

# Strategies for Sustainable Supply Chains among Supermarkets in Nairobi

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## Abstract

This study aimed at establishing strategies for sustainable supply chains among supermarkets in Nairobi, Kenya. The study aimed to achieve two objectives: To establish the extent to which supermarkets in Nairobi adopted sustainable supply chain strategies and to determine the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi. Using a cross sectional descriptive research design, the researcher conducted a survey on a sample of 52 supermarkets based in Nairobi. Quantitative data was collected by use of questionnaires from supply chain officers or their equivalents and analyzed using SPSS. Percentages and frequencies were used to analyze the extent to which supermarkets in Nairobi adopted sustainable supply chain strategies whilst regression analysis was used to determine the relationship between sustainability in supply chain and supply chain strategies. The findings indicate that to a large extent, most of the supermarkets in Nairobi have adopted strategies for sustainable supply chains such as involving other firms to develop sustainable products that meet environmental requirements; investing in waste minimization practices and managing transport efficiencies through better vehicle utilization among others. However, the study encountered limitations like short timeframe as well as bureaucratic and lengthy process of obtaining information.

## CHAPTER ONE: INTRODUCTION

### 1.1 Background of the Study

Modern supply chain managers are confronted with dynamic and complex supply chains with trends and developments that are hard to predict. Long-term trends such as ongoing globalization, increasing intensity of competition, growing demands of security, environmental protection, resource scarcity and the need for reliable, cost-efficient and flexible business systems capable of supporting customer differentiation among many others pose challenges for supply chain managers of today's firms. In order to respond to these challenges and stay competitive, supply chain managers need to be able to identify and understand new sustainability issues in their organizations and business environment. This calls for highly efficient supply chain operations and networking skills that must continuously adapt to sustainability demands to create sustainable and long-term customer-focused supply chains (Cetinkaya et al., 2011).

In today's globalized economy, sustainable supply chain management is very crucial in maintaining the integrity of a brand, managing operational costs and ensuring business continuity (United Nations, 2000). According to Dangelmaier, Blecken, Delius and Klopfer (2010), many firms have incorporated sustainability concepts into their businesses although they often consider the sustainability dimension independently rather than interdependently. Organizations no longer compete as single independent entities but rather through their supply chains. This necessitates the extension of the concept of sustainability from organizational focus to the entire supply chain. As a result, according to Cetinkaya et al. (2011) decision makers designing supply chains need to take into consideration the development of sustainable supply chain strategies that can create a sustainable competitive advantage.

According to Seuring and Mueller (2008), the concept of sustainability has become increasingly important in supply chain management as companies respond to external pressure from policy makers and consumers as well as internal pressure from their leaders' values and sense of responsibility. Elkington (2004), points out that raising concerns on depleted resources, exploitation of child labor, environmental damage, endangered species, and global warming have changed the old-style of managing operations of most firms in the world to become more concerned with both economic, environment and social sustainability of their operations.

#### 1.1.1 Sustainable Supply Chain

Sustainable supply chain is the strategic achievement and integration of a firm's social, environmental and economic goals through the systematic coordination of key inter-organizational business processes to improve the long-term economic performance of the individual company and its value of network (Carter and Rogers,

2008). United Nations (2000) report define sustainable supply chain as the management of economic, environmental and social impacts, and the encouragement of good governance practices, all through the lifecycles of goods and services. The objective of sustainable supply chain is to create, care and nurture long-term environmental, social and economic value for all parties involved in bringing products and services to the market. By incorporating sustainability concept into supply chain relationships, organizations can advance corporate sustainability, promote broader sustainable development objectives thus protecting the long-term viability of their businesses and secure a social license to operate.

Seuring and Muller (2008) view the concept of sustainable supply chain as the process that entails the management of information, material and capital flows as well as cooperation among companies along the supply chain while taking goals from all three dimensions of sustainable development into consideration. According to Elkington, (2004), the three dimensions of sustainable development are economic, environmental and social which are derived from customers and stakeholders' needs. In sustainable supply chains, environmental and social criteria need to be fulfilled by the members to remain within the supply chain, whilst it is expected that competitiveness would be maintained through meeting customer needs and related economic criteria.

### **1.1.2 Supply Chain Strategy**

Tracing its roots to the Greek word *strategia*, the term strategy initially referred to how a given goal was accomplished. In the current business environment, strategy continues to bear a notion of victory as it did in the antiquity. In the context of supply chain management, strategy indicates how the supply chain should function in order to achieve supply chain goals. Thus, supply chain strategy determines the goals and the configuration of the supply chain with regard to supply chain partners, structures, processes, and systems. According to Cetinkaya et al. (2011), a company's supply chain represents an essential strategic resource in the achievement of the firm's overall strategic goals. Sloan (2006) points out that supply chain strategies are very critical for sustaining high-level organizational performance in a world that is becoming ever more turbulence and characterized by rapid technological innovations, shifting political alliances and emerging economies. It is well recognized that thinking strategically has everything to do with business performance, resulting in survival at worst or blasting the competition at best.

Supply chain strategies such as supply chain collaboration, risk management, supply chain integration, cost minimization, supplier engagement and e-procurement, must be aligned with the business strategy, take account of markets served, sources of supply and be customer focused (Cetinkaya et al., 2011). Porter (1996) points out that in developing a company's strategy, managers determine the company's overall direction: its vision, goals, ethical perspectives on the social environment and corporate identity as well as the scope of its business. Therefore, firms develop business strategies like the supply chain strategies that are concerned with the relationship between the company and its surroundings. The type of strategy describes how an enterprise plans to respond to competitors, customers, suppliers and governmental authorities in the market. As pointed out by Hines (2004), it is important to recognize that there are different paths to successful supply chain strategies. The path chosen by an organization will depend on the number of factors that influence their decision.

