

**INVENTORY MANAGEMENT AND OPERATIONAL PERFORMANCE IN THE OIL  
MARKETING COMPANIES IN KENYA**

**MARK ANTHONY WAFULA**

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

**OCTOBER, 2016**

**DECLARATION**

I declare that this is my original work and has not been presented for a degree in any other university.

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

**MARK ANTHONY WAFULA**

**D61/77158/2015**

This project has been presented for examination with my approval as the university supervisor:

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

**MR. JOEL LELEI**

**Department of Management Science**

**School of Business**

**University of Nairobi.**

## **DEDICATION**

I dedicate this project to my lovely wife Mercy and daughter Tielle for the immense support and understanding they accorded me during the entire period. I would also want to dedicate it to my parents Mr. and Mrs. Wafula and my siblings.

## **ACKNOWLEDGMENT**

This project would not have been accomplished without good health of mind, body, and soul and for that, I thank the almighty God greatly.

I want to sincerely appreciate the mentoring, unwavering dedication, wise counsel, sacrifice and unfaltering support of my supervisor Mr. Lelei. At no time did you tire in giving me intellectual advice until final completion of the project. I will forever remain grateful for that.

I would also want to thank my classmates for their encouragement and support at all times.

Last but not least I would like to appreciate my workmates for the strong support and understanding during the entire MBA course period.

## TABLE OF CONTENTS

<b>DECLARATION</b> .....	<b>ii</b>
<b>DEDICATION</b> .....	<b>iii</b>
<b>ACKNOWLEDGMENT</b> .....	<b>iv</b>
<b>ABSTRACT</b> .....	
<b>CHAPTER ONE</b> .....	<b>1</b>
<b>INTRODUCTION</b> .....	<b>1</b>
1.1 Background of the Study.....	1
1.1.1 Inventory Management .....	2
1.1.2 Operational Performance .....	3
1.1.3 Inventory Management and Operational Performance .....	4
1.1.4 The Oil Industry in Kenya .....	5
1.2 Research Problem .....	7
1.2 Objectives of the Study .....	9
1.4 Value of the Study .....	10
<b>CHAPTER TWO</b> .....	<b>11</b>
<b>LITERATURE REVIEW</b> .....	<b>11</b>
2.1 Introduction.....	11
2.2 Theoretical Perspective .....	11
2.2.1 Theory of Constraints.....	11
2.2.2 Lean Theory .....	12
2.2.3 Stochastic Inventory Theory .....	13
2.3 Inventory Management Techniques.....	13
2.3.2 Just In Time Technique.....	14
2.3.3 Vendor Managed Inventory .....	15
2.3.4 ABC Analysis .....	16
2.4 Challenges in Implementation of Inventory Management Techniques .....	17
2.5 Empirical Review and Relationship Between Inventory Management and Operational Performance .....	19
2.6 Summary of Literature Review .....	21
2.7 Conceptual framework.....	23
<b>CHAPTER THREE</b> .....	<b>24</b>

<b>RESEARCH METHODOLOGY .....</b>	<b>24</b>
3.1 Introduction.....	24
3.2 Research Design.....	24
3.3 Target Population.....	24
3.4 Data Collection .....	25
3.5 Data Analysis .....	25
<b>CHAPTER FOUR.....</b>	<b>27</b>
<b>DATA ANALYSIS, RESULTS AND DISCUSSION.....</b>	<b>27</b>
4.1 Introduction.....	27
4.2 Demographic and Respondents Profile.....	27
4.2.1 Gender.....	27
4.2.2 Age of Respondents .....	28
4.2.3 Academic background.....	29
4.2.4 Job Title .....	29
4.2.5 Length of Service .....	30
4.2.6 Number of Year of Company Existence .....	31
4.2.7 Number of Employee .....	31
4.2.8 Firm’s Average Profits.....	32
4.2.9 Firm Ownership .....	33
4.3 Inventory Management Techniques.....	33
4.3.1 Inventory Management practices .....	34
4.3.2 Just in time practices .....	35
4.2.3 Activity Based Management Techniques.....	36
4.2.4 Economic Order Quantity .....	37
4.2.5 Vendor Managed Inventory .....	39
Practice.....	39
4.4. Challenges in the Implementation of Inventory Management Techniques.....	40
Challenges.....	40
4.5 Relationship between Inventory Management and Operational Performance.....	42
4.5.1 Inventory management and Operational Performance.....	42
Inventory management and Operational Performance.....	43
4.5.2 Regression Analysis.....	43
4.6 Discussion.....	46

<b>CHAPTER FIVE .....</b>	<b>48</b>
<b>SUMMARY, CONCLUSION AND RECOMMENDATIONS .....</b>	<b>48</b>
5.1 Introduction.....	48
5.2 Summary of the Findings.....	48
5.3 Conclusion .....	49
5.4 Study Limitations.....	50
5.5 Recommendations.....	50
5.6 Suggestions for Further Studies .....	51
<b>REFERENCES.....</b>	<b>52</b>
<b>APPENDICES .....</b>	<b>55</b>
Appendix I: Introduction Letter .....	55
Appendix II: Questionnaire .....	56

## **ABSTRACT**

This study is targeted at investigating the inventory management and operational performance in the Oil marketing companies in Kenya. The research objectives were to establish the inventory management techniques used in the oil marketing companies in Kenya; to examine the challenges diverse oil marketing enterprises experience in Kenya in the application of Inventory management methods of inventory management practices and to determine the correlation between inventory management techniques and operational performance in the Oil Marketing Companies in Kenya. This study was carried out through a descriptive research design. This study targeted 75 Oil marketing companies in Kenya; since the population is small a census was done. Data was analyzed using descriptive statistics with the use of Statistical Package for Social Sciences (SPSS). The exploration further discovered a positive correlation between inventory management and operational performance of Oil marketing firms. The finding revealed that variables; Just-in-time, Activity Based Management Economic Order Quantity, and Vendor Managed Inventory have a positive increase in operational performance. From the findings some of the challenges found to affect inventory management include: poor supply chain coordination between the various players and Unfavorable government policies e.g. quotas, bans. The study finds out that firms specializing in oil marketing activities benefit from sound inventory control management systems. Some of these benefits comprise optimal utilization of allocated resources, reduction of associated costs, enhanced profitability and effectiveness in sales operations.



# CHAPTER ONE

## INTRODUCTION

### 1.1 Background of the Study

An effective management of inventory is a critical operation in various firms specializing in the production of goods and services (Sharma, 2009). Sound administration offers a firm a competitive edge in the market. It thus gets to be crucial to convey front line systems to oversee inventories in order to maintain a strategic distance from lost deals, expenses of changing production rates, additional time costs, sub-contracting costs, superfluous expense of offers and raincheck punishments amid times of pinnacle interest (Chen, 2005).

In majority of Oil Marketing Firms, inventory creates some huge piece of existing resources (Song et al. 2006). Oil marketing firms accomplish huge investment funds from powerful materials administration, which adds up to between half and 60% of aggregate costs (Song *et al.*, 2006). Oil firms in Kenya are portrayed by lengthened or overextended chains of retailers (purchasers/operators) which, therefore, insinuate long chains of exchanges between chain individuals and customers (Amoro, 2011) Inventory management is critical for business operations in light of the fact that their prosperity and cost decrease of the association's consumption require enhanced Operational Performance and learning to the representatives (Lambert, 2008). These methods are basic and learning in them is profoundly attractive in this way, managers and procurement staff should have the capacity to apply the strategies for the advantage of the organization (Fellows & Rottger, 2005).

### **1.1.1 Inventory Management**

According to Stevenson (2010), Inventory Management is defined as a framework employed in firms in controlling its interest in inventory. It includes the recording and observing of stock level, estimating future request and settling on when and how to arrange (Adeyemi & Salami, 2010). The essential objective of Inventory Management, along these lines, is to have satisfactory amounts of brilliant things accessible to serve client needs, while additionally minimizing the expenses of conveying stock (Brigham & Ehrhard, 2005).

As per Miller (2010), Inventory Management includes all exercises set up to guarantee that clients have the required item or service. It organizes the acquisition, assembling and dissemination purposes to accomplish the marketing projections and authoritative necessities of benefiting the item to the clients. Inventory management is principally required with indicating the size and position of loaded merchandise (Ketchen & Hult, 2007).

As indicated by Miller (2010), inventory management includes all exercises set up to guarantee that clients have the required item or service. It arranges the obtaining, assembling and dispersion capacities to meet the showcasing needs and authoritative needs of profiting the item to the clients. A portion of the inventory management procedures being used include: The Just-in-Time (JIT) inventory management method which assists with overseeing income for a retailer. An organization just purchases what they require from a merchant when they get a client deals request. The next IM method is ABC investigation in which there is a pecking order from the most profitable things to the slightest. Since the organization may not esteem your whole stock similarly, this control will have the

organization centering their time and assets on things that profit. Economic Order Quantity procedure empowers associations to position their stock restitution on an expedient premise. For instance, it can be set on a monthly, quarterly, half-yearly or annually. On the other hand, Vendor Managed Inventory strategy is a streamlined way to deal with Inventory Management and request satisfaction whereby the seller is completely in charge of the recharging of stock in view of opportune POS data to the purchasers. The management of inventories has an essential bearing on the budgetary quality and aggressiveness of associations because of the reason that it specifically influences the working capital, creation and client administrations (Vergin, 2012).

