

**DISTRIBUTION STRATEGIES AND PERFORMANCE  
OF KENYA MEDICAL SUPPLIES AUTHORITY**

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**A Research Project Submitted in Partial Fulfilment of the  
Requirements for the Award of Degree of Master of Business  
Administration, School of Business. University of Nairobi**

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## **DECLARATION**

I declare that this Research Project is my original work and has never been submitted to any other university for assessment or award of a degree.

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

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This Research Project has been submitted with my authority as the University Supervisor.

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## **DEDICATION**

I dedicate this work to my brother Johnstone Nyarigu for his encouragement to keep going and support during the entire duration.

## ABSTRACT

This study sought to investigate the extent to which strategies adopted by Kenya Medical Supplies Authority (KEMSA) seem to be ineffective as health facilities do not receive the Medical Supplies on time and the orders received do not match the demanded quantities. The specific objectives were to identify the medical distribution strategies adopted by KEMSA; and to determine the impact of the distribution strategies adopted on the performance of KEMSA. The study employed descriptive case study design. Data was collected by use questionnaires and analysed quantitatively and qualitatively. The study established that KEMSA adopted three strategies that included pull strategy, push strategy and a mixed strategy comprising of both push and pull elements. The study also established general improvement in application of pull strategy. The study established that push strategy was applied in 2011 and 2012 and not applied thereafter. On mixed strategy comprising of some push and pull elements, the study established that there was fluctuation in the trends between 2011 and 2015. The study found that there was improvement in performance of the institution from 2011 to 2015. On impact of the strategies on performance, the study established that that there was strong correlation between both pull and push strategies and performance. The findings, however, indicated weak correlation between pull strategy and performance as well as push strategy and performance. The study also established that all strategies employed are important factors influencing KEMSA performance but at varying degrees where mixed strategy of both push and pull contributed most to the performance followed by pull strategy then push strategy. In view of the findings, the study concluded that while KEMSA has adopted three distribution strategies, the pull strategy is most applied and push remained relevant despite not being applied. The study also concludes that while pull strategy is most applied, the performance of KEMSA is largely affected by application of combination of both push and pull strategies. However, while the performance of KEMSA is largely determined by combination of both push and pull strategies, it remains fair and there is opportunity for improvement in the distribution of pharmaceuticals and equipment. It is with these findings that the study recommended re-application of push strategy. The study also recommended for KEMSA to address the challenges that reduce efficiency and effectiveness in each of the strategy applied.

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## **LIST OF ABBREVIATIONS**

BRP	Business Process Re-Engineering
CSC	Collaborative Supply Chain
GOK	Government of Kenya
KEMSA	Kenya Medical Supplies Authority
MOH	Ministry of Health
MSH	Management Sciences for Health
SC	Supply Chain
SCM	Supply Chain Management
TQM	Total Quality Management
USA	United States of America
USAID	United States Agency for International Development
WHO	World Health Organization

# CHAPTER ONE: INTRODUCTION

## 1.1 Background of the Study

Distribution is very crucial in the process of supply chain management particularly of medical products (pharmaceuticals and equipment). Different entities and individuals are fully responsible for the process of handling, distribution and storage of products. However, in other incidences, a person is only entitled to take control of certain distribution elements especially medical supplies (WHO, 2010). The World Health Organization considers entrance to medicine as one of the priorities for the citizen, where supply chain in medicine is very necessary (WHO, 2003). In Kenya, medical supply is mainly a function of KEMSA, a corporation that falls under the ministry of health (KEMSA act, 2013) .

Kenya Medical Supplies Authority, has for the past period received bad publicity and reputation and is known for inconsistent customer service and inefficiencies in its operation. In July 2007, KEMSA's performance started declining and in June 2008, its operations had come to a near halt (GOK, 2008). The Authority has been under a series of transformation and yet the bureaucracies have been its biggest impediment. KEMSA's medical supply chain has suffered from great short-term demand fluctuations with serious adverse effects to the Kenyans (GOK, 2008).

An efficient and effective type of supply chain management is characterised by high level of reliability, timeliness, easy movement of health products as well as data up and down the supply chain module: from the point of service delivery (this include clinics, hospital and health posts where the health commodities are well dispensed) to national, county as well as sub county levels. Data from this point of service are very important and relevant for supply chain managers for decision making. This kind of decisions

include the type of health commodities that are supposed to be delivered and at what time. The paper-based type of logistic management system is commonly applied in third world countries; the right person does not commonly access right data at the right time. (Frost, Islam, Printz, Whitehouse, & Hiller, 2011). This points to inefficiencies in the supply chain which has adverse impact on the health sector. There is need for eliminating such inefficiencies especially in the wake of improving Universal Health Coverage.

### **1.1.1 Distribution Strategy**

Distribution Strategy is a plan to make a product or a service available to the targeted customers through its supply chain. The supply chain is lowest of the business network. It is defined as the human capital management, processing of business, information as well as material between the business, its customers as well as its suppliers. This allows for maximum customer satisfaction with maximum business margin (McNeil, 2007). What is important is to be put into consideration all supply chain participants that can acquire benefit from improved functions of supply chain management

Distribution is very crucial in the process of integration of supply of equipment as well as medical drugs. Different people and organisations are responsible for sourcing of product, procurement, transporting them, delivery of these products, storage, tracking devices, installing, commissioning, maintenance as well as service. This ensures safety as well as performance of those medical equipment at the point of (Medical Device Authority, 2013).

The “push” strategies maximise use of firm sale force as well as trade promotions to enable creation of demand from consumers for the products. In this particular scenario, producers are able to promote the products to the wholesalers make use of the firm’s

trade promotion and sales force to come up with the consumer demand for the company products. In this type of strategy, wholesaler's products are promoted from the producer, then wholesalers promote their products to the retailers and finally patient's drugs are promoted by the retailers. Practically, the company is able to promote its product to the pre-wholesalers, then wholesalers or the pharmacy or give focus to one of the channels. In the type of pull strategy, the consumers themselves request the products and eventually pulls them all through the distribution channel. Information is very important in the process of offering effective channels of distribution. Moreover, finance is the major engine that enhance all this. In most of the countries, the public health officials have very limited experience in the process of designing the procurement system that is very optimal. This includes the system of distribution that can perfectly fit the current market (Oyamo & Mburu, 2014).

Most countries are radically moving away from the pharmaceutical system of procurement whose operation are done by the public sector and investigations are underway to involve the public sector too in order to strengthen public health. The publication of MSH/WHO (2007) shows the existence of the various modes (Oyamo & Mburu, 2014). In Kenya, KEMSA has the mandate of medical supplies and this has limited participation of the private sector. Until the mandate is revised, KEMSA will therefore continue as major supplier of medical supplies to public and private medical entities. This implies that any inefficiencies cannot currently be addressed by adopting integrated procurement system that allows private sector to procure and supply medical supplies. Therefore, there is need to identify and address inefficiencies in KEMSA's distribution strategy as a means of improving KEMSA's performance.

### **1.1.2 Firm Performance**

A firm's key dimensions of lean supply chain's performance is well defined in terms of the speed of delivery, level of reliability of delivery, flexibility and price of the drugs. Time is one of the fundamental measures as well as competitive advantage for the performance of lean supply chain. Many companies maximize use of the balanced scorecard developed by Kaplan & Norton's (1992). The model is mainly based on the principle that states that, an efficient system of performance be in a position to provide managers with the effective information to address these questions: how do we look at our shareholders in the financial perspective? How can our customers be in a position to see the company? This is called customer perspective. Finally, how can we be in a position to improve and create the value? This is called learning and innovation perspective. The model helps the company to translate its strategy as well as vision through the objectives and measures defined apart from stressing on the need for the financial measures that provide minimal (Onyango, 2013).

The model of supply chain performance refers to the extended activities of supply chain in the process of meeting the requirements of the end customers that includes the availability of the products, timely product delivery as well as all necessary inventory as well as capacity in the process of delivering the service in the manner that is very effective (Harrison et al.,2005). The measure of performance is quantitatively able to elaborate something that is very crucial concerning our product as well as service and their production process. The measure of performance let every person to know: how best we are faring on, whether we are meeting the company goals, whether the customers are satisfied or not, if the whole process is controlled statistically and where improvements can be done (Onyango, 2013).

