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# EFFECTS OF INVENTORY MONITORING TECHNIQUES ON DISTRIBUTION SERVICE PERFORMANCE OF ESSENTIAL DRUGS IN PUBLIC HEALTH FACILITIES: A CASE STUDY OF KENYA MEDICAL SUPPLIES AUTHORITY

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## Abstract

*Purpose: The study aimed determining the effects of inventory monitoring techniques on distribution service performance of essential drugs in public health facilities: a case study of Kenya Medical Supplies Authority*

*Materials and methods: The study adopted a descriptive research design since the study was to gather quantitative and qualitative data that describes the nature and characteristics of the effects of supply chain management on distribution service performance of essentials drugs supply to the public health facilities in Kenya. The target population of this study comprised of senior managers, middle-level managers and non-management staff of KEMSA who were 270 members. Both quantitative and qualitative methods of data analysis were used to analyse the gathered data. The quantitative data generated was analysed by use of descriptive statistics feature in SPSS to generate information which was presented using tables, charts, frequency distribution table and percentages and inferential statistics to make predictions or inferences about the population from observations and analyses of sample. The regression model was used to show the relationship between the dependent variable and the independent variables. A sample size of 135 respondents was targeted for this study, with 104 respondents returning fully filled questionnaires.*

*Results: The study determined     that effective Inventory Monitoring Techniques on distribution service performance in public health facilities of Kenya Medical Supplies Authority it was found that Techniques of Inventory Control includes Analysis E.O.Q. (Economic Order Quantity) enables Setting Stock Level Inventory Turnover Ratios*

*Recommendations: Cost minimization techniques should be employed in the keeping and allocation of inventory. Management should closely monitor and manipulate their inventory system to maintain production consistency for organizational profitability and effectiveness.*

Keywords: Inventory Monitoring Techniques, Distribution Service Performance, Innovation, Asset Management, Public Health Facilities

## INTRODUCTION

### 1.1 Background to the Study

According to Kottler (2005) believes that physical distribution (logistics) has been expanded into the broader concept of supply chain management.

Besides logistics, other functional areas such as marketing finance and operations management made an equally significant contribution Hugo et al., (2004). Despite the fact that there is no agreed definition, supply chain management is intended to cover all business processes between vertically linked organizations (Bowersox et al., 2009, Lambert et al., 1998; Bask & Juga, 2001).

Lysons and Farrington (2006) points out that supply chain management can be summarized to mean the management of all activities, information, knowledge and financial resources associated with the flow and transformation of goods and services up from raw-materials suppliers, components suppliers, and other suppliers in such a way that the expectation of the users and the organizations are met or surpassed.

David et al., (1997) identify seven principles (Practices) of supply chain management that applied together can enhance revenue, assets utilization as well as customer satisfaction. These principles are: The 5 rights- The buyer ensures that materials or goods are of the right quality, the right quantity are delivered to the right place at the right time for the right price; Cost Management- that purchasing efficiency and effectiveness contribute to organization's cost saving and hence bottom line profit. This achieved by considering total cost of ownership and by putting in place efficient and effective delivery system and inventory management. The Constitution of Kenya establishes a devolved governance system in accordance with the principles and values of supply chain management articulated by Articles 174 and 175 of the constitution. The Fourth Schedule of the Constitution sets out the functions and powers of the National and County governments.

### 1.1.1 Global Perspective supply chain management

The Coca-Cola Company owns its anchor bottler in North America, Coca-Cola supply Chain Management Company Competitive Strategy Focus on aggressive marketing has which has been the cornerstone of the culture and strategy of its business. Coca-Cola Supply chain management involves planning, design, and control of the flow of material, information and finance along the supply chain to deliver superior value to the end customer in an effective and efficient manner. (Birou, 2003).

According to Bales, (2007). Build the information system for the cocacola led to improvements and modifications supply chain sytems. Which lead to the final information flow system and solution for any of their supply chain constrains the information model deals with the integration of supply chain members and concentrates on the flow of information among the chain members.

