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Effect of Inventory Control Techniques on Organization's Performance at Kenya Medical Supplies Agencies

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Abstract:
For years, logistics companies in the field of medicine have faced a number of challenges especially in stock control which has influenced efficiency of their operations. The challenges identified include overstocking which results to out dated or expired products, under stocking, lack of inventory taking and theft by employees and delays in the order and delivery or medical supplies. Advances in information technology have drastically changed possibilities to apply efficient inventory control techniques. In addition, the recent progress in research has resulted in new and more general methods that can reduce the supply chain costs substantially. This study sought to determine the effects of inventory control techniques on the organization's performance. This study was carried out at Kenya medical supplies agencies. The study had four objectives, which examine the various inventory control techniques such as; Determination of various levels of materials, economic order quantity, perpetual inventory system, and ABC analysis technique. The research adopted a descriptive case study design. Stratified random sampling technique was used to determine the sample size. Data was analyzed through quantitative and qualitative techniques. This involved generation of numeric measures of the responses provided. Use of Statistical Package for Social Sciences helped generate descriptive statistics required for this data. Data was presented in tables and charts and interpretation made based on research objectives.

Keywords: *Inventory controls, techniques, organization performance*

1. Introduction

Inventory control refers to the process whereby the investment in materials and parts carried in stock is regulated within predetermined limits set in accordance with inventory policy established by management. The activities of inventory control thus include: determination of limits of inventories to be held, determination of inventory policies, setting out of investments pattern and its regulation as per individual and collective requirements, follow-up to examine the working of the inventory policy and effecting changes as and when needed. In this modern time, there are many issues involved in selling and stocking. Therefore, inventory control is crucial. For years, logistics companies in the field of medicine have faced a number of challenges especially in stock control which has influenced efficiency of their operations. The challenges identified include overstocking which results to out dated or expired products, under stocking, lack of inventory taking and theft by employees and delays in the order and delivery or medical supplies (Xiong, 2006). Advances in information technology have drastically changed possibilities to apply efficient inventory control techniques. In addition, the recent progress in research has resulted in new and more general methods that can reduce the supply chain costs substantially (Axsäter, 2007).

Different departments in an organization handling inventory have varied goals on the level of inventory to hold. One of the major goals of stock control is to keep stock levels down to make cash available for other purposes. However, under this goal, the purchasing department prefers to order large batches to enjoy volume discounts (Bose, 2006). The production department also has its goal with regard to inventory, of maintaining long production runs to avoid time consuming setups and also have a large raw material inventory to avoid stops in production due to missing materials. On the other hand, the marketing department would like to have stock of finished goods to be able to provide customers a high service level. Therefore, it is seldom trivial to find the best balance between goals and that's why inventory control is needed (Mercado, 2007).

Inventory control is the activity which organizes the availability of items to the customers. It functions to coordinate the manufacturing, purchasing, and distribution functions to meet the marketing needs. This role comprises the supply of new products, current sales items, consumables, obsolescent products and all other supplies. Inventory enhances an organization to support the customer service, manufacturing and logistics activities in circumstances where purchase of the items is inadequate to satisfy the demand. Lack of satisfaction arises from cases where the speed of manufacturing or purchasing is too protracted, or where quantities cannot be provided without stocks. (Lewis, 2012) Inventory control facilitates organizations to find the appropriate inventory levels through different models such as economic order quantity and to monitor the level via inventory control systems for instance red line and two-bin method, or computerized inventory control systems. Appropriate

inventory control requires organizations to perform stocking and apply suitable mechanisms to value stock to avoid overstating and understating profits (Kotabo, 2002).

Kenya Essential Medicine Supplies Agency (KEMSA) is government agency mandated to procure, store, and distribute drug and health commodities to health facilities around the county. The pharmaceutical sector has been faced with challenges of ineffective and inefficient supply chains. The country has suffered from low availability and accessibility of medical supplies, and quality pharmaceutical services. As indicated in the aforementioned background, optimal use of appropriate inventory control techniques could provide a solution in addressing the ineffectiveness and inefficiencies experienced in the sector. However, there is hardly an indication that there have been conclusive studies done to examine inventory control techniques and their effect on organizational performance. In light of this therefore, the proposed study was seeking to examine the effect of inventory control on organization's performance with a focus on Kenya Essential Medicine Supplies Agency(KEMSA). (USAID and GoK 2011),

1.1. Statement of the Problem

The pharmaceutical sector in Kenya, involving many different stakeholders such as the manufacturers themselves, national regulators, government ministries, wholesalers and others (UNIDO, 2010), has been faced with challenges of ineffectiveness and lack of efficiency as far as medical supplies is concerned (USAID & GoK, 2011). Kenya Medical Supplies Agencies has been mandated to procure, store and distribute health commodities to facilities around the country (USAID and GoK, 2011). With the introduction of devolved system of government, KEMSA finds itself in limbo owing to the fact that its role under the devolved system of government is not clearly defined. Evidently, Kenya has suffered as a result of low availability and accessibility of medical supplies as well as quality pharmaceutical services, putting into question the extent to which KEMSA is adequately executing its mandate. The study was seeking to establish the extent of the effects Inventory control techniques on the firm's performance and what should be done so that it can be of greater success to the firm through adopting new or improving existing techniques for competitive advantage.

1.2 Objectives of the study

2.2.1. General Objective

The general objective of the study was to assess the effect of Inventory Control techniques on organizational performance.