### **1.1.3 Supermarkets in Nairobi**

According to McClelland (1962), a supermarket is a large retail store of not less than two thousand (2,000) square feet sales area with three or more checkouts and operated mainly on self-service basis. The range of merchandise in a supermarket comprise all food groups, including fresh meat, fresh fruits and vegetables, bakery, dairy products as well as nonfood goods like basic household requirements such as soaps and cleaning materials among many other items.

McCullough, Pingali and Stamoulis (2008) assert that the first supermarket in Kenya arose in 1960s. However, it is during the mid-1990s that the sector started experiencing rapid growth leading to the establishment of several supermarkets all over the country. This was due to the recovery of the economy that gave consumers buying power to try the new products the supermarkets were marketing to them as well as policy changes such as stabilization and liberalization that had several important effects for supermarkets.

Nairobi being the capital and the largest city of Kenya, there are large-format supermarkets of up to one hundred and seventy five square feet (175,000 sq. ft.) (Neve and Reardon, 2003). Currently, the Official Yellow Pages Kenya has a list of one hundred and ten (110) supermarkets in Nairobi ([yellowpageskenya.com](http://yellowpageskenya.com), 2012). These range from well-established retail chains to independent one-store supermarkets. The dominant players in the sector with extensive branch network across the entire city are Nakumatt, Tuskys and Uchumi. Nakumatt has been noted as a groundbreaker in East and Central Africa as it was the first retailer to have its stores open round the clock. Uchumi, which is a limited public company, has had some operational problems but it is now on the recovery path. Other supermarkets with notable presence in several parts of Nairobi are Ukwala, Naivas and Chandarana (Irungu and Wanjau, 2011).

According to Pralahad and Hammond (2002), supermarkets in Nairobi are no longer niche players catering exclusively to high-income consumers in the capital as they used to decades ago. Both high and low-income consumers shop at supermarkets on regular basis. With a sharp growth curve of Nairobi inhabitants, their aggregate demand constitute the effective market that supermarkets in Nairobi can thrive on by managing their supply chains effectively.

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

Sustainable supply chains are an increasing priority for companies, governments and other organizations around the world. Modern business organizations are faced with the challenges of conducting their businesses in a more environmentally friendly manner. The rise of green consumerism, pressure from regulatory bodies, governments and other stakeholders require businesses to consider the economic, social and environmental perspectives in conducting their operations. These three perspectives lead to sustainability in the supply chain.

Globally, supermarkets are regularly faced with challenges of ensuring that their suppliers are as mindful of their environmental and social responsibilities as they are or should be. This is not always easy to do particularly for supermarkets in Nairobi whose suppliers come from diverse backgrounds. The supermarkets are equally faced with challenges in recycling their packaging materials and ensuring stakeholders' safety among others (Ratan et al., 2010). The supermarkets therefore need to embrace good sustainable supply chain strategies in order to survive in the ever-challenging business environment.

Embracing sustainability in the supply chain leads to a number of benefits (Liang and Chang, 2008). Sustainable supply chain strategies create new opportunities for organizations. They support organizations in achieving advantages over their competitors as well as improving their overall performance (Liang and Chang, 2008). Dakov and Novkov (2006) further assert that sustainable supply chain enables specialization and concentration of efforts; development of integral innovative decisions; improvement of brand differentiation and customer loyalty by offering unique capabilities to address environment health and safety related requirements and expectations. It also leads to product, process, and supply quality improvement.

Several studies have examined sustainability of supply chains. Fitzgerald, Luck and Morgan (2007) conducted a study on strategies for sustainable supply chain management in Sweden. The study specifically focused on supplier interaction devices. The findings of the study indicate that to adopt sustainability in a company's supply chain, the employed strategy should communicate a clear understanding of sustainability, be strategic and relevant to sustainable development. Al-Odeh and Smallwood (2012) carried out a study on sustainable supply chain management (SSCM) in the USA. The study reviewed trends and frameworks in SSCM. The study established that the forces behind supply chain sustainability are customers' awareness that exerts pressure on organizations to adopt sustainable strategies. Mwirigi (2010) conducted a study on the challenge of building sustainable supply chain relationships among small firms. The study focused on Faulu Kenya as a microfinance institute, its supplier and customer relationships. The findings of the study indicate that there is a strong sustainable relationship between a firm and its customers on one hand and its suppliers on the other.

From the above studies, it is evident that several contributions have been provided concerning sustainable supply chain management. However, the studies so far indicated a clear gap on the strategies for sustainable supply chains among supermarkets. This study therefore sought to fill this gap by investigating strategies for sustainable supply chains among supermarkets in Nairobi. The study sought to answer the following questions: to what extent supermarkets in Nairobi adopted sustainable supply chain strategies and what is the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi?

### **1.3 Research Objectives**

The aim of the study was to achieve the following objectives:

- i. To establish the extent to which supermarkets in Nairobi adopted sustainable supply chain strategies.
- ii. To determine the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi.

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

The findings of the study will benefit those in the academic realm. Those interested in conducting further research in this area will be able to find materials for reference.

The study will also assist supermarkets in Nairobi to better understand strategies for sustainable supply chains that have been employed by other organizations elsewhere. They will be able to do a comparison of their current strategies and those employed by other firms. This will enable them to benchmark and adopt the best practices in the sector.

The findings of the study will equally enable policy makers to devise sustainable supply chain policies that are based on empirical evidence.

The government will also be able to understand the various strategies for sustainable supply chains and their impact on both the economic, social and environmental aspects of the economy.

## CHAPTER TWO: LITERATURE REVIEW

### 2.1 Introduction

This chapter discusses relevant literature that has been reviewed in the area of sustainable supply chain. Among the issues discussed, include the overview of sustainable supply chain, sustainable supply chain strategies, challenges of adopting sustainable supply chain strategies and the conceptual framework.

