

**THE PRACTICE OF SUPPLY CHAIN MANAGEMENT  
IN PUBLIC HEALTHCARE SECTOR IN KENYA: THE  
CASE OF KENYA MEDICAL SUPPLIES AGENCY**

**BY**

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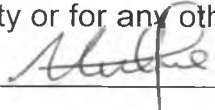
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## DECLARATION

This research project is my original work and has not been presented for a degree in any other university or for any other award.

Signed:  Date: 19/11/2010

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I confirm that the work reported in this study was carried out by the candidate under my supervision.

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## ABSTRACT

Kenya Medical Supplies Agency (KEMSA) supplies healthcare commodities to government institutions since its inception in 2000. In 2008 a taskforce was constituted by the Minister for Medical Services to gauge its performance. Its findings showed that KEMSA's performance was below what was expected. The taskforce report largely attributed KEMSA's poor performance to financial and governance problems. This research was carried out to ascertain whether KEMSA had the requisite operational structures and competences to be able to fulfill its mandate.

Lockamy & McCormack (2004) and Reyes & Giachetti (2010) suggest that supply chain maturity models can be used as a diagnostic tool to determine the current maturity level of a system and identify areas of improvement. KEMSA's operational systems have been assessed for maturity and hence areas of improvement identified.

The research findings show that KEMSA's supply chain is at the functional excellence stage of maturity. In this stage SCM processes are defined and documented, organizational structure remain traditional, performance is more predictable, SCM costs remain high, customer satisfaction has improved but still remains low and interdepartmental integration has not been achieved.

KEMSA will need to work on the improvements suggested in chapter 5 to take the supply chain to a higher level of maturity. Some of the improvements include sharing information real time with all supply chain partners and employing cutting-edge technologies such as Radio Frequency Identification (RFID) and electronic data interchange (EDI).

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# CHAPTER 1: INTRODUCTION

## 1.1. Background.

According to Cohen and Rousel (2004), Supply Chain Management (SCM) has emerged as one of the critical strategic areas of any enterprise. SCM provides a major source of competitive and financial advantage in today's rapidly changing business environment (Altekar, 2005). The benefits of an efficiently run SCM system include: reduction in lead time, faster inventory turnover, accurate forecasting of inventory levels, increased warehouse space, reduction in safety stock and better working capital utilization (Blanchard, Comm, & Mathaisel, 2008).

The health sector has not been left behind as far as implementation of SCM is concerned. Effective supply chains determine the success of any public health programs since they lead to increased program impact, enhanced quality of care and improved cost effectiveness and efficiency (FPLM/JSI, 2000). In 2001, Papageorgiou Regional General Hospital, Greece, introduced a Enterprise Resource Planning (ERP) by utilizing SAP R/3 software. The implementation of the software resulted in a number of considerable improvements, including: improvements in information quality, data integrity, visibility and timeliness of information, increasing quality of communication between nurses and the storage locations' personnel, automated generation of the list of requirements resulting from clinic orders, decreasing transaction costs and complete and accurate billing procedures (Stefanou & Revanoglou, 2006). This revolutionized the

operations at this hospital and the Regional Health Authority sought to introduce the same in hundred other hospitals.

Descioli (2005), concludes that the implementation of automated point of use systems has enabled hospitals to develop more sophisticated supply chain policies that can further increase patient care and simultaneously reduce costs. He further argues that supply chain policies should be differentiated with respect to a product's demand, variability, unit cost, physical size, and criticality. This differentiation will better align the hospital supply chain with its strategy of maximizing patient care.

Supply chain management has to adopt best-in-class practices for the results enumerated in the foregoing paragraphs to be realized. Van Landeghem and Persoons (2001), define best-in-class practices as state-of-the-art of how to perform a business. They assert that best-in-class practices take very different forms and exist on very different levels. They include: techniques and technologies, concepts and performance measures. For instance, voice recognition technology in warehouse management, collaborative planning forecasting and replenishment (CPFR) and shorter cycle times are described as some of the best-in-class practices.

Companies exhibiting best-in-class performance, have been found to employ best-in-class practices. Companies that have employed best-in-class SCM

practices have reaped enormous benefits. Wal-Mart is arguably the largest retailer in the world. It has achieved financial success due to its focus on efficient and effective SCM (Blanchard et al., 2008). Some of the best-in-class practices that it has implemented include: electronic data interchange (EDI), Radio frequency identification (RFID) technology and CPFR.

The work of Netland et al. (2007), IBM (2005), and Lockamy & McCormack (2004), suggests that SCM process performance is strongly related to SCM maturity. They propose that companies develop through five stages before they reach maturity namely; ad hoc, defined, linked, integrated and extended. It is companies that have reached the maturity stage that have been found to employ best-in-class practices and hence exhibit best-in-class performance. Additionally, the research indicates that direct process performance measures such as cycle times and inventory levels are also related to SCM maturity. These relationships suggest that the SCM maturity measurement instrument can be used for prescriptive purposes in SCM improvement efforts by indicating which maturity measurements are deficient, therefore focusing on continual improvement efforts.

The supply chain maturity model as developed by Lockamy and McCormack (2004) has been used in Brazil and Mexico. In their article, *Supply Chain Maturity and Performance in Brazil*, McCormack, Ladeira and Oliveira (2008) assert that quantifying supply chain maturity and performance gives a company an opportunity to align its performance measurements and process improvement

actions with its broader policies and strategies. Reyes and Giachetti (2010), in their article, *Using experts to develop a supply chain maturity model in Mexico*, suggest that supply chain maturity models can be used as a diagnostic tool to determine the current maturity level and identify areas of improvement.

### **1.1.1. Kenya Public Healthcare Sector.**

The public healthcare system in Kenya is headed by the Ministry of Health (MOH). It has the following levels of health facilities: national referral hospitals, provincial general hospitals, district hospitals, health centres and dispensaries. There are also parastatals which offer services to MOH at various levels. These include: Kenya Medical Supplies Agency (KEMSA), National Quality and Control Laboratories, Government Chemist, National Council of Population Board and National AIDS and STI Control Program (NASCOP).

National referral hospitals are at the apex of the health care system, providing sophisticated diagnostic, therapeutic, and rehabilitative services. The two national referral hospitals are Kenyatta National Hospital in Nairobi and Moi Referral and Teaching Hospital in Eldoret.

Provincial hospitals act as referral hospitals to their district hospitals. They also provide very specialized care. The provincial level acts as an intermediary between the national central level and the districts. They oversee the

implementation of health policy at the district level, maintain quality standards, and coordinate and control all district health activities.

District hospitals concentrate on the delivery of health care services and generate their own expenditure plans and budget requirements based on guidelines from headquarters through the provinces. Health centres provide many of the ambulatory health services and generally offer preventive and curative services, mostly adapted to local needs. Dispensaries are meant to be the system's first line of contact with patients and provide wider coverage for preventive health measures, which is a primary goal of the health policy.

KEMSA was established to serve provincial, district, health centres and dispensaries. Its mandate was to make sure these facilities have the medicines, equipments, reagents and other consumables necessary in their work. All the funds for medicines and other consumables budgeted in MOH are channeled to KEMSA which does procurement and distribution of the commodities. Most of the programs funded by development partners in support for MOH use KEMSA as their agency for distribution of commodities to all public health institutions. These programs include: Kenya Expanded Program on Immunization (KEPI), Reproductive Health Program, Long Lasting Insecticide Treated Nets (LLITNs) distribution program, Division of Malarial Control and Tuberculosis and Leprosy Program.