Meindl, (2015) states that Information technology plays a vital role for increasing collaboration among supply chain members. From the information point of view the effective supply chain management must provide the right amount of relevant information to the right person at the right time. Information is the key to successful supply-chain management.

### 1.1.2 Regional Perspective supply chain management

Unilever South Africa manages a number of partnerships globally and Customer partnerships, around one-fifth of Unilever's sales are through ten major retail chains. The uniliver products are sold in over 10 million small shops in developing and emerging markets. 50% of sales from developing and emerging markets. The supply chain division manages two electronic communication systems, one of which was Internet-centric. These systems were frequently used to collect and share information on all supply chain management activities in the company. (Brand, 2002).

The electronic systems were helpful as they provided ready access to information that enabled supply management executives to analyze projects based on their size, risk and resources. Unilever focused on fostering healthy relationship with its suppliers. According to a Unilever supplier, the

company was forming collaborative rather than a traditional combative relationship Unilever has integrated SCM with its innovation process at Global and Regional level Innovation. (Brand, 2002).

Fearon, (2001) to improve existing products and create new ones that consumers love. Unilever R&D teams work on breakthroughs that build a brighter future for customer, company and environment at the Global Level SCM division appoint representatives who provide list of potential suppliers to innovation team at the Regional Level – SCM division appoint innovation manager to help innovation groups to identify potential suppliers.

### 1.1.3 Kenya Medical Supply Agency

The Kenya Medical Supplies Authority (KEMSA) is the sole supplier of all pharmaceuticals and other medical products for the 3,936 facilities in the public health sector in the country. KEMSA is a semi-autonomous public sector institution under MoMS with supply management responsibilities that include sourcing, purchasing, and distributing pharmaceuticals and health supplies on behalf of GOK. The overall aim of the state-run drug distribution system is to make them accessible and affordable to Kenyan users of public health services. All procurements conducted by KEMSA are governed by the Kenya Public Procurement and Disposal Act (2015), and annual procurement plans for essential drugs and commodities are prepared by KEMSA and various health departments. KEMSA uses manual systems and procedures for procurement. These do not offer reliable and accurate management information which is a key factor in ensuring transparency across the entire procurement process.

Implementation of supply base agility practices strengthen transparency and accountability thus reduced opportunities for corruption by strengthening KEMSA's procurement capacity and accountability, improve supply chain management of public health, establish capacity within the Ministry of Health to monitor KEMSA's procurement function and assess compliance, strengthen the supervision of medical supplies delivered to rural health facilities.

### 1.2 Statement of the Problem

KEMSA currently procures and distributes over 1,173 products ranging from essential drugs, donated program drugs, medical consumables, and other specialty consumables such as X-ray and dental materials under a centralized model. In addition to bureaucratic challenges, there is also a perception among some private sector representatives that in the past there has been a lack of transparency around some of KEMSA's procurement activities. The combination of these factors has positioned KEMSA as potentially non-competitive in the private sector in the current context. As a general rule, KEMSA purchases pharmaceutical products using an open tender system where the vendor who meets the selection criteria and offers the lowest price gets awarded.

The GOK has put forward a policy to promote local pharmaceutical manufacturing and part of this policy is the regulation stipulating that KEMSA purchase products from local manufacturers at prices up to 115% of the lowest price offered by an international supplier. In practice some non-compliance with this regulation has been observed, with KEMSA continuing to source internationally despite local availability of a drug, which has led to some discontent among local manufacturers. KEMSA plays the role of procuring, storing and distributing health commodities for the public health sector. But the supplies from KEMSA are always short of the requirements of the public health institutions in County government. This has forced the public health facilities in devolve government to be purchasing a substantial portion of essential drugs requirements from the local pharmaceutical stores using revenue they get from the public health facilities cost sharing initiative.

According to World Bank as the major donor for Reproductive Health and HIV/AIDS financing,

supply chain agility as an aspect of supply chain management has declined at an alarming rate resulting in a decrease in global GDP to up to 4.7% (WB, 2014). According to (UNICEF, 2012) the primary provider of vaccines and some of the essential drugs in Kenya, Kenya's infant mortality rate stands at 48%, with the country's life expectancy at birth being 58%. This is significantly lower than the global average of 68%.