Distribution decisions in most cases are based on long-term forecasts. An adequate forecasting system is often necessary to structure any distribution system. Distribution system may be as a response of the business in the process of anticipation of the demand of customers. From the whole viewpoint of supply chain, deciding whether this type of supply chain is a pull or a push is very difficult and depend on what constitute the supply chain process and where specific participants are placed in the supply chain model (McNeil, 2007).

Public Health Programs require supply chain to ensure that the product is available and when it is needed. Implementation of the indicators of supply chain indicators or the metrics as one of the simplest and least expensive and less time-consuming activity in the operations improvement. It is very crucial for the metrics to be able to align and not work to counter the process (Aronovich, 2010). This study therefore examined the extent to which distribution strategy are suitable or not.

### **1.1.3 Kenya Medical Supplies Authority**

Kenya Medical Supplies Authority (KEMSA) is the corporation of the state established under the ministry of health that as established under KEMSA act of 2013 whose function is to procure, store and distribute medical supplies for public program prescription. KEMSA is also mandated to establish the storage network, packaging as well as packaging and provision of distribution facilities for provision of the drugs as well as medical supplies in the different health institutions. KEMSA has been mandated to enter into the partnership in an established framework with the county governments for the reason of providing procurement services, storage and distribution of the drugs as well as supply of drugs.

Since 1901, the institution has undergone transformation aimed at improving service delivery. The authority has gone a long way in the process of addressing the historical challenges through the system of supply chain. The company corporate mission hinges on the ability to optimise on use of efficient procurement system as well as distribution and storage of the value for money drugs to the facilities of the public (KEMSA, 2014).

Part of the transformation aimed at improving efficiency in its supply system is the adoption of the pull and push system that has greatly depended on the characteristics of the medical products they handle. The supply chain with higher demand uncertainties and have higher unit cost including low transportation cost relative to the product's total cost then this can have a better fit for the pull system or commonly known as the demand driven system. On the other hand, products that have low demand uncertainties and require high economy of scale would preferably have greater cost saving from pooling and pushing the distribution (Kamau, 2006).

It is against the backdrop in service delivery that on 10th July 2008, KEMSA Board was dissolved and Task Force formed following concerns over KEMSA's declining performance. The Task Force was mandated to make legislative and policy recommendations that would empower KEMSA to discharge its mandate. In carrying out its work, the Task Force examined numerous documents and interviewed several people whom it considered to be representative of all the stakeholders of KEMSA, including government officials, health facilities staff, development partners, suppliers, transporters, KEMSA staff, members of the dissolved board of directors and the suspended chief executive (GOK, 2008). From these unprecedented events, there is need to examine the factors that have hindered the achievement and the full

implementation of an appropriate distribution strategy by the Kenya Medical Supplies Authority.

## **1.2 Research Problem**

Distribution of the equipment as well as the pharmaceutical drugs is very important of effective management of the drugs and supply which is very important in all institutions of healthcare (WHO, 2007). A framework and institution to support effective distribution system is therefore necessary. The framework and institution should therefore be responsive to emerging needs in the medical field. In Kenya, KEMSA as an institution operates the framework of medical supplies. The institution has undergone transformation aimed at improving efficiency in the distribution system.

However, the transformation of KEMSA to meet local and international standards in service delivery of medical supplies has not been achieved. The adoption of push and pull strategies as part of the transformation strategies is not meeting the expectations of the procurement requirements of medical supplies recommended by the World Health Organization (WHO). The WHO recommends for the efficient supplies of medical equipment through the concept of just-in-time that requires timely supply in respect to demand (Taskforce, 2008). At KEMSA, the strategies adopted seem to be ineffective as health facilities do not receive the medical supplies on time and the orders received do not match the demanded quantities. This unprecedented reality compromises medical services in the medical facilities which puts many lives at risk.

The emerging questions in this situation therefore revolve around the type or system or strategy of distribution adopted by KEMSA and effects on KEMSA's performance in distribution of medical supplies. It is against the backdrop of the inefficiencies in the distribution of drugs and other medical supplies that this study sought to investigate the



distribution strategies adopted at the Kenyan Medical Supplies Authority and the impact they have on the performance of the Authority. The study is seeking to answer the questions: what are the distribution strategies adopted by KEMSA in the distribution of medical supplies? What impact do the distribution strategies adopted have on the performance of KEMSA?

### **1.3 Research Objectives**

This study was guided by the following objectives:

1. To identify the medical distribution strategies adopted by KEMSA.
2. To determine the impact of the distribution strategies adopted on the performance of KEMSA.

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

It is anticipated that this study would be important in several ways to KEMSA, Health Sector stakeholders and researchers. The management of the Kenya Medical Supplies Authority (KEMSA) will have important information to enable them to improve in their core functions. Best distribution strategy would be developed to address the challenges resulting into stock outs of drugs in most of the health facilities in the County which have a cumulative effect ranging from deaths and complications of other simple illnesses.

The health sector has several partners including donors, civil societies, and the public and this research will provide information for policy making and would go further in encouraging them continue in their efforts of funding the sector. In addition, the Ministry of Health will find it easy in their planning and allocation of available resources as well as County governments improving on provision of health services.

Finally, this study finding would enhance other researchers to try and establish other issues that would not have been satisfactorily established and thus form a basis of future research

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction**

This section describes reviewed different literature relation to the KEMSA's functions and findings from the perspective of other researchers. The chapter is outlined under the following subheadings: theoretical foundation; medical distribution strategy; Performance measurement; distribution strategy and performance of KEMSA; and conceptual framework.

### **2.2 Theoretical Foundation**

This study adopted Michael Porter's Competitive Advantage of Nation's theory which provides a tool for analysing competitiveness with all its implications focusing upon individual industries, or clusters of industries, in which the principles of competitive advantage are applied (Porter, 1990). Hitt, Ireland, and Hoskinsson (2015) says that a competitive strategy that is winning is always established on the market that is predictable, consistent and understanding. The main objective of this strategy of business is to be able to accomplish the competitive advantage that is very sustainable. A competitive advantage arises when the company is in position to deliver the same benefit just like a competitor but at slightly lower cost or be in a position to deliver the benefits that are above that of the competing firms. Currently, the existence of technology that is dynamic calls into question the level of sustainability of the competitive advantage. Managers have been able to embrace Total Quality Management, product reengineering and benchmarking as the tool to improve on product quality, improvement of production of the products as wells as the production speed (Safford, 2005).

Any company can have or acquire the competitive advantage whenever it acquires a competitive edge over its rival in acquiring customers and being in a position to defend the company against the prevailing competitive forces (Thompson & Strickland, 2002). The sustainable competitive advantage emanates from the core competencies that improves the company benefits. To be in a position to succeed in building a reliable competitive advantage a company must be able to produce what the firm will perceive to be of stronger value. This means the company should produce and sell products at a lower price, or products of better quality that customers can pay more for them without complaining. It consists of all kind of moves as well as approaches that a company has is taking in order to attract more customers without pressure hence improving its competition in the market (Thompson & Strickland, 2002). It is concerned with what the company is able to do in order to gain its competitive advantage

Porter (1990) provides an outline three major approaches to achievement of competitive strategy with the aim of being a low-cost producer. This is also called low cost leadership strategy, seeks to achieve product differentiation from the other companies this is called differentiation strategy and finally narrow portion of the market focus, this is also called niche or focus strategy. Many drug firms are highly interested with acquiring profit from efficient product movement from the producers to the patients. The payers are interested in the right channel that can be in position to offer these types of products at as lowest price as possible without necessarily aligning to the interest (McCain, 2012).