1.2.2. Specific Objective

- To establish the effect of determination of various level of materials inventory control technique on performance of KEMSA
- To establish the effect of Economic order quantity inventory control technique on performance of KEMSA
- To Establish the effect of perpetual Inventory system on performance of KEMSA
- To establish the extent to which ABC analysis inventory control technique affects the performance of KEMSA

2. Literature Review

2.1. The Concept of Inventory Control

The best-known and most fundamental inventory decision model is Economic Order Quantity Model. Its origin dated back to the early 1900s. The EOQ has been previously defined by Tersine (1994) and Coleman (2002) as the ordering quantities which minimizes the balance of cost between inventory holding costs and re-order costs. Inventory exists in an entire supply chain because of the mismatch in supply and demand and a perfect synchronization between them is almost impossible (Tersine, 1994).

Economic order quantities enable organization to maintain a regular inventory of products which have a uniform and independent demand (Tersine 1994). It is widely used deterministic model which assumes that the demand rate for an item is constant and continuous. The order lead time and the inventory holding cost are also presumed to be known and constant. With the previously mentioned conditions the order quantity as well as the time between orders are always constant and remain unchanged. Inventory is spread across the chain in the form of raw material, work in process (WIP), finished goods, or maintenance, and repair & operating (MRO) supplies. Therefore, inventory is essential in the operation of KEMSA in the public health sector since they may hold inventory as finished goods, work in progress or raw materials for further processing. A fellow (2005) asserts that inventory plays a vital role when it comes to demand planning and as a result, the organization needs to be versatile in its management of its inventory when it comes to periodic or seasonal inventories. The level of inventory is important to customer service by having readily available products. When customer expectation is met, not only could the company maintain its sales, but could also increase them. Inventory cost can be optimized by exploiting economies of scale (Ballou, 2004)

2.2. Inventory Control Techniques

Inventory control involves the coordinating of materials availability, controlling, utilization and procuring of materials. Inventory control is the direction of activities with the purpose of getting the right inventory in the right place at the right time and in the right quantity and it's directly linked to production function of any organization which implies that the inventory management system operated will affect the profitability of an organization directly and indirectly (Alm, 2000). Inventory Control System is the process of managing inventory in order to meet customer demand at the lowest possible cost and with a minimum of investment (Byoungho, 2004).

A successfully implemented inventory control program takes into account such things as purchasing goods commensurate with demand, seasonal variation, changing usage patterns, and monitoring for pilferage, (Ellram, 1996). A preliminary step in the process of inventory control is to determine the approximate costs of carrying inventory. According to Langabeer (2001), these costs include such expenses as storage costs, inventory risks, and the loss-of-opportunity costs associated with tying up capital. Inventory management is a vital function to help insure the success of manufacturing and distribution companies. The effectiveness of inventory management systems is directly measurable by how successful a company is in providing high levels of customer service, low inventory investment, maximum throughput and low costs, Ellram (1996). Control of inventory, which typically represents 45% to 90% of all expenses for business, is needed to ensure that the business has the right goods on hand to avoid stock-outs, to prevent shrinkage (spoilage/theft), and to provide proper accounting. (Khan 2003)

2.3. Level of Materials Technique of Inventory Control

Material control is concerned with physical property and value of the property. Material control is one ofthe policy procedures employed inthe management of materials and these include internal checks asin continuous, period, spot and or any other type of control establishedby management tocarry out activities aimed at ensuring aneffective andefficient materialmanagement procedure. Other forms of material control include ensuring high security of the store house and stock yard, good custody of keys, limiting access topremises andmaking of materials as in coding, to minimize theft, segregation of prescribed item. This is paramount in the case of KEMSA which plays the role of procuring, storing and distributing health commodities for the public health sector. However, the supplies from KEMSA are always short of the requirements of the public health institutions due to unscrupulous handling of the same. (Brackus (2000)

According to Kotabo (2002), though there are many systems for control of stock, both manual and automatic, there are really twobasic approaches on which these systemsare based. Recording method which may take place eitherwhen materials fall to a pre-determined levelor according to the situation discovered whenthe levels arereceived on a periodic regular basis. The action level method of controlling sock byquality whichinvolves fixing stock levels for each commodity which is recorded in the stock system. Under the action level methods of provision, commodities are ordered at unspecified intervals and when ordering levels are related. This means that orders can only be placed usually for one item at time. In Kenya all procurement conducted by KEMSA is governed by the Kenya public Procurement and Disposal Act (2005), 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.

2.4. Economic Order Quantity Technique of Inventory Control

Economic order quality is the quality of inventory that should be ordered at once. The quantity of inventory ordered at once affects inventory ordering and holding costs and will ultimately have a bearing on profitability. Put differently, EOQ is the optimum size of the order that minimizes the cost of ordering and holding cost. Economic order quantity is used to determine the optimal number of units of the product to order so as to minimize the total cost associated with the purchase, delivery and storage of the product. The main objectives of economic order quantity are to minimize the cost of ordering, cost of carrying materials and total cost of production. Ordering costs include cost of stationery, salaries of those engaged in receiving and inspecting, general office and administrative expenses of purchase departments. Carrying costs are incurred on stationery, salaries, rent, materials handling cost, interest on capital, insurance cost, risk of obsolescence, deterioration and wastage of materials and evaporation. (Robert 2004)

Therefore, if a few large orders are placed, annual ordering costs was low, but annual holding costs will be high (Hanger, 1982). On the contrary, if many small orders are placed over all, ordering costs was high but annual holding costs will be low. To be profitable, it is necessary to determine if increasing the order size to obtain large volume discounts and slightly lowering costs will be more off-set at a higher holding cost. Researcher concurs that profitability can only be achieved at optimum level of relevant costs, that is, holding costs and ordering costs (Lynch, 2005). Inventory control helps organization to establish the proper inventory levels through the economic order quantity; and to keep track of this level through inventory control system which many be manual such as two bin method and red line method, or computerized inventory control systems. Proper inventory controls also require an organization to undertake stocking and use appropriate method to value stock so as not to under or over state profits (Kotabo, 2002).