A number of studies have been carried out in the field of supply chain management targeting different industries. For example, Moenga (2011) focuses on SCM practices and challenges for small scale tee sector in Kenya the findings were as follows; the supply chains in the sector were found to be too long involving several stages which increase operating costs. The sector was found to face several challenges which threaten its long term growth and survival, the most worrying challenge being the continued rising labor and other operating costs.

According to Gitau (2011) on SCM malpractices in the Kenya public sector the study reveals that there was noncompliance SCM policies and guidelines, lack of professional skills among the SCM staff, lack of ethics, competitive tendering, accountability, inadequate use of technology, also reveals government has put in place comprehensive anti-corruption program in public procurement, there is application of PPDA as a guide in the procurement process in Ministries and there are ongoing training programs on the procurement principles, operations and law. But to the extent of the researcher's literature review, there are no studies that the researcher is aware of that have focused on the effects of supply chain management on distribution of essentials drugs supply to the public health facilities.

## 1.3 Research Objectives

Effects of inventory monitoring techniques on distribution service performance of essential drugs in public health facilities: a case study of Kenya Medical Supplies Authority.

### 1.3.1 Specific Objectives

Specific objectives of this study were

i. To establish how Innovation affects inventory monitoring techniques in public health facilities

ii. To determine how Asset Management affects inventory monitoring techniques in public health facilities.

iii. To determine how Responsiveness affects inventory monitoring techniques in public health facilities.

## 2.1 Theoretical foundation and Literature

The theoretical literature review helps establish what theories already exist, the relationship between them, to what degree the existing theories have been investigated, and to develop new hypotheses to be tested. Often, this form is used to help establish a lack of appropriate theories or reveal that current theories are inadequate for explaining new or emerging research problems. The unit of analysis can focus on a theoretical concept or a whole theory or framework (Fink, 2005). Defee (2010) provide a summary analysis of the theories being used in contemporary logistics and supply chain management. They reveal that over 180 specific theories are used from different disciplines in SCM and logistics. These include competitive theory, microeconomic theory, system theory, marketing theory, theories of organization, sociological theory, social exchange theory, inventory theory, institutional theory, decision theory, innovation theory and psychological theories for individuals.

### 2.1.1 General Systems Theory on Supply Chain

The study was based on Institutional Theory in establishing influence of inventory monitoring techniques on distribution service performance. The general systems theory was developed initially by Von Bertalanffy (1969) Another important concept of a system is the definable boundary that separates a system from its environment and allows

inputs to and outputs out of the system (Rudolf, 2011). The general systems theory according to Rudolf (2011) identifies four general systems principles. These principles are; The more specialized or complex a system is, the less adaptable it is to its environment, the larger the system, the more the resources are required to support the system, systems often contain other systems, and are in themselves components of larger systems and systems grow proportionally to resources allocated to the system.

Supply chains are considered systems of providing flow of good, product or services to consumers (Chopra & Meindl, 2004). The contribution of the general systems to supply chain can be seen from this view point that the supply chain is a system with inputs and expected outputs, to inform management of supply chain. Handfield and Nicholas (1999) explains that, within the context of the general systems theory, the supply chain includes the management of information systems, sourcing and procurement systems, logistics systems, order and customer service systems and integration of these activities through improved relations between these systems can be used to gain competitive advantage.

The general systems theory provides opportunity to distinguish subsystems and variables that operate within a supply chain leading to a better understanding of the dynamics within the supply for better study and improvements. General Systems Theory on Supply Chain is adopted in this study because it can be used to explain how the management of information systems, sourcing and procurement systems, logistics systems, order and customer service systems and integration of these activities through improved relations between these systems can be used to gain competitive advantage.