To hold down distribution costs KEMSA's customer base places their replenishment orders on a quarterly basis. While this helps to minimize the distribution costs, it may not fully account for the additional inventory costs required for the facilities to maintain

their inventory. With only four opportunities to order each year, the average inventory for a facility will be three times as large compared to the opportunity to order 12 times per year. For example, if a facility had an annual consumption rate on a commodity for 100,000 units, they would need to order on average 25,000 units each quarter. If they were able to order monthly, their average order would fall to 8,333 units per order. In addition, with the variability in demand, there is a greater probability of facility out-of-stocks when ordering only four times per year as well as a longer duration between replenishments (Nzioka, 2010).

### **2.3 Distribution Strategies**

A push-based chain of supply aligns their distribution and production decision making process towards long term forecast. Most of the manufacturers makes the forecast of their demand by basing on their previous orders received from their distribution centers and retailers' warehouses. A preplanned schedule of manufacturing is conducted and then their products are pushed down to the supply chain the inventories of the vendors irrespective of the information demand patterns available at that time. The demerits of this kind of push is that; the company may be unable to meet the prevailing market demand; there may be a very high likelihood of obsolescence in the supply of inventory as the demand of the specific type of products vanishes (Wang' & Wittwer, 2007).

The bullwhip effect mostly take place in the push system. Backward along the chain of supply, many suppliers tend to place larger type of orders up to the downstream demand of uncertainty in order to meet the demand of the customers hence making the entire system to be unstable. In such kind of system, the level of service is very low as the system is not able to respond to the requirement of the service. This makes the products

to be obsolete. The pull-based supply system the decision on the production and distribution is based on the demand of the customers (Wang' & Wittwer, 2007).

In ideal pull system, orders come before the inventories are held. This is made a success by fast flow of the information concerning the demand of the customers to different supply chain participants. This type of system has many advantages. This includes; stable system of supply chain and low inventory level. No perfect pull or push system of supply chain exists hence most of the systems operates in combination of both (Kaminsky & Simchi-Levi, 2003). High uncertainty of demand encourages very high level of the pull strategy while the high economic conditions gives room for incentives to high degree of the push system(Wang' & Wittwer, 2007).

The plan also foresees KEMSA to implement the central system of procurement that are handled by Ministry of Health and simultaneously improve the supply chain logistic capacity. The plan requires the government to engage in continuous capacity building for this enhanced role for KEMSA. In fact, one of the planned key outputs for commodity supplies management is to strengthen the capacity for the management of the drugs as well as the management of drugs using latest information system (Kamau, 2006).

In the United States of America, Hospitals are now applying lean principles to their inventory systems to improve efficiency and reduce operating costs. In this case, there has been a medical dispensing technology to improve their pharmaceutical inventory system. A recent study conducted by the Supply Chain Resources Cooperative suggests that hospitals engaging in those new medical dispensing technologies will over an estimated period of five years realize a significant benefit that will contribute to meeting the required mandate (Handfield, 2007).

According to Handsfield (2007), if the United States of America companies for example learnt over a period of ten years that effective managing inventory is central to remaining competitive. Although in practice maintenance of high inventory level is acceptable, it in most cases resulting into high cost of carrying, diminished market share and profit reduction among others. According to Shook (2010), “Lean Supply Chain is a philosophy that seeks to shorten the time between customers’ order and the shipment to the customer by eliminating waste”. However, the details provided on the benefits of pull strategy in supply chain management, not many participants can apply the demand-pull model. The organization that apply this type of model will always strive to move the inventories from the point of decoupling to its supplier or suppliers’ supplier (Shook, 2010).

#### **2.4 Performance Measurement**

The high need to come up with the latest system of performance measurement system at different levels of the decision making resulted to Robert S. Kaplan and David P. Norton (1992) to be able to develop and propose the balanced scorecard to help in evaluation of the corporate performance from four different dimensions: learning and growth, customers, financial perspectives and internal processes. Contrary, under the latest market trend in terms of the environment (Green supply chain), leanness (Lean supply chain) collaborative method (CSC type of collaborative method), communication technology among others results to contemporary oriented perspective as well as future of supply chain in the era of dynamic technology (Jaimes, Serna, & Buritica, 2012).

Organizational management needs measurement of development of performance system adopted by group of companies which is considered as one of tool for impacting

more on the supply chain management (Ballou et al, 2000; Lancioni, 2000). Most of the performance management system maximize use of modern approaches like Balanced scorecard, TQM, business process reengineering or benchmarking. The performance measurement is considered as part of the overall system of management hence it is viewed as one of the system of quantifying the effectiveness of the actions taken. It is one of the most common practice in the public performance measurement of the public sector. It talks about three Es of; Effectiveness, Economy and Efficiency (Consultant, 2003)

## **2.5 Distribution Strategy and Organizational Performance**

The rapid distribution of the medical supplies performs a very important function in the assurance of the efficiency as well as effectiveness of the healthcare system. The medical distribution and supply entails movement of the large volume of diverse products that are supposed to be delivered rapidly (Maged, Fernando, Honzhong, Zhihong, & Daniel, 2009). The network of drug distribution for example have been in the chaotic state as it consists of the open market, community pharmacies that are managed by the Non-Governmental organisations, medicine stores, public and private hospitals, importers as well as pharmaceutical manufacturers resulting into ineffective process of procurement as well as channels of distribution (Oyamo & Mburu, 2014).

According to Kahia and Iravo (2014) in their study of Bata Shoe Company limited, it was found out that product, customers, technology as well as the structure of distribution are among the factors that affect the logistics of distribution. The research work also determined the quantities ordered, location of the customers, the requirements of the customers and the customer numbers as among the aspects that affects the performance of the logistics of distribution



In his study, Kadivane (2012) sought to find out supply chain management strategy and performance of KEMSA. In the study recommendations, he asserts that there is need for an investigation and focus on the innovation and developing of the overall distribution strategy (for example investigate the applicability of new technologies and resources in SCM) that would enhance KEMSA's competitive advantage.

Over the ten years of KEMSA's existence, the organization has implemented a centralized supply chain network, established scheduled deliveries to all of its five thousand plus customers through outsourced transport and continues to serve its customers. However, its distribution functions remain plagued by operational inefficiencies according to reports by the Ministries of Health (MOH), the United States Agency for International Development (USAID) and the World Bank.

As at July 2008, KEMSA had a total distribution network that consisted of a total of eleven network of warehouses that was well spread across 9 towns with a total storage space of 292, 810 square feet. The previous assignment established that do not meet the international good distribution practices as recommended by the World Health Organization (Nzioka, 2010). This research therefore aims at investigating the contribution of the strategy in the performance of KEMSA related to its mandate.

## 2.6 Summary of Literature Review

**Table 2.1 Summary of Literature Review**

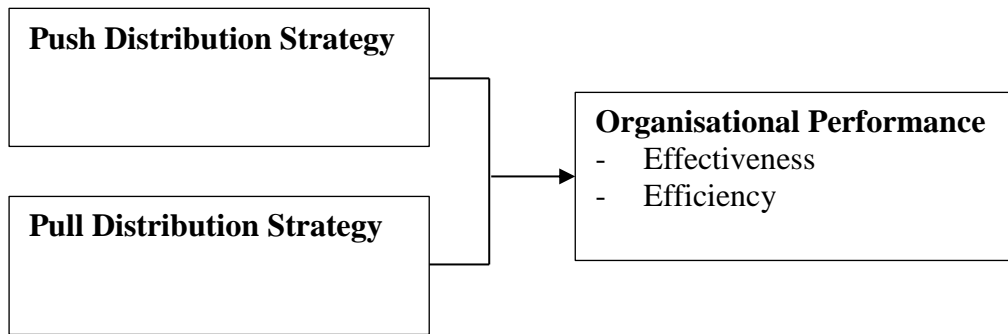
Author	Research	Findings	Research Gap(s)
Maged Dessouky, Fernando Ordenez, Horgzhong Jia and Zhihong Shen, 2009	Rapid Distribution of Medical Supplies	Some important issues in the design of an efficient pharmaceutical supply chain involve deciding where to place the warehouses/ inventories and how to route distribution vehicles. Solving appropriate facility location and vehicle routing problems can ensure the design of a logistic network capable of rapid distribution of medical supplies. Both these problems must be solved in coordination to quickly disburse medical supplies in response to a large-scale emergency.	This research focused on rapid distribution of medical supplies in Los Angeles, USA and was regarding an approach hypothetical to an anthrax emergency in that region.
George Mutua Nzioka, 2010	The Practice of Supply Chain Management in Public Healthcare Sector in Kenya: The Case of Kenya Medical Supplies Agency	Although the KEMSA taskforce report of 2008, highlighted financial and managerial problems at the core of KEMSA's inefficiencies, it is apparent from this report that its SCM processes were not at par with industry best strategy. The study highlighted several areas where KEMSA's SCM processes can be improved to be at par with industry best strategy.	This study focused on the SCM processes at KEMSA and attempted to link these processes to the reported performance by the taskforce report of 2008. This study concluded that the unfavourable performance could have been due to managerial and financial shortcomings as reported in the taskforce report of 2008 as well as the findings of this report.