### 2.2 Overview of Sustainable Supply Chain

According to Fitzgerald, Luck and Morgan (2007), a supply chain is a network of companies that exchange resources such as materials and information to deliver products to clients. Supply chains consist of a firm, its suppliers, distributors and customers. Generally, the supply chain represents an opportunity to strengthen a company's position in the market through efficient use of resources. The field of sustainable supply chain aims to achieve these objectives while also benefiting society and the earth by spreading visions, values and actions for sustainability to other companies and consumers. As observed by Bai and Sarkis (2010), a sustainable supply chain extends the conventional scope of supply chain by environmental and social issues and it attempts to explicitly consider all three dimensions of sustainability (environment, social and economic) in designing and optimizing the supply chain.

Savitz and Weber (2000) explain that a sustainable supply chain creates profit for its shareholders while protecting the environment and improving the lives of those who meet interacts. Fitzgerald, Luck and Morgan (2007) view a sustainable supply chain as a network of companies that exchange resources such as materials, information and services in a way that takes care of the economic, environmental and social issues. The scope of sustainable supply chain is defined from the idea of triple-bottom line 'economic, environmental and social dimensions' developed by Elkington in 1997. As pointed out by Ratan et al. (2010), sustainability has emerged as a proactive approach for improving business processes and activities by social, economic and environmental aspects.

Ratan et al., (2010) further point out that sustainability is a wide-ranging term that can be applied to almost every facet of life on earth over various times. It indicates on how to live life in this world, how to do business, how to make products, how to recycle the used materials without compromising the ability of future generations to meet their own needs. Several business issues compel companies to start a sustainable supply chain journey. Primary among them according United Nations (2000) is to ensure compliance with laws and regulations and support international principles for sustainable business conduct. In addition, firms are increasingly taking actions that result in better social, economic and environmental impacts in order to meet societal expectations as well as gain business benefits.

Seuring, Stefan, Beske and Jor (n.d.) observe that players in a sustainable supply chain have the obligation to meet the environmental and social criteria while at the same time remain competitive in order to meet customer demands and related economic criteria. According to Charter et al. (2001), the amount of value companies offer to their customers is the sum of the value added along the supply chain. In the similar manner, the sustainability of the goods and services a company provides is also the sum of all the environmental, ethical and social impacts of these goods and services along the supply chain. Therefore, organizations are beginning to recognize that they have to recognize, comprehend, and manage sustainability issues within their organization as well as co-operate with other organizations in the supply chain to ensure that these concerns are successfully managed throughout the supply chain.

Fitzgerald, Luck and Morgan (2007) assert that in a competitive business environment that requires strategy and innovation to improve the bottom line, proper management of sustainable supply chain can help address global, social and ecological sustainability and an opportunity to lead transformational change towards a sustainable future. Increasingly, companies are now identifying sustainability as an opportunity to create competitive advantage. Cetinkaya et al. (2011) suggest that as a key to competitive advantage in many companies, the supply chain significantly determines the social, economic and environmental impacts of any company, which in turn influence more and more of stakeholders and shareholders. Hence, a sustainable supply chain represents one of the most important success factors for achieving sustainable development for a company.

### 2.3 Supply Chain Sustainable Strategies

Supply chain sustainable strategies specify how the supply chain should function in order to achieve a firm's economical, environmental and social objectives. They establish how a company should work with suppliers and policies relating to customer relationships and sustainability (Russell and Lipsky, 2009). The core supply chain

sustainable strategies discussed in this section are supply chain collaboration, risk management, cost minimization, supplier engagement and e-procurement.

### **2.3.1 Supply Chain Collaboration**

Collaboration across the supply chain defines the current global business. Most significant impacts on the environment and society occur in several companies' supply chains. As these networks grow in scale and complexity, so too the opportunities for companies to protect the environment, improve labor conditions, promote human rights and support ethical business activities. By working together, buyers and suppliers can ensure that a baseline standard of business conduct is met as well as collaborate to improve the effects of business operations on the environment and society at large (United Nations, 2000).

Through collaboration, companies can take joint actions to reduce carbon dioxide emissions in the supply chain. Equally, in order to create products that meet environmental requirements while being produced under good social working conditions and at reasonable costs, the members of the supply chain have to collaborate (Pagell and Wu, 2009). Pagell and Wu (2009) further explain that since sustainable supply chain strategies aim at developing products and services with substantially lower or no social and environmental impacts across the whole life cycle and they also heavily depend on process innovations, such innovations call for collaboration among partnering companies and are related to supplier development. This is because collaboration with suppliers entails the transfer of knowledge and information on social, environmental and economic issues between supply chain partners leading to product and process innovations for both the buyer and suppliers.

Companies embarking supplier collaboration on sustainability issues are in a better position of adding new features and performance characteristics to existing products and even generate new products that may result in fewer negative environmental impacts or have improved end of life collection and discarding options than traditional products. Equally, sustainability of products can be a differentiating factor that can lead to increased sales for an organization (United Nations, 2000). Firms therefore, should collaborate with all players across the supply chain to ensure that they are committed to sustainable objectives since throughout the life cycle of a company's products there are numerous social and environmental impacts on the environment and on people. This can lead to the spread and advancement of sustainability objectives throughout the business community.

### **2.3.2 Risk Management**

Risk management involves assessing supply chain operations in terms of identifying the risks associated with non-sustainable practices. These risks range from direct financial penalties from breaking environment and social regulations to negative media exposure that can have an enduring impact on a company's image (Gattorna, 2009). Organizations can protect themselves from potential supply chain interruptions or delays associated with suppliers practices by ensuring that all supply chain players have effective compliance strategies and robust management systems covering all the sustainable supply chain issues. Companies can ensure conformity to the issues by conforming to norms or applying commonly accepted standards (Beske, Koplin and Seuring, 2008). Examples of such norms and standards categorized by economic, environmental, and social aspects according to Koplin, Seuring and Mesterharmare (2007) include economic criteria e.g. guidelines on quality aspects, environmental criteria e.g. Eco-Management and Audit Scheme and Social criteria: e.g. conventions of the International Labor Organization.

