

**GREEN SUPPLY CHAIN MANAGEMENT PRACTICES  
AND SUPPLY CHAIN PERFORMANCE OF PRIVATE  
HOSPITALS IN NAIROBI, KENYA**

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## DECLARATION

I declare that this project is my original work and has never been presented in any other learning institution for an award of any Diploma or Degree program.

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## **DEDICATION**

This project is dedicated to my mum, Lydia Mwangi who inspired and taught me the virtues of perseverance, humility, honesty and hard work. I will forever be grateful to you. Your desire for nothing short of the best has been driving me ever since.

To my son Gerwyn Chege you inspired me to work harder and made me believe I will make it.

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## **LIST OF ABBREVIATIONS**

EFP - Environmentally Friendly Practices

GSC- Green supply chain

GSCM- Green supply chain Management

KPI- Key Performance Indicators

KIPPRA- The Kenya Institute for Public Policy Research and Analysis

NHIF- National Hospital Insurance Fund

PPB- Pharmacy and Poisons Control Board

SC-Supply Chain

SCC- Supply Chain Council

SCM- Supply Chain Management

SCOR- Supply Chain Operations Reference

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## **ABSTRACT**

Over the past decade, Green Supply Chain Management (GSCM) has emerged as an important component of the environmental and supply chain strategies for a number of companies and they have been aiming at integrating environmental concerns in their business operations and in interactions with their stakeholders in embracing environmental sustainability into business strategies. Therefore the study aimed at determining the various GSCM practices and their impact on Supply Chain Performance (SCP). The specific objectives of this study were: to determine the various GSCM practices that are currently applied by the private hospitals in Nairobi, to determine the SCP in private hospitals in Nairobi and to establish the challenges faced in the implementation of the GSCM practices by the private hospitals in Nairobi. The research design for the study was descriptive survey. The researcher proposed to do a census on all the 45 private hospitals in Nairobi Kenya under category C according to NHIF classification. The data was analyzed by use of multivariate data analysis techniques, as it allowed simultaneous investigation of more than two variables. Frequency proportions were used to determine the extent of adoption of the GSCM practices and the SCP. The researcher utilized the statistical package for Social sciences (SPSS) software to analyze the efficiency and effectiveness of the data in details. On green design a low but significant relationship was found while on green operations the relationship with SCP showed that there was high significant, on reverse logistics and outbound logistics the significance level was high, as well as purchasing and in-bound logistics. The study finally concludes that waste management greatly affects SCP it was concluded so because hospital used biodegradable materials and the hospital had invested on hazardous disposal equipments, the hospitals also used recycled materials and the hospital purchased eco-design of products for reduced consumption of material/energy. The study recommends that hospital should provide design specification to suppliers that include environmental requirements when purchasing an item, the hospitals should also cooperate with suppliers for environmental objectives and also cooperate with suppliers for eco-design in order to boost green design in the hospitals SCP

## **CHAPTER ONE: INTRODUCTION**

### **1.1 Background of the study**

Green Supply Chain Management (GSCM) is an approach used to design and/or redesign the supply chain(SC) to incorporate; practices that minimize the impact of a firm's activities on the environment not only from start to finish of a SC, but also from the beginning to the end of a product's life cycle for the purposes of improving the long-term performance of the individual companies and the supply chain (Green et al., 2008).Over the last two decades, the public has become more aware of environmental issues and global warming and companies always anticipate questions about how green their manufacturing processes are, their carbon footprint and how they recycle the end products after use (Vachon and Klassen, 2007).

As a result, both manufacturing and service organizations must consider the impact of environmental approach on business performance and the economic viability of the firm as well as on the environmental performance. Success at the supply chain level leads to success at the organizational level (Chopra and Meindl, 2004). Since customers and governmental entities have begun to demand that processes, products, and services be environmentally friendly, it is important that managers identify and implement environmental sustainability practices that extend throughout the supply chain.

With ever increasing attention being paid to global environmental issues, customers are beginning to adjust their purchasing habits by increasing their willingness to spend money on eco-friendly products. Increasing stakeholder pressure is one of the most important factors in the decision-making of companies hence the need for GSCM practices. There are a lot of factors to evaluate the performance of the SC such as customer service, quality, lead time, cost etc. Also due to the environmental requirements (social responsibility, Kyoto Protocol, government agencies etc.) an increasing attention has been given to develop environmental strategies in all organizations.

According to Boraya et al, (2012) performance is the accomplishment of a given task measured against preset known standards of accuracy, completeness, cost, and speed.

Supply chain performance measurements are a continuous and formal systematic approach to monitor and evaluate accomplishments as regards to the extent to which they meet or deviate from pre-established levels or standards.

### **1.1.1 Green Supply Chain Management Practices**

Zuh and Sarkis (2004) argue that GSCM is the addition of the green component to SCM and that it involves addressing the influences and relationships between SCM and the natural environment. According to them GSCM practices stretches from green purchasing to integrating green SC, flowing from supplier, to manufactures and finally to customers. They further suggested that GSCM practices consist of four major dimensions: internal environmental management, external environmental management, investment recovery, and eco design. On quality management they indicated that implementation of GSCM under quality control; organizations can improve their environmental practice by learning from experiences of their quality management programs. By receiving the certificate for the ISO 14001 environmental management system (EMS) standard, organizations are able to create structured mechanisms for continuous improvement in environmental performance. The widespread environmental consciousness among consumers nowadays means that companies are forced to pay more attention to their environmental management practices.

Two forces in particular are forcing companies to embrace environmental management. The first is international environmental protection regulations such as the Montreal Convention and the Kyoto Protocol; the second is the environmental consciousness of consumers (Chen et al., 2006). Companies understand that if they supply products and services which satisfy their customers' environmental concerns, then those customers are more likely to favor their products or services.

### **1.1.2 Supply Chain Performance**

GSCM can reduce the ecological impact of industrial activity without sacrificing quality, cost, reliability, performance or energy utilization efficiency. It involves a paradigm shift, going from end-of-pipe control to meet environmental regulations to the situation of not only minimizing ecological damage, but also leading to overall economic profit. The

Supply Chain Performance (SCP) measurement system includes three dimensions: resource, output, and flexibility (Beamon 1999). Efficient resource management is critical to profitability, without acceptable outputs, customers will turn to other supply chains, and also in an uncertain environment, supply chains must be able to respond to change.

Supply Chain Operations Reference (SCOR) model, which is the world standard for supply chain management, it provides a unique framework for defining and linking performance metrics, processes, best practices, and people into a unified structure. In measuring the performance of the supply chain and comparing against internal and external industry goals focuses on: reliability achievement of customer demand fulfillment on-time, complete, without damage etc, responsiveness the time it takes to react to and fulfill customer demand ,agility the ability of supply chain to increase/decrease demand within a given planned period ,cost objective assessment of all components of supply chain cost, assets the assessment of all resources used to fulfill customer demand. SCOR model can help supply chain managers evaluate cost/performance tradeoffs, develop strategies for meeting new customer expectations, and respond to domestic and global market growth.

### **1.1.3 The Private Health Sector in Kenya**

Private healthcare system in Kenya has grown tremendously over the last two decades due to various reasons, among them lack of adequate and quality public healthcare services and introduction of user fees. There have been some health facilities identifying themselves as hospitals whereas others with similar features identify themselves as clinics or nursing homes, although the law stipulates what should be hospitals, nursing homes, and clinics (Oduwo *et al*, 2001). The classification problem has arisen due to providers changing names, e.g. from hospital to nursing home, so that they can qualify for higher reimbursement from the National Hospital Insurance Fund (NHIF) (Kimani, et al, 2004). NHIF has contracted hospitals under three Categories; A, B & C, Under Category A (government hospitals), under contract Category B (private and mission) hospitals, under Category C (private). NHIF accredited hospitals will be used in this study (Appendix I).

The private healthcare sector has made a remarkable contribution in the delivery of healthcare services in Kenya. It has filled a resource gap for health development by improving efficiency and quality of care by promoting competition and complementing public sector services. There are too many suppliers in the marketplace, driving down price and quality. Virtually all levels, from importers to retailers, are characterized by a high degree of competition and fragmentation as the hospitals really mostly on imported products for their operation. Government has limited capacity to monitor and enforce quality standards. The Pharmacy and Poisons Control Board (PPB) has a large mandate for inspecting facilities and issuance of operating license.

In the recent past several hospitals have adopted GSC practices which have included putting up environmentally friendly structure from the construction materials used to the adoption of solar power as a source of energy an example of Nairobi hospital. They have also invested in technology systems for their operations by reducing paperwork; with the example of mater hospital where they issued the receipt of payment only.