Author	Research	Findings	Research Gap(s)
(Kanavos, Schurer, & Vogler, 2011)	The pharmaceutical distribution chain in The European Union: structure as well as impact on the prices of pharmacies.	In the European Union, Manufacturers recognize the importance and contribution of the distribution sector to ensuring easy access as well as availability of the drugs to the patients. It is commonly argued that the distribution cost in many occasions is not proportional to the offered value to the public. This should be put into consideration and be aligned to the contribution made by the pharmaceutical sector in bringing unique therapeutically alternatives into the market.	The study focused on the distribution and access of medicine to patients in the European Union and the effects on the pharmaceutical prices with little attention on the effect on the performance.
Samuel Kadivane Kazi, 2012	Supply Chain Management Strategy and Performance at Kenya Medical Supplies Authority	Innovative supply design has a very great effect in the selection as well as corporation with the suppliers. This improves the efficiency in the supply chain hence this enhances supply chain management strategy leading to improvement of the performance	The researcher focused on the general supply chain management strategy and challenges at KEMSA with no attention on the distribution strategy
Evelyne Akinyi Oyamo and Daniel Kiarie Mburu, 2014	Effects of the process of procurement process on the distribution of the Pharmaceutical Drugs in the public hospitals in the Kenyan country: A case of the Mission for Essential Drugs and Supplies	The study established that specification design, procurement planning, contracting and selection of the supplier's impact on the distribution of the pharmaceutical drugs in the public hospitals extensively in the MEDS. The research further suggested that since the research work is constrained to the Mission for the Essential Drugs and Supplies, other research work should be done in other organisations while specialising on the supply as well as distribution of the pharmaceutical drugs.	The research work was mainly limited to the Mission for Essential Drugs and Supplies and how the design of specification. Planning, selection of suppliers and specification of design impact on the distribution of the pharmaceutical drugs in the public hospitals.

## 2.7 Conceptual Framework

The following conceptual model was developed as illustrated in Figure 2.1

**Figure 1: Conceptual Framework**



Independent Variables

Dependant variable

Source: Researcher, 2016

Figure 1 depicts the conceptual framework of the research. The model indicates distribution strategies adopted and the impact on performance of KEMSA.

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 Introduction

This section covers the research design to be adopted in this study, the expected respondents, collection of data and further how the data collected will be analysed.

### 3.2 Research Design

The research made use of a descriptive case study design. The study involved an analysis of the distribution strategy at KEMSA. This design facilitated examination of the supply strategies in terms of efficiency and effectiveness. Since the study involved collection of data over long periods of time, mostly above five years it was helpful in determining trend of the variables under study. It was possible to learn more about cause and effect relationships among variables of the study. More data over longer periods of time allowed for better understanding of the impact created by the strategies of distribution at KEMSA. The study was limited to collecting data in the year 2015, 2014, 2013, 2012 and 2011.

### 3.3 Study Population

The study targeted KEMSA employees. KEMSA has 42 warehousing employees, 46 distribution and 21 procurement employees. The study targeted KEMSA employees engaged in the receipt and dispatch of drugs and medical equipment. To arrive at the suitable sample size of 28 respondents, Kothari's (2004) sample size formula illustrated in Table 1 was used.

$$n = \frac{Z^2 pqN}{e^2(N - 1) + Z^2 pq}$$

Where:  $n$ : is the sample size for a finite population;  $N$ : size of population i.e. 109;  $p$ : population reliability (or frequency estimated for a sample of size  $n$ ), where  $p$  is 0.3

(30%) and  $p + q = 1$ ;  $e$ : margin of error considered is 10% for this study;  $Z$  is the normal reduced variable at 0.05 level of significance  $z$  is 1.96.

Table 3.1: Sample Frame

Respondents	Category	Population	Sample
KEMSA employees	Warehousing	42	10
	Distribution	46	12
	Procurement	21	6
Total		109	28

Source: Researcher, 2016

### 3.4 Data Collection

The study will target KEMSA employees particularly those engaged in the receipt and dispatch of drugs and medical equipment. Structured questionnaires were used to collect primary data. These questionnaires were designed to capture information on the ordering, deliveries and the time taken to deliver an order to KEMSA, time taken to receive drugs and equipment after processing from KEMSA including feedback where required.

The questionnaires also contained sections with the likely impacts of their distribution strategy adopted by KEMSA on its performance. A distribution summary form was also used to collect additional information on the distribution practices for the years 2015, 2014, 2013, 2012 and 2011. This established the trend in performance for this period.

### 3.5 Data Analysis

The data was collected by use of questionnaires which was analysed quantitatively and qualitatively. Quantitative analysis involved analysis of numeric data while qualitative involved analysis of non-numeric data. The data was analysed quantitatively by use of SPSS. The content analysis was supplied by use of the quantitative data. The findings of the quantitative data outcomes were then presented using the statistical tables while the quantitative finding was presented in form of themes.

Table 3.2 Summary of Data Analysis Methods

Objective	Section of the questionnaire	Data Analysis Method
To identify distribution strategy adopted by KEMSA.	Questionnaire Sections 1	Factor analysis
To determine the impact of distribution strategy on performance of KEMSA.	Questionnaire Section 2-12	Descriptive and Inferential Analysis

# CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

## 4.1 Introduction

This particular section gives an analysis of collected from the KEMSA staff engaged in the acquisition, receipt and dispatch of the medical drugs and equipment who were the respondents. The chapter covers the efficiency of the strategies adopted by KEMSA; the effectiveness of the strategies and the effect of the strategies on KEMSA performance.

### 4.1.1 Questionnaire Response Rate

The questionnaire response rate was 86% which was considered suitable for data analysis.

## 4.2 Distribution Strategy Adopted by KEMSA

Responses from the questionnaire were used to identify the distribution strategy adopted by KEMSA. The findings are illustrated in Table 4.2.

**Table 4.1: Distribution Strategies adopted by KEMSA between 2011 and 2015**

Distribution Strategy	Period					Mean
	2011	2012	2013	2014	2015	
Push Strategy	10%	7%	6%	4%	3%	6%
Pull Strategy	38%	42%	52%	74%	83%	58%
Both pull and push strategies	52%	51%	42%	22%	14%	36%

The study under this section is meant to determine the distribution strategies adopted by KEMSA. The findings in Table 4.2 indicate that KEMSA adopted two major distribution strategies, the push strategy and pull strategy. The findings also indicate



that both strategies were also applied together. The findings in the Table also reveal that pull strategy was most preferred (mean of 58%) while application of push strategy reduced (mean of 6%) in the period between 2011 and 2015. The increasing application of pull strategy from 2011 is attributed to effects of devolution where health sector was mainly managed by County governments that maintained control over procurement of medical supplies. This was also attributed to the supply chain improvement recommendations by the Government's Task Force Report (GOK, 2008).

The variation in the application of the strategies was based on various reasons. The preference of pull strategy was demand driven since health facilities had different consumption rates of their medical supplies and this allowed KEMSA to receive orders of the supplies. This limited the application of push strategy. However, push strategy remains relevant in cases of emergencies such as disease outbreaks where KEMSA was compelled to supply some medical supplies as means of managing such emergencies. The use of both push and pull strategies was relevant in cases where either push or pull was unpredictable. Kaminsky & Simchi-levi, (2003) also noted practically, no perfect pull as well as push system exists. The supply chain management is operated in both combinations.