### **1.1.2. Kenya Medical Supplies Agency (KEMSA).**

Kenya Medical Supplies Agency (KEMSA), was established in 2000 as a government agency for procurement, warehousing and distribution of healthcare commodities (KEMSA, 2010). It serves up to 80% of health care institutions in Kenya, comprising: 3169 dispensaries, 657 health centres, 96 sub-district hospitals, 70 district hospitals, 7 provincial hospitals and 2 referral hospitals (KEMSA Taskforce,2008).

KEMSA's procurement process demonstrates a significant degree of efficiency and effectiveness. The process is open and transparent as demonstrated by its open tendering system. The value of its procurement rose from 1.3 billion Kenya shillings in financial year 2005/2006 to 3.27 billion Kenya shillings in financial year 2007/2008. No costing metrics exist for the procurement function. Supplier lead time ranges from one to eleven months and procurement lead times ranges from six to fifteen months.

As at July 2008, KEMSA had a distribution network consisting of eleven warehouses, which include centralized and regional warehouses, spread across nine towns with an estimated storage space of 292,810 square feet. There are three centralized warehouses in Nairobi which carry out the following functions: receiving bulk commodities, quality checks of incoming goods, packing of customized kits, order capture from facilities, order picking, order checking and collation, dispatch of goods, inventory management and reserve storage of both

fast and slow moving commodities. The regional warehouses carry out the following functions: reserve storage of slow moving goods, storage of parallel program goods, trans-shipment points and dispatch of bulk and slow moving goods. Previous assessments have established that KEMSA warehouses do not meet Good Distribution Practices recommended by the World Health Organization (WHO).

KEMSA has implemented the *Navision* Enterprise Resource Planning (ERP) since February 2008 with procurement order capture, inventory management, order processing, warehouse management and financial management modules. However, the *Navision* system is functioning sub-optimally and is only used to capture orders and to print delivery notes. Some warehouse performance indicators are: order fill rate- 50%, customer order lead time- 4 weeks, stock turns- 0.33 and obsolescence as a percentage of turnover- 5%.

Distribution of commodities to KEMSA's 4001 facilities is carried out through a pull and push system. It uses a combination of both in-house and outsourced transport to make direct deliveries to the respective facilities. Eighty percent of deliveries are done by third party logistics providers (3PLs). Performance indicators for distribution include: average transport lead time- 5 days and transport costs as a percentage of turnover/throughput-10%.



## **1.2. Statement of the Problem.**

The deployment of best-in-class SCM practices has revolutionized businesses around the world by saving costs, increasing service levels to customers, decreasing lead times, decreasing stock levels and increasing profits (Blanchard, Comm, & Mathaisel, 2008).

Reyes and Giachetti (2010), suggest that supply chain maturity models can be used as a diagnostic tool to determine the current maturity level and identify areas for improvement. The model by Lockamy and McCormack can be used for both assessing the state of KEMSA's supply chain and for highlighting areas for improvement.

The KEMSA taskforce report of October 2008, highlighted poor performance indicators. Average transport lead time of 5 days compared to industry average of 1 day. Transport costs as a percentage of throughput of 10% compared to industry average of 0.86%. Order fill rate of 50% against an industry average of 85%. Customer order lead time of 4 weeks against an industry average of 2.6 days. Stock turn-over of 0.33 compared to industry average of 4.3. Obsolescence as a percentage of turn-over of 5% compared to industry average of 0.16% and procurement lead times of 8 to 12 months against the industry average of 1 to 4 months.

The taskforce attributed the unfavourable performance ratings to several factors, including: ineffective and uncoordinated financing mechanisms, inadequate human resources and weak governance structures.

Kenya Medical Supplies Agency had the basic SCM processes in place. A customer care team was in place both at the head office and in the regions. Warehousing and distribution department was in place and was headed by a warehouse manager in each of the warehouses. Demand management was done by the warehousing team and the technical team. Procurement was managed by the procurement team headed by a procurement manager. Information technology (IT) issues were handled by the IT team headed by an IT officer. The technical director was assigned the duty of co-ordination between the various teams. Each team had its own performance assessment system.

The supply chain management processes were not adequately addressed by the taskforce. The unfavourable results of KEMSA performance could also have resulted from lack of employment of best-in-class supply chain management practices. This study endeavours to establish whether KEMSA employs best-in-class practices in its SCM processes and highlight areas for improvement.

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

The objectives of the study were:

1. To assess the level of maturity of each of the following functional areas:  
Demand management, Procurement management, Logistics management, Customer/Supplier Management, IT for SCM and Performance measurements.
2. To assess the level of maturity of the entire KEMSA SCM system.
3. To find out whether SCM practices have been implemented uniformly across the SCM system.

#### **1.4. Importance of the Study.**

This study aims at contributing towards the improvement of public healthcare SCM practices in Kenya. It intends to contribute towards the goal of the government to increase access and availability of healthcare commodities to all Kenyans.

The study's findings will assist KEMSA in its quest to improve its performance to levels acceptable by its clientele. The findings will also inform the government on whether or not the same practices should be extended to the hospital level.

Health Supply Chain Management professionals will benefit from this study by understanding what needs to be done to improve the public and private health supply chains to higher levels of maturity.

To academia, it is intended to contribute towards the emerging interest in adapting leading business practices to transform supply chain practices in business management.

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## **CHAPTER 2: LITERATURE REVIEW.**

This chapter presents a critical review of available literature on supply chain management both in commercial firms and healthcare institutions. However, the literature is restricted to SCM processes, which is the subject of this study. The chapter is divided into three sections. Section one details the meaning and origins of SCM. Section two tackles SCM processes in general while highlighting some of the best-in-class practices in each process. Section three discusses the SCM maturity model.

### **2.1. The Concept of Supply Chain Management.**

Supply Chain Management is the integration and management of supply chain organizations and activities through co-operative organizational relationships, effective business processes, and a high level of information sharing to create high performing value systems that provide member organizations sustainable competitive advantage (Handfield, 2002; Mentzer,2001). SCM has the following key components: movement of product through the supply chain, management of the associated information flows, management of business relationships, and the creation of customer value ( Bu´rca, Fynes, & Marshall, 2005).

Supply chain management has evolved from various streams. One stream runs right from transport management, distribution management, and sales management up to the latest stream called logistics management. The other stream runs from purchase management to materials management and up to

procurement management. The third stream can be referred to as manufacturing management. All these branches of business management ultimately converge onto a new management philosophy called SCM (Altekar, 2005).

## **2.2. Supply Chain Management Processes.**

The Supply Chain Operations Reference (SCOR) model version 9.0 (Supply Chain Council, 2008) gives a list of generic supply chain processes. SCOR is based on five distinct management processes, namely: plan, source, make, deliver and return. Combining insights from the SCOR (2008); Altekar (2005); Tompkins & Harmelink (2004), SCM processes can be categorized into the following types; Plan- Demand Management, Source- Procurement Management, Make- Operations/Manufacturing Management, Deliver- Logistics Management and Return- Reverse Logistics. There are other supporting systems which run across the whole supply chain and contribute to the success of the system. These include; Information Technology (IT) for SCM, SCM Performance Measurements and Customer/Supplier Relationship Management.