### **1.1.2 Operational Performance**

Operational performance alludes to the procedures equipped towards coordination and upgrade of work exercises and results inside an association. Proficient and powerful operational execution is required to augment an organization's competitive edge through improvement of value, cost reduction quality, persistence, time to market, and item development, client lead times, stock levels, and conveyance time (Ngatia, 2013).

Indicators of effective operational performance include: enhanced financial performance, lead time performance, enhanced responsiveness, client unwaveringness, advancement, quality items, and decrease in abundance stock levels and upgrades in item/prepare outline (Johnson, 2003). Assessment of operational performance of associations ought to use both budgetary and non-monetary measures, albeit most associations have not made utilization of an adjusted system for money related and non-monetary indicators (Kaplan & Norton,

1992). Mark (2006) distinguished request lead time as the most vital operational measure. Mark (2006) characterized request lead time as the time that breaches between the receipt of a request and shipment of the item to the client. Mark (2006) distinguished other performance measures as usefulness of request era, arranging, generation booking, inventory management and quality.

### **1.1.3 Inventory Management and Operational Performance**

Inventory plays an imperative part in the development and survival of an organization as in inability to adequately and effectively oversee inventory, will prompt loss of clients because of poor services delivery subsequently sales will decrease.

Coyle, Bardi and Langley (2003) express that stock is an advantage on the asset report of associations has taken an extended centrality as an aftereffect of the system of various associations to diminish their enthusiasm for settled assets, that is; plants, stockrooms, office structures, rigging and device, and so forth. In every practical sense every wander feels that its vital to hold stocks (or stock) of various items. That is because of it would be in every practical sense hard to work with one and just of everything to be sold or used as a piece of creation or used as a piece of office work. A store or a benefit or load of everything or material used or sold a significant part of the time is along these lines kept up, so that goods are sold or used they can be displaced or recovered from the stocks held for imaginable later utilize. In light of unsteadiness in future intrigue, and because of the unwarranted availability of provisions, stock is along these lines believed to ensure an openness of items

to reduce the general associated costs in the management of organizational stock (Drury, 2000).

Lucay (2003) posits that there are undesirable levels of irrational stock which intensifies the threats of stock getting the chance to be old, stock mishap through mischief and thievery, extended limit costs like lease, assurance and pointless tie up of the affiliation's advantages. He encourage states that a firm would relinquish profits when it keeps sustaining extreme levels of stock since resources are not being placed assets into other profitable attempts.

#### **1.1.4 The Oil Industry in Kenya**

The petroleum industry in Kenya was established in 1948 through the petroleum Act chapter 116 of the laws of Kenya. The sector falls under Kenya's Ministry of Energy. Kenya has no known oil reserves and relies entirely on the import of both crude and imported products. The Arabian Gulf remains the source of Kenya's oil and as a result, procurement for the same must be done through foreign exchange (GOK: Economic Survey, 2005). In total, petroleum accounts for 25% of the fuel needs, wood fuel 72% , electricity 2% and others 1%. The low usage of petroleum products is due to the heavy reliance on wood fuel by most rural people (GOK: Economic survey, 2003).

The sector was liberalized in, October 1994. Before progression, the administration was vigorously required in deciding both the valuing and supply of petroleum items. This was done through a value setting council which met consistently to audit costs. Before progression, deficiencies were experienced for low edge items like Kerosene. The primary

worries at the season of advancement were to offer help to purchasers in admiration of normality of supply and guarantee the steady and focused valuing that a changed business sector is relied upon to give (GOK: Economic Survey, 1998). The report from PIEA takes note of that while deficiencies diminished in genuine terms, the costs of petroleum items have fallen as quickly as supply changes were experienced. The two variables that impacted the result were business sector structure and hindrances to passage that still existed. One noteworthy impact of deregulation has been the immersion of the petroleum business sector and passage of numerous new contenders, implying that, today, and a normal driver is presented to commonly the quantity of petrol stations than before (Koech, 2002).

The oil industry in Kenya is portrayed by 75 oil marketers. It is administered by the Kenyan law which covers operations from rough importation, refining and retailing. It is an oligopolistic structure overwhelmed by around 3 noteworthy players. The three players control over portion of the piece of the pie with 54.9% of the aggregate piece of the overall industry as at March 2014 (Total Kenya controlling 21.7%, Vivo Kenya 18.9% and KenolKobil 13.9%) as per PIEA, (2014). The segment is extremely aggressive described by value controls, regular non-differentiable items and strict tax assessment structure inside a changed economy along these lines requiring selection of different techniques other than cost and its related subsidiaries as a focused procedure.

Kenya Petroleum Refineries Limited (KPRL) is possessed by government and Shell/BP and Chevron/Texaco on a 50 for every penny premise (Government of Kenya, 2005). Kenya has as of recently stayed without key petroleum stocks which are basic in padding the nation

against both inland and seaward inventory network disturbances and to give supply security. The Energy (Petroleum Strategic Stock) Regulations, 2008 (Legal Notice No. 43 of 2008) accommodates Strategic supplies of refined petroleum for 90 days of utilization. The directions give that NOCK should acquire the stock to be put away by KPC. (National Energy and Petroleum Policy, January 2015). Inventory Management in the Petroleum industry is very dynamic, and thus it is very important to measure its performance to know what to control so as to keep the company on track of its business objectives. Measuring the performance of inventory management will create a scope for improvement of its performance, which will go a long way in leading a company to gaining competitive advantage (Shivoh, 2012).

## **1.2 Research Problem**

Effective inventory stream management in supply chains is one of the key variables for achievement. The test in overseeing inventory is to adjust the supply of inventory with interest. A firm would preferably need to have enough inventories to fulfill the requests of its clients and keep away from lost deals because of stock-outs. Then again, the firm does not have any desire to have a lot of stock remaining focused in view of the expense of conveying stock. Enough however not all that much is a definitive target (Coyle, Bardi and Langley, 2003).

On a global point of view, Vikram et al (2012) directed a study on inventory management systems and supply chain collaboration that assumes table supply side. The researcher's discoveries inferred that inventory management offices were all the more eager to have

seller overseen inventory system to keep up predictable supply and joint effort amongst partners. A related study by Adeyemi et al (2010) concentrated on inventory management advancement instrument in Coca-Cola Bottling industry in Nigeria. The analyst reasoned that right amount, quality and timing of inventory is accomplished by use proper inventory management systems. Richey et al (2009) directed a study that tried to comprehend firms' production network execution. The study reasoned that organizations, working in a testing aggressive environment, encounter large amounts of inventory network execution through creating viable production network linkages.

The Oil Marketing Companies in Kenya are involved in a global supply-chain that incorporates local and international transportation, requesting and inventory perceivability and control, materials taking care of, import/fare help and data innovation. One of the inadequacies of a creation system is that each association is inclined to act to its most noteworthy preferred standpoint to propel its advantage. The target of satisfying a complete customer is easily lost and open entryways that could rise up out of some coordination of decisions transversely over periods of the stock frameworks could in like manner be lost. If providers could be made more strong, there would be less necessity for inventories of unrefined materials, quality evaluation structures, patch up, and other nonvalue including works out, achieving slant creation. Therefore there is need to understand inventory management practices in Kenya Oil marketing companies, the challenges they face and also find out the relationship with operational performance.



On local perspective, Ng'ang'a (2013) also conducted a study on inventory management systems concept. The study focused on effectiveness of inventory management in Ministry of State for Provincial Administration and internal security in Nairobi. The study concluded that delay in procurement and frequent stock outs affected the organization performance. The study conducted by Githendu et al. (2008) indicated that firms that have centralized stock holding have an advantage because they are able to control the stocks and avoid stock duplication in their subsidiaries. Kariuki (2003), tries to exemplify the diverse benefits of inventory cost management in privately owned corporations. Additionally, Gathumbi (1997), posit that the Application of Inventory Models in Drug Inventory Management is equally advantageous, helping firms position themselves in the market. The studies did not bring out the role of inventory management especially in the area of operational performance. Majority of the studies done concentrated on the financial and organizational performance. Thus this study will bridge this gap by answering the following questions: what is the role of inventory management on operational performance of oil industry in Kenya; challenges faced by oil marketing companies in Kenya in the application of Inventory management techniques of inventory management practices and the relationship between inventory management techniques and operational performance in the Oil Marketing Companies in Kenya?

## **1.2 Objectives of the Study**

The objectives of the study are to;

1. Establish the inventory management techniques used in the oil marketing companies in Kenya.

2. Establish the challenges faced by oil marketing companies in Kenya in the application of Inventory management techniques of inventory management practices.
3. Determine the relationship between inventory management techniques and operational performance in the Oil Marketing Companies in Kenya.

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

It is hoped that this investigation will offer adequate evidence that Oil Marketing Firms in Kenya can use to improve on their performance by managing inventory adequately. Thus operations managers will find this research useful for knowledge and operational implementation.

The study will enable policy makers obtain knowledge of Oil industry dynamics and the appropriate role of inventory management played in operational management. It will also provide guidelines for policy makers for designing suitable strategies that will control the industry.

Additionally, the study will help scholars through the formation of bases for further studies in the field of inventory management and operational performance, especially in the Oil industries sector. This will probably generate and develop new knowledge and ideas to narrow the gap in the area of inventory management.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

The chapter presents a review of other publications connected to the identified research objectives. It provides a thorough assessment of studies and propositions by other scholars concerning the concept of Inventory Management. The content of the chapter comprises: Theoretical Framework, Role of Inventory Management and Operational Performance. The chapter also highlights the gaps identified and a conceptual framework is drawn to reflect the relationship of variables.