Harms et al. (n.d.) point out that codes of conduct as well as norms and standards can serve as criteria for evaluating and selecting suppliers and to determine a minimum level of improvement in order to create more sustainable products. In addition, companies can ask their suppliers for labels and certificates, which verify the compliance with social and environmental obligations. Harms et al. (n.d.) assert further that norms, standards, and codes can provide valuable criteria for decision-making and, therefore, requiring compliance deems appropriate for both risk avoidance and performance improvements along the supply chain.

### **2.3.3 Cost Minimization**

Cost minimization views sustainability as method of reducing cost in the supply chain while also having a positive impact. The rationale for cost minimization is that the resulting surplus of revenues over costs is available for distribution to meet the various goals of the firm. Minimizing the costs of meeting a firm's objectives helps improve the environment. Many examples have shown that there is a direct relationship between reducing environmental burdens and reduced costs through gains in efficiency. For example, better vehicle utilization through transport efficiencies reduces vehicle miles, which in turn reduce carbon dioxide (CO<sub>2</sub>). It is also proficient to invest in energy conservation, material recycling, economies in the management of transport fleets and waste minimization i.e. by using less packaging materials (Gattorna, 2009).

Pearce and Barbier (2000) explain that cost minimization can arise out of the fact that many businesses

have to deal directly or indirectly with environmental pressures. The costs of dealing with such groups can often be higher because the pressure may show up in loss of market share if the firm fails to defend itself adequately. Such costs may be reduced by avoidance of costly encounters with such groups. Pearce and Barbier (2000) further point out that costs can also be minimized by focusing on the interest of employees. It is well known that employees have strong views on the status of the firm for which they work. Notable among such employee concerns is the environment profile of the organization. Equally, organizational management has a strong interest in meeting employee concerns for both profit and nonprofit reasons. For instance avoiding costly work interruptions, transaction cost such as labor turnover, avoidance of a bad external image and maintaining longer-term continuity of staff, especially skilled staff among other motives produce positive attitudes to supply chain sustainability.

#### **2.3.4 Supplier Engagement**

The keystone of the engagement strategy is the relationship between the company and its suppliers. Generally, under this strategy, organizations agree to form a long-term partnership that is both sustainable and financially successful. As a result, engagement strategies focus on educating the supplier about sustainability and working closely with them to incorporate sustainability into their core business strategy and throughout their operations. Engagement-based initiatives generate opportunities for proactive actions that can move organizations beyond compliance and into strategic upstream thinking. They utilize custom devices such as training, and sometimes requesting suppliers to create their own goals and actions for sustainability. The suppliers may be encouraged to report to the buying company on their sustainability successes and challenges (Fitzgerald, Luck and Morgan, 2007).

The objective of a firm in engaging with suppliers is to ensure that suppliers develop a shared way of thinking concerning sustainability matters, to build ownership of supplier sustainability vision, strategy and performance as well as to work more closely with suppliers with common priorities. There are several levers organizations can utilize advance sustainability in the supply chain for example raising awareness and encouraging suppliers to integrate and drive sustainability into their business through setting expectations, ongoing monitoring and collaborating with suppliers to overcome barriers to improvement (United Nations, 2000).

#### **2.3.5 e-Procurement**

e-Procurement is the purchasing and sale of supplies and services via the internet (Dimension Data, 2011). Using internet in procurement can create enormous benefits for an organization with mostly paper based procurement systems and purchases a large volume of functional, repair and operating items. The primary strategic benefits of e-procurement include significant cost savings and the freeing up of time for the purchasing staff to concentrate on more of the firm's core business activities (Wisner, 2012). This comes about because a properly implemented e-procurement system connects a company's internal systems, such as accounts payable directly to their vendors and suppliers, permitting system-to-system integration and automation of much of the purchasing process.

An e-procurement process is by nature already a more sustainable way of procuring services and products, because it is automated, efficient and paperless. A proper e-procurement system also allows organizations to take sustainability a step further by enabling the selection of products and services according to set international sustainability criteria i.e. the sourcing of products and services that have less impact on the environment (Dimension Data, 2011). In addition to reducing a company's carbon footprint and environmental waste, sustainable procurement has also multiple long-term business benefits. They include; competitive advantage through innovation, improved public image and potential economic benefits through longer lasting materials, improved efficiencies and less expense on waste disposal and clean-up.

#### **2.4 Challenges of adopting Supply Chain Sustainability Strategies**

Moving business practices so that they are in line with sustainability is a huge challenge. Many challenges attributable to the adoption of sustainable supply chain strategies are due to organizational inertia and difficulties of corporate culture change. One key obstacle is that in most organizations people operate and think in narrow, compartmentalized channels related to their field of specialty. Other challenges include: capital investment commitments; lack of understanding of the intricate interplay between economic, environmental and social activities and how that affects the economic bottom line; measurement; risk management and monitoring; transparency of information and knowledge; corporate culture; and alignment of corporate strategy with sustainable supply chain strategies (Carter and Rogers, 2008; Seuring and Müller, 2008b; Linton, Klassen and Jayaraman, 2007; Storey, Emberson, Godsell and Harrison, 2006).