It was revealed that the guiding aspects for push strategy included situations of projected demand findings which are similar to the study (Oyamo & Mburu, 2014). Push strategy was also applied when consumption patterns of health facilities were predictable. The prediction was obtained from health facility reports that supported an established trend of consumption. In contrast, the preference of pull strategy over push was attributed to several reasons. The first reason is that pull strategy reduced expiries. Also, pull strategy ensured that specific requests were processed. This therefore reduced

the risk of supplying medical items that were not needed. In addition, pull strategy supported proper preparation or planning to support the supply chain. In this case, orders were processed and dispatched on rolling basis.

The findings on distribution strategy indicate that pull strategy was suitable as it allowed stakeholder participation and it was easier to administer. These findings imply that KEMSA has been operating an integrated distribution strategy that allowed for flexibility in addressing varying needs at a given time. In this situation, while the strategies are not equal, there are corresponding impacts of each strategy on KEMSA performance of KEMSA in supply of medical items to different users.

### **4.3 Trends of Distribution Strategies and Performance of KEMSA**

The trends of distribution strategies were analysed and presented in Tables 4.3 to 4.5. Also, the performance of KEMSA was analysed and presented in Table 4.6.

#### **4.3.1 Trends of Pull Strategy**

The study intended to establish the trend in performance of each strategy adopted over a five-year period and the following trends of pull strategy as illustrated in Table 4.3 were obtained and interpreted.

Findings in Table 4.3 indicate that outcomes of trends of pull strategy varied in each of the years. Receiving orders outcomes were below target in 2011 and this improved in the subsequent years. Overall mean of the outcomes was 2.2 which implied that targets of receiving orders were achieved. This was attributed to several factors. For example, 100% of respondents indicated that the orders made were compliant with KEMSA's regulations and standards before processing.

**Table 4.2: Trends of Pull Strategy**

<b>Indicators of Pull Strategy</b>	<b>Outcome Scores</b>					
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Mean</b>
Receiving orders	1	2	2	3	3	2.2
Processing orders	1	1	1	2	2	1.4
Dispatching consignments	2	2	2	2	2	2
Receiving returns	1	1	2	2	2	1.6
Processing returns	2	2	2	2	2	2
Dispatching returns consignments	2	2	2	2	2	2
<b>Mean</b>	<b>1.50</b>	<b>1.67</b>	<b>1.83</b>	<b>2.17</b>	<b>2.17</b>	<b>1.87</b>

Scale: N/A=0, below target=1.0-1.99, on target =2.0-2.99, exceeded target=3.0-3.99

In receiving orders, KEMSA targeted to receive orders quarterly but this varied with some orders received after every three months (13.5 weeks). The cases of emergencies also contributed to some orders received before period of three months was reached.

In processing the orders, the findings in Table 4.3 indicate that the exercise was not achieving the targets, and this improved in the last two years of the assessment period. With an overall mean of 1.4, processing orders remained a challenge as orders were expected to be processed in a period of 48 hours if all conditions are met, yet many orders were processed beyond the duration.

It was found that in most cases, the delay stretched to 1 week as observed by 85.7% of KEMSA officers while in extreme situations, it took at least 14 days as observed by 14.3% of the KEMSA officers. This was attributed to several factors. The delay in processing the orders was attributed to KEMSA's requirement of revising some orders especially whenever actual products as ordered were out of stock but there were alternative products serving same purpose as observed by 85.7% of the respondents. Also, 92.9% of respondents indicated that processing was also delayed due to some circulars guiding new administration and usage of some medical items especially drugs.

On dispatching consignments, findings in Table 4.3 indicate that KEMSA has been achieving its targets. According to KEMSA, all orders were expected to be dispatched 48 hours after processing. KEMSA therefore dispatched all consignments 48 hours after processing. In addition, KEMSA was expected to dispatch all items agreed upon for processing. With a mean of 2.0, there is indication that all orders processed and dispatched 48 hours after processing were made ready for dispatch as ordered. This outcome was confirmed by 92.9% of respondents who indicated that dispatches were made as contained in the orders. The reconciled records in the order forms and dispatch forms were attributed to several reasons. First, 50% of KEMSA officers indicated that such situation was supported by availability of stock while 21.4% attributed to easy processing of orders.

Dispatch also involved delivery of the orders. According to the findings in Table 4.3, deliveries were made according to targets. KEMSA expected that all deliveries were to be made within 1 week. With a mean of 2.0, KEMSA delivered as expected as observed by 86.4% of respondents. However, some cases took between 1 and 2 weeks as observed by 15.1% of KEMSA officers, but this was attributed to external factors such as poor transport network occasioned by weather changes. Realising the target on delivery was attributed to several factors that included use of outsourced logistics services from third parties as confirmed by 71.4% of KEMSA officers. In this case, while KEMSA employees supported some deliveries, majority of the services were outsourced, and this increased performance as contractors in this service have performance contracts of delivering within the expected period. This situation placed a lot of responsibility on KEMSA of ensuring that the items reached intended destinations within the specified period as confirmed by 84.6% of the KEMSA officers.

On returns, findings in Table 4.3 indicate that there was improvement in reducing returns in the years 2013, 2014 and 2015. However, with a mean of 1.6, the targets of receiving returns were not achieved yet KEMSA expected all consignments delivered to match the orders. This was attributed to factors such as orders not matching deliveries which occurred rarely. Another reason is delivery of items to the wrong facility.

With existence of returns, KEMSA was expected to process the returns and correct the situation within a period of 48 hours. In this case, with a mean of 2.0, KEMSA realised the target as the situation was corrected and included reconciling the order forms with dispatch forms. In dispatch of the consignments, KEMSA consistently dispatched correct returns. With a mean of 2.0, the target was achieved as all returns were expected to be dispatched in less than 48 hours after processing. In this situation, priority was given to dispatch of returns which included making deliveries in time.

Overall findings in Table 4.3 indicate that outcome scores were better (mean of 2.17) in 2013 and 2014 while least outcomes were achieved in 2011 (mean of 1.50). The trend is therefore a general improvement. The improvement was observed more in receiving orders (mean of 2.2), dispatching consignments (mean of 2.0), processing returns (mean of 2.0) and dispatching returns consignments (mean of 2.0). All these indicate achieving or targets. However, with an overall mean of 1.87, the KEMSA did not achieve the targets. This is attributed to challenges in processing orders (mean of 1.4) and receiving returns (mean of 1.6). These findings indicate that outcomes of pull strategy are below targets. These overall findings were attributed to the fact that this study covered a period of five years which partly had a period when KEMSA adopted a new business model and the health services had been devolved to the County Governments.

**Table 3.4: Z-Scores for Pull Strategy**

<b>Indicators of Pull Strategy</b>	<b>Mean</b>	<b>z-Score</b>
Receiving orders	2.2	.62696
Processing orders	1.4	-1.63010
Dispatching consignments	2.0	.62696
Receiving returns	1.6	-.87775
Processing returns	2.0	.62696
Dispatching returns consignments	2.0	.62696
Mean	1.87	0E-7
Standard Deviation	.3011	1.0000

Findings in Table 4.4 indicate that pull strategy performed best in receiving orders, dispatching consignments, processing returns and dispatching returns which had positive z scores. However, this strategy had negative z scores in the processing of orders and receiving returns. This is also attributed to KEMSA's requirement of revising some orders especially whenever actual products ordered were out of stock but there were alternative products serving same purpose that the facilities could consider.

Overall findings in Table 4.4 similarly indicate that outcome scores for pull strategy were better with a general improvement after the devolution of Health Services and adoption of the new business model by KEMSA. These findings are also in tandem with the recommendations by the Government's Task Force on Performance of KEMSA (GOK, 2008). Kamau (2006) also outlined the improved efficiency in the distribution system by full adoption of the pull strategy especially for supply chains with higher demand uncertainties and unit costs including low transport cost relative to the products' total cost.