### 2.2.3 Inventory Monitoring Techniques

Alade, Sharma and Sharma (2004) discussed Supply Chain (SC), which involves the configuration, coordination, and improvement of sequentially related set of operations in establishments, integrates technology and human resource capacity for optimal management of operations to reduce inventory requirements and provide support to enterprises in pursuance of a competitive advantage in the marketplace. The paper addresses the structures of supply chain management (SCM) and the activities involved in SCM decisions that help promote profound improvement in efficiency and effectiveness in business operations. In broader context, the paper examines the types of activities involved in SCM decisions; the dynamics of the traditional SCM, the complementarities of technology in achieving effective management of operations through enablers of electronic data interchange (EDI) and quick response (QR) disciplines to implement Just-in-Time (JIT) management techniques; and integrated SC and inventory control as it relates to capacity imbalances and transaction costs. (Alade, Sharma, & Sharma, 2004).

### 2.2.4 Inventory Monitoring Techniques

Modi (2008). Each of the areas needs to be addressed in some form or another to have a successful program of Inventory Management and Inventory Control. Organizations are not satisfied with the contribution inventory makes towards the overall success of their business. The many reasons cited for this are: Wrong quantities of the wrong items are often found on warehouse shelves. Even though there may be a lot of surplus inventory and dead stock in the warehouse(s), backorders and lost sales are common. The material a company has committed to stock is not available when customers request it. Computer inventory records are not accurate. Inventory balance information in the organizations' expensive computer system does not accurately reflect what is available for sale in the warehouse.

The return on investment is not satisfactory. The company's profits, considering its substantial investment in inventory, are far less than what could be earned if the money were invested elsewhere. Many companies take an inventory of

their supplies on a regular basis in order to avoid running out of popular items. Others take an inventory to insure the number of items ordered matches the actual number of items counted physically. Shortages or overages after an inventory can indicate a problem with theft or inaccurate accounting practices. Possessing a high amount of inventory for long periods of time is not usually good for a business because of inventory storage, obsolescence and spoilage costs (Deveshwar & Modi, 2008).

Inventory management simply means the methods you use to organize, warehouse and replace inventory, to keep an adequate supply of goods while minimizing costs. Each location where goods are kept will require different methods of inventory management. Keeping an inventory, or stock of goods, is a necessity in retail. Customers often prefer to physically touch what they are considering purchasing, so you must have items on hand. In addition, most customers prefer to have it now, rather than wait for something to be ordered from a distributor, (Lazaridis & Dimitrios, 2005). In manufacturing, inventory management is even more important to keep production running. Every minute that is spent down because the supply of raw materials was interrupted costs the company unplanned expenses. In counting stock all businesses must know what they have on hand and evaluate stock levels with respect to current and forecasted demands. You must know what you have in stock to ensure you can meet the demands of customers and production and to be sure you are ordering enough stock in the future. Counting is also important because it is the only way you will know if there is a problem with theft occurring at some point in the supply chain (Lazaridis & Dimitrios, 2005).

## 2.2 Conceptual Framework

Conceptual framework is the mental formulation and explanation of ideas. It is the direct link of concepts and relationships of constructs that are going to be used in the study. The conceptual framework comprises of four independent variables and one dependent variable. Mugenda and Mugenda, (2003) defined an independent variable as the one that the researcher manipulates in order to determine the effect or the influence on the other variable. On the other hand a dependent variable is the one that attempts to indicate the total influence arising from the effects of the independent variable and varies as a function of the independent variable according to Mugenda and Mugenda, (2003).