#### **2.2 Theoretical Perspective**

There are diverse theories utilized in conveying clarity to the investigation of the role of stock administration on operational performance. The study obtains from the theory of Constraints, Lean Theory and Stochastic Theory to build the critical concerns regarding the impacts of stock administration approaches on the profitability of large manufacturing firms.

##### **2.2.1 Theory of Constraints**

The Theory of Constraints is an administration reasoning that looks to expand manufacturing throughput proficiency evaluated on the bases of recognizable proof of those procedures that are obliging the industrial system. There are various challenges experienced in the application of the Theory of Constraints. For instance, there is a long lead time, significant number of unsatisfied requests, irregular state of meaningless inventories or nonexistence of appropriate inventories, wrong materials request, expansive number of crisis

requests and endeavor levels, absence of clients engagement, nonattendance of control identified with need orders which suggests on timetable clashes of the assets (Goldratt, 2004). The theory focuses on adequately dealing with the limit and ability of these limitations to enhance efficiency and this can be accomplished by manufacturing firms applying fitting inventory control practices. Theory of constraints is an approach whose proposition is connected to generation aimed at achieving a reduction of the organizational inventory (Cooper, 2006).

### **2.2.2 Lean Theory**

Lean theory is an augmentation of thoughts of Just In Time. The theory disposes of buffer stock and minimizes waste in production procedure (Green and Inman, 2005). Inventory leanness decidedly influences the productivity of a business firm and is the best inventory control tool.

Firms that are leaner than industry average for the most part, see positive returns (Eroglu & Hofer, 2011). The theory expounds on how manufacturers adaptability in their requesting choices, diminish the supplies of stock aimed at eliminating costs associated with the transportation of inventory. Feedback presented against the theory insinuates that materials must be available when dealing in long haul cooperation constituting data and information sharing, and the exchange of accomplices between firms.

### **2.2.3 Stochastic Inventory Theory**

As indicated by Zheng (2002), for most request amount/reorder point inventory systems, the stochastic model, which indicates the requests as stochastic procedures, is regularly more exact than its deterministic partner the EOQ model. Nonetheless, the utilization of the stochastic model has been constrained due to the nonappearance of wise scientific results on the model. This paper breaks down the stochastic request amount reorder point model in correlation with a comparing deterministic EOQ model. In light of necessary optimality conditions for the control variables inferred in the paper, and the investigation is done, and various fundamental subjective properties are set up for the ideal control parameters (Ngatia, 2013). The primary results incorporate the accompanying: (1) as opposed to the deterministic EOQ model, the controllable expenses of the stochastic model because of choice of the requested amount (accepting the reorder point is picked ideally for each requested amount). Also, the aggregate expenses are plainly bigger; the ideal request amount is greater. However, the distinction is little when the amount is substantial; the cost execution is even less touchy to decisions of the required amount. Secondly, the relative increment of the expenses brought about by utilizing the amount dictated by the EOQ rather than the ideal from the stochastic model is close to  $1/8$ , and vanishes when the requesting expenses are critical in respect to other costs (Donaldson, 2001).

### **2.3 Inventory Management Techniques**

Inventory management is very vital to an enterprise since it is custom-made to reducing costs or proliferating profits while satisfying customer's demands by guaranteeing that balanced items of stock are sustained at the right quality, quantity and that are obtainable at

the right time and in the right place (Jay & Barry, 2006). This section will review the literature on the techniques used in inventory management.

### **2.3.1 Economic Order Quantity**

Bachetti et al. (2010) argue that inventory management needs to be organized in a logical way so that the organization can be able to know when to order and how much to order. This must be attained through calculating the Economic Order Quantity (EOQ). Monetary request amount engages correlation to arrange their stock re-establishment on an ideal premise. For instance, the arrangement can be scheduled to happen from month to month, quarterly, half yearly or yearly. By so doing, it enables firms to have insignificant limit costs or zero inside their circulation focuses. Along these lines, as associations attempt to enhance the stock administration, the Economic Order Quantity (EOQ) and Re-Order Point (ROP) are necessary instruments that associations can utilize.

### **2.3.2 Just In Time Technique**

The Just In Time Technique is a Japanese philosophy, rationality associated with assembling which comprises having the right things in the right quality and amount in the correct place and at the opportune time. Utilization of Just In time Technique brings about the increment in quality, profitability, and effectiveness, enhanced correspondence and abatements in expenses and squanders. Hutchins (1999) characterizes (JIT) as a process that is prepared for moment response to the request without the necessity for any overstocking, either in the desire of the application being approaching or as a concern of improvident characteristics all the while.

Hutchins, (1999) additionally concentrated on that the prime objective of Just In time Technique is the accomplishment of zero stock, not simply inside the bounds of a single association at the end of the day all through the whole production network. It can be connected to the assembling procedure inside any organization as it is additionally being adjusted inside administration associations (Hay, 1998).

The components of Just In time Technique incorporate consistent change, taking out the seven sorts of squanders among others. The fundamental reason of JIT is to have as of late the proper measure of stock, whether rough materials or finished stock, open to meet the solicitations of your creation strategy and the solicitations of the enterprise's end customers. The less a firm spend to store and pass on the stock, the less obsolete quality it has to markdown. Finally, this all culminates into saving the company's honest to goodness money.

### **2.3.3 Vendor Managed Inventory**

Vendor Managed Inventory is a streamlined way to deal with inventory management and request satisfaction whereby the merchant is completely in charge of the recharging of stock in light of opportune POS data to the purchasers (retailer). This idea builds the client responsiveness by lessening the free market activity hole consequently giving the fulfillment to end client by benefiting the coveted item when required. Store network accomplices must share their vision of interest, necessity, and requirement to set the regular destinations.

According to Guillaume et al. (2008) the quality of purchaser-supplier relationship and trust, nature of the Information Communication Technology framework and force of data sharing has a positive effect on VMI execution. Marloes et al. (2008) preceding executing VMI, it is essential to examine the level of instability of client interest because a high vulnerability sought after adversely impacts the execution accomplished through VMI. Kazim Sari (2007) identifies that upstream information exchanged to supplier's such as the current stock level and precise deals conjecture is the most vital element for the effective usage of VMI.

### **2.3.4 ABC Analysis**

The ABC stock control technique relies on upon the decide that a little bundle of the things may usually address the weight of money estimation of the total stock. It is used as a part of the era method, while a tremendous number of things may from a little part of the money estimation of stores (Flores and Clay, 2012). According to along these lines to manage stock control high regard things are more solidly controlled than low regard things. ABC examination is an essential action method that follows the Pareto Principle concerning an organization's arrangement of stock (Ramanathan, 2006). Most organization attempts and oversights are depleted on managing A things. C things get the base thought, and B things are in the center. According to Flores and Clay (2012), the ABC approach ranks using the following criteria: A-things represent 70-80% of the firm's annual consumption approximation and just 10-20% of aggregate stocked items. B-things represent 15-25% of annual use esteem and 30% of aggregate the stock and C-things characterize 5% of the annual application of esteem and half of total stocked items.



## **2.4 Challenges in Implementation of Inventory Management Techniques**

According to Stadtler (2008), creating a distinction and upholding the appropriate measure of stock is one of the greatest difficulties that store network director's face. The stock sits as an exchange off between consumer loyalty and material accessibility and also expanding stock holding expenses and working capital. With the globalization of associations, associations are coordinating their universal companions as far as advancement and development of supply chains. In any case, development of supply chains and the supporting innovation does not fully dispense with the previously mentioned exchange off.

The parameters that are utilized for overseeing stock, for example, security stock amount, renewal request amount, reorder point in a Continuous Review arrangement, or audit period in a Periodic Review strategy use variables. For example, administration levels, requests, and supplier recharging lead times as contributions for their computation (Inman, 2009). However quickly evolving markets, contenders, and item lifecycles have made survey periods that worked in more quiet times unsatisfactory for now's pace of business execution. Inability to screen the earth and overhaul these contributions on a regular and point by point premise is a formula for the wasteful stock venture. Organizations set these parameters on a one-time premise, frequently toward the beginning of another procedure change activity or an ERP usage. In any case, inability to screen the qualities altered to the parameters and the parameters themselves prompts their inadequacy in the long haul (Boone et al., 2011). Economic slowdown made significant worry for some supply chains. Organizations are tested to keep basic items and supplies moving, oversee stock levels successfully, look after efficiency, enhance wellbeing and security, meet consistency necessities and hold crisis

transportation costs under wraps. A few specific studies highlight the wastefulness and absence of responsiveness of common SCM frameworks. As indicated by a study by the Grocery Manufacturers Association, mistakes happen in 36 percent of shopper bundled merchandise orders which prompt to stock incorrectness and are recognized as a multi-billion dollar issue (Zebra, 2011).

As indicated by Lambert et al. (2001), there are various difficulties in stock administration which include: inadequate workers responsible for inventory, utilizing a measure of execution for their business that is excessively restricted, and a defective or farfetched marketable strategy for business for the future and not distinguishing deficiencies early. Having individuals responsible for stock without sufficient preparing, knowledge or who ignores the occupation will trigger stock issues, culminating in a poor administrative performance.

According to Braglia (2004) and Montanari (2004) there exists restrictions and frail concentrations in transport which backs off transports and systems. For instance, the "bullwhip effect" an over-reaction by a relationship to changes in the business segment that prompts pointless over-burdening; vexed stock in stock; inordinate stock in stock and not ready to move it quickly enough; mixed up PC assessment of stock things accessible to be bought and tangled PC stock structures.