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2.5. Perpetual Inventory System Technique of Inventory Control

Inventory control defines how often inventory levels are reviewed to determine when and how much to order. It is performed on either a perpetual or a period basis. A perpetual inventory control process reviews inventory status daily to determine inventory replenishment needs. To utilize perpetual review, accurate tracking of all Stock-Keeping Units is necessary. Perpetual review is implemented through a re-order point and order quantity. Perpetual inventory system helps to maintain a continuous record of the changes to inventory. This means all purchases and sales of goods are recorded directly in the inventory account as they occur. The cost of goods sold is readily available at the end of the period, as the inventory account has been constantly updated. (Saleemi (2007),

A proper stock recording system helps in deriving the benefits of perpetual stock verification system and indications about the right time, right quality, and right quantity (Burton, 1981). According to Baily and Farmer (1980) stock records are expected to maintain particulars of receipt, issues and balances remaining in stock for each individual item held in the storehouse from day to day. For the records to provide accurate up- to-date information which is useful to the stock controller, it requires that every transaction of receipt or issue of a particular item is recorded promptly and accurately. Proper up-to-date and complete records result in reduction of wastage and misappropriation in the stores department. Inventory record inaccuracy has had a significant impact on decreasing levels of customer service, increasing costs, and decreasing productivity. Customer service decreases due to more inaccurate stock information, more backordering, and more stock-outs. This excess inventory has increased annual carrying cost and increases the chance for product obsolescence (Burton, 1989).

2.6. ABC Analysis Technique of Inventory Control

ABC analysis is where stocks are classified into three categories namely: A –stock items that are of high value and material to the organization but low volume such as land, building and motor vehicles; B –stock items which are of medium value and medium volume; C –stock items baring minimal value but are of great volume. Effective control of inventories can be costly, time and effort consuming. However, not all items kept in inventory require such meticulous and close-study monitoring particularly if such items are low-value items that are randomly used in the production system. (Lysons, 2003)

The ABC inventory control technique is based on the principle that a small portion of the items may typically represent the bulk of money value of the total inventory used in the production process, while a relatively large number of items may form a small part of the money value of stores. The money value is ascertained by multiplying the quantity of material of each item by its unit price. Each item of inventory is given A, B or C denomination depending upon the amount spent for that particular item. “A or the highest value items should be under the tight control and under responsibility of the most experienced personnel, while “C” or the lowest value may be under simple physical control. Brown (2002) notes that the ABC analysis categorizes products based on importance. Importance may come from cash flows, lead time, stock outs, and stock out costs, sales volume, or profitability. Once the ranking factor is chosen, break points are chosen for classes A, B, C and so on.

3. Research Design and Methodology

This chapter discusses research design and methodology. These are the steps to be taken in the data collection and analysis. The section contains the research instruments which the researcher used in the study. It hastherefore described the research design, target population, sampling design, sample size, data collection techniques, validity and reliability, data collection instruments, data analysis and ethical considerations.

3.1. Research Design

Research design is the strategy, plan and structure of conducting a research project (Kweit and Kweit, 1981, in Leedy, 1993). This was descriptive study whereby the study attempted to describe such behavior, attitudes, values and characteristics in order to assess their influence on organizational performance. Descriptive study design was used because it enabled the researcher make vivid explanation and descriptions of the study outcomes thus making it easier to conclude and give the way forward through recommendation. According to Mugenda (2003) descriptive studies determine and report the way things are. Descriptive research design is a scientific method which involves observing and describing the behavior of a subject without influencing it in any way. Descriptive data are typically collected through a structured questionnaires, interviews or direct observation.

3.2. Sample Design and Technique

This study used stratified random sampling to select respondents to participate in the study. This method attempted to restrict the possible samples to those which are less extreme by ensuring that all parts of the population are represented in the sample in order to increase the efficiency. The purpose of using this method was to decrease the error in the estimation and ensure inclusion of the population elements. The target population was stratified into different categories as per levels in the structure to enable the researcher to improve on efficiency of estimation, focus on important sub-populations, ignore the irrelevant ones and facilitate balancing of difference between strata by sampling equal numbers from strata varying widely in size (Kothari, 2004). This was followed by random sampling per every stratum with a representation of 50%.

A sample of 100 employees was picked representing 50%of the population. This was drawn from each stratum or level in the structure of the procurement and stores departments at KEMSA Nairobi from which the respondents were randomly picked.

50% sample was picked because the population is too small and to get a representative response the researcher has to use a higher sample percentage. Mugenda and Mugenda (1999)

3.3. Data Collection Instruments

The study used a combination of research instruments including questionnaire and interview schedules.The study used a questionnaire to the general staff and an interview for the top, middle and lower level managers at KEMSA. Both the questionnaire and interview had items addressing each research question under examination. The questionnaire was structured while the interview will be semi – structured.

3.4. Data Analysis

The data was analyzed using descriptive and inferential statistics. This was done with the help of statistical package social science (SPSS). Descriptive statistics involved the use of mean and standard deviation to draw conclusion based on the data collected. Inferential statistics involved the use of factor analysis to examine the correlations among different variables. Multiple regression techniques were also used. The result was presented using tables, charts and graphs for easy understanding. The multiple regressions model to be used was of the form.