**Figure 1: Conceptual Framework**
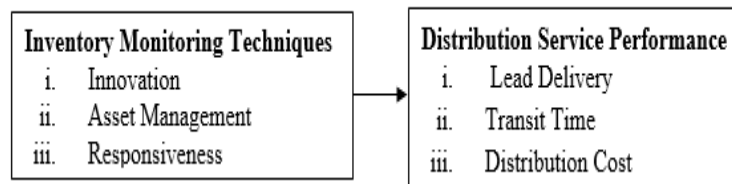


## 3.0 METHODOLOGY

The study adopted a descriptive research design since the study was to gather quantitative and qualitative data that describes the nature and characteristics of the effects of supply chain management on distribution service performance of essentials drugs supply to the public health facilities in Kenya. The target population of this study comprised of senior managers, middle-level managers and non-management staff of KEMSA who were 270 members. Both quantitative and qualitative methods of data analysis were used to analyse the gathered data. The quantitative data generated was analysed by use of descriptive statistics feature in SPSS to generate information which was presented using tables, charts, frequency distribution table and percentages and inferential statistics to make predictions or inferences about the population from observations and analyses of sample. The regression model was used to show the relationship between the dependent variable and the independent variables. A sample size of 135 respondents was targeted for this study, with 104 respondents returning fully filled questionnaires.

## 4.0 RESEARCH FINDINGS AND DISCUSSIONS

### 4.1 Introduction

The study sought to investigate the effects of supply chain management on the distribution service performance in public health facilities with reference to Kenya Medical Supplies Authority as a study case. Specifically, the study looked at four study variables inventory management levels, bureaucratic procurement process, managing deliveries and inventory monitoring technics. This chapter presents the empirical findings and results of the application of the variables. Data was analysed, results interpreted on the basis of the overall objectives of the study.

As tabulated in table 1. As shown majority of the respondent had attained graduate level education with 50%, followed by college level education at 27% while 15% had attained post graduate level of education while 4% had indicated Ph D. Low level of education is associated with low literacy skills which may significantly limit the ability to understand and respond to research questions.

### Table 1: Level of education

| Education level | Frequency | Percent |
|---|---|---|
| College | 28 | 27% |
| Graduate | 52 | 50% |
| Post Graduate | 16 | 15% |
| Ph D | 4 | 4% |
| Total | 104 | 100.0 |

### 4.2 Inventory Monitoring Techniques

As shown in table 2 respondents were asked to indicate their views on effects of managing deliveries on distribution of essentials drugs supply to the public health facilities and the respondents were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements and provide the best answer possible Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree. A mean score of 0 to1.5 means that the respondents strongly disagreed, between 1.50 to 2.50 means they disagreed, 2.50 to 3.50 means the respondents were not sure, 3.50 to 4.50 means they agreed, and a mean above 4.50 means the respondents strongly agreed.

Respondent views were as follows if inventory management increase share market of a company (M=4.784; SD=0.564); second view was if high return on investment can be achieved through effective inventory management in relations to customer and suppliers relations (M=4.870; SD=1.245); third view was if inventory management enhances organizational competitive position in the industry (M=4.125; SD=1.945); Inventory management promotes organizational net income growth? (M=4.234; SD=0.954) and finally accuracy of inventory records promotes organization image (M=4.561; SD=0.763).

The findings are in agreement with Lazaridis and Dimitrios (2005) the duo highlighted the importance of firms keeping their inventory at an optimum level by analyzing the relationship between working capital management and corporate profitability and stressed that its mismanagement will lead to excessive tying up of capital at the expense of profitable operations. A similar study by (Rehman, 2006) established a strong negative relationship between inventory turnover in days and profitability of firms. This view is also held by Sander (2010) who asserted that the amount of inventory ordered at particular intervals does affect the replenishment intervals.

Table 2: inventory monitoring techniques

|  | Mean | Standard Deviation | n |
|---|---|---|---|
| Inventory management increase share market of a company? | 4.784 | 0.564 | 104 |
| High return on investment can be achieved through effective inventory management in relations to customer and suppliers relations? | 4.870 | 1.245 | 104 |
| Inventory management enhances organizational competitive position in the industry? | 4.125 | 1.945 | 104 |
| Inventory management promotes organizational net income growth? | 4.234 | 0.954 | 104 |
| Accuracy of inventory records promotes organization image? | 4.561 | 0.763 | 104 |

## 4.3 Distribution performance

As shown in table 3 above respondents were asked to indicate their views whether they agree or disagree with the following statements on the supply chain management on distribution service performance were instructed to respond to the statements on a 5 point Likert scale and indicate the extent they agree with the statements and provide the best answer possible Strongly Agree, Agree, Undecided, Disagree, Strongly Disagree.