#### **4.3.2 Trends of Push Strategy**

The following trends of push strategy as illustrated in Table 4.5 were obtained and interpreted.

Findings in Table 4.5 illustrate the trends in push strategy. According to the findings, this strategy was applied in 2011 and 2012 and not applied as from 2013. In the period 2011-2012, there was improvement in assessment of needs before processing anticipated orders. However, with a mean of 1.0 in assessing needs of end users, the outcome is below target. This was attributed to difficulty in making decision on items to be supplied without consulting the end users. Thus, understanding the needs of the end users was not clear. These findings are similar to the findings made in the previous study (McNeil, 2007). It is clear that distribution decisions must be based on long term forecasts with an adequate system and structure having to be in place.

**Table 4.5: Trends of Push Strategy**

<b>Indicators of Push Strategy</b>	<b>Outcome Scores</b>					<b>Mean</b>
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	
Assessing needs	2	3	0	0	0	1.0
Processing orders	2	2	0	0	0	0.8
Dispatching consignments	2	2	0	0	0	0.8
Receiving returns	1	1	0	0	0	0.4
Processing returns	2	2	0	0	0	0.8
Dispatching returns consignments	2	2	0	0	0	0.8
<b>Mean</b>	<b>1.83</b>	<b>2.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.77</b>

Scale: N/A=0, below target=1.0-1.99, on target =2.0-2.99, exceeded target=3.0-3.99

The findings also indicate that processing anticipated orders was on target in 2011 and 2012 after which the anticipated orders were not processed in the period between 2013 and 2015. With a mean of 0.8 in the period 2011-2015, processing orders have outcomes that are below targets. According to KEMSA, it is expected that trends in orders made by facilities are indicative of what should be supplied even without orders are received. However, processing such anticipated orders were not effective due to

several reasons that include wrong prediction and policy regulations as supported by 11.1% and 33.3% of KEMSA staff. Also, delays in processing orders was not achieved yet KEMSA required processing of such orders to take 48 hours. For example, findings indicate while most orders took less than one week, some took more than one week. This was confirmed by 83.3% of KEMSA staff who stated that orders were processed in less than week compared to 16.7% who stated that orders were processed after one week.

In terms of dispatching orders, the outcome is below target. With a mean of 0.8 in the period 2011-2015, dispatching orders was below target. According to KEMSA, dispatching orders was expected to occur at least within one week, yet most orders took one month before dispatch. This was confirmed by 76.9% of KEMSA staff who stated that the orders were dispatched in less than week while 23.1% of KEMSA staff stated that orders were dispatched after 1 week.

Findings on returns indicate that KEMSA received returns under this push strategy that required processing and dispatch. With a mean of 0.4 for receiving return, this outcome was below target as KEMSA expected no returns. The presence of returns required processing in which mean of 0.8 indicated outcomes that were below target. According to KEMSA, processing of returns was expected to be done within 48 hours, yet this target was not achieved as some orders were processed after this period. This was attributed to finding suitable match of the needs of the end user.

On dispatching the returns, findings in Table 4.5 indicate that the outcomes achieved were below target. According to KEMSA, dispatches under push strategy are effectively supported when deliveries are made within one week. However, with a mean



of 0.8, the deliveries were not done in time as some occurred beyond one week. This was attributed to delays in transportation occasioned by logistical constraints.

Overall findings indicate that push strategy is not effective and efficient. With a mean of 0.77, the outcomes of push strategy are below target or expectations of KEMSA. This explains the application of the strategy in 2011 and 2012 and later not utilised in 2013-2015 period. However, having all the other conditions in place, this strategy is still relevant to KEMSA and should not be done away with fully. This finding is contrary to the Government’s Task Force Report (GOK, 2008).

**Table 4.4: Z-scores for Push Strategy**

<b>Indicators of Push Strategy</b>	<b>Mean</b>	<b>z-Score</b>
Assessing needs	1.0	1.18661
Processing orders	0.8	.16952
Dispatching consignments	0.8	.16952
Receiving returns	0.4	-1.86467
Processing returns	0.8	.16952
Dispatching returns consignments	0.8	.16952
Mean	0.77	0E-7
Standard Deviation	.1966	1.0000

Findings in Table 4.6 indicate that push strategy performed best in assessing needs, processing of orders, dispatch of consignments, processing of returns and dispatch of return consignments over the period under study. However, this strategy had negative z scores in the receiving of returns similar to the pull strategy. The Overall finding indicate that despite the weakness in processing returns, push strategy still remains relevant and can continue being applied by KEMSA. This finding is contrary to the recommendations by the Governments Task Force of full application of pull strategy (GOK, 2008).

### 4.3.3 Trends of Both Pull and Push Strategy

The following trends of both push and pull strategy as illustrated in Table 4.7 were obtained and interpreted.

**Table 4.7: Trends of Both Pull and Push Strategy**

Indicators of Pull Strategy	Outcome Scores					
	2011	2012	2013	2014	2015	Mean
Receiving orders	2	3	1	2	2	2.0
Processing orders	2	2	1	1	1	1.4
Dispatching consignments	2	2	1	1	1	1.4
Receiving returns	1	1	1	1	1	1.0
Processing returns	2	2	1	1	1	1.4
Dispatching returns consignments	2	2	1	1	1	1.4
<b>Mean</b>	<b>1.83</b>	<b>2.00</b>	<b>1.00</b>	<b>1.17</b>	<b>1.17</b>	<b>1.43</b>

Scale: N/A=0, below target=1.0-1.99, on target =2.0-2.99, exceeded target=3.0-3.99

Findings in Table 4.7 indicate that both push and pull strategies were applied and the outcomes showed a fluctuating trend from 2011 to 2015. Receiving orders was on target (mean of 2.0) while the rest of processes were below target (mean of 1.0-1.4). The below target outcomes were attributed to lack of clarity on when the strategies should be applied. Overall findings indicate that it is only 2012 that targets were achieved and with a mean of 1.43, this strategy did not achieve its outcomes. These findings indicate the outcomes of this strategy are below targets. KEMSA staff could also be able to identify each of the strategies and where they could apply contrary to the findings of (McNeil, 2007). According to Shook (2010), had also noted that a lean supply chain is a philosophy that seeks to shorten the time between customers' order and the shipment of the customer by eliminating waste. But not all participants could practically or easily apply a combination of both strategies (Shook, 2010).

**Table 4.5: Z-Scores for both Push and Pull strategy**

<b>Indicators of both Pull and Push Strategy</b>	<b>Mean</b>	<b>z-Score</b>
Receiving orders	2.0	1.76853
Processing orders	1.4	-.10403
Dispatching consignments	1.4	-.10403
Receiving returns	1.0	-1.35241
Processing returns	1.4	-.10403
Dispatching returns consignments	1.4	-.10403
Mean	1.43	0E-7
Standard Deviation	.3204	1.0000

Findings in Table 4.8 similar to the finding in Table 4.7 indicate that the application of both push and pull strategies performed best in receiving orders while the z score for the rest of the indicators had negative values. The above outcomes were similarly attributed to lack of clarity on when the strategies should be applied.

#### **4.3.4 Performance of KEMSA in Supply of Medical Items**

The performance of KEMSA in supply of medical items was analysed and illustrated in Table 4.9.