## **2.5 Empirical Review and Relationship Between Inventory Management and Operational Performance**

There have been various endeavors to clarify the relationship between stock administration rehearses and the efficiency of a firm. Rajeev (2010) contends that stock administration practices are a method for procuring intensity. Factors of his study were Inventory Management rehearses as an independent variable, and cost diminishment as a reliant variable. The discoveries of the survey showed a positive relationship between the factors. Koumanakos (2008) contemplated the impact of Inventory Management on the solid execution of assembling firms working in Greece. The theory that is inclined to the stock management stimulates variations in the business's budgetary implementation. The discoveries recommend that the higher the level of inventories protected by a firm, the lower the rate of return. Eckert (2007) analyzed Inventory Management and the part it plays in enhancing client benefit levels. He found a positive relationship between stock administration practices and consumer loyalty because of decreased number of stock-outs.

However, Alvesson (2001) contended that cycle inventories emerge as a result of administration choice to buy, create or offer in parts rather people units or ceaselessly. Cycle Inventories amass at different focuses in working frameworks. The extent of the parcel is a tradeoff between the cost of taking care of stock and the cost of making more constant requests and set ups. A numerical depiction of this relationship, the monetary request amount is exceptionally imperative. In JIT the requirement for cycle stock is lessened by establishing cost and time diminishment.

Ronald (1999) reveals that inventories constitute unrefined items, supplies and parts that ensure that stock appears in different concentrations all through an organization's creation and computed channel. Possession of accessible inventories can bring about somewhere around 20 and 40 percent of their esteem every year. Along these lines, painstakingly overseeing stock levels bodes well in connection with the execution of the business association. Despite various steps taken to reduce inventories through Just In Time, time pressure, and fast reaction buys.

Sandeep et al. (2007) postulate that inventory management can bring unwarranted losses if the organization always has stock outs, lack of proper warehousing plans, delivering the wrong goods to the customers as well as the lack of proper documentation for goods procured. The staff needs to understand and apply the Inventory Management techniques to ensure that the organization gets value for its money. James (2008) highlights that wholesalers convey Ten to Thirty percent (10-30%) of extra stock that is superfluous. These cause unnecessary conveying cost, loss of clients, loss of offers, and loss of benefit because of messy and wasteful stock administration. He encourages up that there is the need to set out methods to control physical stock, to decide the substantial cost of overseeing stock. Chopra and Meindl (2013), clarified that stock exists in a reliable operation as a result of the jumble amongst free market activity. Along these lines, stock's part is to grow the measure of interest that can be accomplished by having the thing, or organization prepared and available when the customer needs it.

Cheruiyot (2013) postulates that firms should adopt legitimate stock control approaches, proficient and reasonable information system concerning stock so they can change the costs and risks of stock control against the favorable circumstances got from having stock instantly open for smooth operations. Cut down levels of stock are in like manner undesirable since it meddles with creation, loss of goodwill and high asking for expenses especially when asking for is visit. Lacking stock levels prompts to a business conclusion in light of moving of customers to other capable suppliers as a delayed consequence of era/operation interruptions (Ogoye, 2014).

As indicated by Luthubua (2014) there are four purposes of stock organization which joins the accompanying. Firstly, it provides both internal and outside customers with the required organization's levels in regards to sum and demand rate fill; Secondly, it serves to ascertain present and future essentials for an extensive variety of stock to avoid over-stocking while keeping up a key separation from "bottlenecks" in progress. Lastly, the stock is important in keeping costs to a base by grouping diminish, calm bundle sizes and examination of costs created to assist in getting and conveying on inventories and to give upstream and downstream stock detectable quality in the stock system.

## 2.6 Summary of Literature Review

**Table 2.1:**

<b>Name</b>	<b>Study</b>	<b>Findings</b>	<b>Gap</b>
Sandeep K. et al. (2007).	Supply Chain Management: New Trends and Strategies	goals of stock administration are to increment corporate productivity, to anticipate the effect of corporate	The study did not cover inventory management in oil

		strategies on stock levels, and to minimize the aggregate cost of coordinations exercises	companies
James, H. (2008).	<i>Inventory Management Purchasing Construction Equipment Distribution Magazine</i>	Found that wholesalers convey (10-30%) of extra stock that is superfluous. These cause superfluous conveying cost, loss of clients, loss of offers, and loss of benefit because of messy and wasteful stock administration	Did not explain how inventory affects operational performance and the work concentrated on construction firms
Cheruiyot, K. P. (2013).	Impact of integrated supply chain on performance at Kenya Tea Development Agency.	Findings demonstrate that that association ought to set up legitimate stock control methods, productive and powerful data framework in regards to stock with the goal that they can adjust the expenses and dangers of stock control	This study concentrated on supply chain and performance
Luthubua, D. M. (2014)	Supplier base rationalization practices and supply chain performance of large manufacturing firms in Nairobi, Kenya	Findings indicate that the aim of inventory management includes: Provide both internal and external customers with the required services	The study concentrated on supply chain performance and did not highlight how it affects operational

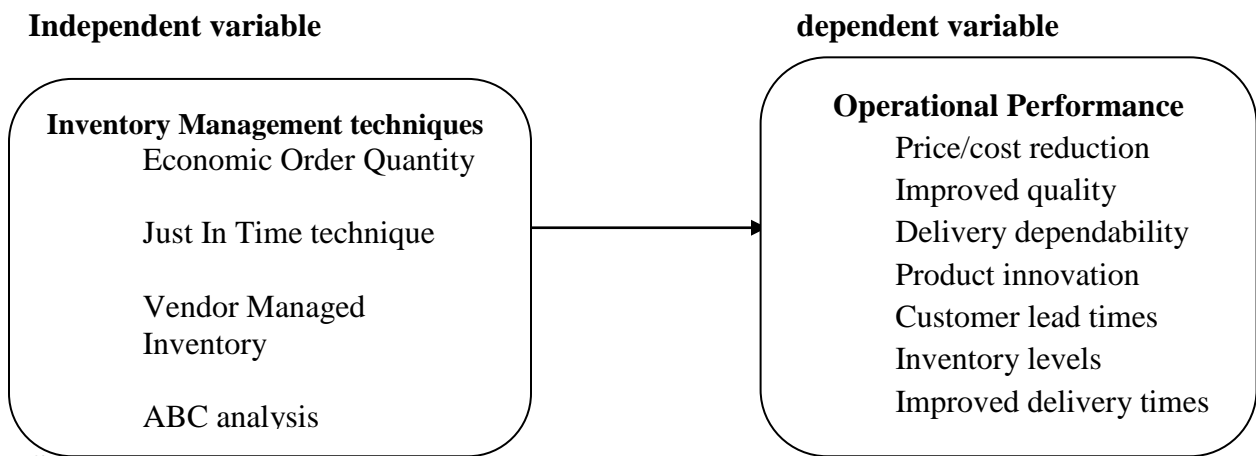
			performance
--	--	--	-------------

Source: Author (2016)

## 2.7 Conceptual framework

The Independent variable in this research is inventory management, and operational performance is the dependent variable.

Figure 3.1: Conceptual Framework



Source: Author (2016)

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter presents the appropriate research design that was used to conduct the study. The main areas of focus in this chapter were researched design, the population of the study, sampling, sample size, data gathering, and data analysis.

#### **3.2 Research Design**

The research adopted a descriptive survey research design as it allows an inside and out examination of the issue under study (Yount, 2006). The design precisely depicts a relationship between variables minimizing inclination and augmenting the unwavering quality of the information (Kothari, 2004). Descriptive studies give basic synopses about the example and the perceptions that have been made (Prem, 1995). This was a guarantee that proper answers are acquired for the research questions.

#### **3.3 Target Population**

The population used in this investigation comprised all the 75 Oil Importing (quarterly published industry magazine, 2014) and Marketing Companies registered by Energy Regulatory Commission of Kenya and the Ministry of Energy of Kenya.

The study used all the oil marketing firms in Kenya. Therefore the sample size was 75 oil marketing companies in Kenya



### 3.4 Data Collection

The questionnaire was used in the collection of the primary data. The questionnaire was divided into four sections whereby Section A gathered background/demographic information, Section B covered the IM techniques; Section C covered the challenges faced while Section D covers the relationship between IM techniques and Operational Performance.

### 3.5 Data Analysis

The collected questionnaire was organized and data was extracted from the questionnaire. After data collection, the data was quantitatively analyzed as per the statistical information acquired through the detailed research questions as follows; demographic information, the extent of application of the IM techniques, challenges faced while implementing the IM techniques and the relationship between IM techniques and Operational Performance. Data results were presented in tables, graphs, and charts to give a clear picture of the findings.

The study employed the regression equation to demonstrate the correlation between inventory management methods and operational performance in the oil marketing firms in Kenya.

$$y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$$

Where: y = Operational Performance

$\alpha$  = Constant; y-intercept, that is, the value of y when x is equal to zero

$\beta_1$  to  $\beta_4$  = the slope demonstrating degree of variation in independent variable by one unit variable

$X_1$  = Economic Order Quantity practices

X2= Just-in-time management practices

X3= Vendor Managed Inventory practices

X4= Activity Based Costing practices

$\varepsilon$  = error term

## **CHAPTER FOUR**

### **DATA ANALYSIS, RESULTS, AND DISCUSSION**

#### **4.1 Introduction**

This chapter shows the findings, presentation, interpretation and discussion of the findings obtained from the field. The research objective was to determine how inventory management and operational performance in the oil marketing companies in Kenya. Tables, figures, charts, mean and standard deviation were used in analyzing the quantitative data collected. The analysis of the standard deviation used the Statistical Package for Social Sciences (SPSS). Questionnaires were dispersed to 75 respondents out of which 58 were returned filled in and in great time giving a reaction rate of 77.3%. This reaction rate was adequate to make conclusions for the study as it went about as a delegate. As indicated by Mugenda and Mugenda (1999), a reaction rate of half is sufficient for examination and reporting; a rate of 60% is great and a reaction rate of 70% and over is incredible. In light of the attestation, the reaction rate was great.