Although this study is on supply chain management, it will not focus on the make and return aspects of SCM. The 'make' aspect of SCM involves manufacturing and KEMSA does not undertake any manufacturing activities. The 'return' aspect of SCM at KEMSA has not been established.

### **2.2.1. Demand Management.**

Management of demand is increasingly recognized as a key issue in improving the efficiency of supply chain operations. It involves forecasting demand and synchronizing it with production, procurement, and distribution (Taylor & Fearnle, 2006).

Demand management has shifted over the decades. In the 1970's the focus was integration of warehousing and transportation within the firm, in the 1980's the focus shifted to re-engineering of cost structures, while in the 1990's the focus shifted to improving customer service with the introduction of corporate websites, internet, intranets and extranets. Today, there has been a paradigm shift to what is known as collaboration as managers realize that long term success of the firm will be achieved if they work within a successful supply chain. This new concept is known as Collaborative Planning Forecasting Replenishment (Altekar, 2005; Walters, 2008).

In public healthcare SCM demand management is synonymous with selection (formulary management), forecasting and quantification. The overriding concern for managers of healthcare supply chains is acquisition of commodities for the lowest prices and for the majority of the population. To this end there is need to control and reduce the range and variety of provided health care goods. Several measures are available for controlling and reducing the variety of health care

goods namely: essential goods concept, standardization and logistics postponement (McGuire, 2006).

The Essential Drug Concept was established by the World Health Organization (WHO) in 1977. The core list of the WHO Model List contains only around 300 effective, safe and cost-effective active ingredients which cover the health care needs of the majority of the population. At the country level, Standard Treatment Guidelines (STGs) are first formulated after which the National Essential Drug List (NEDL) is modeled alongside the treatment guidelines (WHO 2007; Govindaraj, Reich & Cohen, 2000; Enemark , Alban, & Vazquez, 2004). Program managers need to narrow down the Essential Medicines List to a few essential health care goods (program standard list) which are most suitable for the program in a specific region (WHO, 2007a).

Unlike commercial companies, overall demand for healthcare goods always by far exceeds supply. In order to minimize demand distortion, demand data must be collected as far downstream in the supply network and as near to the end-user as possible. There are two main methods for quantifying drug needs i.e Morbidity method and Adjusted consumption method (WHO, 1991b; FPLM & JSI, 2000).

Collaborative Planning Forecasting and Replenishment (CPFR) is one of best practices in demand management. CPFR entails real time information sharing



and real time decision making based on the information received. The decision making is synchronized between all the players in the supply chain (Simatupang & Sridharan, 2005). In the health sector, the NEDL and STGs have to be reviewed regularly and input from all stakeholders sought.

### **2.2.2. Procurement Management**

The fundamental role of the procurement or purchasing function is to acquire optimum quality and quantity of goods and services for the company in a timely manner and at the lowest total cost (Altekar, 2005). Procurement involves; product specification, procurement planning, supplier selection, quotation, assessment of quotations, negotiation, sourcing and approval, purchase requisition and order, delivery and receipt, invoice verification and payment (Puschmann & Alt , 2005).

For public healthcare SCM, the overriding concern must be to provide health care goods of high quality while considering costs and making the best use of funding. Several factors are considered when procuring. These are supplier qualification, dual versus multiple sourcing, centralized versus decentralized purchasing, tender format and the type of purchasing contracts. Purchasing could be through open tender, restricted tender, competitive negotiations and direct purchase (WHO, 1992; WHO, 2000b; McGuire ,2006; Govindaraj, Reich and Cohen, 2000; Enemark, Alban, Vazquez, 2004; WHO, 2007; WHO, 1999).

E- procurement is one of the best practices in procurement management both in commercial firms and in healthcare institutions. The e-procurement process supports the procurement and sourcing activities via internet technologies and enables an efficient negotiation between buyers and suppliers. There are two types of e-procurement: marketplaces and B2B. Marketplaces bring multiple buyers and sellers together in a virtual market while B2B e-procurement is a one to one relationship. Several firms have implemented e-procurement solutions not only to reduce costs, but also to make more efficient this key process ( Gimenez & Lourenco, 2008)

In their article, Breen and Crawford (2005) enumerate the benefits of e-procurement at the Manchester Royal Infirmary Pharmacy, part of the Central Manchester and Manchester Children's University Hospitals NHS Trust. Benefits realized included; faster communication, better supplier relationships, improved accuracy of orders, reduction in costs, savings in time, improved handling of invoices and others (e.g. notification of products being out of stock) and increased reliability of systems. E-procurement is predicted to offer between 20-30 per cent savings in the £6.3 billion NHS hospital procurement market.

Puschmann and Alt (2005) have enumerated success factors for implementation of e-procurement which include: use of standards for catalogs and data interchange, integration of the e-procurement system with other relevant systems, alignment of e-procurement strategies with the procurement process,

standardization of services for representation in the catalog, creation of a central coordination instance for supplier management, preparation of catalogs and link to the balanced scorecard.

### **2.2.3. Logistics Management.**

The International Council of Logistics Management, in 1991, defined logistics as, “the process of planning, implementing and controlling the efficient, effective flow and storage of goods, services and related information from the point of origin to the point of consumption for the purpose of conforming to customer requirements” (Altekar,2005). Logistics management has eight elements, which are: Customer order processing, Location analysis, Inventory control, Material handling, Packaging, Transportation, Warehousing and Customer service.

Customer order management (COM) starts with the order entry process and involves efficient maintenance of customer databases, opportunity evaluation for cross-selling and up-selling, back-order processing and post-order fulfillment transactions. Being an important customer touchpoint, effective COM has a lasting impact on customer satisfaction levels (IBM, 2005).

Mason et al (2007) argue that there is need for collaborative transport management to optimize service delivery and minimize costs. There is need for vertical collaboration with suppliers and customers, horizontal collaboration with other organizations. Transport collaboration is not just about cost minimization, it

is about value optimization, improved service levels, visibility, end customer satisfaction as well as potentially lower costs. Transportation management systems (TMS) facilitate the procurement of transportation services, the short-term planning and optimization of transportation activities, and the execution of transportation plans with continuous analysis and collaboration (Helo, Szekely, 2005).

Warehousing is becoming more and more a critical activity in the supply chain to outperform competitors on customer service, lead times and costs (Faber, Koster, Velde, 2002). Warehousing decisions that a company may need to make include: number of warehouses, types of warehouses and location of warehouses. Some factors considered in warehouse location include: distribution network, demand patterns, transportation costs, labour costs, facility costs, utility costs and expected customer service levels. If warehousing is to be a source of competitive advantage then the implementation of a Warehouse Management Information System (WMIS) is a necessary condition.

A firm can outsource logistics management to third-party logistics (3PL) and Fourth-party logistics (4PL) firms. 3PL refers to the concept of outsourcing the logistics and distribution of a manufacturing and service firm to a logistics service provider. Companies opt for 3PLs for various reasons including; to improve strategic focus, to lower costs, for expansion of markets, for improvement of service levels with improved response time and to increase flexibility.

For the public SCM, a sound inventory control system needs to be in place. A rational and structured system for calculating safety stocks and replenishment orders is needed. The inventory control policies must aim at minimizing demand distortion (McGuire, 2006; Management Sciences for Health, 1997). There are several inventory control policies that can be used. They are: periodic review system, an imprest system, continuous review system, base stock control system, Equal Time Supplies policy or fixed reorder levels policy. It is a common practice to apply different inventory control policies to different classes of items.