**Table 4.9: Performance of KEMSA**

<b>Performance Indicators</b>	<b>Performance Scores</b>					
	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>Mean</b>
Reduction of expiries	2	2	3	3	3	2.6
Satisfaction of end users	2	2	3	3	3	2.6
Supply of items in time	1	1	2	2	2	1.6
Deliveries matching orders	2	2	2	3	3	2.4
Stakeholder participation	1	1	2	3	3	2.0
<b>Mean</b>	<b>1.6</b>	<b>1.6</b>	<b>2.4</b>	<b>2.8</b>	<b>2.8</b>	<b>2.24</b>

Scale: 0.0-0.99=Very poor; 1.0-1.99= Poor; 2.0-2.99 = Fair; 3.0-3.99 = Good

The study sought to establish the trend in performance of KEMSA over the period under study. Findings in Table 4.9 indicate that performance of KEMSA in supply of medical items was measured based on management of expiry of drugs, satisfaction of end users,

just-in-time delivery of the items, making deliveries of what was ordered and involvement of stakeholders in the supply of the items. These were similar outcomes of the study of supply chain performance (Harrison, Lee, & Neale, 2005) The findings also indicate that there has been improvement in performance from 2011. Much of the improvement was observed in reducing expiries (mean of 2.6) and satisfaction of end users (mean of 2.6). With an overall mean of 2.24, KEMSA performance is fair. This implies that KEMSA is optimally working to ensure medical supplies are utilised by the end users which are similar indicators from the study that indicated that in such systems they should be responsive to market changes, inventories and obsolescence (Wang' & Wittwer, 2007)

**Table 4.6: Z-Scores for KEMSA Performance**

<b>Performance Indicators</b>	<b>Mean</b>	<b>z-Score</b>
Reduction of expiries	2.6	.83028
Satisfaction of end users	2.6	.83028
Supply of items in time	1.6	-1.47605
Deliveries matching orders	2.4	.36901
Stakeholder participation	2.0	-.55352
Mean	2.24	0E-7
Standard Deviation	.4335	1.0000

Findings in Table 4.10 indicate that performance of KEMSA in supply of medical items was critically pegged on reduction of expiry, satisfaction of end users, and deliveries matching orders all of which had positive z scores. The findings also indicate that just in time supply and stakeholder participation are not major determinants of performance as they had a negative z score.

#### **4.4 Impact of the Distribution Strategies on the Performance of KEMSA**

Impact of each of the distribution strategies on performance of KEMSA in supply of medical items was determined and described in Tables 4.7 and 4.8:

#### 4.4.1 Correlations

Correlations between variables were obtained and illustrated in Table 4.7.

**Table 4.7: Correlations between Variables**

Strategy		Performance
Both	Pearson Correlation	.789
	Sig. (2-tailed)	.720
	N	6
Pull	Pearson Correlation	.389
	Sig. (2-tailed)	.446
	N	6
Push	Pearson Correlation	.053
	Sig. (2-tailed)	.920
	N	6

Correlation is significant at the 0.05 level (2-tailed).

Findings in Table 4.7 indicate that there is strong correlation ( $r=0.789$ ) between both (pull and push strategy) and performance. The findings, however, indicate weak correlation between pull strategy and performance ( $r=.389$ ) as well as push strategy and performance ( $r=.053$ ). These findings imply that performance of KEMSA is significant when the two strategies (push and pull) are applied together. Wang' & Wittwer (2007), also noted that the combination of the two strategies have a significance of performance. The high demand of the uncertainty encourages high pull strategy level while the high scale of economy provides incentive to the great degree of the push system.

#### 4.4.2 Model Summary

A determination on how each strategy affects performance was done through development of regression model. The findings are illustrated in Table 4.8.

**Table 4.8: Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
	0.866 <sup>a</sup>	.751	.377	.50332

a. Predictors: (Constant), Both, Push, Pull

Table 4.8 shows the coefficient of determination  $R^2$  which tells us how variation in factors (push strategy, pull strategy, both push and pull strategy) explains the changes or variation in performance of KEMSA. With  $R^2$  .866 for the model, this means that the independent variables (predictors) in the model (push strategy, pull strategy, both push and pull strategy) could offer about 86.6% explanation of the variation in the dependent variable (KEMSA performance in supply of medical items).

This means that as the factors change, KEMSA performance varies by 86.6%. This is a high relationship since 13.4% remaining is explained by other variables or factors not included in the model and represented by the error term. Hence the results reveal that the independent variables (factors) are key determinants of performance KEMSA.

#### 4.4.3 Distribution of Coefficients

A determination on how each strategy affects performance was done through regression analysis. The findings are illustrated in Table 4.9.

**Table 4.9: Regression Results**

Coefficients <sup>a</sup>	Unstandardized coefficients		Standardized coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant <sup>b</sup> )	3.150	1.424		2.213	.157
Pull	1.778	.969	.839	1.835	.208
Push	1.139	2.761	1.276	1.499	.273
Both	3.750	1.780	1.884	2.107	.170

a. Dependent Variable: Performance

Table 4.9 shows that there was a positive relationship between all variables and KEMSA performance: Pull strategy ( $\beta = 1.778$ ,  $t = 1.835$ ); Push strategy ( $\beta = 1.139$ ,  $t = 1.499$ ); both push and pull strategy ( $\beta = 3.750$ ,  $t = 2.107$ ). Furthermore, the

significance levels were analysed and as shown in the table, all the variables had a significant relationship with KEMSA performance at  $p < 0.05$ ).

Overall findings indicate that the consistency of regression coefficients on the predictors in the model suggest that these variables are important factors influencing KEMSA performance but at varying degrees. From the regression model the following regression equation is derived:

$$Y = 3.150 + 1.778X_1 + 1.139X_2 + 3.750X_3 + .134X_4 + \varepsilon$$

Where:

Y = KEMSA performance

X<sub>1</sub> = Pull strategy

X<sub>2</sub> = Push strategy

X<sub>3</sub> = Both pull and push strategy

X<sub>4</sub> = Other unmeasured factors

$\varepsilon$  = Error Term

Constant = 3.150, shows that if the factors are rated as zero, KEMSA performance would change by a factor of 3.15. The independent variables have varying degree of impact on KEMSA performance depending on beta coefficients values.

The performance of KEMSA is affected at different degrees by the distribution strategy adopted. In other words, these strategies are important factors influencing KEMSA performance but at varying degrees. The results also show that both push and pull strategy improves KEMSA performance more than the pull strategy and push strategy alone.

## **CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter highlights major findings obtained from the analysis on all the data collected. The chapter also presents relevant conclusions and recommendations.

### **5.2 Summary of Findings**

This study was conducted with the aim of finding whether KEMSA employed best-in-class SCM practices. The first objective was to identify the medical distribution strategies adopted by KEMSA. The second objective was to determine the impact of the distribution strategies adopted on the performance of KEMSA.

On distribution strategy adopted by KEMSA, the study established that KEMSA adopted three strategies. It adopted pull strategy, push strategy and mixed strategy comprising of both push and pull elements. Pull strategy was most preferred while application of push strategy reduced in the period between 2011 and 2015. The increasing application of pull strategy from 2011 is attributed to effects of devolution where health sector was mainly managed by County Governments that took control over procurement of medical supplies.

The study also established general improvement in application of pull strategy. The improvement was observed more in receiving orders, dispatching consignments, processing returns and dispatching returns consignments. All these indicated achievement of targets. However, with an overall mean of 1.87, the KEMSA did not achieve the targets. This was attributed to challenges in processing orders and receiving returns. These findings indicated that outcomes of pull strategy were below targets.



On push strategy, the study established that push strategy was applied in 2011 and 2012 and not applied thereafter. With a mean of 0.77, the outcomes of push strategy were below target or expectations of KEMSA. It was expected that assessment of needs, processing orders, dispatching orders, receiving returns, processing returns and dispatching returns to be above targets. However, the not all the processes were on target.

On mixed strategy comprising of some push and pull elements, the study established that there was fluctuation in the trends between 2011 and 2015. Overall findings indicated that it is only in 2012 that targets were achieved and with a mean of 1.43, this strategy did not achieve its outcomes.

On performance of KEMSA, the study established that there was improvement in performance of the institution from 2011. Improvement was observed in management of expiry of drugs, satisfaction of end users, just-in-time delivery of the items, making deliveries of what was ordered and involvement of stakeholders in the supply of the items. This implied that KEMSA was optimally working to ensure medical supplies are utilised by the end users.

The findings on impact of the distribution strategy adopted on performance of KEMSA revealed that there was strong correlation between both pull and push strategies and performance. The findings, however, indicated weak correlation between pull strategy and performance as well as a weak correlation between push strategy and performance. The study also established that the strategies adopted explained about 86.6% in performance of KEMSA in distribution of medical items.

