENTURES	BUILDING WORKS
162	Pushtech Limited	BUILDING WORKS
163	LEANCONS CONSTRUCTION COMPANY LTD	BUILDING WORKS
164	Dalab Investment Limited	BUILDING WORKS
165	Abgale General Contractors Limited	BUILDING WORKS
166	R World Enterprises Limited	BUILDING WORKS
167	SPUNS VENTURES LIMITED	BUILDING WORKS
168	cybersphere design build limited	BUILDING WORKS
169	Carol Supplies & Agencies Ltd	BUILDING WORKS
170	Togoland Civil & Structural Engineering Construction Limited	BUILDING WORKS

171	EVERBLUE ENVIROMENT CONSULTANTS LIMITED	BUILDING WORKS
172	CSE CONSTRUCION CIVIL & SURVEY ENGINEERING LIMITED	BUILDING WORKS
173	Akshar Builders Limited	BUILDING WORKS
174	Casaro Construction	BUILDING WORKS
175	GAALS Agencies Limited	BUILDING WORKS
176	Watema General Supplies Limited	BUILDING WORKS
177	SOON & SEEL BUILDING & CIVIL CONSTRUCTION	BUILDING WORKS
178	WONDER PROJECTS ENGINEERING CONSTRUCTION LTD	BUILDING WORKS
179	Eworld International Limited	BUILDING WORKS
180	CCS (KENYA) LIMITED	BUILDING WORKS
181	Jefran Enterprises Limited	BUILDING WORKS
182	OLIRIC GENERAL SUPPLIES	BUILDING WORKS
183	Catrimec Services Limited	BUILDING WORKS
184	Infrastructure Investments	BUILDING WORKS
185	Causeway Construction	BUILDING WORKS
186	NORTHLINE LIMITED	BUILDING WORKS
187	Causeway Engineering Ltd	BUILDING WORKS
188	Habbi Construction Co.Ltd	BUILDING WORKS
189	CAX INVESTMENTS	BUILDING WORKS
190	Mahindi Building & Supplies (K) Ltd	ROAD WORKS
191	Renofors Kenya Limited	BUILDING WORKS
192	CHINA PETROLEUM ENGINEERING & CONSTRUCTION CORPORATION	BUILDING WORKS
193	Beverlyne Contractors Limited	BUILDING WORKS
194	Ceabud Eng. Services Ltd	BUILDING WORKS
195	CEBETH ENTERPRISES LIMITED	BUILDING

		WORKS
196	MAHESH AND TIRTH CONSTRUCTION LTD	BUILDING WORKS
197	Alfida Construction Company	BUILDING WORKS
198	Horsyd Limited	BUILDING WORKS
199	AEROPATH KENYA LIMITED	BUILDING WORKS
200	Honet Co. Ltd	BUILDING WORKS
201	GYRATION INVESTMENTS	BUILDING WORKS
202	China State Construction Engineering Corporation	BUILDING WORKS
203	CEMENTERS Ltd	BUILDING WORKS
204	JONESA ENTERPRISES LTD	BUILDING WORKS
205	SWAABIRIYN CONSTRUCTION AGENCIES LIMITED	BUILDING WORKS
206	DATUM ENTERPRISES Ltd	BUILDING WORKS
207	CENTER STAR COMPANY LIMITED	BUILDING WORKS
208	MARA SPRINGS LIMITED	BUILDING WORKS
209	NORTHTECH LTD	BUILDING WORKS
210	DUTY LOGISTICS LIMITED	BUILDING WORKS
211	MAINA POWERS TECHNIQUES LIMITED	BUILDING WORKS
212	BENKO ENTERPRISES LIMITED	BUILDING WORKS
213	MEDABS ENTERPRISES LTD	BUILDING WORKS
214	DONGSHENG CONSTRUCTION ENGINEERING LIMITED	BUILDING WORKS
215	CHINA CAMC ENGINEERING CO. LTD	BUILDING WORKS
216	CENTURION ENGINEERS & BUILDERS Ltd	BUILDING WORKS
217	SIMBA CONTRACTORS LTD	BUILDING WORKS
218	MURANI LTD	BUILDING WORKS
219	Marksons Suppliers Ltd	BUILDING WORKS