Some of the best practices in logistics management include: use of RFID, minimized inventories, synchronised distribution/delivery systems and outsourcing of transportation. Bar codes and RFID as tracking and tracing technologies have revolutionized operations in warehouses and the whole supply chain. In the article, *RFID: an enabler of supply chain operations*, Attaran (2007) details the benefits of RFID in the modern operations of SCM. These include: enhanced visibility along the supply chain, accurate and timely asset tracking, improved productivity by generating the fastest and lowest cost method of acquiring the data, reliable and accurate order forecasts, reduction in inventory costs including stock-out and holding costs, improved accuracy by reducing the opportunity for human error and improved counterfeiting identification.

Other firms are implementing some of the following best practices: outsourcing of non-core logistical functions to leading third-party logistics providers, integration

of end-to-end processes with key service providers and other supply chain partners, real time visibility and event monitoring of customer, product and supply and logistics information throughout the supply chain (IBM, 2005).

#### **2.2.4. Information Technology (IT) for Supply Chain Management.**

Over time, various IT tools have been used by businesses to have a competitive advantage over their rivals. These include; Project management, Computer Aided Design (CAD)/Computer Aided Manufacturing (CAM), Computer Integrated Manufacturing (CIM), Manufacturing Execution Systems, Management Information Systems (MIS), Decision Support Systems, Expert Systems, Knowledge Management Systems, Enterprise Resource Planning (ERP), Customer Relationship Management (CRM) and Supply Chain Management (SCM) systems. SCM encompasses ERP, manufacturing, warehouse management systems, transportation management systems, business intelligence and analysis.

The main objectives of IT in SCM include: providing information availability and visibility, enabling a single point of contact for data, allowing decisions based on total supply chain information and enabling collaboration with supply chain partners (Simchi-Levi, D.; Kaminsky, P.; and Simchi-Levi, E., 2003). The internet has played a key role in advancing SCM capabilities since a firm can connect its supply chain with the supply chains of suppliers and customers in a single vast

network that optimizes costs and opportunities. This has given rise to e-commerce and e-business.

Implementation of e- supply chain processes has enormous benefits (Ontariobuys, 2007). The project was an initiative by six Ontario health care organizations representing 46 hospital facilities and its principal focus was to introduce electronic tools and automated processes into key hospital supply chain functions. Some of the key technologies commonly used to create a modern, automated supply chain are: an enterprise resource planning (ERP) system, e-commerce software, e-commerce gateway, an automatic identification system (bar coding or RFID) and a business intelligence reporting system. Some of the supported functions were: centralized electronic catalogue, electronic requisitioning, electronic purchase order, electronic order acknowledgement, advanced ship notice, electronic invoice and electronic funds transfer.

#### **2.2.5. Supply Chain Management Performance Measurements.**

Leading-edge organizations, whether public or private, use performance measurement to gain insight into, and make judgments about, the effectiveness and efficiency of their programs, processes, and people. These best-in-class organizations decide on what indicators they will use to measure their progress in meeting strategic goals and objectives, gather and analyze performance data, and then use these data to drive improvements in their organization and successfully translate strategy into action (NPR, 1997).

The commonly used framework for performance measurement is Kaplan and Norton's Balanced Scorecard. It is a management system that maps an organization's strategic objectives into performance metrics in four perspectives: financial, internal processes, customers, and learning and growth (Kaplan & Norton, 1996). Within each of the Balanced Scorecard financial, customer, internal process, and learning perspectives, the firm must define the following: Strategic objectives - what the strategy is to achieve in that perspective; Measures - how progress for that particular objective will be measured; Targets - the target value sought for each measure; Initiatives - what will be done to facilitate the reaching of the target.

for The SCOR model also has performance metrics for level 1 through level 3 (Altekar, 2005). The metrics are used in conjunction with the following performance attributes; supply chain reliability, supply chain responsiveness, supply chain flexibility, supply chain cost and supply chain asset management.

#### **2.2.6. Customer/Supplier relationship Management (CRM)**

The CRM process provides the structure how the relationship with the customer is developed and maintained. This process includes identifying key customers, segmenting them and tailoring products and services to their needs. The process also includes all activities related to working with customers in order to: improve processes, eliminate demand variability and non-value added activities and develop agreements of metrics (Gime'nez, Lourenc,o,2008; McGuire, 2006; FPLM,JSI, 2000).



A customer service policy must start by identifying elements of service which are most important to customers such as quality of health care goods, stock availability and lead times (McGuire, 2006). Elements of customer service can be categorized into pre-transaction, transaction and post-transaction elements. The customer service policy as a pre-transactional customer service element should be stated in writing and made available and distributed to customers and health program managers. All orders received by logistics services must be acknowledged, providing information on available stocks and expected delivery time.

Leading CRM practices like customer focus groups and automated cross-selling are increasingly being employed by firms. Other leading CRM practices include: integrating processes end-to-end with key service providers and other supply chain partners to provide differentiated product and service bundling for different customer segments, providing holistic real time order process support, sharing product design specifications, demand requirements, capacities and supply constraints with internal and external supply chain partners, assuring complete focus on meeting customer demand with market fluctuations and closely integrating COM with supply chain planning and execution processes (IBM, 2005).

### **2.3. Supply Chain Management Practices in Public Healthcare Sector.**

The aim of the healthcare industry is to provide quality and safe treatment to patients. Given that the focus of attention is the patient, the role of the supply chain is to be able to provide the correct drug at the time that the patient needs it.

In their book *Managing Drug Supply*, Management Sciences for Health and World Health Organization (MSH, 1997), defined the framework for management of health care supply chains. It embraces a process view in management of health supply chains. Figure 1 summarizes the MSH/WHO framework. This framework is similar to the process view advocated by SCOR.

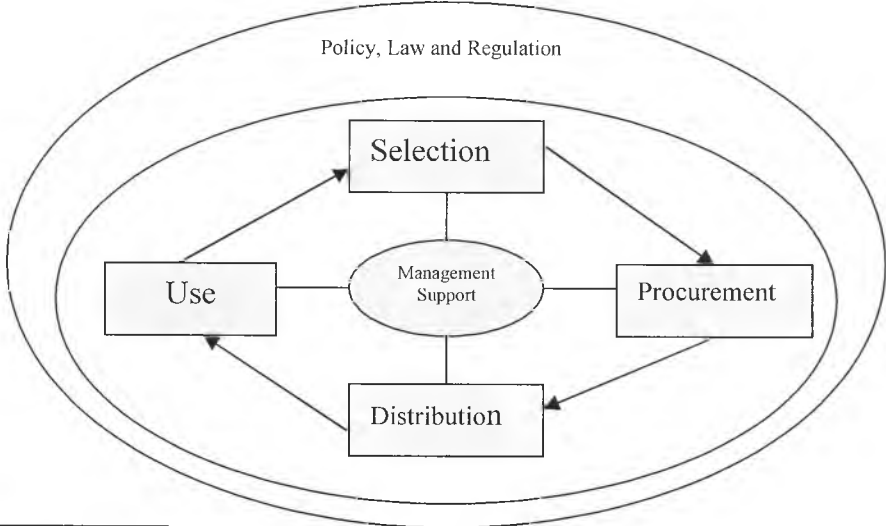
Since public supply chains are funded by the state or donors, their focus is mainly service delivery to patients and not profits. Their strategies are geared towards increasing service levels to patients and reducing costs. Thus effectiveness and efficiency are at the core of these supply chains.