## **1.2 Statement of the Problem**

Over the past decade, GSCM has emerged as an important component of the environmental and supply chain strategies for a number of companies and they have been aiming at integrating environmental concerns in their business operations and in interactions with their stakeholders in embracing environmental sustainability into business strategies (Dyllick and Hockerts, 2002).

Rao and Holt (2005) pointed out that organizations adopting GSCM in the South East Asian region ultimately enhanced both competitiveness and economic performance. Zhu et al. (2007) indicated that enterprises implementing GSCM in China have only slightly improved environmental and operational performance and GSCM practices have not resulted in a significant economic performance improvement. A number of studies have also been conducted on GSC, Mwirigi (2007) did a survey on GSCM practices by manufacturing firms in Kenya with findings that the practice were found valuable in overcoming environmental impacts arising from manufacturing operations as environmental impacts occur at every stage of product life cycle.

Khisa (2011) conducted a study on green procurement practices in the public sector the case of parastatals in Kenya. His findings were that many organizations were either considering or just initiating implementation of green procurement practices. Obiso (2011) undertook a study on GSCM practices in petroleum marketing firms in Kenya. He found out that adoption of the practices had a positive relationship with the environmental performance of oil companies. Also Abuko (2011) conducted a study on the impact of GSC practices on the performance of oil companies in Kenya and the findings were that adoption of GSC practice influenced to a great extent ,quality improvement, efficiency, cost saving, productivity.

Odongo (2011) did a study on strategies adopted by private hospitals in Nairobi to gain competitive advantage the findings were there they were adopting eco-friendly measures in their operations. The study was more of the strategic management skills the hospitals have implemented. The private hospitals in Nairobi, Kenya have continued to grow by opening branches across the city in various estates. This is attributed to the increased level of competition in the sector coupled with enlighten customers on environmental rights and more stringent measures from the regulatory bodies like NEMA. As such the hospitals can use the GSCM practices to reduce their cost and improve their performances and efficiency in their operations to remain competitive. According to (Chau et al., 2010) and the studies mentioned above on adoption of GSCM have been found as a source of competitive advantage and improved performance. Therefore the study aimed at determining the various GSCM practices and their impact on SCP.

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

The objectives of this study were:

- i. To determine the various GSCM practices that are currently applied by the private hospitals in Nairobi.
- ii. To determine the Supply Chain performance in private hospitals in Nairobi.
- iii. To establish the challenges faced in the implementation of the GSCM practices by the private hospitals in Nairobi.

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

The findings from this study contributed to the current academic practices in the area of GSCM research. It will be of value to academicians as they find useful research gaps that stimulate interest in further research in the future.

The findings will be of benefit to the management and staff of the health sector at large who will gain insight into how their organizations could effectively manage and use GSCM practices. The study offers an understanding on the importance of adopting GSCM and as such improves their performance and competitiveness in the health sector.

Understanding on the GSCM practices adopted by the private hospitals would help policy makers in the line ministries of the government and other state agents involved with environmental matters including NEMA and KEBS, to come up with targeted policies and programs that actively stimulated the growth and sustainability of the health sector. It also assisted the policy makers to support, encourage, and promote the establishment of appropriate guidelines and regulatory framework.

The study will be useful to the organizations and those interested in establishing hospitals by gaining understanding of the benefits they accrue through implementation of GSCM practices.

## **CHAPTER TWO: LITERATURE REVIEW**

The chapter provided information from publications on topics related to the research problem. It examined findings from various scholars and authors about GSCM practices. The chapter covered GSCM practices, supply chain performance and conceptual framework for the study.

### **2.1 Green Supply Chain Management Practices**

Practices related to environmental issues and performance encompass both internal and external activities, whether related to preventing pollution before it is generated, recycling waste and spent products, extracting resources and raw materials, or capturing harmful pollutants followed by proper disposal. Srivastava (2007) defines GSCM as ‘integrating environmental thinking into SCM, including product design, material sourcing and selection, manufacturing processes, delivery of the final product to the consumer as well as end-of-life management of the product after its useful life’. GSCM can also be defined as the process of using environmentally friendly inputs and transforming these inputs into outputs that can be reclaimed and re-used at the end of their lifecycle thus, creating a sustainable SC.

Bowen et al. (2001) defined green supply as the buying organization’s intent to improve the environmental performance of purchased input and/or of the suppliers that provide them. As such, green supply includes a wide variety of activities including cooperation between organizations to minimize the logistical impact of the material flows or information gathering regarding the purchased products’ characteristics. Others have proposed definitions more focused on the purchasing function, suggesting that green supply activities consist of the involvement of the purchasing function in facilitating internally-driven environmental activities such as recycle, reuse and source reduction (Min and Galle, 2001).

Backing the network conception of SCM, Chen and Paulraj (2002) consider firms as links in a networked SC. Hence, the performance of a firm is equally dependent on how effectively and efficiently it cooperates with its direct partners and on how well these

business partners cooperate with their own partners. Zelbst et al., (2010), stated that business processes must be integrated and coordinated this include purchasing manufacturing, marketing, logistics, and information systems. Strategic imperatives that must be aligned include customer focus, efficiency, quality, and responsiveness and most recently environmental sustainability. With competition at the supply chain level and a focus on the changing demands of final customers, it is necessary to identify and adopt practices that yield competitive advantage at the supply chain level which, in turn, yield improved performance for the individual supply chain partners (Green et al., 2008).

Chen *et al.* (2006) investigated, through a survey on Taiwanese companies operating in the information and electronics industries on the role of green innovation in corporate competitive advantages. Within GSCM, an interest in SC cooperation that is the integration along SC to create sustainable competitive advantage, i.e. the collaborative paradigm (Vachon and Klassen, 2006). This notion is evident within the field of GSCM, as the interest in supply chain cooperation to create sustainable competitive advantage keeps on increasing. Companies that embrace the concept of sustainability in their strategies are usually referred to as sustainability driven companies. In this context, sustainable products can assume a strategic role, being sustainable offerings in environmental, social and economic terms (Maxwell *et al.*, 2006).

Companies cannot ignore environmental issues due to increasing government regulations and stronger public mandates for environmental accountability which have brought these issues into strategic planning. Firms have now found it necessary to integrate their SC processes to lower costs and meet both environmental and customer requirements. However these two trends are not independent; companies are involving suppliers and purchasers to meet and even exceed the environmental expectations of their customers and governments by adopting Environmentally Friendly Practices (EFP).

The GSCM practice has moved from a mere public relations strategy, to a necessary means of deriving real economic value and compliance. To establish their environmental image, enterprises have to re-examine the purpose of their business. GSCM may provide new opportunities for competition, and new ways to add value to core business programs

(Hansmann and Claudia, 2001). Thus GSCM practice is a key component factor in improving the dynamic capability of any firm. As the world focuses on Environmental safety and public health, companies have been compelled to ensure environmental compliance in their production and supply chain functions. The health sector has found it necessary to address the influence and relationship between SCM activities and the natural environment.

The study particularly focused on current GSCM practices: Green design, green operations, Reverse and inbound logistics and waste management.

### **2.1.1 Green design**

The organizations working together with their suppliers to be able to plan and develop on their environmental activities and projects they want to undertake (Geffen and Rothenberg 2000). This will include; providing design specification to suppliers that include environmental requirements for purchased item, cooperation with suppliers for environmental objectives, cooperation with suppliers for eco-design, cooperation with suppliers for green packaging. This requires organizations to invest in specific resources in cooperative activities that address environmental issues in the SC. GEMI (2004) gave an example on this type of GSCM practices where a supplier of chemicals is collaboratively working with customers at their facilities to reduce their use of chemicals.

These co operations will help the members on the supply chain to reduce the environmental impact. Eco-design requires that manufacturers design products that minimize consumption of materials and energy, that facilitate the reuse, recycle, and recovery of component materials and parts, and that avoid or reduce the use of hazardous products within the manufacturing process (Zhu et al., 2007)

### **2.2.2 Green Operations**

This involves activities like environmental audit for suppliers 'internal management Suppliers' ISO14001 certification this is now a requirement for large automotive companies for their tier-one suppliers, the supplier's environmental practices can be conducted by the organization or an independent third party (Min and Galle 2001), Second-tier supplier environmentally friendly practice evaluation.