#### **4.2 Demographic and Respondents Profile**

This segment is fundamental for giving data in regards to research members and is essential for the assurance of whether the people in a specific study are an agent test of the objective populace and testing the propriety of the respondent in noting the inquiries for speculation purposes.

##### **4.2.1 Gender**

The investigator aimed at determining the gender of the participants' Table 4.1 shows the findings.

**Table 4.2: Gender**

<b>Gender</b>	<b>Frequency</b>	<b>Percent</b>
Male	44	75.9
Female	14	24.1
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

Table 4.1 shows majority 75.9% were male and 24.1% were female.

#### **4.2.2 Age of Respondents**

**Table 4.3: Age of Respondents**

<b>Age</b>	<b>Frequency</b>	<b>Percent</b>
25 years or less	2	3.4
26-30 years	3	5.2
31-35 years	5	8.6
36-40 years	20	34.5
41-45 years	21	36.2
over 45 years	7	12.1
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

Findings on age as indicated in table 4.2 show that majority 36.2% of the respondents were aged 41-45 years. 34.5% were aged 36-40 years, 12.1% were aged over 45 years, 8.6 were

aged 31-35 years, 5.2% were aged 26-30 years while 3.4% were aged 25 years or less. This implies that majority of respondents were of considerable age and could understand the need for the study and therefore give rich information for the study.

### 4.2.3 Academic Background

**Table 4.4: Academic background**

<b>Academic background</b>	<b>Frequency</b>	<b>Percent</b>
Diploma	1	1.7
Degree	47	81.0
Postgraduate	8	13.8
Others	2	3.4
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

An analysis of the study findings indicate that most of the participants as shown in Table 4.3 by 81% of the participants held a University degree, 13.8% of the respondents were holders of postgraduate degree, 3.4% of the respondents were holders of other certificates whereas 1.7% of the participants have diploma certifications, this suggests that the respondents were knowledgeable, insinuating a sound reaction to research questions easily.

### 4.2.4 Job Title

The respondents were asked to state their job position. Job position of the respondents ensured that the survey results were valid and reliable.

**Table 4.5: Job Title**

<b>Job title</b>	<b>Frequency</b>	<b>Percent</b>
Inventory manager	18	31.0
Chief procurement officer	8	13.8
procurement manager	23	39.7
Purchasing manager	9	15.5
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

From Table 4.4, the majority (39.7%) of the respondents were procurement managers, 31% were inventory managers, 15.5% were purchasing managers, and 13.8% were Chief procurement officers. This means that majority of the respondents were procurement manager and inventory managers with sufficient information critical for this study.

#### **4.2.5 Length of Service**

The study requested the respondents to indicate how long they had served in the organization.

**Table 4.6: Length of Service**

<b>Length of service</b>	<b>Frequency</b>	<b>Percent</b>
Less than 2 years	8	13.8
2 to 5 years	24	41.4
6 to 10 years	18	31.0
Over 10 years	8	13.8
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

From the findings, majority 41.4% had worked for 2-5 years, followed by 31% who had worked for 6 to 10 years while 13.8% had worked for over 10 years and another 13.8% had worked for Less than 2 years. This suggests greater part of the respondents had worked with the association for an impressive timeframe and accordingly they were in a position to give sound data identifying with this study.

#### 4.2.6 Number of Year of Company Existence

The period of service in a given firm was also crucial in this study. Table 4.6 shows the findings.

**Table 4.7: Number of year of company existence**

<b>Number of year of company existence</b>	<b>Frequency</b>	<b>Percent</b>
Less than 2 years	3	5.2
2 to 5 years	10	17.2
6 to 10 years	30	51.7
Over 10 years	15	25.9
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

From the findings, majority 51.7% of firms had been in operation for 6 to 10 years. 25.6% had been in operation for over 10 years, 17.2% had been in operation for 2 to 5 years whereas 5.2% had been in operation for Less than 2 years.

#### 4.2.7 Number of Employee

. Table 4.7 shows the findings on the number of employees in their firm

**Table 4.8: Number of Employee**

<b>Number of Employee</b>	<b>Frequency</b>	<b>Percent</b>
Less than 50	6	10.3
50 to 100 employees	18	31.0
100 to 200 employees	27	46.6
200 to 500 employees	7	12.1
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

The findings show that majority 46.6% of the firms had 100 to 200 employees, 31% had 50 to 100 employees, 12.1% had 200 to 500 employees while 10.3% had Less than 50 employees.

#### **4.2.8 Firm's Average Profits**

Table 4.8 shows the study findings on the firm's average profit.

**Table 4.9: Firm's average profits**

<b>Firm's average profits</b>	<b>Frequency</b>	<b>Percent</b>
Below 100 million	3	5.2
100 million to 500 million	13	22.4
500 million to 1 billion	20	34.5
1 billion to 5 billion	12	20.7
Over 5 billion	10	17.2
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**



The findings indicate that majority 34.5% of the respondents had average profits of 500 million to 1 billion, 20.7 had average profits of 1 billion to 5 billion, 22.4% had average profits of 100 million to 500 million, and 17.2% had average profits of Over 5 billion while 5.2% had average profits of Below 100 million.

#### **4.2.9 Firm Ownership**

The data collection tools asked the participants to specify the form of ownership of their firm. The ownership of an organization is very important because it determines who and how strategy is adopted in the organization. Table 4.9 shows the findings.

**Table 4.10:Firm Ownership**

<b>Ownership</b>	<b>Frequency</b>	<b>Percent</b>
Foreign	25	43.1
Local	16	27.6
Both foreign and local	17	29.3
<b>Total</b>	<b>58</b>	<b>100.0</b>

**Source: Author (2016)**

Majority, 43.1% of the firms, were foreign owned, 29.3% were owned joined by both foreign and local while 27.6% were locally owned.

### **4.3 Inventory Management Techniques**

This section analyses inventory management techniques by using descriptive statistics. The means and standard deviation are indicated and the explanation indicate

### 4.3.1 Inventory Management practices

The respondents were requested that rate the announcements gave on stock administration in the oil firms. The respondents were requested that rate the statements in a range of 1-5.

Standard deviation was additionally used to quantify the fluctuation. The conveyances with a coefficient of assortment higher than 1 are suspected to be high change while those with a coefficient of assortment lower than 1 are suspected to be low-distinction.

**Table 4.11: Inventory Management practices**

<b>Descriptive Statistics</b>	<b>Mean</b>	<b>Std. Dev</b>
Procurement of all inventories is carried out once each year	2.2586	.92358
Items requisition is always fixed	3.5172	.73010
Actual ordering of inventories is triggered by inventory dropping to a specified level.	4.2172	0.61200
Inventory is ordered at the end of a predetermined time period	3.8966	.91171
The right amount of inventory is requisitioned when needed	4.2414	.84417
Inventory is delivered at the right time by the suppliers	3.6552	.94686
Inventory is delivered at the right place by the suppliers	3.8448	.96975
Exact amount of inventory ordered is delivered by the suppliers	4.4310	.84005
The organization gives inventory information to suppliers of different products	3.8793	.67739
Suppliers take full responsibility for maintaining an agreed level of inventory of each material.	3.9483	.82552
Inventory is procured throughout the year	4.2586	.66386

<b>Average overall value</b>	<b>3.8317</b>	<b>0.8132</b>
------------------------------	---------------	---------------

**Source: Author (2016)**

The table 4.10 shows that respondents agreed that exact amount of inventory ordered is delivered by the suppliers with a mean of 4.4310. They agreed that firms procure inventory throughout the year as indicated with a mean of 4.2586. They continued to agree that the right amount of inventory is requisitioned when needed as shown by a mean of 4.2414. It was least agreed that Items requisition is always fixed as shown by a mean of 3.5172. Respondents disagreed on statement that procurement of all inventories is carried out once each year as shown by a mean of 2.2586. This implies that inventory management is a process that is continuous in the organization and therefore there is always need for managing inventory throughout using a certain technique. Good inventory management can lead to good performance in an organization.

### **4.3.2 Just In Time Practices**

The respondents were asked to rate the statements provided on just in time practices in the oil firms. The respondents were asked to rate the statements as follows 1=no extent, 2=small extent, 3=moderate extent 4=large extent and 5 =Very large extent. Standard deviation was also used to measure the variance. The distributions with a coefficient of variation higher than 1 are considered being high variance whereas those with a coefficient of variation lower than 1 are considered to be low-variance.