Examples of successful public healthcare supply chains can be found in Canada. In an initiative called *Supply Chain Modernization in Ontario Health Care* (Ontariobuys, 2007), benefits were realized from implementing best-in-class practices in the following areas of SCM: demand management, procurement management, logistics management, customer/supplier management, IT for SCM and performance measurements.

**SELECTION**  
 -Marketing approval and registration  
 -Essential Medicines List  
 -Standard Treatment Guidelines

**POLICY,LAW AND REGULATION**  
Policies  
 -Generic Policies  
 -Decentralization  
 -Use of private services  
 -Integration of services/supply systems.  
 -Availability by level of care.  
Pharmaceutical Laws and Regulations  
 -Accreditation/Licensing  
 -Procurement Laws  
 -Pharmacopeial Standards  
 -Pharmacy benefits

**PROCUREMENT**  
 - Morbidity and consumption quantification.  
 - Tendering and contracting  
 -Quality Assurance and Supplier pre-qualification.  
 -Supplier Performance monitoring and Evaluation  
 -Price Monitoring  
 -Pooled procurement/group purchasing  
 -Donor co-ordination  
 - Medicines donation guidelines



**USE.**  
 - Drug Information Services.  
 - Rational Prescribing  
 -Drug Use Evaluation Data  
 -Good Dispensing Practices  
 -Patient Information Counseling

**MANAGEMENT SUPPORT**  
Organization and Management  
 -Program Planning and implementation.  
 -Program Monitoring and Evaluation.  
 -Community participation.  
Financing  
 -Pharmaceutical Financing Strategies including Revolving Fund.  
 - Analysing and Controlling Expenditure  
 -Financial planning and Management  
 -Donor financing  
Information Management  
 -Information-based decision making  
 -Pharmaceutical Management Information Systems.  
 -Indicator-based monitoring  
Human Resource Management  
 -Personnel Management  
 -Pre-service education.  
 -Continuing education  
 -In-service training

**DISTRIBUTION.**  
 -Central Medical Stores/Alternative Models  
 -Vertical/Integrated Programs  
 -Inventory Management  
 -Kit System

Figure 1: Public Pharmaceutical Management Framework.

Source. *Managing Drug Supply, 1997.*

## **2.4. Supply Chain Management Maturity Model.**

Lockamy & McCormack (2004), developed the *Supply Chain Maturity Model*, borrowing heavily from the *Business Process Orientation Model* and the *SCOR*. This model postulates that the operations of an organization transition between five distinct stages before attaining maturity and excellence. It is organizations that have reached the maturity stage that exhibit best practices. The five stages of maturity show the progression of activities toward effective SCM and process maturity. Each stage contains characteristics associated with process maturity such as predictability, capability, control, effectiveness and efficiency. These stages are; ad hoc, defined, linked, integration and extended.

IBM (2005) also developed a demand supply chain maturity model similar to the one developed by Lockamy and McCormack. The model groups supply chains into the following five categories of increasing integration, customer orientation and responsiveness; static, functional integration, horizontal integration, external collaboration and on demand supply chain. On application of this maturity model in mainland China, IBM found that top-performing firms are adopting leading management practices that are akin to those in the on demand stage of maturity. The classification by Lockamy and McCormack (2004) and IBM (2005) are similar and can be combined to come up with a broad classification as shown in the table below.

STAGE	CHARACTERISTICS OF STAGE
1. Ad hoc/Static supply chain	<ul style="list-style-type: none"> <li>-Processes are unstructured and ill-defined</li> <li>-Little supply chain information available, Process measures are not in place</li> <li>-Minimal communication with partners</li> <li>-Jobs and organizational structures are not based on horizontal SCM processes.</li> <li>- Individual heroics and "working around the system" are what makes things happen.</li> <li>-Process performance is unpredictable.</li> <li>-Targets, if defined, are often missed.</li> <li>-SCM costs are high.</li> <li>-Customer satisfaction is low.</li> <li>-Functional co-operation is also low.</li> </ul>
2. Defined/Functional Excellence	<ul style="list-style-type: none"> <li>- Basic SCM processes are defined and documented.</li> <li>-Jobs and organization basically remain traditional.</li> <li>-Process performance is more predictable.</li> <li>-Targets are defined but still missed more often than not.</li> <li>-Overcoming the functional silos takes considerable effort owing to boundary concerns and competing goals.</li> <li>- SCM costs remain high.</li> <li>- Customer satisfaction has improved, but is still low.</li> </ul>
3. Linked/Horizontal integration	<ul style="list-style-type: none"> <li>- Represents the breakthrough level.</li> <li>- Managers employ SCM with strategic intent and results.</li> <li>- Broad SCM jobs and structures are put in place outside and on top of traditional functions.</li> <li>-Cooperation between intra-company functions, vendors and customers takes the form of teams that share common SCM measures and goals that reach horizontally across the supply chain.</li> <li>-Process performance becomes more predictable and targets are often achieved.</li> <li>-Continuous improvement efforts take shape focused on root cause elimination and performance improvements.</li> <li>-SCM costs begin decreasing and feelings of esprit de corps take the place of frustration.</li> <li>-Customers are included in process improvement efforts and customer satisfaction begins to show marked improvement.</li> </ul>
4. Integration/ External collaboration	<ul style="list-style-type: none"> <li>-The company, its vendors and suppliers, take cooperation to the process level.</li> <li>- Organizational structures and jobs are based on SCM procedures, and traditional functions, as they relate to the supply chain, begin to disappear altogether.</li> <li>-SCM measures and management systems are deeply imbedded in the organization.</li> <li>-Advanced SCM practices, such as collaborative forecasting and planning with customers and suppliers, take shape.</li> <li>-Process performance becomes very predictable and targets are reliably achieved.</li> <li>-Process improvement goals are set by the teams and achieved with confidence. SCM costs are dramatically reduced</li> <li>-Customer satisfaction and esprit de corps become a competitive advantage.</li> </ul>
5. Extended/On demand supply chain	<ul style="list-style-type: none"> <li>-Competition is based on multiform supply chains.</li> <li>-Collaboration between legal entities is routine to the point where advanced SCM practices that allow transfer of responsibility without legal ownership are in place.</li> <li>-Multi-firm SCM teams with common processes, goals and broad authority take shape.</li> <li>-Trust, mutual dependency and esprit de corps are the glue holding the extended supply chain together.</li> <li>-A horizontal, customer focused, collaborative culture is firmly in place. Process performance and reliability of the extended system are measured and joint investments in improving the system are shared, as are the returns.</li> </ul>

Table 1: Characteristics of the five stages of SCM maturity.

*Adapted by author from IBM (2005) and Lockamy & McCormack (2004)*

Some of the practices that fit stage five of the maturity scale and which can be termed as best-in-class practices include: online real time order configuration and updates, customer pull driven and differentiated fulfillment, real time status

throughout order pipeline, open network supporting standards with rapid reconfiguration, variable cost structure, outsourcing all non-core supply chain activities, dashboards for monitoring end-to-end performance and alert exceptions and integrating end-to-end processes with key service providers and other supply chain partners.