Green purchasing strategies adopted in the organization to respond to global call. In the supply network the purchasing perspective in GSCM practices will bring about cost reduction through integrating suppliers in the supply chain. Organizational performance includes financial and marketing performance of the organization as compared to the industry average. Green et al. (2008) argue that green purchasing and supply policies are likely to result in improved environmental performance. GSCM practices such as green purchasing, cooperation with customers, eco-design, and investment recovery, are designed to positively impact environmental performance of firms.

### **2.2.3 Reverse Logistics and Outbound Logistics**

Reverse logistics has been defined as the term used to refer to the role of logistics in product returns, source reduction, recycling, materials substitution, reuse of materials, waste disposal, and refurbishing, repair and remanufacturing. The idea is to eliminate or minimize waste (energy, emissions, chemical/hazardous and solid wastes). Design of products for reuse, recycle, recovery of material, and component parts. (Sarkis 2005)

The initiatives that an organization chooses to follow between the various logistics functions as reverse logistics and environmental considerations will have an impact on the performance of that organization. In an eco-transportation system there are parameters like fuel sources, infrastructure, operational practices and organization of the transport system. These parameters and the dynamics that connect them determine the environmental impact generated in the transportation logistics phase of the SC (Kam et al., 2003)

### **2.2.4 Purchasing and In-bound Logistics**

Green purchasing strategies form the largest part of inbound logistics side which are adopted by organizations to respond to the global concern of the environmental stability. From purchasing perspectives of the supply network GSCM practices have several benefits ranging from cost reduction to integration of suppliers to form a participative decision-making process that will promote environmental innovation (Bowen et al., 2001; Rao, 2002)

### **2.2.5 Waste Management**

How waste is managed. Use of lean methods improves the environmental performance by reducing general wastes and minimizing hazardous waste. GSCM practices since they focus on the elimination of waste that is associated with environmental sustainability this should lead to cost savings and enhance the overall performance of a firm (Rao, 2002).

Rao and Holt (2005) demonstrated a link between GSC and economic performance and they also found that GSCM practices led to competitiveness and better economic performance.

Klassen and McLaughlin (1996) in their study on the effect of announcements of winning environmental awards by the organizations on stock prices. They found evidence that the market valued such recognition and duly awarded the firms with increased valuations as reflected by higher stock prices. With cost saving nature of the environmental performance leading to improved economic performance. Waste management will have an impact on the economic performance as it relates to the ability to reduce costs associated with purchased materials, energy consumption, waste treatment, waste discharge, and fines for environmental accidents (Zhu et al., 2008). Environmental performance relates with the ability of manufacturing plants to reduce air emissions, effluent waste, and solid wastes and the ability to decrease consumption of hazardous and toxic materials (Zhu et al., 2008)

The adoption of GSCM practices in all organization demonstrated a link between those practices and overall performance of an organization (Rao and Holt 2002).

### **2.2 Supply Chain Performance Measurements**

SCM focuses on how organizations control their suppliers' processes, technology, and capability to improve competitive advantage. It's also based on interactions of manufacturing, logistics, materials, distribution, and transportation functions within an organization. In this regard, for measuring supply chain performance, (SCP) many characteristics of SCM should be reflected in the SCP measurement system. SCP measurement models are divided into four categories: cost, a combination of cost and customer responsiveness, activity time, and flexibility (Cooper et al. (1997).

Gunasekaran et al. (2004) stated that a framework for supply chain performance measures should consider the four major supply chain activities/processes. 1) Plan: Order entry methods, Human resource productivity 2) Source: Efficiency of purchase order cycle time, Supplier pricing against market 3) Make/Assemble: Percentage of defects, Cost per operation hour, Human resource productivity index 4) Deliver: Flexibility of service system to meet customer needs, Effectiveness of enterprise distribution planning schedule. An addition to this from SCOR model is the return processes associated with returning or receiving returned products for any reason. These processes extend into post-delivery customer support aspect of the management process in supply chain it relates to activities such as reverse logistics.

The performance section of SCOR consists of two types of elements: Performance Attributes and Metrics. SCOR Level 1 metrics are strategic, high-level measures that cross multiple SCOR processes. Lower level metrics are associated with a narrower subset of processes. For example, delivery performance is calculated as the total number of products delivered on time and in full based on a commit date. SCOR identifies five core supply chain performance attributes: Reliability, Responsiveness, Agility, Costs, and Asset Management. Consideration of these attributes makes it possible to compare an organization that strategically chooses to be the low-cost provider against an organization that chooses to compete on reliability and performance.

The Reliability attribute addresses the ability to perform tasks as expected. Reliability focuses on the predictability of the outcome of a process. Typical metrics for the reliability attribute include: on-time, the right quantity, the right quality. The SCOR KPI (key performance indicators)(level 1 metric) is Perfect Order Fulfillment. Reliability is a customer-focused attribute. The Responsiveness attribute describes the speed at which tasks are performed. Examples include cycle-time metrics. The SCOR KPI is Order Fulfillment Cycle Time. Responsiveness is a customer-focused attribute.

The Agility attribute describes the ability to respond to external influences and the ability to change. External influences include: Non-forecasted increases or decreases in demand; suppliers or partners going out of business; natural disasters; acts of (cyber) terrorism; availability of financial tools (the economy); or labor issues. The SCOR KPIs include

Flexibility and Adaptability. Agility is a customer-focused attribute. The Cost attribute describes the cost of operating the process. It includes labor costs, material costs, and transportation costs. The SCOR KPIs include Cost of Goods Sold and Supply Chain Management Cost. These two indicators cover all supply chain spend. Cost is an internally-focused attribute. The Asset Management Efficiency (“Assets”) attribute describes the ability to efficiently utilize assets. Asset management strategies in a supply chain include inventory reduction and in-sourcing vs. outsourcing. Metrics include: inventory days of supply and capacity utilization. The SCOR KPIs include: Cash-to-Cash Cycle Time and Return on Fixed Assets. Asset Management Efficiency is an internally-focused attribute.

A metric is a standard for measurement of the performance of a process. SCOR metrics are diagnostic metrics. SCOR recognizes three levels of predefined metrics: Level 1 metrics are diagnostics for the overall health of the supply chain also known as strategic metrics and (KPIs). Benchmarking level 1 metrics helps establish realistic targets that support strategic objectives. Level 2 metrics serve as diagnostics for the level 1 metrics this helps to identify the root cause or causes of a performance gap. Level 3 metrics serve as diagnostics for level 2 metrics. For example, Delivery Performance is calculated as the total number of products delivered on time and in full based on a commit date. Additionally, metrics (diagnostics) are used to diagnose variations in performance against plan. For example, an organization may wish to examine the correlation between the request dates and commit date. SCC recommends that supply chain scorecards contain at least one metric for each performance.

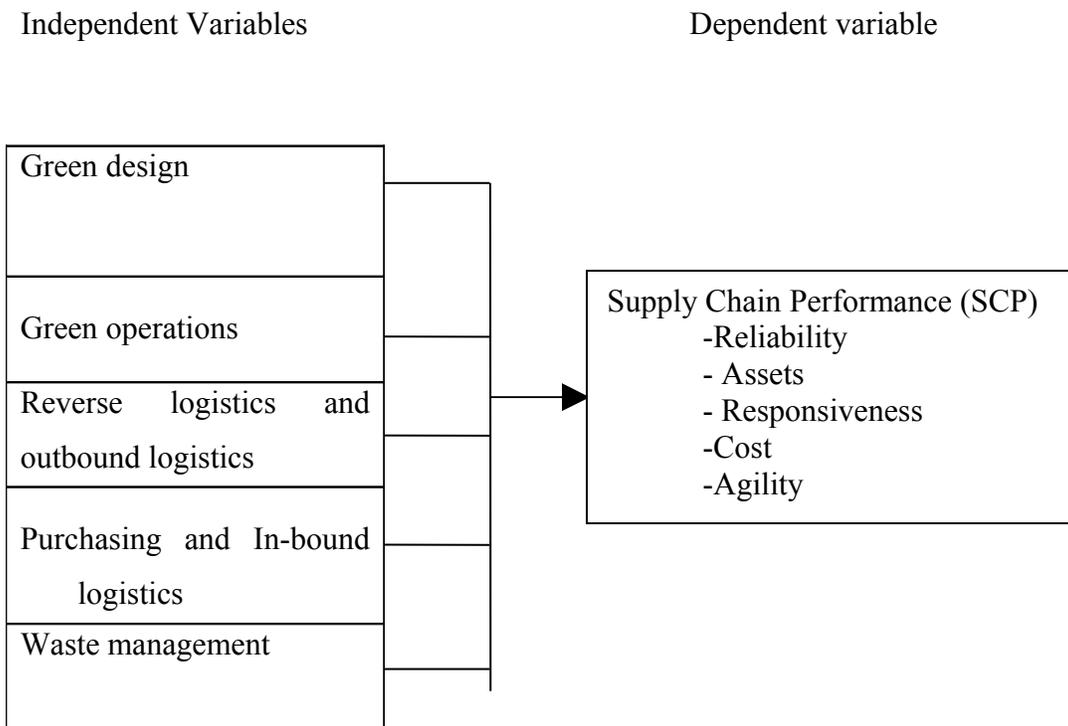
### **2.3 Summary of the Literature Review**

The GSCM practices have been expounded in detail in the literature as well as the studies done in the area. It has shown that there lacks a comprehensive framework on the GSCM practices and as a result different organizations adopts different practices that they deem suitable to their business context. As such there is lack of universally acceptable GSCM practices. The literature also pointed out the benefits accrued from adoption of GSCM practices, this include the positive relationship between GSCM practices and improvement in the SCP as well as economic and environmental performance of the

various organizations. Rha (2010) did a study on the GSCM and SCP but the study focused on the manufacturing firms only and recommended further research on the same on other practices and different firms. The study focused on comparing the outcomes with this study too.