220	DAMOVIN ENGINEERING SERVICES LTD	BUILDING WORKS
221	Laguna Ventures Company limited	BUILDING WORKS
222	Facelift Enterprises Limited	BUILDING WORKS
223	WADIA CONSTRUCTION COMPANY LTD	BUILDING WORKS
224	Spurtracks Construction Co. Ltd	BUILDING WORKS
225	Jo World Agencies Limited	BUILDING WORKS
226	VICTORIA ENGINEERING COMPANY LIMITED	BUILDING WORKS
227	NICAAD CONSTRUCTION & MANAGEMENT LTD	ROAD WORKS
228	CALSDAN GENERAL TRADING CO. K LTD	ROAD WORKS
229	BEKIRU ENTERPRISES LIMITED	ROAD WORKS
230	Candid Construction Limited	ROAD WORKS
231	ANCARTA CONSTRUCTION COMPANY LIMITED	ROAD WORKS
232	WP Building & Civil Engineering	ROAD WORKS
233	Sajucy Co Limited	ROAD WORKS
234	HALGAN MEGABIDS LTD	ROAD WORKS
235	NAZARETH CONSTRUCTION COMPANY LIMITED	ROAD WORKS
236	APEX FIRSTCHOICE CONSTRUCTION LIMITED	ROAD WORKS
237	Pamar Civil & Building Contractor	ROAD WORKS
238	Stastech Limited	ROAD WORKS
239	Vabela Geoconsult and Services Limited	ROAD WORKS
240	AFROBAU KENYA LIMITED	ROAD WORKS
241	G-Tech Construction Co. Ltd	ROAD WORKS
242	Peleko Enterprises	ROAD WORKS
243	SCARLET SERRET LIMITED	ROAD WORKS
244	Mwetec General Contractor	ROAD

		WORKS
245	Channa Construction Ltd	ROAD WORKS
246	EXACT ENGINEERING LIMITED	ROAD WORKS
247	Conier Limited	ROAD WORKS
248	INOVATE ENTERPRISES LIMITED	ROAD WORKS
249	Mosmok General Supplies Limited	ROAD WORKS
250	Seluk Investment Limited	ROAD WORKS
251	Home Turnkey Services	ROAD WORKS
252	Chartered Engineering Services Ltd	ROAD WORKS
253	Charwins Ltd	ROAD WORKS
254	Feisa Construction Company Limited	ROAD WORKS
255	Unami Construction Company Limited	ROAD WORKS
256	Gobol Engineering International Limited	ROAD WORKS
257	NAMAYANA ENTERPRISES LIMITED	ROAD WORKS
258	Chefa Enterprises Ltd	ROAD WORKS
259	Samsun Holding Limited	ROAD WORKS
260	Chenjo Construction Ltd	ROAD WORKS
261	DADSONS SERVICES LIMITED	ROAD WORKS
262	METROPOLITAN ENGINEERING LIMITED	ROAD WORKS
263	Videmi Dotcom Supplies Limited	ROAD WORKS
264	Butech Building Solution	ROAD WORKS
265	THE ARC GENERAL DEALERS(K) LIMITED	ROAD WORKS
266	SCANJET LOGISTICS Limited	ROAD WORKS
267	Bahar Holdings Ltd	ROAD WORKS
268	TUSMO CONSTRUCTION CO LIMITED	ROAD WORKS

269	PEMORALD ENTERPRISES Limited	ROAD WORKS
270	JOSSY GENERAL CONSTRUCTORS LIMITED	ROAD WORKS
271	Dirie and Sons Company Limited	ROAD WORKS
272	JOVADA Construction (K) Limited	ROAD WORKS
273	Globalink International Freighters Ltd	ROAD WORKS
274	Wuyi Decoration Engineering (K) Co. Ltd	ROAD WORKS
275	NEREJA ENTERPRISES Limited	ROAD WORKS
276	Pronto Works	ROAD WORKS
277	Junjo Commercial Agencis Ltd	ROAD WORKS
278	ALMABROOK INVESTMENT Limited	ROAD WORKS
279	Brema Construction Co. Ltd	ROAD WORKS
280	Chary Business Ventures Limited	ROAD WORKS
281	SANABIL GENERAL SUPPLIES LIMITED	ROAD WORKS
282	SMARTLANE LIMITED	ROAD WORKS
283	HOMELAND EAST AFRICA LIMITED	ROAD WORKS
284	China Jiangxi International K Ltd	ROAD WORKS
285	BROWNY CONTRACTORS LIMITED	ROAD WORKS
286	China Jiangxi Corporation for International Economic and	ROAD WORKS
287	China Overseas Eng. Group Co. Ltd	ROAD WORKS
288	URBANE PROJECTS LIMITED	ROAD WORKS
289	Maraba Construction Limited	ROAD WORKS
290	NALIYE AGENCY Limited	ROAD WORKS
291	CHINA RAILWAY No. 5 ENGINEERING GROUP COMPANY LIMITED	ROAD WORKS
292	NETIS EAST AFRICA LIMITED	ROAD WORKS
293	CHINA RAILWAY No. 10 ENGINEERING GROUP	ROAD