**Table 4.12:Just in time practices**

<b>Practices</b>	<b>Mean</b>	<b>Std. dev</b>
The firm has only the required inventory when needed	2.1379	.86751
Inventory is delivered at the right time by the suppliers	4.5862	.59337

Inventory is delivered at the right place by the suppliers	4.1552	.58645
Exact amount of inventory ordered is delivered by the suppliers	4.2069	.55436
The firm replenishes inventory just when needed	4.3793	.55654
<b>Average overall value</b>	<b>3.8931</b>	<b>0.6316</b>

**Source: Author (2016)**

From the findings in table 4.11, it is clear that majority agreed to a high extent that Inventory is delivered at the right time by the suppliers with a mean of 4.5862. They agreed that the firm replenishes inventory just when needed with a mean of 4.3793. It was agreed that exact amount of inventory ordered is delivered by the suppliers with a mean of 4.2069. However the respondents did not agree to the statement that the firm has only the required inventory when needed with a mean of 2.1379. This implies that the firms practice just in time technique in their inventory management in order to enhance operational performance in their firms.

### **4.2.3 Activity Based Management Techniques**

The respondents were asked to rate the statements provided on Activity based management techniques in the oil firms. The respondents were asked to rate the statements as follows 1=no extent, 2=small extent, 3=moderate extent 4=large extent and 5 =Very large extent. Standard deviation was also used to measure the variance. The distributions with a coefficient of variety higher than 1 are thought to be high change while those with a coefficient of variety lower than 1 are thought to be low-difference.

**Table 4.13: Activity based management techniques**

<b>Practice</b>	<b>Mean</b>	<b>Std. dev</b>
The firm categorizes inventory based on how much monetary value	4.6552	.57892

they hold		
Items that hold more of the firms funds are tightly controlled by management	4.2241	.49712
The firm puts fairly less control on the items that hold least of company's funds	4.0862	.68273
The firm puts a fair amount of control on items that hold an average amount of the company's funds	3.1379	.71201
<b>Average overall value</b>	<b>4.0259</b>	<b>0.6177</b>

**Source: Author (2016)**

Findings show that respondents agreed to a very high extent that the firm categorizes inventory based on how much monetary value they hold as shown with a mean of 4.6552. They agreed to a high extent that items that hold more of the firms funds are tightly controlled by management with a mean of 4.2241. it was agreed with to a high extent with a mean of 4.2241 that items that hold more of the firms funds are tightly controlled by management and it was moderately agreed that the firm puts a fair amount of control on items that hold an average amount of the company's funds as shown by a mean of 3.1379. This shows that activity based management is used in management of inventory for good operational performance.

#### **4.2.4 Economic Order Quantity**

The respondents were asked to rate the statements provided on Economic Order Quantity techniques in the oil firms. The respondents were asked to rate the statements as follows 1=no extent, 2=small extent, 3=moderate extent 4=large extent and 5 =Very large extent.

Standard deviation was also used to measure the variance. The distributions with a coefficient of variety higher than 1 are thought to be high change while those with a coefficient of variety lower than 1 are thought to be low-difference.

**Table 4.14: Economic Order Quantity**

<b>Practice</b>	<b>Mean</b>	<b>Std. dev</b>
The firm orders inventory when current inventory level has reached a certain defined level.	4.4310	.59566
The firm replenishes inventory on a timely basis i.e. weekly, monthly, quarterly, semiannually or annually	4.1379	.57578
The firm orders a specific amount of inventory at a time.	4.1724	.62514
The firm maintains that level of inventory that minimizes the total inventory holding costs	4.3621	.78803
The firm orders amounts of inventory that minimizes the total ordering costs	4.2241	.56330
<b>Average overall value</b>	<b>4.2655</b>	<b>0.6296</b>

**Source: Author (2016)**

Findings show that respondents agreed that the firm orders inventory when current inventory level has reached a certain defined level with a mean of 4.4310. This was followed by agreement that the firm maintains that level of inventory that minimizes the total inventory holding costs with a mean of 4.3621. They agreed that the firm orders amounts of inventory that minimizes the total ordering costs with a mean of 4.2241. It was agreed that the firm

orders a specific amount of inventory at a time. With a mean of 4.1724 and the firm replenishes inventory on a timely basis i.e. weekly, monthly, quarterly, semiannually or annually was agreed with a mean of 4.1379.

#### 4.2.5 Vendor Managed Inventory

The respondents were asked to rate the statements provided on Vendor Managed Inventory techniques in the oil firms. The respondents were asked to rate the statements as follows 1=no extent, 2=small extent, 3=moderate extent 4=large extent and 5 =Very large extent. Standard deviation was also used to measure the variance. The distributions with a coefficient of variety higher than 1 are thought to be high change while those with a coefficient of variety lower than 1 are thought to be low-variance.

**Table 4.15: Vendor Managed Inventory**

<b>Practice</b>	<b>Mean</b>	<b>Std. dev</b>
Vendors are fully tasked with the responsibility of replenishing inventory on time.	4.5690	.59566
The vendors and the buyers are linked through a POS system	4.3621	.55245
The vendors replenish inventory based information from the buyers through the POS system	4.2241	.67650
Once an item of stock has been bought the same information is passed to the vendor through the POS system for replenishment.	4.4655	.62732
<b>Average overall value</b>	<b>4.4052</b>	<b>0.6130</b>

**Source: Author (2016)**

It was agreed to a very high extent that Vendors are fully tasked with the responsibility of replenishing inventory on time. As shown with a mean of 4.5690, it was agreed to a high extent that Once an item of stock has been bought the same information is passed to the vendor through the POS system for replenishment with a mean of 4.4655. It was agreed that The vendors and the buyers are linked through a POS system with a mean of 4.3621 and the vendors replenish inventory based information from the buyers through the POS system was agreed with a mean of 4.2241. This implies that vendor managed techniques are used in inventory management to enhance operational performance.

#### **4.4. Challenges in the Implementation of Inventory Management Techniques**

The respondents were asked to rate the statements on challenges in the implementation of inventory management techniques. The respondents were asked to rate the statements as follows 1=no extent, 2=small extent, 3=moderate extent 4=large extent and 5 =Very large extent. Standard deviation was also used to measure the variance. The distributions with a coefficient of variety higher than 1 are thought to be high change while those with a coefficient of variety lower than 1 are thought to be low-variance.

***Table 4.16: Challenges in the Implementation of Inventory Management Techniques***

<b>Challenges</b>	<b>Mean</b>	<b>Std. dev</b>
Identifying and maintaining the right amount of inventory	4.2241	.85928
Rapidly changing markets	4.2241	.62248
Rapidly changing competitors	4.4138	.67628
Rapidly changing product lifecycles	4.5345	.56864



Stiff competition from similar firms	4.2241	.70195
Dynamic business environment	4.4310	.72818
Unfavorable government policies e.g. quotas, bans,	4.4552	.69590
Inability to predict demand with perfect accuracy	4.1897	.60573
Using forecasts to determine how much inventory to purchase	4.1997	.60573
Poor supply chain coordination between the various players	4.1552	.69590
finding the right balance between having too little inventory and too much inventory	4.2414	.50646
Lack of proper employee training on inventory management	4.5345	.68096
Lack of senior management commitment on inventory management	4.2414	.43166
<b>Average overall value</b>	<b>4.313</b>	<b>0.6446</b>

**Source: Author (2016)**

It was agreed to a very high extent that there is lack of proper employee training on inventory management with a mean of 4.5345 and the rapidly changing product lifecycles was agreed with a mean of 4.5345. It was agreed that there are unfavorable government policies e.g. quotas, bans with a mean of 4.4552 and another challenge is the rapidly changing competitors as agreed with a mean of 4.4138. Other challenges include Poor supply chain coordination between the various players agreed with a mean of 4.1552 and Inability to predict demand with perfect accuracy agreed with a mean of 4.1897.

These discoveries are in accordance with the discoveries of Stadtler (2008) who found that recognizing and keeping up the appropriate measure of stock is one of the greatest difficulties that inventory network chiefs confront. Stock sits as an exchange off between

consumer loyalty and material accessibility and in addition expanding stock holding expenses and working capital. The parameters that are utilized for overseeing stock, for example, security stock amount, and renewal arrange amount, reorder point in a Continuous Review strategy, or survey period in a Periodic Review approach utilize elements, for example, benefit levels, requests, and provider recharging lead times as contributions for their count (Inman, 2009). However quickly evolving markets, contenders, and item lifecycles have made audit periods that worked in more settled times inadmissible for now's speed of business execution. Inability to screen nature and upgrade these contributions on an incessant and nitty gritty premise is a formula for wasteful stock speculation.

## **4.5 Relationship between Inventory Management and Operational Performance**

This section looks at the relationship between Inventory Management and Operational Performance

### **4.5.1 Inventory management and Operational Performance**

The respondents were asked to rate the variables on organizational operational performance. The respondents were asked to rate the statements as follows 1=no extent, 2=small extent, 3=moderate extent 4=large extent and 5 =Very large extent. Standard deviation was also used to measure the variance. The distributions with a coefficient of variation higher than 1 are deliberated as having a high variance whereas those with a coefficient of variation lower than 1 are considered to be low-variance.

**Table 4.17: Inventory management and Operational Performance**

<b>Inventory management and Operational Performance</b>	<b>Mean</b>	<b>Std. dev</b>
Price/cost reduction	4.0690	.74603
Improved quality	4.3621	.64068
Delivery dependability	4.2586	.66386
Customer lead times	4.1897	.60573
Product innovation	4.2414	.62996
Inventory levels	4.4483	.56731
Time to market	4.2586	.57918
Improved delivery time	4.2344	.68340
<b>Average overall value</b>	<b>4.2578</b>	<b>0.6395</b>

**Source: Author (2016)**

Findings show that the respondents agreed to a high extent on the variables provide with mean between 4.0 and 4.5. This shows the operational performance is improved operational performance is improved through cost reduction, changes in inventory levels, improved delivery time, there is Delivery dependability, there is improved quality and Customer lead times. As observed by Dess and Robinson (2014), sound planning and successful stock administration can contribute significantly to a firm yearly turnover. Westhead (2013) advised that stock administration comprises of everything from exact record-keeping to delivery and accepting of items on time, in this manner, a stock administration that is appropriately kept up can stay with a's production network running easily and productively.