## 2.4 Conceptual Model

**Figure 2.1: Conceptual Model to Link GSCM Practices and Supply Chain Performance**



(Source: Author 2012)

The application of GSCM practices is expected to have an impact on the SCP. Localized sourcing will lead to reduced short procurement distance and reduced inventory costs. Improved hospital layout will cause reduced in house traffic movement, enabled mechanization leading to improved efficiency. Utilizing fuel efficient equipments and machines leading to improved fuel efficiency. Consolidation of outbound and reverse logistics will reduce waste of space and time .This is expected to have an impact on the reliability and responsiveness .Waste management solutions will reduce the solid waste

and as such positively affect the SCM costs. Green sourcing has led to timely delivery of materials, products and improved service to customers.

## **CHAPTER THREE: RESEARCH METHODOLOGY**

The chapter describes the proposed research method used. This included the research design, target population, sampling design, data collection and techniques for data analysis.

### **3.1 Research Design**

The research design for the study was descriptive survey. (Abuko 2011) used the design in his research. This design was deemed appropriate as it allowed the researcher to draw conclusion on the link between GSCM practices and performance.

### **3.2 Population**

The researcher proposes to do a census on all the 45 private hospitals in Nairobi Kenya under category C according to NHIF classification (appendix I).

### **3.3 Data Collection**

The data for the research was sourced mainly from both primary and secondary data. The primary data was collected through a questionnaire that was administered on a drop and pick later method to the manager in-charge of procurement or his/her equivalent. The questionnaire had three parts; part A for biodata of the respondent, part B dealt with GSCM practices and supply chain performance, and part C had the challenges. A questionnaire was chosen as it acted as a useful tool for collecting data from respondents by providing a means of expressing their views more openly and clearly. Secondary data was from text books, journals, magazines and the internet.

### **3.4 Data Analysis**

The data was analyzed by use of multivariate data analysis techniques, as it allowed simultaneous investigation of more than two variables. Frequency proportions were used to determine the extent of adoption of the GSC and the SC performance. The researcher utilized the statistical package for Social sciences (SPSS) software to analyze the efficiency and effectiveness of the data in details.

The following regression equation was used:

$$Y = \beta_0 + \beta_1 \chi_1 + \beta_2 \chi_2 + \beta_3 \chi_3 + \beta_4 \chi_4 + \epsilon$$

Where: Y = Supply Chain Performance (SCP)

X<sub>1</sub> = Green design

X<sub>2</sub> = Green operations

X<sub>3</sub> = Reverse logistics and outbound logistics

X<sub>4</sub> = Purchasing and In-bound logistics

X<sub>5</sub> = Waste management

β<sub>0</sub> = the constant

ε = error term

## **CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETITION**

### **4.1 Introduction**

This chapter presents analysis and findings of the study as set out in the research methodology. The results present the various GSCM practices and their impact on SCP. The data was gathered exclusively from the questionnaire as the research instrument. The questionnaire was designed in line with the objectives of the study. To enhance quality of data obtained, likert type questions were included whereby respondents indicated the extent to which the variables were practiced in a five point likert scale.

#### **4.1.1 Response Rate**

The study targeted to sample 45 respondents in collecting data on various GSCM practices and their impact on SCP. From the study, 30 out of 45 sampled respondents filled in and the questionnaire were picked making it 67% response rate (table 4.1). This commendable response rate was made a reality after the researcher made personal visits to remind the respondent to fill-in and return the questionnaires.

**Table 4:: Response Rate**

<b>Response</b>	<b>Frequency</b>	<b>Percentage</b>
Responded	30	67
Not responded	15	33
<b>Total</b>	<b>45</b>	<b>100</b>

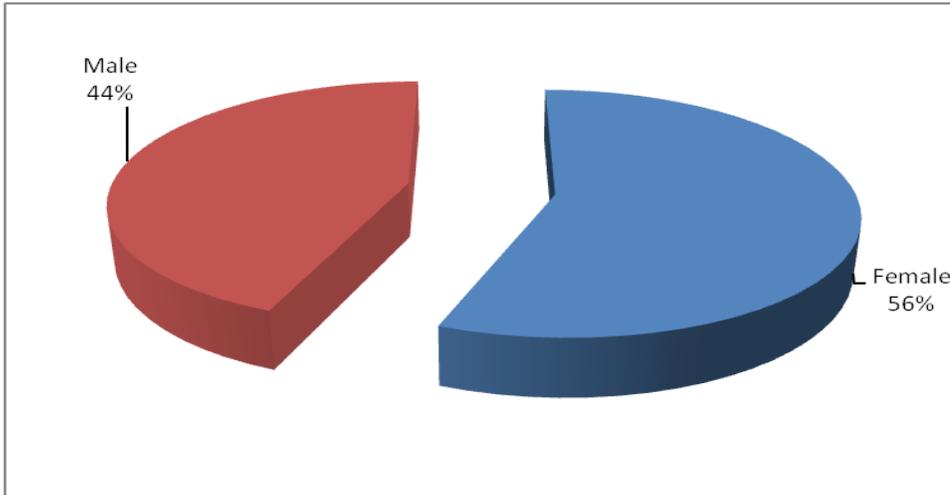
**Source: Research Data, 2012**

### **4.2 General Information**

#### **4.2.1 Gender of the Respondents**

The study sought to find out the respondents gender. According to the study majority were females and the minority were males as depicted in (figure 4.1).

**Figure 4.1: Gender of the Respondents**

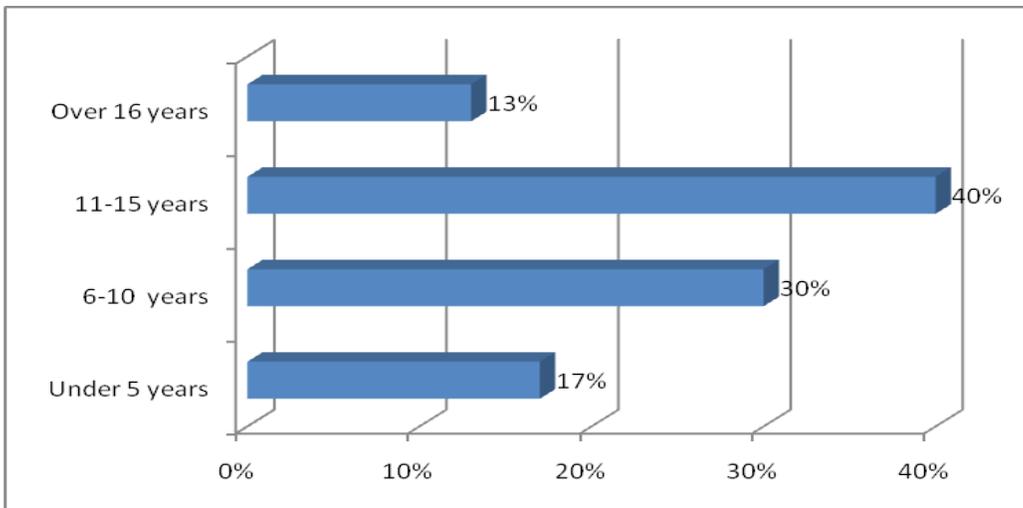


**Source: Research Data, 2012**

#### **4.2.2 Years of hospital in operation**

The study sought to know the number of years the hospital has been in operation. According to the findings 40% (who were the majority) indicated 11-15 years, 30% indicated 6-10 year, 17% of the respondents indicated below 5 years and 13% (who were the minority) indicated above 16 years as depicted in (figure 4.2).