Drawing from the work of Netland et al. (2007), IBM (2005), and Lockamy & McCormack (2004), a set of practices that fit the characteristics described in the 'extended' stage, will be isolated and will form the basis of the questionnaire to be used for assessment. These practices will cover the areas of: demand management, procurement, logistics, IT for SCM, performance measurement and customer relationship management.

## CHAPTER 3: RESEARCH METHODOLOGY

Research methodology is divided into the following sections: research design, population, sample and sampling technique, data collection and data analysis.

### 3.1. Research Design.

A descriptive study was undertaken to ascertain and describe some of the SCM practices in one public organization. The study was modeled alongside the *Supply Chain Maturity Model* as espoused by Lockamy & McCormack (2004) and IBM (2005). The results were benchmarked against practices that defined the 'extended' stage of the supply chain maturity model. These practices included; end-to-end visibility, collaboration in all areas, customer driven demand and global outsourcing.

### 3.2. Population.

The population for the study was the entire workforce of Kenya Medical Supplies Agency (KEMSA), approximately 115 staff members.

KEMSA was chosen for this study since it embodied all the SCM practices that were being studied. It was also the largest healthcare SCM entity in terms of monies spent and had the potential of employing SCM best practices. Although there were other organizations such as John Snow Inc., GTZ, Crown Agents, Kenya Pharma, Global Fund, USAID and Clinton Foundation, they executed

mainly the procurement function and the rest was done by KEMSA. Thus the study concentrated on KEMSA which had fully functional SCM systems.

### **3.3. Sample and Sampling Techniques.**

The sample for the study was heads of functional or administrative departments, section heads, the deputy Chief Executive Officer (CEO) and the CEO. Staff from the following departments were to be engaged: procurement, warehousing and distribution, information technology, technical, administration, customer care and finance. Thirty respondents were targeted to complete the questionnaire. They included: the CEO, the deputy CEO and four persons from each department.

Judgemental sampling was used. This method of sampling was preferred since the study intended to find out the maturity level of processes and technologies employed in the firm. Only those who were conversant with these processes would be able to give accurate and objective information thus the choice of heads of departments, sectional heads and the Chief Executive Officer.

### **3.4. Data Collection.**

Primary data was used since the study aimed to find out the extent to which KEMSA had employed SCM best practices in which case primary data was the most appropriate.



A questionnaire was used with the aim of assessing the position of KEMSA in terms of application of 'best-in-class' SCM practices. Drawing from the work of Netland et al. (2007), IBM (2005), and Lockamy & McCormack (2004), a set of practices that fitted the characteristics described in the 'extended' stage, were isolated and formed the basis of the questionnaire.

The questionnaire had six sections which respectively were intended to collect information on: demand management, procurement management, logistics management, customer/supplier management, IT for SCM and performance measurements. The questionnaire had a total of 42 questions. The respondents indicated one answer on a 5-point Likert scale at the end of each question.

The questionnaire was self-administered. After an initial meeting with the Chief Executive Officer and the Human Resource Manager, the questionnaires were distributed to the respondents. A total of thirty questionnaires were distributed and received back. They were collected from the respondents after seven days.

### **3.5. Data Analysis.**

Data from the questionnaires was entered in Microsoft Excel and uploaded into Statistical Package for Social Sciences (SPSS) version 12. Descriptive and inferential statistics were computed.

The mean for each functional area (demand management, procurement management, logistics management, customer/supplier management, IT for SCM and performance measurements) and for the whole SCM system were computed. The mean indicated the maturity level of each functional area and the SCM system as a whole. In the article *Supply Chain Maturity and Performance in Brazil*, McCormack, Ladeira and Oliveira(2008), came up with a system of grading the five stages of the Lockamy & McCormack maturity model. In their system the different best practices were awarded marks out of 478. Upper cut-off points were then identified for each stage, as follows: 'extended' stage -416; 'integrated' stage -338; 'linked' stage -227; 'defined' stage-112 and 'ad hoc' stage -94.

Reyes and Giachetti (2010) used a Likert scale of 1 to 5 to determine the maturity levels of firms in Mexico. This study used the same upper cut-offs as Reyes and Giachetti. These were: 'extended' stage-5; 'integrated' stage- 4.9; 'linked' stage-3.9; 'defined' stage- 2.9 and 'ad hoc' stage-1.9.

Friedman test was performed to check whether there were statistical differences between the computed means of the different functional areas. This helped in knowing whether best-in-class practices were applied uniformly across functional areas or if there were differences in their application.

## CHAPTER 4: DATA ANALYSIS, RESULTS AND DISCUSSION.

This chapter presents the findings of the study as per the data collected from the respondents. The chapter is divided into the following sections; maturity level for each functional area, maturity level for the whole SCM, the differences between maturity levels for the various functional areas.

### 4.1. Maturity level for each functional area.

Table 2 shows the mean and standard deviation of the means of each functional area.

	N	Mean	Std. Deviation
Demand management mean	30	2.86667	.754935
Procurement management mean	30	2.77619	.766728
Logistics management mean	30	2.03000	.739594
customer_supplier management mean	30	2.90000	.805691
Performance management mean	30	2.70833	.978945
Information technology mean	30	2.27222	.884610
Valid N (listwise)	30		

Table 2: Mean for each functional area.

Objective one of the study sought to know the maturity levels of each functional area. The mean score for each best practice comprising a functional area was first calculated and then the overall mean score for the functional area was calculated. The findings show that all functional areas had a mean score of

between 2.0 and 2.9. Using the Lockamy & McCormack (2004) model, all the functional areas were in the 'functional excellence' stage of maturity.

#### **4.1.1. Demand Management.**

Demand management had a mean score of 2.87. The seven demand management best practices, that is, Essential Drug/Commodities List(EDL) is updated; structured involvement of customers in updating the EDL; dispensed-to-user data is used for forecasting; ABC and VEN analysis are part of forecasting; ABC and VEN analysis are done by ERP system; structured involvement of customers in forecasting and customers and suppliers can access the forecasting information real time, received mean scores of 3.97, 3.67, 2.53, 2.83, 2.37, 2.50 and 2.20 respectively.

The highest rating was for the practice of updating Essential Drug List regularly. The question whether customers and suppliers could access forecasting and quantification information real time received the lowest rating. A critical component of demand management called visibility is lacking in the supply chain, since the practice on sharing information in real time amongst supply chain partners is absent.

#### **4.1.2. Procurement Management.**

Procurement management had a mean score of 2.78. The seven procurement best practices, that is, EDI used for exchange of procurement documents; World Wide Web is used for exchange of procurement documents; EFT used for payments; structured involvement of suppliers in policy formulation; educational seminars for suppliers are done; prepare future plans together; price is considered in selection of suppliers and reliability is considered during selection of suppliers, had mean scores of 2.03, 2.50, 2.77, 3.00, 2.50, 3.73 and 2.90 respectively.

The practice that received the lowest score was the use of EDI for exchange of procurement documents. Involvement of suppliers in the procurement process received the highest mean score of 3.73. From these findings the procurement function lacks the necessary technology to be able to attain best in class status.