The study also established that all strategies employed are important factors influencing KEMSA performance but at varying degrees. In the regression model derived, mixed strategy contributed most to the performance followed by pull strategy and then push.

From the model, other factors not measured in this study only contributed 13.4% of the performance of KEMSA.

### **5.3 Conclusions**

In the view of all this mission of the study, this study concludes that while KEMSA has adopted three supply chain strategies, the pull strategy is most applied due to governance changes where County Government hospitals are making major decision on when the medical items are to be supplied. The study also concludes that while pull strategy is most applied, the performance of KEMSA is largely affected by application of combination of both push and pull strategies. However, while the performance of KEMSA is largely determined by combination of both push and pull strategies, it remains fair and there is opportunity for improvement in the supply chain.

### **5.4 Recommendations**

This study recommends KEMSA to continue applying push strategy as it remains relevant to its internal performance. KEMSA should address challenges in the strategies especially on supplying items on time. This can be improved if KEMSA has a clear communication between order processing and distribution schedule. KEMSA should maintain proper data as this plays a key role in the continued application of push strategy. This strategy requires historical data to determine the supplies that are required by various regions at different periods.

### **5.5 Limitations of the Study**

This did not exhaust all the factors that influence distribution performance at KEMSA. In addition, the study focused on the performance trend over a period of five years and

therefore did not capture the trend in performance after adoption of new business model.

### **5.6 Suggestions for further Studies**

There is a need for further research to identify any other factor that impacts distribution of pharmaceuticals and medical equipment. Such factors may relate to geographical challenges, poor infrastructure, politics, and even legal mandate of KEMSA. Further research needs also to be carried out on performance of other institutions' that distribute medical drugs and equipment as well as the trend in performance after devolution of Health services.

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# APPENDICES

## Appendix 1- Introduction Letter



**UNIVERSITY OF NAIROBI**  
**SCHOOL OF BUSINESS**  
**MBA PROGRAMME**

Telephone: 020-2059162  
Telegrams: "Varsity", Nairobi  
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P.O. Box 30197  
Nairobi, Kenya

DATE 20/7/2016

**TO WHOM IT MAY CONCERN**

The bearer of this letter KANYAROT FREDRICK OPATI


Registration No. D61/67002/2011

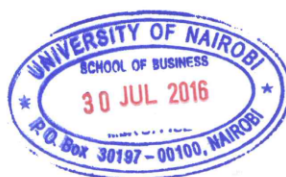
is a bona fide continuing student in the Master of Business Administration (MBA) degree program in this University.

He/she is required to submit as part of his/her coursework assessment a research project report on a management problem. We would like the students to do their projects on real problems affecting firms in Kenya. We would, therefore, appreciate your assistance to enable him/her collect data in your organization.

The results of the report will be used solely for academic purposes and a copy of the same will be availed to the interviewed organizations on request.

Thank you.

  
**PATRICK NYABUTO**  
**MBA ADMINISTRATOR**  
**SCHOOL OF BUSINESS**



## Appendix 2- Questionnaire

### QUESTIONNAIRE TO KEMSA EMPLOYEES ON THE

### DISTRIBUTION STRATEGIES AND PERFORMANCE OF KEMSA

This study is meant to capture the distribution strategies at the Kenya Medical Supplies Authority and the subsequent impacts on its performance as part of its core mandate of the distribution of essential drugs and medical equipment in Nairobi County.

Kindly provide the most accurate information regarding each of the items in the questionnaire as it is at KEMSA. The study will take approximately 15 minutes of your time. Please remember this study is for academic purposes only and your information will be kept as confidential. There is no right and wrong answer.

#### PART I

What distribution strategy is adopted by KEMSA in the distribution of medical drugs and equipment in Nairobi area?

Push strategy [ ]      Pull strategy [ ]      Both push & pull [ ]

If pull, do you make the actual deliveries as contained in the orders?

Yes [ ]                      No [ ]

If Yes, what reasons would attribute this to?

Availability of stock [ ]

Availability of staff [ ]

Easy processing of the orders [ ]

Clear and easy approval process [ ]

If No, what are the reasons for the variation?

Stock out [ ]

Expiries [ ]

Failure to submit appropriate orders and/or documents as required [ ]

Lack of internal approval [ ]

Donor requirements [ ]

Do most orders made meet KEMSA's regulations and standards before processing?

Yes [ ] No [ ]

If Yes, how long do you take to process such orders?

Less than 1 week [ ] 1-2 weeks [ ] 2-4 weeks [ ] Above 4 weeks [ ]

If No, what do you do?

Refer orders back to facilities [ ]

Reject the orders [ ]

Seek clarification where necessary [ ]

Do you mostly dispatch the actual quantities as ordered?

Yes [ ] No [ ]

If Yes, give reasons

Stock availability [ ]

Staff availability [ ]

Status consideration e.g emergency response [ ]

Policy change [ ]

If No, give reasons:

Stock outs [ ]

Lack of staff [ ]

Policy change [ ]

Approval process [ ]

How long does it take to deliver the items ordered to the facilities after processing and approval?

Less than 1 week [ ] 1-2 weeks [ ] 2-4 weeks [ ] Above 4 weeks [ ]

Who makes the deliveries?

KEMSA staff [ ] Outsourced/third party [ ] Health facility [ ]

In cases of delay in making deliveries, who takes up the responsibility?

KEMSA staff [ ] Outsourced/third party [ ] Health facility [ ]

Do deliveries meet the expectations of the facilities (are in line with orders made)?

Yes [ ] No [ ]

If Yes, give reasons:

Correct description of the orders [ ] Easy processing of the orders [ ] If

No, give reasons:

Inability to understand the orders [ ]

Inability to process the orders [ ]

Stock outs [ ]

If push strategy is used, do you meet the actual requirements of the facilities?

Yes [ ] No [ ]

If Yes, what reasons would attribute this to?

Availability of stock [ ]

Availability of staff [ ]

Understanding of facilities' needs [ ]

If No, what are the reasons for the variation?

Stock out [ ]

Expiries [ ]

Lack of internal approval [ ]

How long does it take to deliver the items to the facilities after dispatch?

Less than 1 week [ ] 1-2 weeks [ ] 2-4 weeks [ ]

Above 4 weeks [ ]

If push strategy is involved, do you deliver items that are required by the facilities?

Yes [ ] No [ ]

If push strategy is involved, what guides the identification of items to be processed and delivered?

Prediction [ ] Guessing [ ] Frequency of orders made [ ]

Policy [ ] Outbreak of diseases [ ] Increased demand [ ]

Others [ ] (please specify) .....

If push strategy is applied, what is the average time taken to process the deliveries?

Less than 1 week [ ] 1-2 weeks [ ] 2-4 weeks [ ]

Above 4 weeks [ ]

If push strategy is involved, how long does it take to deliver the items to the facilities after dispatch?

Less than 1 week [ ] 1-2 weeks [ ] 2-4 weeks [ ]

Above 4 weeks [ ]

What is the frequency of applying push strategy in every three months?

Few times [ ] Many times [ ]

If both push and pull strategies are applied, which strategy do you prefer?

Push strategy [ ] Pull strategy [ ]

Give reasons:

Easy to administer [ ] Encourages stakeholder participation [ ]

Others [ ] (please specify) .....

In your own opinion, what are your recommendations to improvement of the distribution system at KEMSA?

.....

.....

.....

THANKS

**PART II**

**Distribution summary form**

<b>Variables -If pull strategy used</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Time of receiving orders (if any)					
Time expected to process orders					
Actual Time of processing orders					
Expected time after processing to dispatch consignment					
Actual Time of dispatching consignment					
Quantity of orders made					
Quantity processed and dispatched					
Frequency of orders made					
Frequency of orders processed and consignment dispatched					

## **PART II**

### **Distribution summary form**

<b>Variables -If push strategy used</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Time of dispatching orders					
Time expected to process orders					
Expected time after processing to dispatch consignment					
Actual Time of dispatching consignment					
Quantity of orders dispatched					
Frequency of dispatching orders					