**Figure 4.2: Years of hospital in operation**

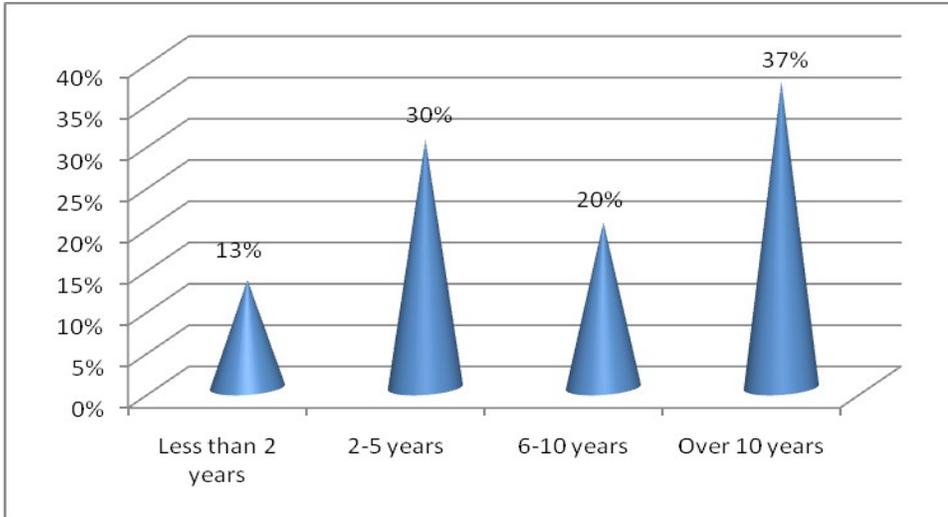


**Source: Research Data, 2012**

### 4.2.3 Years worked in the hospital

The study aimed at investigating the number of years the respondents had worked for the hospital. The study found that 37% (who were the majority) indicated over 10 years, 30% indicated 2-5 years, 20% indicated 6-10 years and 13% indicated less than 2 years as depicted in (figure 4.3).

**Figure 4.3: Years worked in the hospital**

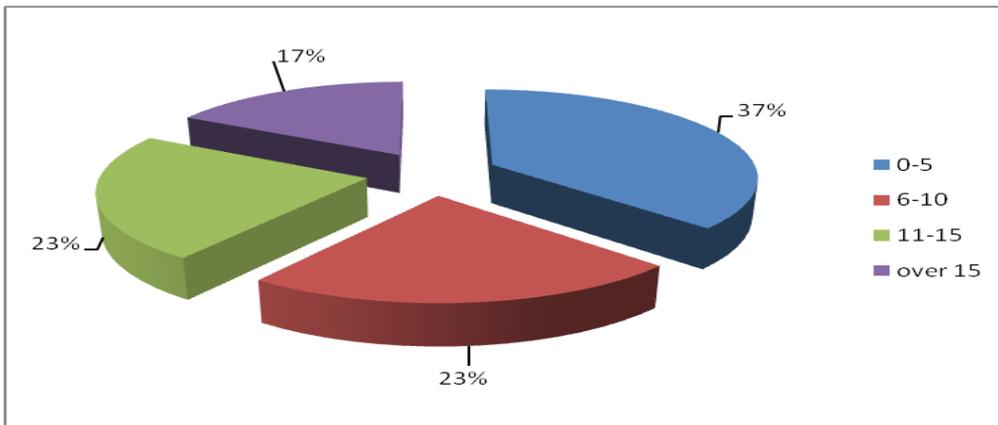


**Source: Research Data, 2012**

### 4.2.4 Number of branches in Nairobi

On the number of branches the specific hospitals had, the study found that 37% had 0-5 branches, 23% had both 11-15 branches and 6-10 branches, and 17% had over 15 branches in Nairobi as depicted in (figure 4.4).

**Figure 4.4: Number of branches in Nairobi**



**Source: Research Data, 2012**

### 4.3 Green Supply Chain Management Practices (GSCM)

#### 4.3.1 Years the organization had practiced GSCM

The study aimed at investigating the years the organization had practiced GSCM

**Table 4.2: Years the organization practiced GSCM**

	<b>Frequency</b>	<b>Percent</b>
Considering currently	10	33
1 year	7	23
2 years	5	17
3 years	8	27
<b>TOTAL</b>	<b>30</b>	<b>100</b>

**Source: Research Data, 2012**

According to the findings of the study 33% were still considering practicing GSCM, 27% had 3 years, 23% had practiced for 1 year and 17% (who were the minority) had practiced GSCM for 2 years.

#### 4.3.2 Organization Practicing Green Design

The study sought to know the respondents level of agreement with statements related to organization practicing green design. The results are presented on table 4.3

**Table 4.3: Organization Practicing Green Design**

<b>Green design</b>	<b>Mean</b>	<b>Std Dev.</b>
Your hospital provided design specification to suppliers that include environmental requirements when purchasing an item	4.28	.847
You have cooperation with suppliers for environmental objectives	4.17	1.131
You have cooperation with suppliers for eco-design	4.20	1.039
You have cooperation with suppliers for green packaging	1.30	1.09017
<b>TOTAL</b>	<b>13.95</b>	<b>4.10</b>
<b>AVERAGE</b>	<b>4.21</b>	<b>1.02</b>

**Source: Research Data, 2012**

According to the results, respondent's agreed with hospital providing design specification to suppliers that include environmental requirements when purchasing an item with a mean score of 4.2800, having cooperation with suppliers for eco-design was shown by a mean score of 4.20 and having cooperation with suppliers for environmental objectives was shown by a mean score of 4.17, respondents to great extent with organization not

having cooperation with suppliers for green packaging as shown by a mean score of 1.3067.

### 4.3.3 Organization Practicing Green Operations

The study sought to know the respondents level of agreement with statements related to organization practicing Green operations. The results are presented on table 4.4

**Table 4.4: Organization Practicing Green Operations**

<b>Green operations</b>	<b>Mean</b>	<b>Std Dev.</b>
The hospital organizes green supply chain seminars and workshops	4.5600	.79253
The hospital conduct environmental audit for suppliers ‘internal management Suppliers’	4.3733	.92668
The hospital had attained ISO14001 certification on the environmental maintenance	4.3600	.93923
The suppliers to the organization had to show compliance with particular regulations such as emissions caps, hazardous materials labeling, product specification and had environment-related documents	4.2400	.89805
<b>TOTAL</b>	<b>17.5333</b>	<b>3.5565</b>
<b>AVERAGE</b>	<b>4.3833</b>	<b>0.888912</b>
		<b>3</b>

**Source: Research Data, 2012**

According to the findings; respondents agreed that their organization practiced Green Operations with the hospital organizing green supply chain seminars and workshops as shown by a mean score of 4.5600, conducted environmental audit for suppliers ‘internal management Suppliers’ as shown by a mean score of 4.3733, the hospital had attained ISO14001 certification on the environmental maintenance as shown by a mean score of 4.3600, the suppliers to the organization have shown compliance with particular

regulations such as emissions caps, hazardous materials labeling and product specification and had environment-related documents shown by a mean score of 4.2400.

#### 4.3.4 Organization Practicing Reverse Logistics and Outbound Logistics

The study sought to know the respondents level of agreement with statements related to organization practicing reverse logistics and outbound logistics. The results are presented on table 4.5

**Table 4.5: Organization Practicing Reverse Logistics and Outbound Logistics**

<b>Reverse logistics and outbound logistics</b>	<b>Mean</b>	<b>Std Dev.</b>
The hospital managed reverse flow of material, environment-packaging and distribution	4.3200	.90285
The hospital controlled environmental risk associated with suppliers operations	4.1067	1.10983
Assuring proper utilization of materials by customers	4.4267	.85698
<b>TOTAL</b>	<b>12.853</b>	<b>2.86966</b>
<b>AVERAGE</b>	<b>4.2845</b>	<b>0.95655</b>
		<b>3</b>

**Source: Research Data, 2012**

From the results majority of the respondents agreed that organization practiced reverse logistics and outbound logistics with assured proper utilization of materials by customers as shown by a mean score of 4.4267, hospital managing reverse flow of material, environment-packaging and distribution was shown by a mean score of 4.3200 and the control on environmental risk associated with suppliers operations as shown by a mean score of 4.1067.