$Y=a + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + e$

Where Y= Performance of Kenya Medical Supplies Agency

a= Constant

β_1, β_2, β_3 and β_4= coefficient

Determinants Performance of Kenya Medical Supplies Agency

$X_{1=\text{Level}}$ of material techniques of inventory control

X_2= Economic Order Quantity

X_3= Perpetual Inventory System

X_4= ABC analysis Technique

e = error term

Variable type	Construct	Indicators
Independent	Levels of material techniques of inventory control	material control material storage stock taking cost of inventory control
	Economic Order Quantity	cost of procurement quality of procurement
	Perpetual Inventory System	levels to be procured levels already available storage capacities
	ABC analysis Technique	high value material to the organization but low volume medium value and medium volume of materials supplies items baring minimal value but are of great volume
Dependent Performance of Kenya Medical Supplies Agency (KEMSA)	Cost	marginal cost reduction total cost of operations cost per unit produced
	Customer satisfaction	level complains growth in sales
	Efficiency	speed of handling supplies ease of material handling introduction of material handling system
	competitiveness	performance against other competitors ratings by other stakeholders

Table 1

4. Data Analysis, Presentation and Discussion

This chapter presents the findings of the study and their discussion in relevance to the objectives and past studies carried out in the same area. Quantitative data was analyzed using Microsoft Excel Suite 12 and SPSS version 19 both for windows and was presented in form of frequencies, means, modes and percentages. Qualitative data was presented by way of narration. Presentation was done using tables, charts and graphs for easy yet effective communication.

4.1. Questionnaire Return Rate

The researcher distributed 100 self-administered questionnaires to the sampled respondents, 98 questionnaires were returned among which five were rejected for incomplete information leaving 93 questionnaires for data analysis. This represents an 85% response rate which the researcher sufficient to proceed with data analysis.

4.2. Respondents Profile

The following section presents the findings of the characteristics of the study participants namely: gender, age, education level and work experience of the respondents.

4.2.1. Gender and Age Distribution

Category		Frequency	Percentage
Gender	Male	50	52.8
	Female	43	47.2
Age	20-30 years	3	2.8
	31-45 years	28	29.2
	46-55 years	42	44.4
	Over 55 years	20	23.6
Total		186	

Table 2: Gender and Age Distribution (N=93)
Source: Author (2014)

Majority of the study participants were males. Table 2 reveals that 52.8% of all respondents were male presenting a small gender disparity. The table also reveals that majority (44.4%) of the participants were aged between 46 and 55 years followed by those aged between 31 to 45 years (29.2%), then by those over 55 years (23.6%). Respondents aged between 20 and 30 years formed the minority group with only 2.8%.

4.2.2. Highest Education Level Attained

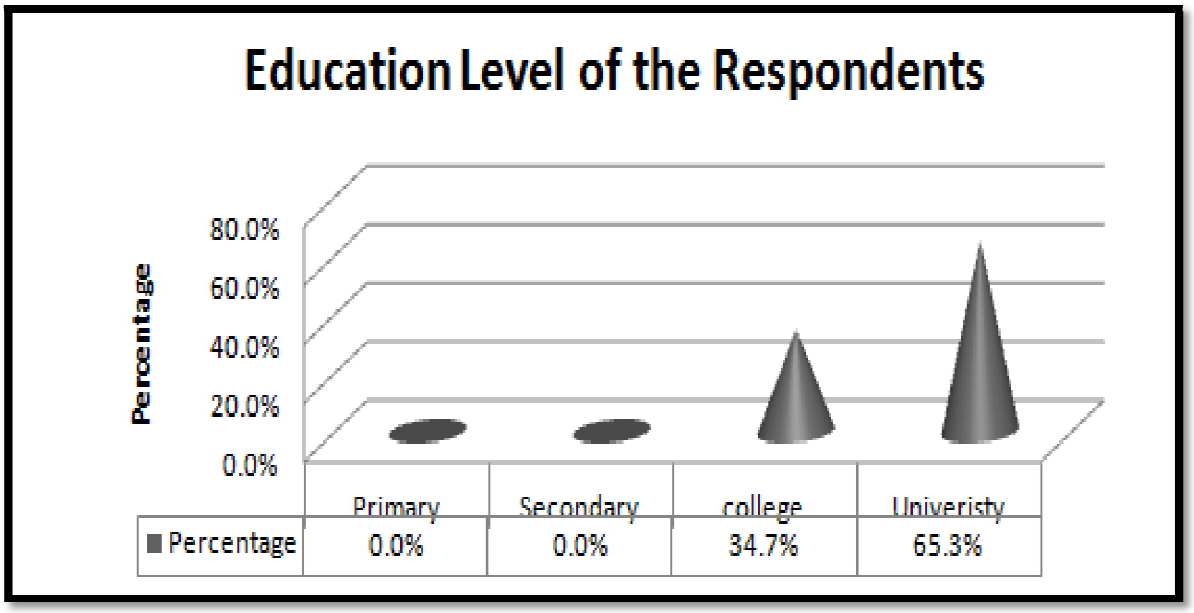

Figure 1: Highest Education Level Attained
Source: Author (2014)

All the respondents in the study had acquired formal education albeit to academic levels. The majority (65.3%) held a university degree and the rest of the respondents had been through college education. This shows that the respondents in the study were well learned and thus would be able to comprehend and provide the relevant information sought by the study.