A mean score of 0 to1.5 means that the respondents strongly disagreed, between 1.50 to 2.50 means they disagreed, 2.50 to 3.50 means the respondents were not sure, 3.50 to 4.50 means they agreed, and a mean above 4.50 means the respondents strongly agreed, the first question was if buying drugs from KEMSA is more cost effective (M=4.605; SD=0.843); the second question was if presence of drugs inspection and acceptance committee contributes to quality control of goods supplied (M=4.561; SD=0.763); third view sought was if the tendering requirement by public procurement and Disposal act and regulation 2006 is helpful in attaining good price from local suppliers (M=4.125; SD=1.945); the four view sought was if clear specification leads to the right drugs acquisition (M=4.234; SD=0.954); and finally if KEMSA

services are satisfactory to the facilities (M=4.542; SD=0.634).

Supply chain management is the management of all the activities that are involved in the provision of a product or service that is required by the end customers. It starts with the acquisition of raw materials, processing and distribution and ends with the backward flow of cash and information which flows in both directions. The main purpose of SCM is to satisfy both supply and demand requirements of customers in the chain.

Table 3: Distribution Service Performance

| Statement | Mean | Standard Deviation | n |
|---|---|---|---|
| Buying drugs from KEMSA is more cost effective? | 4.605 | 0.843 | 104 |
| Presence of drugs inspection and acceptance committee contributes to quality control of goods supplied? | 4.561 | 0.763 | 104 |
| The tendering requirement by public procurement and Disposal act and regulation 2006 is helpful in attaining good price from local suppliers? | 4.125 | 1.945 | 104 |
| Clear specification leads to the right drugs acquisition? | 4.234 | 0.954 | 104 |
| KEMSA service is satisfactory to the facility? | 4.542 | 0.634 | 104 |

## 4.4 Regression Analysis model

The $R^2$ is the coefficient of determination. This value explains how conflict of interest varied, personal gains, nepotism and external influence The model summary table shows that three predictors can explain 85.6 % of change in conflict of interest namely: personal gains, nepotism and external influence an implication that the remaining 14.4 % of the variation in procurement performance could be accounted for by other factors.

Table 4:  Regression Analysis model

| Model | R | R Square | Adjusted R Square | Std. Error |
|-------|------|------|------|------|
| 1 | .896a [a] | .803 | .797 | .425 |

a. Predictors: (Constant), Responsiveness, Innovation, Asset Management

b. Dependent Variable: Distribution Service Performance

## 4.4.2 Beta coefficients

The constant 1.766 represented the constant which predicted value of Distribution Service Performance in public health facilities when all effects of conflict of Responsiveness, Innovation, and Asset Management remain constant at zero (0). This implied that Distribution Service Performance in public health facilities would be at 1.766 holding, Responsiveness, Innovation, and Asset Management at zero (0).

Regression results revealed that Innovation has positive influence Distribution Service Performance in public health facilities as indicated by $\beta 1$= 0.275, p=0.000<0.023, t= 2.633 The implication is that an increase in Innovation leads to increase Distribution Service Performance.

Regression results revealed that Asset Management has positive influence Distribution Service Performance in public health facilities as indicated by $\beta 2$= 0.356, p=0.000<0.000, t= 2.458 The implication is that an increase in Asset Management leads to increase Distribution Service Performance Regression results revealed that Responsiveness has positive influence Distribution Service Performance in public health facilities as indicated by $\beta 2$= 0.061, p=0.000<0.022, t= 2.413 The implication is that an increase in Responsiveness leads to increase inventory monitoring techniques.