#### 4.3.5 Organization Practicing Purchasing and In-Bound Logistics

The study sought to know the respondents level of agreement with statements related to organization practicing purchasing and in-bound logistics. The results are presented on table 4.6

**Table 4.6: Organization Practicing Purchasing and In-Bound Logistics**

<b>Purchasing and in-bound logistics</b>	<b>Mean</b>	<b>Std Dev.</b>
The hospital had included GSCM strategies in its strategic planning process	3.973	1.1146
The hospital had integrated suppliers in the supply chain in order to reduce costs and improve customer service	4.106	1.0975
The hospital performance had improved(customer base, loyalty)	1.640	1.1927
<b>TOTAL</b>	<b>9.72</b>	<b>3.4050</b>
<b>AVERAGE</b>	<b>3.24</b>	<b>1.1350</b>

**Source: Research Data, 2012**

According to the findings; respondents agreed that the hospital had integrated suppliers in their supply chain in order to reduce costs and improve customer service with a mean score of 4.1067, the hospital had slightly included GSCM strategies in its overall strategic planning process with a mean score of 3.9733 while majority of the respondents agreed that the hospital performance had not improved (customer base, loyalty) with a mean score of 1.6400.

#### **4.3.6 Organization Practicing Waste Management**

The study sought to know the respondents level of agreement with statements related to organization practicing waste management. The results are presented on table 4.7

**Table 4.7: Organization Practicing In Waste Management**

<b>Waste management</b>	<b>Mean</b>	<b>Std Dev.</b>
The hospital purchased eco-design of products for reduced consumption of material/energy	4.09	.93250
The hospital used biodegradable materials	4.41	.91671
The hospital had invested on hazardous disposal equipments	4.41	.916
The hospital used recycled materials	4.25	.973
<b>TOTAL</b>	<b>17.166</b>	<b>3.73821</b>
	<b>7</b>	<b>0.93455</b>
<b>AVERAGE</b>	<b>4.2916</b>	<b>3</b>

**Source: Research Data, 2012**

According to the results; majority of the respondents agreed that the hospital used biodegradable materials as shown by a mean score of 4.4133, the hospital had invested on hazardous disposal equipments as shown by a mean score of 4.4100, the hospital used recycled materials as shown by a mean score of 4.25 and the hospital purchased eco-design of products for reduced consumption of material/energy as shown by a mean score of 4.0933.

#### **4.4 Supply Chain Performance**

##### **4.4.1 Performance of Supply Chain With Regards To Reliability**

The study aimed at knowing the respondents level of rate with performance of supply chain in the hospital with regards to reliability. The results are presented on table 4.8

**Table 4.8: Performance of Supply Chain With Regards To Reliability**

<b>Reliability</b>	<b>Mean</b>	<b>Std Dev.</b>
Flexibility of ordering	4.16	1.12
Timeliness of deliveries	4.24	.942

Quality of service	4.28	.923
Information dissemination	4.36	.799
Order processing	4.44	.757
Action on customer complaints	4.49	.723
Order fulfillment	4.5867	.65951
warehousing	4.7067	.63189
packaging	4.76	1.07
<b>TOTAL</b>	<b>40.023</b>	<b>7.6254</b>
	<b>4</b>	
<b>AVERAGE</b>	<b>4.4470</b>	<b>0.8473</b>

**Source: Research Data, 2012**

According to the study; majority of the respondents also agreed with performance of supply chain in the hospital with regards to reliability on warehousing which was shown by a mean score of 4.7067, order fulfillment was shown by a mean score of 4.5867, action on customer complaints was shown by a mean score of 4.49, order processing was shown by a mean score of 4.44, information dissemination was shown by a mean score of 4.36, quality of service was shown by a mean score of 4.28, timeliness of deliveries was shown by a mean score of 4.24, flexibility of ordering was shown by a mean score of 4.16 and packaging as shown by a mean score of 4.76.

#### **4.4.2 Performance of Supply Chain With Regards To Assets**

The study sought to know the respondents level of agreement with statements related to performance of supply chain in the hospital with regards to assets. The results are presented on table 4.9

**Table 4.9: Performance of Supply Chain With Regards To Assets**

<b>Assets</b>	<b>Mean</b>	<b>Std Dev.</b>
Cash flow management	4.2000	1.12706
Inventory control	4.3467	.84619
Security of stocks	1.2133	.82680
Return on Supply Chain Fixed Assets	3.9733	.92959
<b>TOTAL</b>	<b>10.733</b>	<b>3.7296</b>
	<b>3</b>	<b>4</b>
<b>AVERAGE</b>	<b>3.1833</b>	<b>0.9324</b>
		<b>1</b>

**Source: Research Data, 2012**

According to the study; security of stocks was shown by a mean score of 1.2133, return on supply chain fixed assets was shown by a mean score of 3.9733, however respondents agreed on cash flow management as shown by a mean score of 4.2000 and Inventory control was shown by a mean score of 4.3467

#### 4.4.3 Performance of Supply With Regards To Responsiveness

Respondents were to rate the performance of supply chain in their hospital with regards to responsiveness. The results are presented on table 4.10

**Table 4.10: Performance of Supply With Regards To Responsiveness**

<b>responsiveness</b>	<b>Mean</b>	<b>Std Dev.</b>
Accuracy of orders delivered	1.120	1.0261
suppliers Response Time	1.200	.97260
<b>TOTAL</b>	<b>1.32</b>	<b>1.9987</b>
<b>AVERAGE</b>	<b>1.16</b>	<b>0.9993</b>
		7

**Source: Research Data, 2012**

According to the findings; majority of the respondents rate the responsiveness low with supplier's response time shown by a mean score of 1.2000 and accuracy of orders delivered shown by a mean score of 1.1200.

#### 4.4.4 Performance of Supply Chain with Regards To Cost

The study aimed at investigating performance of supply chain in the hospital with regards to cost. The results are presented on table 4.11.

**Table 4.11: Performance of Supply Chain with Regards To Cost**

<b>cost</b>	<b>Mean</b>	<b>Std Dev.</b>
Supply Chain Management Cost management	4.106	1.0975
	7	8

**Source: Research Data, 2012**

According to the findings majority of the respondents agreed that supply chain management cost management was shown by a mean score of 4.1067

#### 4.4.5 Performance of Supply Chain With Regards To Agility

The study aimed at knowing the respondents level of rate with performance supply chain with regards to agility. The results are presented on table 4.12

**Table 4.12: Performance of Supply Chain With Regards To Agility**

<b>agility</b>	<b>Mean</b>	<b>Std Dev.</b>
Supply Chain Flexibility	3.640	1.19277
Supply Chain adaptability	4.093	.93250
<b>TOTAL</b>	<b>7.733</b>	<b>2.12527</b>
<b>AVERAGE</b>	<b>3.866</b>	<b>1.06263</b>
	<b>7</b>	<b>5</b>

**Source: Research Data, 2012**

According to the study majority of the respondents agreed that performance was well in the supply chain adaptability as shown by a mean score of 4.0933 while the respondents moderately agreed with supply chain flexibility as shown by a mean score of 3.6400.

#### 4.5 Challenges

##### 4.5.1 Challenges Experienced In Practicing Green Supply Chain Management Practices

The study aimed at investigating the challenges experienced in practicing green supply chain management practices.

**Table 4.13: Challenges Experienced In Practicing Green Supply Chain Management Practices**

	<b>Mean</b>	<b>Std Dev.</b>
Lack of Commitment and Support for GSCM from senior managers	4.4133	.91671
An effective human resource base to implement green supply chain	4.49	.723

exists in the organization		
Lack of cross-functional cooperation for environmental improvements	4.44	.757
The hospital faces financial challenges to implement the practices	4.36	.799
Lack of clear guidelines and enforceable laws by the relevant bodies in the government to the society at large	1.76	1.07
communication of the procedures within the organization makes implementation difficult(bureaucracy)	4.0133	1.1911
Obsolete technology and equipments	1.9467	1.2180
		3
<b>TOTAL</b>	<b>29.423</b>	<b>6.6748</b>
	<b>3</b>	<b>5</b>
<b>AVERAGE</b>	<b>4.2033</b>	<b>0.9535</b>
		<b>5</b>

**Source: Research Data, 2012**

According to the study as shown on table 4.13, majority of the respondents acknowledged that there were challenges they experienced with effective human resource base implement green supply chain existing in the organization as shown by a mean score of 4.49, lack of cross-functional cooperation for environmental improvements was shown by a mean score of 4.44, lack of Commitment and support for GSCM from senior managers was shown by a mean score of 4.4133, the hospital facing financial challenges to implement the practices was shown by a mean score of 4.36, communication of the procedures within the organization making implementation difficult (bureaucracy) was shown by a mean score of 4.0133 while respondents disagreed with obsolete technology and equipments as shown by a mean score of 1.9467 and lack of clear guidelines and enforceable laws by the relevant bodies in the government to the society at large was shown by a mean score of 1.76.