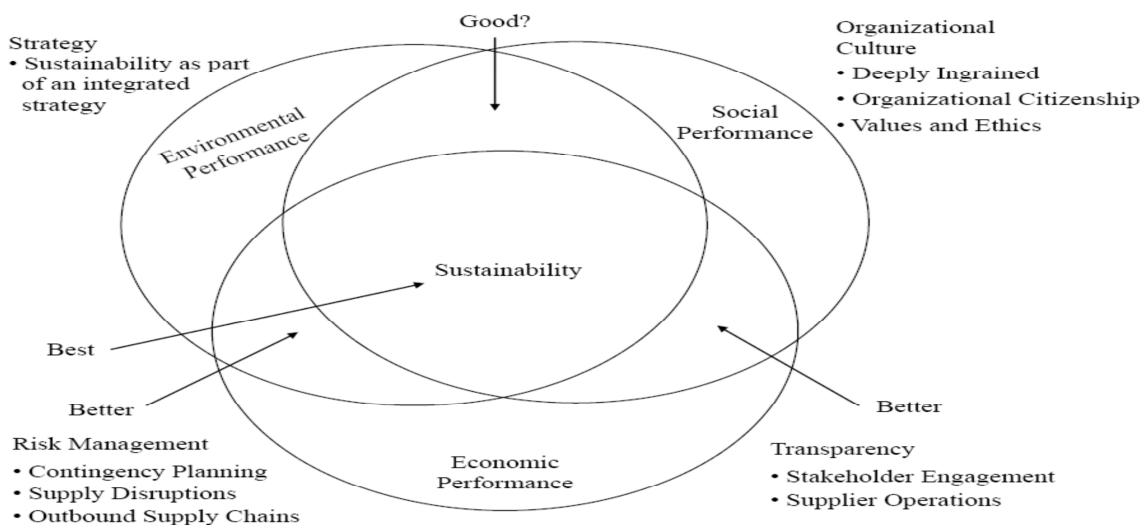
#### **2.5 Summary of the Literature Review and Knowledge Gap**

The reviewed literature indicates that sustainable supply chain entail the strategic achievement and integration of

an organization's economical, environmental and social goals through the systematic coordination of key inter-organizational business processes to improve the long-term economic performance of the individual company and its value network. Sustainable supply chain strategies specify how the supply chain should function in order to achieve the organization's social, environmental and economical objectives. The core strategies discussed in the chapter are supply chain collaboration, risk management, cost minimization, supplier engagement and e-procurement. As noted in the discussions, moving business practices so that they are in line with sustainability is a huge challenge for most organizations.

A knowledge gap exists on the strategies for sustainable supply chains among supermarkets especially in African countries where the literature on sustainable supply chain management is limited and studies on the topic are rather scant. This study therefore aims to bridge this gap by conducting a study to establish strategies for sustainable supply chains among supermarkets in Nairobi.

## 2.6 Conceptual Framework



**Source:** Carter and Rogers (2008)

At the center of this conceptual framework is Elkington's (1997) triple bottom line, which is the intersection of environmental, social, and economic performance. Carter and Rogers (2008) explain that the sustainability of a company's supply chain depends on three variables: economic performance, environmental performance and social performance. They further point out that organizations should identify and engage in social and environmental activities that will hopefully help, or at least not harm, economic performance.

In the above framework, sustainable supply chain management is the dependent variable whereas economic performance, social performance and environmental performance are the independent variables. If an organization combines the three independent variables, it will be able to achieve sustainable supply chain management. As pointed out by Dangelmaier, Blecken, Delius and Klopfer (2010), the sustainability dimensions of social, environment and economic are interdependent and should be considered interdependently.

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 Research Design

The study adopted a cross sectional research design in investigating strategies for sustainable supply chains among supermarkets in Nairobi. The researcher conducted a survey of supermarkets based in Nairobi. Descriptive research design allowed the researcher to study the elements in their natural form without altering them. The design also provided the researcher with data about the specific variables that were examined, as well as enabling the researcher to accommodate large sample sizes and generalization of results (De Vaus, 2002).

### 3.2 Population

The total number of supermarkets that were operating in Nairobi during the study period according to the Official Yellow Pages Kenya was one hundred and ten (110) ([yellowpageskenya.com](http://yellowpageskenya.com), 2012). The 110 supermarkets therefore formed the target population for this study. It is from the 110 supermarkets that the researcher was able to sample the ones that were considered for the study.

### 3.3 Sample Design

According to Cooper and Schindler (2008), the ultimate test of a sample design is how well it represents the characteristics of the population it purports to present. Yamane (1967) provides a simplified formula to calculate sample sizes. The researcher utilized Yamane (1967)'s formula as provided here below to calculate the sample size for this study.

$$n = \frac{N}{1 + N(e)^2}$$

In the above formula,  $n$  is the sample size,  $N$  is the population size, and  $e$  is the level of precision. The study assumed a precision level of 10%. Therefore  $n = 110 / [1 + 110(0.1)^2] = 52.381 \approx 52$ . Thus, a sample size of fifty two (52) supermarkets was deemed sufficient and was adopted for this study.

Supermarkets with one branch and those with more than one branch were considered as the only two categories that existed during the study period. The sample therefore constituted 50% of the supermarkets with more than one branch and 50% of single branch supermarkets drawn randomly from Nairobi. This enabled the researcher to get the mixed perception of the two groups as far as strategies for sustainable supply chains are concerned. For supermarkets with more than one branch, information was collected from the head office thus treating the supermarkets as one organization.

### 3.4 Data collection

Primary quantitative data was collected from one supply chain officer or his/her equivalent from the randomly selected supermarkets. The data was collected by use of a structured questionnaire. The questionnaire contained both open and closed ended questions; it was self-administered through a drop-and-pick method.

The questionnaire was divided into two sections. Section A contained questions on supermarket profile while section B sought relevant data to the following objectives: to establish the extent to which supermarkets in Nairobi adopted sustainable supply chain strategies; and to determine the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi.

### 3.5 Data analysis

The study collected quantitative data. The data was analyzed using Statistical Packages for Social Sciences (SPSS). Descriptive statistics i.e. percentages and frequencies were used to analyze the extent to which supermarkets in Nairobi adopted sustainable supply chain strategies whilst regression analysis was used to determine the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi. Tables and bar charts were used to explain the findings from the data as well as indicate levels of respondents' concurrence.

**Regression Equation:**  $Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e$

Where:  $Y$  = sustainability in supply chain,  $a$  = y-intercept when  $x$  assumes a value of zero,  $b_1 - b_5$  = the weights associated with supply chain sustainable strategies,  $x_1$  = supply chain collaboration,  $x_2$  = risk management,  $x_3$  = cost minimization,  $x_4$  = supplier engagement,  $x_5$  = e-procurement and  $e$  = error term.