4.2.3. Work Experience

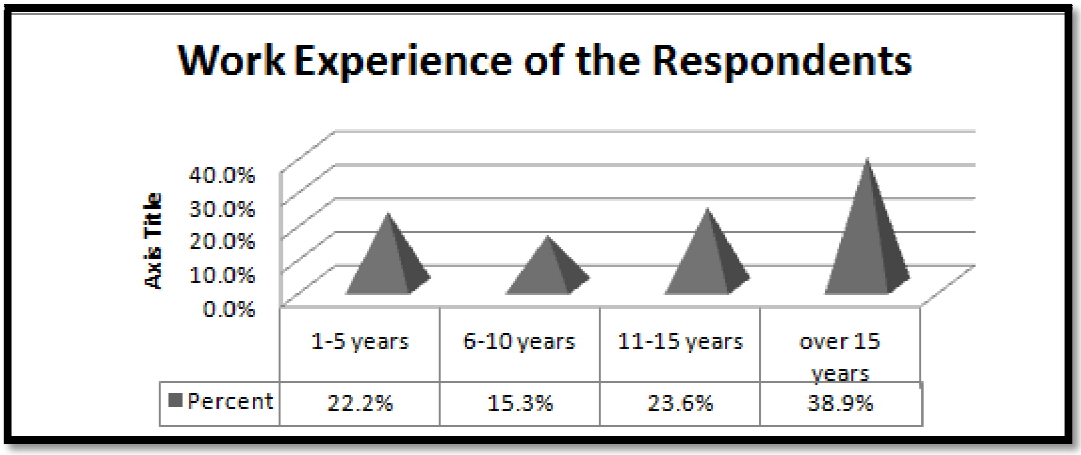

Figure 2: Work Experience of the Respondents
Source: Author (2014)

A majority (38.9%) of the respondents had an experience of over 15 years, 23.6% of the respondents had a work experience of 11 to 15 years, 22.2% of the respondents had a work experience of 1 to 5 years and the rest of the respondents had a work experience of between 6 and 10 years. The researcher was satisfied that the study participants had acquired enough experience in their respective schools to enable them provide valid and relevant information as regard the study questions.

4.3. Organizational performance at KEMSA

Respondents were given a list of qualities of Organizational performance at KEMSA and asked to rate then as they were exhibited by them. The outcome is as indicated in table 3 below.

Category	1 %	2 %	3 %	4 %	5 %
Cost reduction	5.3	5.6	15.3	26.4	44.4
Minimization of lead time	11.1	20.8	9.7	23.6	31.9
Increased revenue	2.8	5.6	8.3	25.0	55.6
Customer satisfaction	4.2	18.1	9.7	37.5	29.2
Regional coverage	11.1	12.5	12.5	27.8	34.7

Table 3: Qualities of Organizational Performance (N=93)
1=Least Important, Not So Important, 3=Neutral, 4=Important,
5=Most Important, %=Percentage
Source: Author (2014)

According to table 3, respondents indicated Cost reduction (44.4%), Minimization of lead time (31.9%), Increased revenue (55.6%) and Customer satisfaction (34.7%) as very important factors KESMA considers so as to organizational performance. Respondents also indicated that increase in Regional coverage (37.5%) was important for firms to achieve better performance.

4.4. Inventory Control Systems

Respondents were asked to indicate how well their KESMA executes Perpetual inventory system, Determination of various levels of materials, Economic Order Quantity ABC analysis technique approaches in pursuance of better organizational performance. A five-pointLikert scale was used to rate their responses and the outcome is highlighted in the following sub-units.

4.4.1. Perpetual Inventory System

Respondents were asked to rate the following statements that relate to effects ofABC analysis technique on the performance of KEMSAand indicate to what extent they agreed with them. Their responses are indicated in table 4 below
Key: 1=strongly disagree 2=Disagree 3=Not sure 4=Agree 5=strongly agree

Category	1 %	2 %	3 %	4 %	5 %	M	S.D
We have an established electronic mechanism for inventory control in KEMSA	6.1	70.7	21.1	1.5	.8	1.20	.579
Our employees have necessary skills, knowledge, experience and sense of judgment to use both manual and automated inventory control techniques	11.4	67.1	20.3	.4	.8	1.12	.627
Stocktaking or stock verification is done oftenwith a view to finding out whether the book balances thus controlling possible malpractices.	6.9	73.6	19.1	.4	.0	1.13	.510
Discrepancies are easily located and corrected Immediately.	6.9	72.4	19.9	.8	.0	1.15	.530
Perpetual inventory system provides reliable information to the management of the number of units, and the value of every item of stores.	7.3	65.4	22.0	4.5	0.8	1.26	.692

Table 4: Perpetual Inventory System (N=93)
1=Strongly Agree, 2=Agree, 3=Disagree, 4=Undecided, 5=Strongly Disagree,
M=Mean, S.D= Standard Deviation, %=Percentage
Source: Author (2014)

According to table 4, respondents indicated that agreed with all the four statements in regard to Perpetual inventory system. They agreed with the statements that KEMSA hasestablished electronic mechanism for inventory control(70.7%, M=1.20, S.D=0.579), employees have necessary skills, knowledge, experience and sense of judgment to use both manual and automated inventory control techniques(67.1%, M=1.12, S.D=0.627), Stocktaking or stock verification is done often with a view to finding out whether the book balances thus controlling possible malpractices. (73.6%, M=1.13, S.D=.510), Discrepancies are easily located, and corrected Immediately. (72.4%, M=1.15, S.D=0.530) and Perpetual inventory system provides reliable information to the management of the number of units, and the value of every item of stores. (65.4%, M=1.26, S.D=0.692).