#### **4.1.3. Logistics Management.**

This component had a mean score of 2.03, the lowest in all functional areas. The ten logistics best practices, that is, orders placed at regular intervals; orders are entered into a secure portal; customers can access order status real time; organization uses EDI for business transactions; suppliers can access status of their invoices real time; bar codes are used in the warehouse; RFID is used in the warehouse; voice recognition technologies are used in the warehouse; Continuous Review method for inventory control is used and Transport

Management module is in use, had mean scores of 3.00, 1.77, 1.27, 1.77, 1.20, 3.57, 2.00, 1.33, 2.13 and 2.27 respectively.

The practice of customers placing orders at regular intervals received the highest rating. The lowest score concerned the ability of suppliers/customers to access status of stock in the warehouse real time. It seemed most of the technologies and systems that underpin successful warehousing and distribution were missing at KEMSA. Crucial technologies such as RFID and transportation systems were lacking. Transportation and sharing of information between partners seemed underdeveloped in the whole supply chain.

#### **4.1.4. Customer/Supplier Management.**

This component had a mean score of 2.90. The four best practices, that is, written confirmation of orders is done; the ERP has a Customer Relationship Management module; customer satisfaction surveys are done and a call centre for customers to give feedback is in place, had mean scores of 2.47, 2.33, 3.20 and 3.60 respectively.

Sharing of information with customers on availability of commodities was not done real time. The presence of dedicated customer service personnel who responded to all customer issues received the highest mean score of 3.60.

#### **4.1.5. Performance Measurement.**

This component had a mean score of 2.71. The eight best practices, that is, a performance measurement system is in use; customer order cycle time are monitored; line count fill rate are monitored; procurement lead times are monitored; Key Performance Indicators are monitored; continuous and incremental improvement is done; inventory turnover is monitored and inventory record accuracy is monitored, had mean scores of 2.13, 2.60, 2.53, 2.77, 2.43, 2.70, 3.13 and 3.37 respectively.

It was worth to note that KEMSA did not have a performance measurement system in place. It also lacked key performance indicators for its supply chain. However, some aspects of performance management such as monitoring procurement lead time and cycle times were carried out.

#### **4.1.6. Information Technology for SCM.**

The functional area had a mean score of 2.27. The six best practices, that is, information is collected in a centralised point; supply chain partners have access to forecasts; data capturing technologies are in place; ICT systems have modular interfaces; bar codes are used and RFID is used for tracking items, had mean scores of 3.23, 1.73, 2.30, 1.87, 2.83 and 1.67 respectively.

Although KEMSA had a ERP, interdepartmental co-operation in use of the ERP was lacking. Cutting edge IT systems and equipments seem to be lacking at KEMSA. Thus end-to-end visibility of information and processes was missing.

#### **4.2. Maturity level for the whole KEMSA SCM.**

The mean score for the entire KEMSA supply chain was 2.59. The means of the six functional areas were added and divided by six to give the mean for the whole system. This means that the whole supply chain is in the 'functional excellence' stage of the maturity scale.

According to Lockamy and McCormack maturity model, some of the characteristics associated with SCM systems at this stage include: basic SCM processes are defined and documented; jobs and organization basically remain traditional; process performance is more predictable; targets are defined but still missed more often; overcoming the functional 'silos' takes considerable effort owing to boundary concerns and competing goals; SCM costs remain high; and customer satisfaction has improved, but is still low.

#### **4.3. Differences in maturity levels between the functional areas.**

In order to fulfill the research objective, "To find out whether SCM practices have been implemented uniformly across the SCM system", friedman test was done. In this case we sought to test the null hypothesis that, the means in all functional areas were the same. The mean ranks between the functional groups were



different as seen in Table 3. The friedman test statistics as seen in Table 4 also confirmed that the means between the functional areas were different. The *p*-value was small 0.000, thus the null hypothesis is rejected. The Friedman test showed that there were significant differences between the means of the various functional areas. This meant that the functional areas were not being developed at the same rate.

Table 3 shows the mean ranks between the means of the various functional areas.

	Mean Rank
Demand management mean	4.60
Procurement management mean	4.03
Logistics management mean	1.73
customer_supplier management mean	4.43
Performance management mean	3.80
Information technology mean	2.40

Table 3: Mean ranks of the functional areas.

Table 4 shows the test statistic for the friedman test.

N	30
Chi-Square	58.958
df	5
Asymp. Sig.	.000

Table 4: Friedman test statistic

## **CHAPTER 5: CONCLUSION AND RECOMMENDATIONS.**

This chapter highlights major findings obtained from the analysis on all the data collected. Relevant conclusions are drawn and appropriate recommendations made.

### **5.1. Conclusions.**

This study was conducted with the aim of finding whether KEMSA employed best-in-class SCM practices. It was also to verify whether its performance as gauged by the task force of 2008 was solely due to managerial and financial problems or there were other operational inadequacies.

The KEMSA SCM scored a mean of 2.6. This implied that KEMSA was in the defined/functional excellence stage of the maturity model. In this stage SCM processes are defined and documented, organizational structure remains traditional, performance is more predictable, SCM costs remain high, customer satisfaction has improved but still remains low and overcoming functional silos takes considerable effort. All the functional areas were in this stage with demand management and customer management scoring 2.9 while information technology for SCM scored 2.3.

The Friedman test implied that the different functional areas were not developing in a uniform manner. Some functional areas seem to be more developed than others.

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 practices.

## **5.2. Recommendations.**

This study highlights several areas where KEMSA's SCM processes can be improved to be at par with industry best practices.

Visibility in terms of information and processes needs to be improved. Visibility is a key area in making demand management, customer management and logistics management efficient. There should be a deliberate attempt to share information amongst KEMSA's functional areas and amongst its partners in real time.

Collaboration with customers and suppliers should be encouraged. KEMSA should also endeavour to form cross-functional/cross-partner teams and processes. This should be taken to the point where employees interact freely across functions as well as with partners and information is shared freely. When this is done at real time the supply chain will have achieved collaborative planning replenishment and forecasting, the pinnacle of collaboration in SCM.

Some of the technologies and techniques associated with excellent supply chains are missing at KEMSA. These include; voice recognition technology in warehousing, interfacing of IT platforms in the partner firms, EDI, RFID, use of a

performance measurement system such as Balanced Score Card and creating a virtual network between partners.

There should be a deliberate effort to continuously improve SCM processes at KEMSA in a uniform manner. For the firm to achieve its goals the functional areas should work harmoniously without some areas dragging others behind.

### **5.3. Limitations of the study.**

Maturity models have been used extensively in business organizations. However, their use in public healthcare settings in Kenya was found to be limited.

Therefore data for comparison of the findings of this study was lacking.

Lockamy and McCormack maturity model has mainly been used in for-profit organizations. KEMSA is a non-for-profit organization and the conclusions drawn may need to be validated with other not-for-profit organizations.

### **5.4. Suggestions for further Research.**

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 concludes 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. However, performance is determined by

several other factors including: technology, customers, suppliers and human resources.

KEMSA's performance can be determined more conclusively by looking at the other factors. Further research is needed to look at the supply chain processes and the other factors in the whole supply chain encompassing the customers, suppliers and even the regulatory environment.

## APPENDIX 1.

### KEMSA introduction letter

DR. GEORGE MUTUA NZIOKA,  
P.O.BOX 49675 - 00100  
NAIROBI, KENYA  
Cell phone No. +254-722-508236 ; +254-737-122913  
E-mail; gnzioka@ke.earo.crs.org  
05<sup>th</sup> October, 2010.