	COMPANY LIMITED	WORKS
294	MOSMAT GENERAL MERCHANTS CO LIMITED	ROAD WORKS
295	China Sichuan International Cooperation Company Ltd	ROAD WORKS
296	China Wu Yi Kenya Co. Ltd	ROAD WORKS
297	Tribelion Africa Company Limited	ROAD WORKS
298	CHINA WU YI CO. LTD	ROAD WORKS
299	China Zhongxing Construction Co. ltd	ROAD WORKS
300	Alfalink Enterprises Limited	ROAD WORKS
301	Laxminarayan Builders Limited	ROAD WORKS
302	RAFJO DEVELOPMENT COMPANY LIMITED	ROAD WORKS
303	WEIHAI CONSTRUCTION GROUP CO. LTD	ROAD WORKS
304	LILAAF CONSTRUCTION COMPANY LIMITED	ROAD WORKS
305	Chogis Garage Limited	ROAD WORKS
306	Lindi Construction and Supplies Limited	ROAD WORKS
307	NORA NAIRI INVESTMENTS LIMITED	ROAD WORKS
308	ASWA DEVELOPERS & CONTRACTORS	ROAD WORKS
309	GEONET TECHNOLOGIES LIMITED	ROAD WORKS
310	Cuma Refrigeration East Africa Ltd	ROAD WORKS
311	SKYSPACE SYSTEMS LIMITED	ROAD WORKS
312	Nasnasnak Enterprises Limited	ROAD WORKS
313	CROWN EMPIRES & GENERAL SUPPLIERS LTD	ROAD WORKS
314	Flokice Supplies & Construction Company Limited	ROAD WORKS
315	ARDENT INVESTMENT LTD	ROAD WORKS
316	World Link Construction Ltd	ROAD WORKS
317	Almacruf Contractors Ltd	ROAD WORKS

318	Siki General Contractors	ROAD WORKS
319	Associated Construction Co. K Ltd	ROAD WORKS
320	Cat & Dman Limited	ROAD WORKS
321	Silmerk Ltd	ROAD WORKS
322	Hamrose General Supplies Limited	ROAD WORKS
323	China Henan International Cooperation Group Company Limited	ROAD WORKS
324	Baselink Group Limited	WATER WORKS
325	DYLIX COMPANY LTD	WATER WORKS
326	Cilneod Kenya Ltd	WATER WORKS
327	LIRONA CONSTRUCTION LTD	WATER WORKS
328	KAKA GENERAL INVESTMENTS LIMITED	WATER WORKS
329	FOURWAY CONSTRUCTION COMPANY LIMITED	WATER WORKS
330	FINE ENGINEERING WORKS LIMITED	WATER WORKS
331	Soil And Water Masters Limited	WATER WORKS
332	Citrolam Contractors Ltd	WATER WORKS
333	Olacho enterprises limited	WATER WORKS
334	SHUNAZ TRANSPORTERS AND SUPPLIERS LTD	WATER WORKS
335	Totemic Construction Co. Ltd	WATER WORKS
336	SAFA CITY Contractor Company Limited	WATER WORKS
337	HYDROBUILD CONSTRUCTION CO. LTD	WATER WORKS
338	Fastec Suppliers Limited	WATER WORKS
339	Valeria Construction Limited	WATER WORKS
340	MAGIC INDUSTRIES LIMITED	WATER WORKS
341	TREVCON ENGINEERING LIMITED	WATER WORKS
342	TARAN LIMITED	WATER



		WORKS
343	Serve Kenya Limited	WATER WORKS
344	BIOPOWER SYSTEMS LIMITED	WATER WORKS
345	SAMAAN CONSTRUCTION LIMITED	WATER WORKS
346	CARSON HOLDINGS Limited	WATER WORKS
347	Cesways Limited	WATER WORKS
348	BUSHRUNALI SUPPLIERS & CONTRACTORS COMPANY LIMITED	WATER WORKS
349	VANQO ROADS AND ENGINEERING LTD	WATER WORKS
350	Emni Investments Limited	WATER WORKS
351	Pentacon Ltd	WATER WORKS
352	Bevak Builders Limited	WATER WORKS
353	Smartcon Contractors & Suppliers Company	WATER WORKS
354	Contell Africa Limited	WATER WORKS
355	Columbia Developers (K) Ltd	WATER WORKS
356	COMAC LIMITED	WATER WORKS
357	COMACON LIMITED	WATER WORKS
358	WOTASAN ENTERPRISES LTD	WATER WORKS
359	Waki Clearing & Forwarding Agents Limited	WATER WORKS
360	Plan Structures Limited	WATER WORKS
361	Nariana Enterprises Limited	WATER WORKS
362	Steward Holdings Limited	WATER WORKS
363	Jemko Building & Civil Eng. Company	WATER WORKS
364	Frejed Engineering Services Limited	WATER WORKS
365	Joskith Ltd	WATER WORKS
366	Kinondo Engineering Works Limited	WATER WORKS

367	Bricata Merchants	WATER WORKS
368	ASAL BUILDERS LIMITED	WATER WORKS
369	Daja Company Limited	WATER WORKS
370	ZODIAC LOGISTICS LIMITED	WATER WORKS

**Source: NCA (2018)**