**4.6 Correlation Analysis**

The study tested the relationship using correlation analysis as presented in the table below. This was tested using Pearson Product Moment Correlation Coefficients.

**Table 4.14: Pearson Correlation**

		<b>Supply</b>	Green	Green	reverse	purchasing
--	--	---------------	-------	-------	---------	------------

		<b>Chain Performance (SCP)</b>	design	operations	logistics and outbound logistics	and in-bound logistics
Green design	Pearson Correlation	0.231**	1			
	Sig. (2-tailed)	0.000				
Green operations	Pearson Correlation	0.016	0.186	1		
	Sig. (2-tailed)	0.032	0.002	.		
reverse logistics and outbound logistics	Pearson Correlation	0.022	0.032	0.635	1	
	Sig. (2-tailed)	0.027	0.027	0.000	.	
Purchasing and in-bound logistics	Pearson Correlation	0.065	0.047	0.539	0.070	1
	Sig. (2-tailed)	0.276	0.432	0.000	0.000	
Waste management.	Pearson Correlation	0.327	0.054	0.721	0.038	
	Sig. (2-tailed)	0.013	0.022	0.721	0.041	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

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

On green design, a correlation coefficient of 0.231 was obtained, while on green operations the relationship with (SCP) had a correlation of 0.016, reverse logistics and outbound logistics had a correlation of 0.022.

Purchasing and in-bound logistics had a correlation of 0.065, whereas waste management had a correlation of 0.013 and all the variables depicted a high significance.

#### 4.7 Regression Analysis

**Table 4.15 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.706(a)	0.499	0.454	0.59519

Predictors: (Constant), green design, green operations, reverse logistics and outbound logistics, purchasing and in-bound logistics and waste management

The coefficient of determination,  $R^2$  is 45.4% meaning 45.4% of the variation in SCP is explained by the variation in green design, green operations, reverse logistics and outbound logistics, purchasing and in-bound logistics and waste management. This implies that, 59.1% variance is unexplained by some independent variables not tested by the researcher in this study like lean and agile supply chain practices such as just-in-time(JIT).

**Table 4.16 ANOVA**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19.68	5	3.936	11.111	.000(a)
	Residual	6.018	17	0.354		
	Total	25.698	22			

a Predictors: (Constant), green design, green operations, reverse logistics and outbound logistics, purchasing and in-bound logistics and waste management.

b Dependent Variable: Supply Chain Performance (SCP)

The study used ANOVA to establish the significance of the regression model from which an F-significance value of  $p < 0.001$  was established. This shows that the regression model has a less than 0.001 likelihood (probability) of giving a wrong prediction.

**Table 4.17 Coefficients Results**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.275	.364		0.755	0.453
	Green design	0.322	.206	.166	1.565	0.122
	Green operations	0.147	.126	.110	1.163	0.249
	Reverse logistics and outbound logistics	0.277	.134	0.240	2.068	0.042
	purchasing and in-bound logistics	0.182	.131	.117	1.603	0.031

	waste management	0.203	.211	.167	1.651	0.127
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A Dependent Variable: Supply Chain Performance (SCP)

The following regression analysis was obtained:

$$Y = 0.275 + 0.322X_1 + 0.147X_2 + 0.277X_3 + 0.182X_4 + 0.203X_5$$

Whereby Y is Supply Chain Performance (SCP), X<sub>1</sub> is green design, X<sub>2</sub> is green operations, X<sub>3</sub> is reverse logistics and outbound logistics, X<sub>4</sub> purchasing and in-bound logistics and X<sub>5</sub> is waste management. The model illustrates that when all variables are held at zero (constant), the value of SCP would be 0.275. However, holding other factors constant, a unit increase in green design would lead to a 0.322 increase in SCP, a unit increase in green operations would lead to a 0.147 increase in SCP, a unit increase in reverse logistics and outbound logistics would lead to a 0.277 increase in SCP, a unit increase in purchasing and in-bound logistics would lead to a 0.182 increase in SCP, and a unit increase in unit increase in waste management would lead to a 0.203 increase in SCP.

There is a positive significant relation between SCP and Reverse logistics and outbound logistics (p=0.042) and purchasing and in-bound logistics (p=0.031).

## **CHAPTER FIVE: SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

### **5.1 Introduction**

This chapter provides the summary of the findings and conclusions. It also gives the recommendations, limitations and suggestions for further study.

### **5.2 Summary of the Findings and conclusions**

On GSCM practices the study found that majority of the respondents were still considering practicing GSCM in their organizations. Majority of the respondents agreed with statements regarding organization practicing green design with an average mean score of 4.2167. Also for statements related to organization practicing in waste management as shown by an average mean score of 4.2916. Respondents strongly agreed with statements related to organization practicing green operations in their

institutions with an average mean score of 4.3833. On respondent's level of agreement with statements related to organization practicing reverse logistics and outbound logistics they strongly agreed with an average mean score of 4.2845. Finally majority of the respondents could neither agree nor disagree as shown by an average mean score of 3.24

On SCP the study found that majority of the respondents agreed with performance of supply chain in the hospital with regards to reliability as shown by an average mean score of 4.4470. Which was the same as with statements regarding performance of supply chain in their hospital with regards to responsiveness as shown by a mean score of 4.1067. Majority of the respondents could neither agree nor disagree with performance of supply chain in the hospital with regards to assets as shown by a mean score of 3.1833, as well as on performance supply chain with regards to agility as shown by an average mean score of 3.8667. On statements related with performance of supply chain in the hospital with regards to cost majority of the respondents disagreed with an average mean score of 1.1067.

Further on challenges experienced in practicing green supply chain management practices majority of the respondents agreed as shown by an average mean score of 4.2033.

On green design, a correlation coefficient of 0.231 was obtained depicting a significant relationship. While on green operations the relationship with (SCP) there was correlation coefficient of 0.016, on reverse logistics and outbound logistics it had a correlation coefficient of 0.022 Purchasing and in-bound logistics the correlation coefficient was 0.065, whereas waste management the correlation coefficient was 0.013.

In the regression model the study found that when all variables are held at zero (constant), the value of (SCP) would be 0.275. However, holding other factors constant, a unit increase in green design would lead to a 0.322 increase in (SCP), a unit increase in green operations would lead to a 0.147 increase in (SCP), a unit increase in reverse logistics and outbound logistics would lead to a 0.277 increase in (SCP), a unit increase in purchasing and in-bound logistics would lead to a 0.182 increase in (SCP), and a unit increase in unit increase in waste management would lead to a 0.203 increase in (SCP).

There was a positive significant relation between (SCP) and Reverse logistics and outbound logistics ( $p=0.042$ ) and purchasing and in-bound logistics ( $p=0.031$ ).

From the study the researcher concluded that green design affect SCP this is found with a positive coefficient 0.322, with p-value of 0.002. It indicates that the result is significant at  $\alpha =5\%$ . This was so since the hospital provided design specification to suppliers that included environmental requirements when purchasing an item and the hospitals had cooperation with suppliers for eco-design and also had cooperation with suppliers for environmental objectives. This study concludes that green operations affect SCP this is found with a positive coefficient 0.147, with p-value of 0.039. It indicates that the result had a positive significant relationship with supply chain performance since the hospitals had attained ISO14001 certification on the environmental maintenance, the suppliers had shown compliance with particular regulations such as emissions caps, hazardous materials labeling and product specification and had environment-related documents.

This study concludes that reverse logistics and outbound logistics affect SCP this is found with a positive coefficient 0.277, with p-value of 0.042. It indicates that the result were positive and significant depicted was low because minority practiced reverse logistics and outbound logistics in assuring proper utilization of materials by customers and hospital management didn't reversed flow of material. Hospitals did not control environmental risk associated with suppliers operations well.

This study concludes that purchasing and in-bound logistics affect SCP this is found with a positive coefficient 0.182, with p-value of 0.031. It shows that the relationship was positive and significant (thou low) with performance this was so since the minority hospitals had included GSCM strategies in their strategic planning process and hospitals performance had improved (customer base, loyalty). Finally this study concludes that waste management affect SCP this is found with a positive coefficient 0.203, with p-value of 0.044. It indicates that the result was also positive and significant it was concluded so because hospital used biodegradable materials and the hospital had invested on hazardous disposal equipments, the hospitals also used recycled materials and the hospital purchased eco-design of products for reduced consumption of material/energy.