4.4.2. Determination Of Various Levels Of Materials

Respondents were asked to rate the following statements that relate to the effects of determination of various levels of materials on the performance of KEMSA and indicate to what extent they agreed with them. Their responses are indicated in table 5 below.
Key: 1=strongly disagree 2=Disagree 3=Not sure 4=Agree 5=strongly agree

Category	1 %	2 %	3 %	4 %	5 %	M	S.D
Stock levels should be maintained to minimum level so as not to incur unnecessary stock holding cost but always available for continuous service to customers.	8.1	65.4	21.5	4.5	.4	1.24	.677
Determining various level of material technique is key in KEMSA so as to reduce insecurity and to minimize theft of drugs	40.2	50.4	7.3	2.0	.0	1.28	.690
Loss of drugs is a game of the day in KEMSA due to weakness in the system of custody and control of stock.	40.7	52.0	6.5	.4	.4	1.26	.650

Table 5: Determination of Various Levels of Materials (N=93)
1=Strongly Agree, 2=Agree, 3=Disagree, 4=Undecided, 5=Strongly Disagree,
M=Mean, S.D= Standard Deviation %=Percentage
Source: Author (2014)

Respondents agreed with the statements that stock levels should be maintained to minimum level so as not to incur unnecessary stock holding cost but always available for continuous service to customers.(65.4%, M=1.24, S.D=0.677), market determining various level of material technique is key in KEMSA so as to reduce insecurity and to minimize theft of drugs (50.4%, M=1.28, S.D=0.690) and Loss of drugs is a game of the day in KEMSA due to weakness in the system of custody and control of stock(52.0%, M=1.26, S.D=0.650).

4.4.3. Economic Order Quantity

Respondents were asked to rate the following statements that relate to the effects of Economic Order Quantityinventory control on the performance of KEMSA and indicate to what extent they agreed with them. Their responses are indicated in table 5 below.

Key: 1=strongly disagree 2=Disagree 3=Not sure 4=Agree 5=strongly agree

Category	1 %	2 %	3 %	4 %	5 %	M	S.D
It helps to minimizes the cost of ordering and holding cost and also minimizes the total cost associated with the purchase, delivery and storage of the product.	60.0	21.1	16.4	2.0	.4	1.41	.733
Wastage of materials and evaporation is reduced through the use of EOQ	50.3	30.3	18.9	.4	.0	1.39	.666
Through EOQ it has been easy to maintain proper inventory levels	50.0	33.5	14.8	2.0	.0	1.38	.670
Inventories help prevent stock out and disruption of production and distribution of medicines	67.9	12.0	17.1	10.6	2.4	1.28	.959

Table 6: Economic Order Quantity (N=93)
1=Strongly Agree; 2=Agree; 3=Disagree; 4=Undecided; 5=Strongly Disagree;
M=Mean, S.D= Standard Deviation %=Percentage
Source: Author (2014)

Respondents rated highly all the variables It helps to minimizes the cost of ordering and holding cost and also minimizes the total cost associated with the purchase, delivery and storage of the product. (60.0%, M=1.41, S.D=0.733), Wastage of materials and evaporation is reduced through the use of EOQ (50.3, M=1.39, S.D=0.666), Through EOQ it has been easy to maintain proper inventory levels(50.0, M=1.38, S.D=0.670) Inventories help prevent stock out and disruption of production and distribution of medicines(67.9, M=1.28, S.D=0.959).

4.4.4. ABC Analysis Technique

Respondents were asked to rate the following statements that relate to the effects ABC analysis techniqueof inventory control on the performance of KEMSAand indicate to what extent they agreed with them. Their responses are indicated in table 5 below.

Key: 1=strongly disagree 2=Disagree 3=Not sure 4=Agree 5=strongly agree

Category	1 %	2 %	3 %	4 %	5 %	M	S.D
ABC classification aids purchasing staff to use resources to maximum efficiency by concentrating on those items that have the greatest potential savings thus increasing efficiency.	1.2	91.5	6.9	.4	.0	1.07	.306
Grouping products on the level of importance helps in distribution of medicines in hospitals and pharmaceuticals hospitals based on the same standard	1.2	81.7	15.4	1.6	.0	1.17	.449
Helps in determining availability of drugs in warehouses before depletion of each category and the management of drugs on the levels of stock availability.	2.0	82.1	14.6	.8	.4	1.15	.461

Category	1 %	2 %	3 %	4 %	5 %	M	S.D
ABC is particularly useful in distribution planning when the products are grouped or classified by their sales activity.	9.1	64.5	14.2	8.1	4.1	1.24	.986

Table 7: ABC Analysis Technique (N=93)
1=Strongly Agree; 2=Agree; 3=Disagree; 4=Undecided; 5=Strongly Disagree;
M=Mean, S.D= Standard Deviation %=Percentage
Source: Author (2014)

Respondents agreed with the statements that ABC classification aids purchasing staff to use resources to maximum efficiency by concentrating on those items that have the greatest potential savings thus increasing efficiency (91.5%, M=1.07, S.D=0.306), Grouping products on the level of importance helps in distribution of medicines in hospitals and pharmaceuticals hospitals based on the same standard (81.7%, M=1.17, S.D=0.449), Helps in determining availability of drugs in warehouses before depletion of each category and the management of drugs on the levels of stock availability (82.1%, M=1.15, S.D=0.461) and ABC is particularly useful in distribution planning when the products are grouped or classified by their sales activity (64.5, M=1.24, S.D=0.986)

4.5. Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.974(a)	.948	.945	.334

Table 8: Model Summary
Source: Author (2014)

The table 11 shows that the four independent variables that were studied explain 94.5% of the organizational performance as represented by coefficient of determination (R^2). This means 94.5% of the effects of Inventory Control techniques on organizational performance are explained by the independent variables (ABC analysis technique, Economic Order Quantity, Perpetual inventory system and Determination of various levels of materials) 5.5% of the effect is not explained, this can be taken care of by the variable not considered in the study and the error term.