## CHAPTER FOUR: DATA ANALYSIS, RESULTS AND INTERPRETATIONS

### 4.1 Introduction

This chapter presents data analysis, findings and interpretations of the study results in line with the research objectives. The data was collected from the supermarkets in Nairobi, analyzed and the findings presented using frequencies and percentages in the form of tables and bar charts. Fifty-two (52) questionnaires representing the sample size were administered randomly through a drop and pick method to respondents among the selected 52 supermarkets in Nairobi. The respondents were given a period of one week to enable them respond. However, of the 52 questionnaires issued, only 47 were filled and returned. This represented a response rate of 90.38%, which was considered excellent for the study since the findings can be generalized.

### 4.2 Company profile

Section A of the questionnaire sought information concerning the profile of supermarkets in Nairobi. Data on business duration, existence of a procurement/supply chain department, number of suppliers, average contract length between the suppliers and the supermarkets and how the number of suppliers among supermarkets in Nairobi had changed for the last five years were analyzed to determine the general profile of the supermarkets in Nairobi. The findings of the study are presented and explained in the sub-sections that follow.

The study sought to establish from the respondents, the duration in years the supermarkets in Nairobi had been operating in business. From the study findings as presented in table 4.1 below, 25.5% of the surveyed supermarkets in Nairobi had been operating in business for 1-5 years, 12.8% for 6-10 years, 6.4% for 11-15



years, 21.3% for 16-20 years and 34.0% for above 20 years. This shows that majority of the supermarkets in Nairobi have been operating in business for more than 20 years. This depicts that supermarkets in Nairobi have developed supply chains and hence they engage in supply chain management activities.

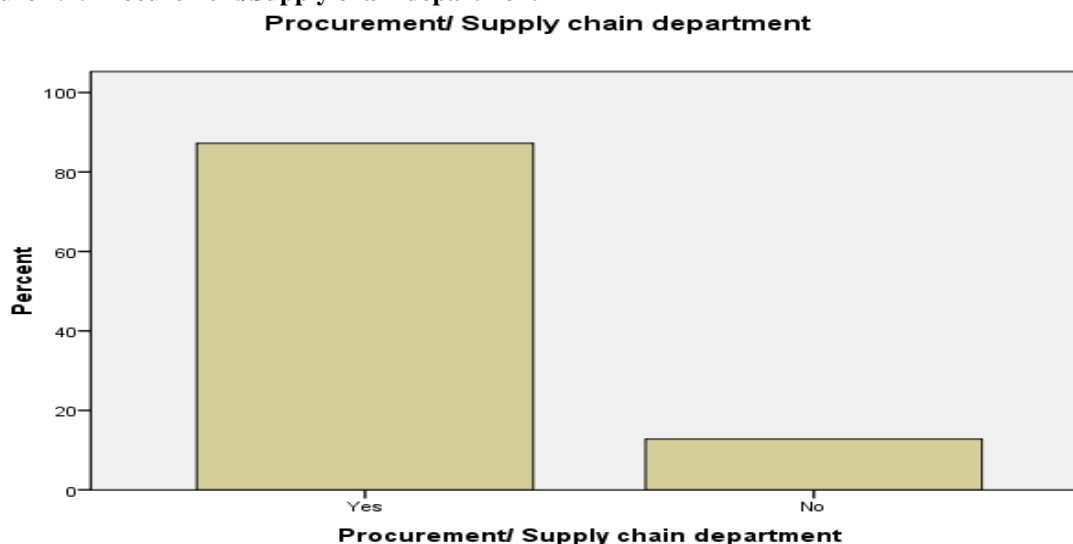
**Table 4.1: Duration in business**

| Response       | Frequency | Percent |
|----------------|-----------|---------|
| 1-5 years      | 12        | 25.5    |
| 6-10 years     | 6         | 12.8    |
| 11-15 years    | 3         | 6.4     |
| 16-20 years    | 10        | 21.3    |
| Above 20 years | 16        | 34.0    |
| Total          | 47        | 100.0   |

Source: Researcher (2012)

The study also sought to ascertain from respondents whether supermarkets in Nairobi had procurement/supply chain departments. From the study findings as presented in figure 4.1, majority of the respondents agreed that supermarkets in Nairobi had procurement/supply chain departments.

**Figure 4.1: Procurement/Supply chain department**



Source: Researcher (2012)

The researcher sought to ascertain from the study respondents the number of suppliers among the supermarkets in Nairobi. As shown in table 4.2, 19.1% of supermarkets in Nairobi had 1-20 suppliers, 21.3% had 21-40 suppliers and 59.6% had 60 and above suppliers. This therefore shows that majority of the supermarkets in Nairobi have 60 and above suppliers. This is an indication that strategies for sustainable supply chains are of greater significance among supermarkets in Nairobi in order to effectively manage the supply chains with multiple suppliers.

**Table 4.2: Number of suppliers**

| Response           | Frequency | Percent |
|--------------------|-----------|---------|
| 1-20 suppliers     | 9         | 19.1    |
| 21-40 suppliers    | 10        | 21.3    |
| Above 60 suppliers | 28        | 59.6    |
| Total              | 47        | 100.0   |

Source: Researcher (2012)

The study also sought to establish from the respondents, the average contract length in years the supermarkets in Nairobi engaged their respective suppliers. It is evident from the findings of the study presented in the figure 4.2 below that the average contract length in years majority of the supermarkets in Nairobi engage suppliers are 1-5 years.

**Figure 4.2: Average contract length with suppliers**



Source: Researcher (2012)

The researcher sought to determine from the respondents how the number of suppliers among supermarkets in Nairobi had changed for the last five years. According to the study findings tabulated below, majority of the respondents indicated that the number of suppliers among supermarkets in Nairobi had been increasing for the last five years. They represent 93.6% of the respondents who participated in the study. This implies that supermarkets in Nairobi will ever require strategies for sustainable supply chains in order to survive in the dynamic and turbulent business environment with unpredictable suppliers' base.