## 4.5.2 Regression Analysis

The study conducted a multiple regression analysis so as to analyze the inventory management techniques and operational performance.

**Table 18:Model Summary**

<b>Model</b>	<b>R</b>	<b>R Square</b>	<b>Adjusted R Square</b>	<b>Std. Error of the Estimate</b>
1	.822	.754	0.817	.204

**Source: Author (2016)**

Adjusted R squared is the coefficient of determination which explains the extent to which changes in the dependent variable can be explained by changes in the independent variable or the percentage of variation in the dependent variable. From Table, the value of Adjusted R Square was 0.817 an indication that there was a variation of .817 percent on equitable operational performance due to changes in the independent variable (Just-in-time, Activity Based Management Economic Order Quantity, Vendor Managed Inventory). This shows that 81.7 percent changes in equitable operational performance could be accounted to inventory management techniques

**Table 19:Analysis of Variance (ANOVA)**

	<b>Sum of Squares</b>	<b>Df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
Regression	63.588	4	15.897	7.062	.001b
Residual	87.789	44	2.251		
<b>Total</b>	<b>151.377</b>	<b>58</b>			

**Source: Author (2016)**

From the findings the significance value (p- value) is .001 which is less than 0.05 thus the model is statistically significance in predicting how Just-in-time, Activity Based Management Economic Order Quantity and Vendor Managed Inventory affect the operational performance of Oil marketing firms. The calculated value at 5% level of significance was 7.062. Since the calculated value is greater than the critical value (7.062>2.65), this shows that the overall model was significant and that Just-in-time, Activity Based Management Economic Order Quantity, and Vendor Managed Inventory techniques all have a positive effect on operational performance.

**Table 4.20:Regression Coefficients**

	Unstandardize	Std. Error	Standardized	t	Sig.
	d Coefficients		Coefficients		
	B		Beta		
(Constant)	0.475	0.072		.141	.005
Just-in-time	0.683	0.083	.241	.567	.002
Activity Based Management	0.702	0.041	.493	.374	.003
Economic Order Quantity	0.793	0.037	.106	.643	.001
Vendor Managed Inventory	0.699	0.027	0.178	0.579	0.004

**Source: Author (2016)**

The finding revealed that holding independent variables constant(Just-in-time, Activity Based Management Economic Order Quantity, and Vendor Managed Inventory) to a constant zero, operational performance of Oil marketing firms in Kenya would be at 47.5%, a unit increase in Just-in-time would lead to increase in operational performance of Oil

marketing firms by a factor of 0.683. A unit increase in Activity Based Management would lead to increase in operational performance by a factor of 0.702. A unit increase in Economic Order Quantity would lead to increase in operational performance by a factor of 0.793 and a unit increase in Vendor Managed Inventory would lead to increase in operational performance by a factor of 0.699.

#### **4.6 Discussion of the Findings**

The study identified a positive correlation between inventory management and operational performance. The finding of the study is in line with the Chapman et al. (2000) study that effective inventory management has become a critical issue for firms' productivity. Inventory management is indispensable in any business aspiring to accomplish efficiency in production. Many oil marketing firms have saved millions of dollars in costs and reduced inventories while refining productivity and consumer satisfaction through various inventory management practices. This is because inventory management results to integration of better production methods to minimize costs and wastages.

The finding also supports the study by Kotler & Keller (2006) that inventory management is highly significant in any relevant initiative in the inventory intensive oil marketing industry since effective processes in inventory management allow the firm to lowering inventory costs as well as averting implications arising from deficiency of material resources. Additionally, inventories are important segments of current assets to oil marketing firms. Holding inventory ensures operational activities proceed uninterrupted, therefore, to achieve high productivity oil marketing firms apply various practices of inventory management to

determine and maintain an optimum level of investment in inventory that meets customer demands and reduces inventory costs.

## **CHAPTER FIVE**

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

#### **5.1 Introduction**

This chapter presents the summary of the study findings, conclusion and recommendations drawn from the study findings.

#### **5.2 Summary of the Findings**

The study found that firms deliver the exact amount of inventory ordered is by the suppliers with Firms procure inventory throughout the year and the right amount of inventory is requisitioned when needed the study found that items requisition is always fixed. It was also found that procurement of all inventories is carried out once each year.

The findings indicate that inventory is delivered at the right time by the suppliers. Most of the firm replenishes inventory just when needed and the exact amount of inventory ordered is delivered by the suppliers. It was found that firms do not have only the required inventory when needed Firms practice just in time technique in their inventory management inorder to enhance operational performance in their firms.

Findings show that the firm categorizes inventory based on how much monetary value they hold Items that hold more of the firms funds are tightly controlled by management Items that hold more of the firms funds are tightly controlled by management. The firm puts a fair amount of control on items that hold an average amount of the company's This shows that



activity based management is used in management of inventory for good operational performance.

Findings indicate that the firm orders inventory when current inventory level has reached a certain defined level. The firm maintains that level of inventory that minimizes the total inventory holding costs. The firm orders amounts of inventory that minimizes the total ordering costs. Firm orders a specific amount of inventory at a time. The firm replenishes inventory on a timely basis i.e. weekly, monthly, quarterly, semiannually or annually.

### **5.3 Conclusion**

The study concludes that that inventory management is a process that is continuous in the organization and therefore there is always need for managing inventory throughout using a certain technique good inventory management can lead to good performance in an organization.

In view of the study discoveries, it is presumed that a critical correlation occurs between inventory management methods and operational accomplishments in the marketing functions of oil firms in Kenya. Powerful inventory control management is considered as one of the zones an organization of any association should secure ability. The limit of any relationship to progress reasonable stock control organization structure will depend on how much it sees the preferences it stands to get from such program. All around the revelations that rose up out of this study have demonstrated that Oil publicizing firms stay to get an awesome arrangement from intense stock control organization system. Some of this

favorable position consolidate perfect use of benefits, cost diminishment, improved productivity, upgraded bargains reasonability, reduction of waste, straightforwardness and obligation, basic stockpiling and recuperation of stock, high stock use among others.

#### **5.4 Recommendations**

The study recommends that oil marketing firms adopt proactive attitudes towards the issue of proper inventory management practices. Being proactive requires maintenance of the right level of inventory at any point in time. The oil marketing firms should avoid the dangers that are inherent in keeping too little or too much of stock.

The study suggests that oil showcasing firms embrace the stock keeping strategy that best suits their operation. Here, seller oversaw stock could be deliberated on as an alternate approach since it was successful in upholding the correct level of stock as well as anticipated stock-outs. Additionally, there is the necessity that firms train their staff on stock control administration. This means just prepared proficient with the essential expertise ought to be responsible for stock administration. Best practice stock administration programming ought to be sent by firms as a solid system for dealing with the increasing expense of the holding stock. This may include preparing representatives on the use of the product, or by securing the administrations of outer framework experts.

#### **5.5 Study Limitations**

The research study constituted of only 75 licensed Petroleum marketing firms in Nairobi by the Energy Regulatory Commission. This is a relatively small number since there are many more other Petroleum marketing firms and other Petroleum marketing stakeholders who

were not included in this study. This limits generalization of the findings to other sectors and firms that were not included in the study.

## **5.6 Suggestions for Further Studies**

Based on the findings, the study suggests that further studies should be conducted on the influence of inventory management techniques on performance of other firms that are not oil based companies .The study also suggests that further studies to be conducted on a larger sample size that encompasses all the registered Oil Marketing Firms by the Energy Regulatory Commission (ERC) to investigate influence of inventory management on operational performance

## REFERENCES

- Adeyemi, S. L. & Salami, L. O. (2010). Inventory management: A tool for optimizing resources in a manufacturing industry. *Journal of Social Science*, 23(2); 135-142.
- Amarnath, S. (2007). Financing The Agricultural Value ChainBASIX Experiences. Hyderabad, India: *Unpublished report for BASIX Equity for Equity*.
- Chen, H., Murray, F., & Owen, W. (2005). What actually happened to the inventories of American companies between 1981 and 2000? , *Management Science*, 51, 7,1015-31.
- Cheruiyot, K. P. (2013). Impact of integrated supply chain on performance at Kenya Tea Development Agency. *International Journal of Social Sciences and Entrepreneurship*, 1(5), 194-203.
- Datta, P. (2007). *A Complex System, Agent Based Model for Studying and Improving The Resilience of Production and Distribution Networks*. Cranfield University. USA: Unpublished Degree of Philosophy
- Dess, G. G., & Robinson, R. B. (2014). Measuring organizational performance in the absence of objective measures: the case of the privately-held firm and conglomerate business unit. *Strategic management journal*, 5(3), 265-273.
- Gonzalez, J. L. & Gonzalez, D. (2010). *Analysis of An Economic Order Quantity and Re-Order Point Inventory Control Model for Company XYZ*. California Polytechnic State University. San Luis Obispo: Unpublished Project.
- Howorth, C. & Westhead, P. (2003). The focus of working capital management in UK small firms. *Management Accounting Research*, 14(2), 94-111.