Model	Sum of Squares	Mean Square	F	Sig.
Regression	182.106	45.526	408.034	.001(a)
Residual	10.042	.112		
Total	192.147			

Table 9: Analysis of Variance (ANOVA)
Source: Author (2014)

From table 4.10, the significance value is 0.001; this means all Inventory Control techniques have significant influence on organizational performance at KEMSA since they have significant value less than 0.05.

	Organization Performance	Competitive Advantage	Pricing ABC Analysis Technique	Promotion Economic Order Quantity	Distribution Perpetual Inventory System Perpetual Inventory System	Product Determination Of Various Levels Of Materials
Organization performance	Pearson Correlation	1	.523(**)	.842(**)	.4 18(**)	.685(*)
	Sig. (2-tailed)	.	.000	.003	.047	.001
	N	95	95	95	95	95
ABC analysis technique	Pearson Correlation	.523(**)	1	.006	.107	.227(*)
	Sig. (2-tailed)	.000	.	.351	.301	.027
	N	95	95	95	95	95
Economic Order Quantity	Pearson Correlation	.842(**)	.006	1	.232(*)	.534(*)
	Sig. (2-tailed)	.003	.951	.	.023	.022
	N	95	95	95	95	95
Perpetual inventory system	Pearson Correlation	.418(**)	.107	.232(*)	1	.257(**)
	Sig. (2-tailed)	.047	.301	.023	.	.000
	N	95	95	95	95	95
Determination of various levels of materials	Pearson Correlation	.685(*)	.227(*)	.534(*)	.257(**)	1
	Sig. (2-tailed)	.001	.027	.022	.000	.
	N	95		95		95

Table 10: Correlations between the Study Variables
Source: Author (2014)
** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

To know whether the KEMSA adopting inventory control systems have improved organization performance over the others, the researcher conducted a Pearson moment correlation. Initially the companies adopted inventory control systems were expected to have improved organization performance over the others. From the findings in the table, the study found that there was strong correlation coefficient between organization performance and ABC analysis technique as shown by correlation factor of 0.842, this strong relationship was found to be statistically significant as the significant value was 0.003 which is less than 0.05, this concurred with the expected results. This concurred with the expectation that companies that use ABC analysis technique haveimproved organization performance over the others. The study also found strong positive correlation between organization performance and Economic Order Quantityas shown by correlation coefficient of 0.685, this too was also found to be significant since the significant value is 0.001 which is less than 0.05. This also concurred with the expectation that firms that use Economic Order Quantityhave improved organization performance over the other firms.

The association between organization performance and perpetual inventory system was also found to be strong positive as shown by correlation coefficient of 0.523; this was significant since the significant value was 0.00 which was less than 0.05. This also concurred with the study expectation that firms that use perpetual inventory system have improved organization performance over the others. Lastly the study found significant weak positive correlation between organization performance anddetermination of various levels of materials as shown by correlation coefficient of 0.418 and significant 0.047. This also concurred with the expected results that firms that use determination of various levels of materials have improved organization performance over the other firms. In general, all growth strategies were found correlated and significant to improved organization performance, this concurred with the expectation that firms that use inventory control strategieshave improved organization performance over the other firms.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	.614	.179		.240	.811
	*ABC analysis technique	.437	.034	.979	30.017	.035
	* Economic Order Quantity	.219	.027	.042	1.516	.019
	* Perpetual inventory system	.523	.033	.048	1.557	.047
	*Determination of various levels of materials	.046	.024	.049	1.937	.006

Table 11: Multiple Regressions of Coefficients
Source: Author (2014)

From the findings in table 4.11 the established regression equation was

$$Y=0.614 + 0.437\ X_1 + 0.219\ X_2 + 0.523\ X_3 + 0.046\ X_4 + e$$

From the above regression model, holding ABC analysis technique, Economic Order Quantity, Perpetual inventory system and Determination of various levels of materials to constant zero organization performance would be at 0.614. It was established that a unit increase ABC analysis technique would cause an increase in organization performance by a factor of 0.437. The study also revealed that a unit increase in Economic Order Quantity would cause an increase in organization performance by a factor of 0.219. One unit increase in perpetual inventory system would lead to increase in organization performance by a factor of 0.523. Lastly the study established that a unit increase in determination of various levels of materials would cause an increase in organization performance by a factor of 0.046. This shows that there is a positive relationship between organization performance and inventory control systems.

5. Summary of Major Findings, Conclusions and Recommendations

This chapter presents a summary of the major findings from the results of the study and the conclusions made from them. It also presents the recommendations made by the researcher. This was done in respect to the stipulated objectives in a bid to answer the research questions.

5.1. Summary of the Major Findings

The following are the major findings of the study as per the objectives which are to determine effects of ABC analysis technique, Economic Order Quantity, Perpetual inventory system *and* Determination of various levels of materials on organizational performance of the KEMSA.