Existing body of literature indicates that GSCM practices are positively or negatively associated with economic and environmental performance. In this paper, GSCM practices revealed a significantly positive relationship with the SCP parameters. Since GSCM practices affected SCP in this regard, implementing GSCM practices improves organizations' capacity to handle the supply chain disruption.

### **5.3 Recommendations**

The study recommends that hospital should provide design specification to suppliers that include environmental requirements when purchasing an item, the hospitals should also cooperate with suppliers for environmental objectives and also cooperate with suppliers for eco-design in order to boost green design in the hospitals SCP.

The study further recommends that hospitals should manage reverse flow of material, environment-packaging and distribution environmental risk associated with suppliers operations and assures proper utilization of materials by customers.

Hospitals should cooperate with suppliers for green packaging in order to improve green design and ensure proper waste management for clean and safe environment. Hospitals performance should be improved in terms of customer base, loyalty to ensure proper and satisfactory services. On assets the hospitals should keep proper documentation of stocks to improve hospitals accountability. The hospitals should be encouraged to have more accurate orders delivered and fasten supplier's response time to enhance better services to the customers. The hospitals should have clear guidelines and enforceable laws by the relevant bodies in the government to benefit the society at large.

### **5.4 Limitations of the study**

There are limitations to this study that should be considered when interpreting the study results. First the study focused on private hospitals in Nairobi only (category C); secondly this study did not include all GSCM practices. Finally time and other resources were limited to the researcher like the questionnaires were administered on drop and pick later method.

### **5.5 Suggestions for Further Research**

The study has determined the various green supply chain management practices and their impact on supply chain performance in private hospitals in Nairobi Kenya under category C according to NHIF classification. The hospitality industry in Kenya however is comprised of various other hospitals located in other areas in Kenya which differ in their way of management and have different settings all together. This warrants the need for another study which would ensure generalization of the study findings for all the hospitals in Nairobi and in Kenya and hence pave way for new policies. The study therefore recommends further study to be carried out to investigate the factors influencing green supply chain management practices and their impact on supply chain performance in Kenyan hospitals.

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## APPENDIX I: Research Questionnaire

This questionnaire will be seeking on the private hospitals procurement staff. The information is intended for academic purposes only and will not be divulged to any other person. Please complete all sections of this document. All questions are interrelated and are very important for the study.

### PART A: BIO DATA

1. Name of the respondent (optional).....
2. Name of the hospital.....
3. Gender: Male [ ] Female [ ]
4. How long has your hospital being in operation?
  - a) Under 5 years
  - b) 6-10 years
  - c) 11-15 years
  - d) Over 16 years
5. How long have you worked in this hospital?
  - a) Less than 2 years
  - b) 2-5 years
  - c) 6-10 years
  - d) Over 10 years
6. How many branches of your hospital do you have in Nairobi if any?
  - a) 0-5
  - b) 6-10
  - c) 11-15
  - d) Over 15

### PART B: GREEN SUPPLY CHAIN MANAGEMENT PRACTICES (GSCM)

7. How long has your organization established GSCM?
  - a) Considering it currently
  - b) 1 year.

- c) 2 years.
- d) 3 years.
- e) more than 4 years

8. Please tick appropriately the extent to which your organization has been practicing the following green supply chain practices. (Use the scale to tick the most appropriate response)

**5) Strongly agree 4) Agree 3) Moderate extent 2) Disagree 1) Strongly disagree**

<b>Green design</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Your hospital provides design specification to suppliers that include environmental requirements when purchasing an item					
You have cooperation with suppliers for environmental objectives					
You have cooperation with suppliers for eco-design					
You have cooperation with suppliers for green packaging					
<b>Green operations</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
The hospital conduct environmental audit for suppliers 'internal management Suppliers'					
The hospital has attained ISO14001 certification on the environmental maintenance					
The suppliers to the organization have to show compliance with particular regulations such as emissions caps, hazardous materials labeling, product specification and having environment-related documents					
The hospital organizes green supply chain seminars and workshops					
<b>Reverse logistics and outbound logistics</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
The hospital manages reverse flow of material, environment-packaging and distribution					

The hospital controls environmental risk associated with suppliers operations					
Assuring proper utilization of materials by customers					
<b>Purchasing and in-bound logistics</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
The hospital has included GSCM strategies in its strategic planning process					
The hospital has integrated suppliers in the supply chain in order to reduce costs and improve customer service					
The hospital performance has improved(customer base, loyalty)					
<b>Waste management</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
The hospital purchases eco-design of products for reduced consumption of material/energy					
The hospital uses biodegradable materials					
The hospital has invested on hazardous disposal equipments					
The hospital uses recycled materials					

**PART C: SUPPLY CHAIN PERFORMANCE**

9. Please tick appropriately how you rate the performance of your supply chain in your hospital with regards to the parameter listed.

**5) Excellent 4) Very Good 3) Good 2) Poor 1) Very Poor**

parameters	5	4	3	2	1
Order processing					
Information dissemination					
packaging					
warehousing					
Flexibility of ordering					
Security of stocks					
Accuracy of orders delivered					
Supply Chain Management Cost management					
Return on Supply Chain Fixed Assets					
Action on customer complaints					
Supplier Response Time					

**PART D: CHALLENGES**

10. Please tick the extent to which the following challenges are experienced in your organization in practicing green supply chain management practices

**5) Very great extent 4) Great extent 3) Moderate extent 2) Low extent 1) Very low extent**

	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
Lack of Commitment and Support for GSCM from senior managers					
An effective human resource base to implement green supply chain exists in the organization					
Lack of cross-functional cooperation for environmental improvements					
The hospital faces financial challenges to implement the practices					
Lack of clear guidelines and enforceable laws by the relevant bodies in the government to the society at large					
communication of the procedures within the organization makes implementation difficult(bureaucracy)					
Obsolete technology and equipments					

Thank you for your time

## **APPENDIX II**

### **Nairobi Province Hospitals**

NHIF has contracted hospitals under three Categories; A, B & C, Under Category A (government hospitals), under contract Category B (private and mission) hospitals, under Category C (private)

Hospital	Postal Address	Beds	Cat.
Avenue Healthcare Ltd	45280 Nairobi	60	C
Blessed Louis Palazzolo Health Center	656 Nairobi	24	B
Chiromo Lane Medical Centre	73749 Nairobi	15	C
City Nursing Home Nairobi	14591 Nairobi	20	C
Coptic Church Nursing	21570 Nairobi	37	C
Divine Word Parish Health Center	304 Nairobi	32	B
Dorkcare Nursing Home Ltd	33541 Nairobi	15	C
Edelvale Trust Jamaa H Hospital	17153 Nairobi	46	C
Emmaus Innercore Nursing Home	78123 Nairobi	16	C
Enkitok Joy Nursing Home	285 Kiserian	15	C
Family Health Options	30581 Nairobi	20	C
Gertrudes Garden Children's Hospital Nbi	42325 Nairobi	72	C
Guru Nanak Ramgarhia Sikh Hospital	33071 Nairobi	85	C
H.H. Agakhan Hospital (Nairobi)	30270 Nairobi	165	C
Huruma Nursing & Maternity Home	72934 Nairobi	26	B
Kamiti Hospital	40061 Nairobi	195	A
Karen Hospital Ltd	74240 Nairobi	102	C
Kayole Hospital	67617 Nairobi	40	C
Kenyatta National Hospital (Amenity Wing	20723 Nairobi	225	C
Kenyatta National Hospital (General Ward	20723 Nairobi	1804	A
Kilimanjaro Nursing & Maternity Home	43920 Nairobi	26	C
Langata Hospital	934 Nairobi	30	C
Lions Sight First Eye Hospital	66576 Nairobi	52	C
Madina Nursing Home	78370 Nairobi	18	C
Magadi Soda Company Hospital Magadi	10 Magadi	50	C
Maria Immaculate Hospital	57216 Nairobi	28	C
Maria Mat. & Nursing Home	34736 Nairobi	20	B
Mariakani Cottage Hospital	12535 Nairobi	21	C
Marie Stopes Kenya Limited	46 59328 Nairobi	19	C
Masaba Hospital	53648 Nairobi	156	C
Metasia Health Clinic	185 Kiserian	22	C

<http://www.nhif.or.ke/healthinsurance/> downloaded on 5th August, 2012