Table 5: Coefficients

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|------|------|------|------|------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1.766 | .181 | | 9.769 | .001 |
| | Innovation | .275 | .105 | .360 | 2.633 | .023 |
| | Asset Management | .356 | .145 | .480 | 2.458 | .000 |
| | Responsiveness | .061 | .148 | .070 | 2.413 | .022 |

a. Predictors: (Constant), Responsiveness, Innovation, Asset Management

b. Dependent Variable: Distribution Service Performance

Y = 1.766+0.275 X1+0.356X2 +0.061X3 +e

Where:

Y= Distribution Service Performance

$\beta 0$=Constant of Regression

X1= Innovation

X2= Asset Management

X3 = Responsiveness

$\varepsilon$ = Error of Regression

## 5.0 SUMMARY OF RESULTS, CONCLUSION AND RECOMMENDATION

### 5.1 Introduction

This chapter presents the summary of the study findings, conclusions made based on the study objectives and recommendations of the study as well as suggestions for further research.

### 5.2 Inventory Monitoring Techniques

The study determined    that effective Inventory Monitoring Techniques on distribution service performance in public health facilities of Kenya Medical Supplies Authority it was found that Techniques of Inventory Control includes Analysis E.O.Q. (Economic Order Quantity) enables Setting Stock Level Inventory Turnover Ratios. Organization should consider having operation of the enterprise ABC Analysis A.B.C. (Always Better Control) method is dividing inventory into

three categories: A, B, and C, based on annual consumption unit, inventory value, and cost significance. Effective control methods as Inventory Turnover Ratios, the ratio indicates how quickly the inventory is used for production. Higher the ratio, shorter will be the duration of inventory at the factory. Economic Order Quantity The most economic buying quantity or the optimum quantity is determined.

## 5.3 Conclusions

The study concludes that; Inventory Monitoring Techniques requires organization to optimization technologies that can address the most complex inventory issues where transportation costs are compensated against Inventory Reduction via Lot Size Optimization the pipeline inventory. On the other hand, Cycle inventories can be reduced by decreasing transportation choices also impact

customer the lot sizes used in production and distribution responsiveness and thus the service level replenishment.

## 5.4 Recommendations

The study recommended that KEMSA Management should diversify their inventory system, to suit specific needs of production. Inventory management should maximize space and timely delivery to avoid staying off production. The overriding need for any method of stock allocation should be customer satisfaction. Cost minimization techniques should be employed in the keeping and allocation of inventory. Management should closely monitor and manipulate their inventory system to maintain production consistency for organizational profitability and effectiveness.

## REFERENCES

Alade, J. A., Sharma, D. K., & Sharma, H. P. (2004). Role of supply chain management decisions in effective inventory control. Journal of Academy of Business and Economics Vol 21(6), 136-149.

Bales, W. (2007). Measures of Purchasing Effectiveness. Arizona: Arizona State University.

Birou, L. (2003). International purchasing benefits and requirements and challenges. International Journal of purchasing and supply Vol. 6. (2), 22-25.

Chopra, S., & Meindl, P. (2015). Supply Chain Management 6th edition. New Jersey: Prentice Hall.

Deveshwar, A., & Modi, D. (2008). Inventory Management Delivering Profits through Stock Management. International Journal of Logistics Management, 19(1), 36-48.

Fearon, H. E. (2001). Purchasing and Materials Management, 9th edition. Chicago, IL: University of Chicago press.

Government of Kenya. (2010). Constitution of Kenya. Nairobi: Government Printers.

Government of Kenya. (2011). Final Report of the Task Force On Devolved Government- A Report on the Implementation of Devolved Government in Kenya, Task Force on Devolved Government of Kenya. Nairobi: Government Printers.

Kenya Healthcare Federation. (2016). Kenyan Healthcare Sector. Nairobi: Embassy of the Kingdom of the Netherlands in Nairobi.

Lee, H. (2004). The Triple-A Supply Chain. Harvard Business Review October, 102-112.

Lysons, K., & Farrington, B. (2006). Purchasing and Supply Chain Management. Harlow: Pearson Educational Limited.

Mugenda, O., & Mugenda, A. (2003). Research Methods; Quantitative and Qualitative Approaches. Nairobi: ACTS.

Orodho, A. J. (2012). Essentials of Educational and Social Sciences Research Methods. Nairobi: Masola Publishers.