Majority of the study participants (52.8%) were of the males aged between 46 and 55 years at (44.4%). All the respondents in the study had acquired formal education albeit to academic levels. The majority (65.3%) held a university degree and this shows that the respondents in the study were well learned and thus, were be able to comprehend and provide the relevant information sought by the study. A majority (38.9%) of the respondents had an experience of over Fifteen years and therefore the researcher was satisfied that the study participants had acquired enough experience in their respective departments to enable them provide valid and relevant information as regard the study questions.

Respondents indicated that for firms to achieve better performance, ABC analysis technique (44.4%), Economic Order Quantity(31.9%), Perpetual inventory system(55.6%) and Determination of various levels of materials (34.7%) were deemed as very important factors firms should consider.

Looking at the first objective that aimed to determine effects of perpetual inventory system on the organizational performance of KEMSA, respondents indicated that they agreed with the statements that the established electronic mechanism for inventory control in KEMSA(70.7%, M=1.20, S.D=0.579), employees have necessary skills, knowledge, experience and sense of judgment to use both manual and automated inventory control techniques(67.1%, M=1.12, S.D=0.627), stocktaking or stock verification is done often with a view to finding out whether the book balances thus controlling possible malpractices.(73.6%, M=1.13, S.D=.510),discrepancies are easily located, and corrected immediately. (72.4%, M=1.15, S.D=0.530) and that perpetual inventory system provides reliable information to the management of the number of units, and

the value of every item of stores. (65.4%, M=1.26, S.D=0.692). All the named factors were key to determining the performance of firms if they adopted the said perpetual inventory system

The second objective sought to establish the effects of determination of various levels of materialson the performance of KEMSA. Respondents agreed with the statements that stock levels should be maintained to minimum level so as not to incur unnecessary stock holding cost but always available for continuous service to customers(65.4%, M=1.24, S.D=0.677), determining various level of material technique is key in KEMSA so as to reduce insecurity and to minimize theft of drugs (50.4%, M=1.28, S.D=0.690) and loss of drugs is a game of the day in KEMSA due to weakness in the system of custody and control of stock(52.0%, M=1.26, S.D=0.650). Again, all the named factors were key to determining the performance of firms if they adopted the said determination of various levels of materials.

The third objective was meant to establish the effects of Economic Order Quantity on the performanceof KEMSA. Respondents rated highly all the variables under perpetual inventory system as they did strongly agree with the statements. The statements include; It helps to minimizes the cost of ordering and holding cost and also minimizes the total cost associated with the purchase, delivery and storage of the product. (60.0%, M=1.41, S.D=0.733), wastage of materials and evaporation is reduced through the use of EOQ (50.3, M=1.39, S.D=0.666), Through EOQ it has been easy to maintain proper inventory levels (50.0, M=1.38, S.D=0.670) and Inventories help prevent stock out and disruption of production and distribution of medicines (67.9, M=1.28, S.D=0.959). All the named factors were key to determining the competitive advantage of firms if they adopted the said Economic Order Quantity.

On the last objective that aimed to establish the effects of ABCon the performance of KEMSA, respondents agreed with the statements that ABC classification aids purchasing staff to use resources to maximum efficiency by concentrating on those items that have the greatest potential savings thus increasing efficiency. (91.5%, M=1.07, S.D=0.306), grouping products on the level of importance helps in distribution of medicines in hospitals and pharmaceuticals hospitals based on the same standard (81.7%, M=1.17, S.D=0.449), helps in determining availability of drugs in warehouses before depletion of each category and the management of drugs on the levels of stock availability. (82.1%, M=1.15, S.D=0.461) and ABC is particularly useful in distribution planning when the products are grouped or classified by their sales activity. (64.5, M=1.24, S.D=0.986). Clearly most firms focused on ABC analysis technique **as** their inventory control approach as it rated highly on the Likert scale.

5.2. Conclusions

To address the issue on the specific inventory control systems adopted that promotes organization performance, the study concluded that in order to achieve better performance, firms need to come up with sound ABC analysis technique which helps in managing stock levels and also provide a proper method control by tracking stock movements.

Firms should also develop approaches that aim to reduces cost in a bid to achieve competitive advantage and good performance in general. This so because, perpetual inventory system has been shown to be more efficient due to the automation of the inventory control system. This improves stock and management but also promotes efficiency alongside cutting costs.

Determination of various levels of materials has been rated as the most aggressive approach of inventory control at KEMSA that has a direct impact on performance of KEMSA. This enhances performance through cost effectiveness by managing stocks at minimum level.

Finally, on the ABC technique is critical in determining efficiency by enabling effective classification of materials thus eliminating losses and damages that come with confusion due to poor classification it also makes it easier to access of materials with the storage facilities.

5.3. Recommendations

In light of the above findings, the researcher made the following recommendations:

Firms should adopt inventory management approaches that ensure cost effectiveness, efficiency and quality maximization so as to achieve competitiveness and better organization performance. Such approaches will certify all the stakeholders by addressing their interests.

Inventory control strategies adopted by firms should appreciate the need for technology and also be up to industrial best practices which can be ascertained through proper benchmarking. This will ensure that the firm has up to date inventory control systems that can compete well and are very efficient in serving the needs of those the stakeholders.

Workers should be trained on the need for improved inventory control so that they can easily accept them whenever they are introduced in the firms and also provide necessary inputs regarding the strategies involved.

5.4. Suggestions for Further Studies

Given that the study focused only Kenya Medical Supplies Agencies, the results may not apply to all pharmaceutical sectors. It is recommended that a study on inventory control is done cutting across all pharmaceutical sectors in the country that would allow for broader generalization of findings to ensure implementation of proper inventory controls hence achieving better performance of firms.

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