THE CHIEF EXECUTIVE OFFICER,  
KENYA MEDICAL SUPPLIES AGENCY,  
P.O.BOX 47715-00100  
NAIROBI.

Dear Sir,

REF: REQUEST TO DO RESEARCH AT YOUR INSTITUTION.

I am undertaking Master of Business Administration degree at the University of Nairobi, specializing in Operations Management. I intend to do a project in supply chain management in the public healthcare system, entitled *The Practice Of Supply Chain Management in the Public Healthcare Sector In Kenya: The Case of Kenya Medical Supplies Agency.*

The objective of the research is to assess the maturity of the KEMSA supply chain system. Below are the specific objectives of the study as per the project proposal;

1. To assess the maturity level of each of the following functional areas: Demand management, Procurement management, Logistics management, Customer/Supplier Management, IT for SCM and Performance measurements.
2. To assess level of maturity of the entire KEMSA SCM system.
3. To find out whether SCM practices have been implemented uniformly across the SCM system.

I intend to administer questionnaires to 30 staff members; the CEO, the deputy CEO, and four staff members from each of the following departments; customer care, procurement, warehousing and distribution, technical, administration, information technology and finance. A copy of the questionnaire is herein attached.

I have defended my project proposal successfully and would like to go ahead and administer questionnaires.

Thanks and a good day.

Yours sincerely,

Dr. George Mutua Nzioka

## APPENDIX 2:

### QUESTIONNAIRE FOR ASSESSMENT OF PUBLIC HEALTHCARE SUPPLY CHAIN MANAGEMENT SYSTEM.

The purpose of this questionnaire is to collect information on the key functions of SCM in your institution. The information will be used to assess the level of maturity of your SCM system and possibly give insights on what needs to be done to transform it into world class status. The information will help in completing my research project for the award of the degree of Master of Business Administration at the University of Nairobi. This information will not be shared with any other organization apart from the University of Nairobi and your institution.

Area of Supply Chain Management		Description of Supply Chain Management Practice	To what extent does your institution implement the practice described. Circle the correct answer using this key; 1. Never or does not implement 2. Sometimes or to some extent 3. Frequently or partly implemented 4. Mostly or often implemented 5. Always or definitely implemented				
Demand Management	1	The Essential Drug/Commodities List(EDL) is updated regularly	1.	2.	3.	4.	5
	2	There is a structured/formal involvement of Customers and suppliers in the process of updating the EDL	1.	2.	3.	4.	5
	3	Data from healthcare facilities(dispensed-to-user) data is used for forecasting and quantification	1.	2.	3.	4.	5
	4	ABC and VEN analysis are done as part of forecasting and quantification	1.	2.	3.	4.	5
	5	ABC and VEN analysis are done by a business intelligence module of the Enterprise Resource Planning(ERP)/SCM system	1.	2.	3.	4.	5
	6	There is a formal/structured involvement of Customers and Suppliers in the process of forecasting and quantification	1.	2.	3.	4.	5
	7	Customers and suppliers can access the forecasting and quantification information real time	1.	2.	3.	4.	5
Procurement	8	Electronic data interchange(EDI) and the World Wide Web are used for exchange of procurement documents and transactions	1.	2.	3.	4.	5
	9	World Wide Web (internet) is used for exchange of procurement documents and transactions	1.	2.	3.	4.	5
	10	Electronic Fund Transfer(EFT) is used for payment of suppliers	1.	2.	3.	4.	5
	11	There is a structured/formal involvement of	1.	2.	3.	4.	5

		suppliers in policy formulation and continuous improvement meetings						
	12	Educational Seminars for suppliers are convened to learn company policies and prepare future plans together	1.	2.	3.	4.	5	
	13	Price is considered during selection of suppliers	1.	2.	3.	4.	5	
	14	Reliability and flexibility are considered during selection of suppliers	1.	2.	3.	4.	5	
Logistics Management	15	Customers place orders at regular intervals and whenever emergencies occur	1.	2.	3.	4.	5	
	16	Orders from healthcare institutions are entered into a secure portal/ERP/SCM shared by all partners (customers,suppliers,your institution) of the supply chain.	1.	2.	3.	4.	5	
	17	Customers can access status of their orders and status of stocks in your warehouse real time through a secure portal.	1.	2.	3.	4.	5	
	18	Your organization uses EDI or secure internet portal as a means of day-to-day business transaction communication with customers and suppliers	1.	2.	3.	4.	5	
	19	Suppliers can access status of their invoices and status of stocks in your warehouse real time through a secure internet portal.	1.	2.	3.	4.	5	
	20	Bar codes are used in the warehouse for tracking and tracing of commodities	1.	2.	3.	4.	5	
	21	Radio Frequency Identification(RFID) is used in the warehouse for tracking and tracing of commodities	1.	2.	3.	4.	5	
	22	Voice recognition technologies are used in the warehouse for tracking and tracing of commodities.	1.	2.	3.	4.	5	
	23	Continuous Review (inventory replenished according to analysis of consumption in real time) method for inventory control is in use	1.	2.	3.	4.	5	
	24	Transport Management module of your ERP is linked with the Transport Management System of the company hired to transport commodities to the various healthcare institutions	1.	2.	3.	4.	5	
Customer/Supplier Management	25	Written confirmation of healthcare facility orders detailing available commodities and dates of delivery are send to customers upon receipt of orders	1.	2.	3.	4.	5	
	26	The ERP/SCM system has a Customer Relationship Management module for real time information on customer relations	1.	2.	3.	4.	5	
	27	Customer satisfaction surveys are done every year	1.	2.	3.	4.	5	
	28	There is a dedicated call centre/telephone	1.	2.	3.	4.	5	



		number or internet portal for customers to give feedback to your organization all the time						
Performance Measurement	29	There is a performance measurement system such as Balanced Scorecard(BSC) or Supply Chain Operations(SCOR) Reference model in use	1.	2.	3.	4.	5	
	30	Customer order cycle time are monitored all the time	1.	2.	3.	4.	5	
	31	Line count fill rate are monitored all the time	1.	2.	3.	4.	5	
	32	Procurement lead times are monitored all the time	1.	2.	3.	4.	5	
	33	The ERP/SCM has a module that monitors well defined Key Performance Indicators through out the supply chain	1.	2.	3.	4.	5	
	34	Continuous and incremental improvement is focused and gives tangible results	1.	2.	3.	4.	5	
	35	Inventory turnover and inventory months of stock are monitored all the time	1.	2.	3.	4.	5	
	36	Inventory record accuracy is monitored all the time	1.	2.	3.	4.	5	
Information Communication Technology(ICT)	37	Information is collected, processed, visualised and presented in a centralised decision point, to enable efficient decision making	1.	2.	3.	4.	5	
	38	A system is implemented that provides all supply chain partners equal access to forecasts, inventory status and consumption data	1.	2.	3.	4.	5	
	39	Data capturing technologies and IT-systems facilitates decisions based on data and information that are in real-time	1.	2.	3.	4.	5	
	40	ICT systems have modular standardised interfaces to provide connectivity between all supply chain partners- creating a virtual network.	1.	2.	3.	4.	5	
	41	Bar codes are used for track and trace functionality throughout all supply chain partners	1.	2.	3.	4.	5	
	42	RFID is used for track and trace functionality throughout all supply chain partners	1.	2.	3.	4.	5	

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