**Table 4.3: Changing of suppliers**

| Response  | Frequency | Percent |
|-----------|-----------|---------|
| Increased | 44        | 93.6    |
| Reduced   | 3         | 6.4     |
| Total     | 47        | 100.0   |

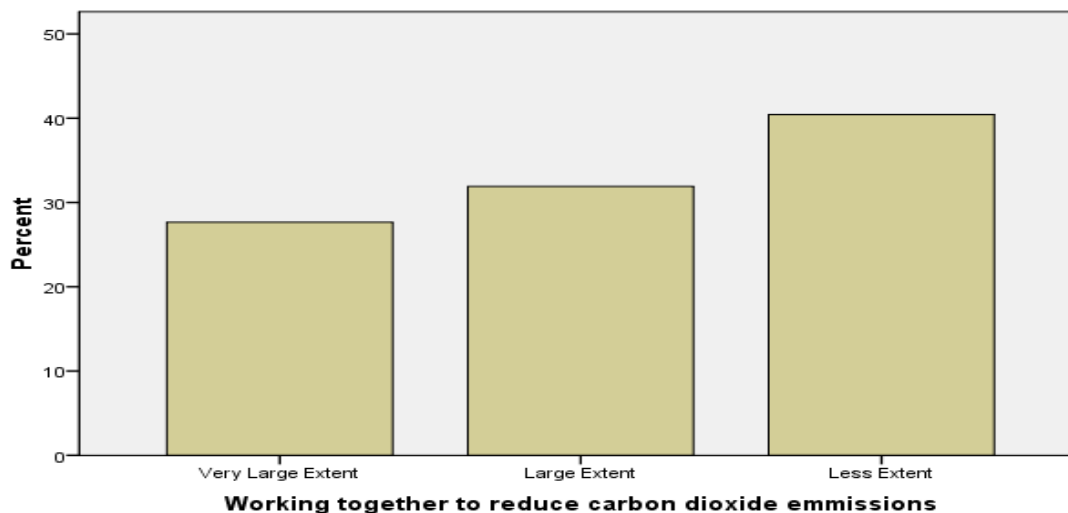
Source: Researcher (2012)

### 4.3 Sustainable Supply Chain Strategies

In this section, the researcher sought views from the respondents on the extent to which they agreed with various statements concerning strategies for sustainable supply chains among supermarkets in Nairobi. The study findings are presented and explained in the following subsections.

The respondents were required to state the extent they agreed that supermarkets in Nairobi worked together with other companies to reduce carbon dioxide emissions in their supply chains. It is evident from the study findings presented in figure 4.3 below that majority of the respondents agreed to less extent that supermarkets in Nairobi worked together with other companies to reduce carbon dioxide emissions in the supply chain. This implies that majority of the supermarkets in Nairobi do not collaborate in order to take joint actions to reduce carbon dioxide emissions in the supply chains. Thus, the effects of their business operations on the environment and society are dreadful.

**Figure 4.3: Working together to reduce carbon dioxide emissions**  
**Working together to reduce carbon dioxide emissions**



**Source:** Researcher (2012)

The researcher sought to establish from the respondents the extent to which supermarkets in Nairobi involved other firms to develop sustainable products that met environmental requirements. As shown in table 4.4, majority of the respondents representing 44.7% of the study participants agreed to larger extent that supermarkets in Nairobi involved other firms to develop sustainable products that met environmental requirements. This implies that the sustainable products developed by supermarkets in Nairobi can result in fewer social and environmental impacts on the environment and on people.

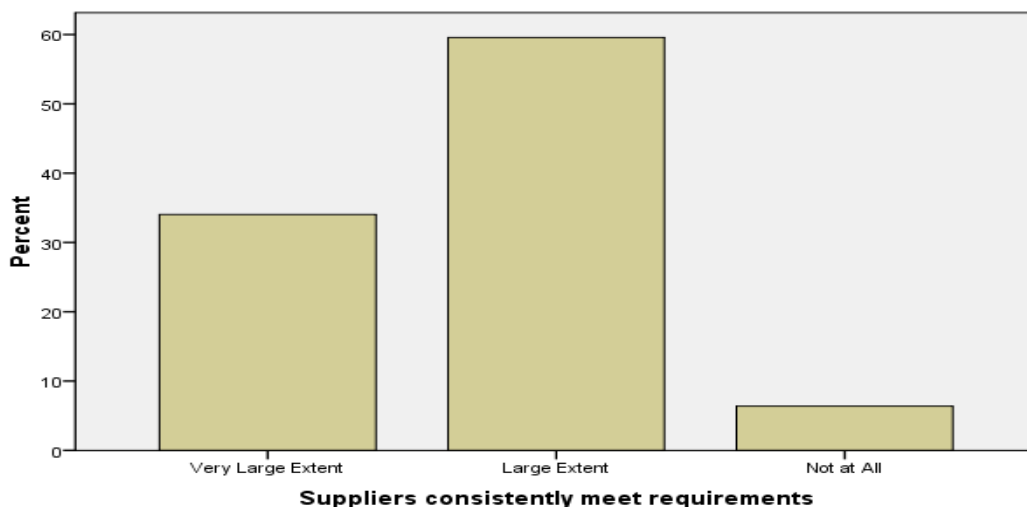
**Table 4.4: Developing sustainable products**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 16        | 34.0    |
| Large Extent      | 21        | 44.7    |
| Less Extent       | 10        | 21.3    |
| Total             | 47        | 100.0   |

**Source:** Researcher (2012)

Further, the researcher sought to establish from the respondents whether suppliers among supermarkets in Nairobi consistently met requirements put in place by the supermarkets such as observing guidelines on product quality. The study results presented in figure 4.4 reveal that a larger proportion of the respondents agreed to large extent that suppliers among supermarkets in Nairobi consistently met requirements such as observing the guidelines on product quality as set by the supermarkets. This is an indication that majority of the supermarkets in Nairobi require compliance from suppliers concerning the norms and standards of business operations before contracting them. This provides valuable criteria for decision-making for both risk avoidance and performance improvements along the supply chain.