- James, H. (2008). *Inventory Management and Purchasing often overlooked as a profit center*, Construction Equipment distribution Magazine
- Johnson, R. (2003), "E-service: enhancing internal customer service through e-procurement", International Journal of Service Industry Management, Vol. 14 No. 5, pp. 539-55.
- Kirkendall, N. (2010) Organizational Performance Measurement In The Energy Information Administration. Energy Administration Department
- Lai, K. H. & Cheng, T. C. E. (2009). *Just-In-Time Logistics*. Wey Court East, Union Road, Farnham, Surrey GU9 7PT, England: Gower Publishing Limited.
- Luthubua, D. M. (2014). *Supplier base rationalization practices and supply chain performance of large manufacturing firms in Nairobi, Kenya* (Doctoral dissertation, University of Nairobi).
- Mark (2006). An Empirical Study of Operational Performance Parity Following Enterprise System Deployment.
- Ngatia (2013). Supply Chain Management Practices and Performance of Kenya Tea Development Authority Managed Factories. MBA Project School of Business, University of Nairobi.
- Ogoye, J. A. (2014). *Influence of quality management systems implementation on Organizational performance:(case study of south nyanza sugar company limited Migori county, Kenya)* (Doctoral dissertation).
- Peel, M. J., Wilson, N. &Howorth, C. A. (2000). Late payment and credit management in the small firm sector: some empirical evidence. *International Small Business Journal*, 18(2), 52-68

- Sandeep K. et al. (2007). Supply Chain Management: New Trends and Strategies. Infosys.
- Schonberger, R. (2008). *Best Practices in Lean Six Sigma Process Improvement. A Deeper Look*. Hoboken, New Jersey, USA: Published by John Wiley & Sons Inc.
- Sharma, J. K (2009). *Operations research: theory and applications*,(4th Ed)., India Macmillan Publishers.
- Vergin, R. C. (2012). An Evaluation of Inventory Turnover in the Fortune 500 Industrial Companies. *Production and Inventory Management Journal*, 39 (1), 51-56
- Wisner, T., Tan, K.C. & Leong, G.K. (2011). *Principles of Supply Chain Management. A Balanced Approach* (3rd ed). USA: Printed in the United States of America
- Zhu, Q., Sarkis J., (2004). 'Relationships between operational practices and performance among early adopters of green supply chain management practices in Chinese manufacturing enterprises' *Journal of Operations Management* Volume 22, Issue 3

## APPENDICES

### **Appendix I: Introduction Letter**

MARK ANTHONY WAFULA

P.O. BOX 44202-00100

NAIROBI.

Email: wafula.mark254@gmail.com

Cell no: 0726711685

Dear Sir/Madam

### **RE: DATA COLLECTION FOR MBA PROJECT**

The subject kindly refers.

I am student in the University of Nairobi pursuing a Master in Business Administration course. I am currently doing my project on '**Inventory Management and Operational Performance in the Oil Marketing Companies in Kenya**'. You are therefore among those who have been selected to provide information beneficial to this study.

In case of any queries please feel free to reach me on the contact details provided above.

Thanks and regards

Yours faithfully

Mark Wafula

## Appendix II: Questionnaire

This questionnaire seeks to collect information on response by your organization to establish the critical success factors in supply chain management. Please provide the information frankly and honestly.

### SECTION A: GENERAL INFORMATION

#### DEMOGRAPHIC INFORMATION

1) What is your gender? (tick one)

Male ( )

Female ( )

2) Age(tick one)

25 years or less( )

26-30 years ( )

31-35 years ( )

36-40 years ( )

41-45 years ( )

over 45 years ( )

3) What is your academic background (tick one)

Diploma ( )

Degree ( )

postgraduate( )

Others ( )

4) What is your job title? .....

5) How long have you worked for the company? (tick one)

Less than 2 years ... ( )

2 to 5 years ..... ( )

6 to 10 years..... ( )

Over 10 years..... ( )

6) How long has the company been in existence? (tick one)

Less than 2 years ... ( )

2 to 5 years ..... ( )

6 to 10 years..... ( )

Over 10 years..... ( )

7) How many employees (approx) has the company employed? (tick one)

Less than 50 ... ( )

50 to 100 employees ( )

100 to 200 employees ( )

200 to 500 employees ( )

Over 500 employees ( )



8) What is the firm's average profits (in Kshs) in the last three financial years? (tick one)

Below 100 million .....( )

100 million to 500 million... ( )

500 million to 1 billion..... ( )

1 billion to 5 billion..... ( )

Over 5 billion..... ( )

9) Is the firm foreign or locally owned? (tick one)

Foreign ( )

Local ( )

both foreign and local ( )

**SECTION B: INVENTORY MANAGEMENT TECHNIQUES**

10) To what extent does each of the following Inventory Management practices apply to your organization? (Please tick) (Use the scale of: 1-No extent, 2-Small extent, 3- Moderate extent, 4-Large extent, 5-Very large extent).

Statements	1	2	3	4	5
Procurement of all inventories is carried out once each year					
Items requisition is always fixed					
Actual ordering of inventories is triggered by inventory dropping to a specified level.					
Inventory is ordered at the end of a predetermined time period					
The right amount of inventory is requisitioned when needed					
Inventory is delivered at the right time by the suppliers					
Inventory is delivered at the right place by the suppliers					
Exact amount of inventory ordered is delivered by the suppliers					
The organization gives inventory information to suppliers of different products					
Suppliers take full responsibility for maintaining an agreed level of inventory of each material.					
Inventory is procured throughout the year					
Others, please specify;					

11) To what extent has your firm used the below practices to manage inventory in an effort to improve on productivity? (Use the scale of: 1- no extent, 2- small extent, 3- Moderate extent, 4- large extent, 5- Very large extent).

<b>Practices</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
The firm has only the required inventory when needed					
Inventory is delivered at the right time by the suppliers					
Inventory is delivered at the right place by the suppliers					
Exact amount of inventory ordered is delivered by the suppliers					
The firm replenishes inventory just when needed					

12) To what extent has your firm used the below practices to manage inventory in an effort to improve on productivity? (Use the scale of: 1- no extent, 2- small extent, 3- Moderate extent, 4- large extent, 5- Very large extent).

<b>Practice</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
The firm categorizes inventory based on how much monetary value they hold					
Items that hold more of the firms funds are tightly controlled by management					
The firm puts fairly less control on the items that hold least of company's funds					
The firm puts a fair amount of control on items that hold an average amount of the company's funds					

13) To what extent has your firm used the below practices to manage inventory in an effort to improve on productivity? (Use the scale of: 1- no extent, 2- small extent, 3- Moderate extent, 4- large extent, 5- Very large extent).

<b>Practice</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
The firm orders inventory when current inventory level has reached a certain defined level.					
The firm replenishes inventory on a timely basis i.e. weekly, monthly,					

quarterly, semiannually or annually					
The firm orders a specific amount of inventory at a time.					
The firm maintains that level of inventory that minimizes the total inventory holding costs					
The firm orders amounts of inventory that minimizes the total ordering costs					

14) To what extent has your firm used the below practices to manage inventory in an effort to improve on productivity? (Use the scale of: 1- no extent, 2- small extent, 3- Moderate extent, 4- large extent, 5- Very large extent).

<b>Practice</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Vendors are fully tasked with the responsibility of replenishing inventory on time.					
The vendors and the buyers are linked through a POS system					
The vendors replenish inventory based information from the buyers through the POS system					
Once an item of stock has been bought the same information is passed to the vendor through the POS system for replenishment.					

### **SECTION C: CHALLENGES IN THE IMPLEMENTATION OF INVENTORY MANAGEMENT TECHNIQUES**

15) To what extent does the company face each of the following challenges in managing its inventory? Please tick where appropriate (Use the scale of: 1- No extent, 2- Small extent, 3- Moderate extent, 4- Large extent, 5- Very large extent).

<b>Challenges</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Identifying and maintaining the right amount of inventory					
Rapidly changing markets					
Rapidly changing competitors					
Rapidly changing product lifecycles					

Stiff competition from similar firms					
Dynamic business environment					
Unfavorable government policies e.g. quotas, bans,					
Inability to predict demand with perfect accuracy					
Using forecasts to determine how much inventory to purchase					
Poor supply chain coordination between the various players					
finding the right balance between having too little inventory and too much inventory					
Lack of proper employee training on inventory management					
Lack of senior management commitment on inventory management					
Others, please specify;					

**SECTION D: RELATIONSHIP BETWEEN INVENTORY MANAGEMENT AND OPERATIONAL PERFORMANCE**

16) Indicate the extent to which the organization has performed for each of the following organizational operational performance parameters. Please tick where appropriate (Use the scale of: 1- No extent, 2- Small extent, 3- Moderate extent, 4- Large extent, 5- Very large extent).

<b>Organizational Operational Performance Parameter</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
Price/cost reduction					
Improved quality					
Delivery dependability					
Customer lead times					
Product innovation					
Inventory levels					
Time to market					
Improved delivery time					

17) Please tick the option that best suits your opinion on the statement given, whereby  
 Strongly Disagree(SD)=1, Disagree(D)=2, Undecided(U)=3,  
 Agree(A)=4, Strongly agree(SA)=5.

<b>Statement</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>
IM Prevents shortages and stock out costs					
IM Enhances continuous production					
IM Reduces production costs					
IM Reduced delivery lead time					
IM Minimized machine down time					
IM Reduced resource wastages					
IM Boosts employee work morale					