**Figure 4.4: Suppliers consistently meet supermarkets requirements**  
**Suppliers consistently meet requirements**



Source: Researcher (2012)

The study also sought to ascertain from the respondents whether supermarkets in Nairobi supported local communities. As indicated in table 4.5, majority of the respondents representing 66.0% of the study participants agreed to large extent that supermarkets in Nairobi supported local communities. This can enable them to the spread and advance sustainability objectives throughout the business community.

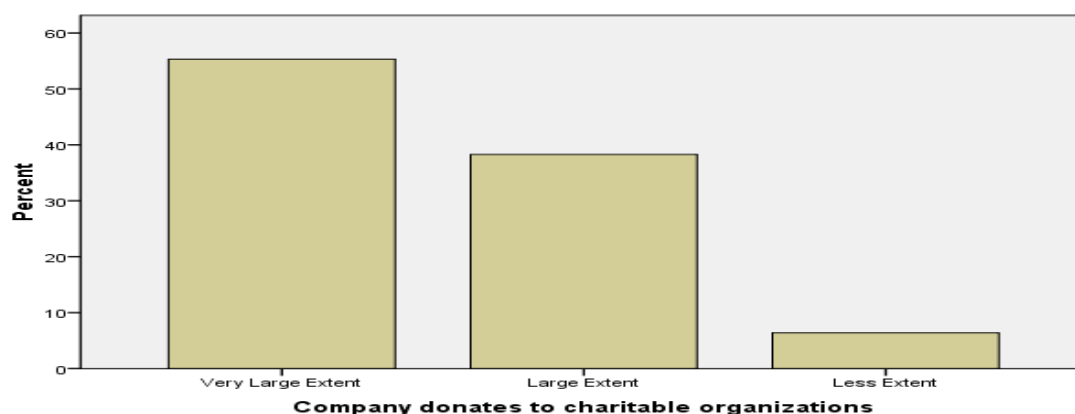
**Table 4.5: Supporting local communities**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 13        | 27.7    |
| Large Extent      | 31        | 66.0    |
| Less Extent       | 3         | 6.4     |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The study also wanted to establish from the respondents whether supermarkets in Nairobi donated to charitable organizations. As presented in the figure below, majority of the respondents agreed to a very large extent that supermarkets in Nairobi donated to charitable organizations. This equally can enable the supermarkets to spread and advance sustainability objectives throughout the business community.

**Figure 4.5: Donating to charitable organizations**  
**Company donates to charitable organizations**



Source: Researcher (2012)

The researcher also wanted to ascertain from the respondents the extent to which supermarkets in Nairobi worked with suppliers to improve their quality in the long run. As shown in table 4.6 below, majority of the respondents (46.8%) agreed to large extent that supermarkets in Nairobi worked with suppliers to improve their quality in the long run. This is an indication that supermarkets in Nairobi collaborate with suppliers to integrate sustainability issues into their core business strategies and throughout their operations hence improving their quality in the long run.

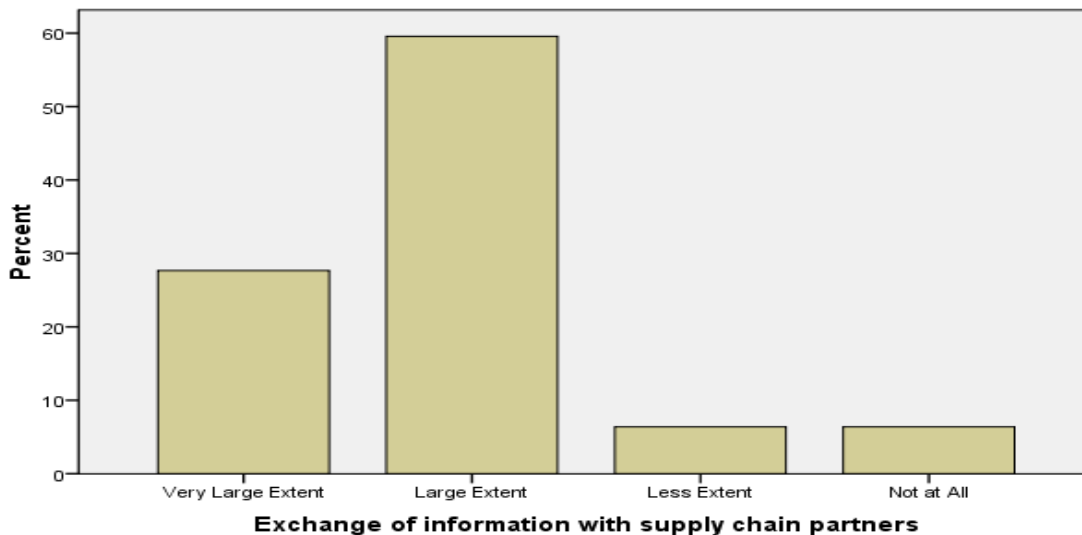
**Table 4.6: Working with suppliers to improve their quality in the long run**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 16        | 34.0    |
| Large Extent      | 22        | 46.8    |
| Less Extent       | 6         | 12.8    |
| Not at All        | 3         | 6.4     |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The study also sought to establish from the respondents whether exchange of information with supply chain partners takes place frequently and in a timely manner among supermarkets in Nairobi. From the findings of the study presented in the figure 4.6, majority of the study participants agreed to large extent that exchange of information with supply chain partners takes place frequently and in a timely manner among supermarkets in Nairobi. This is an indication that supermarkets in Nairobi work closely with suppliers to develop a shared mindset about supply chain sustainability issues.

**Figure 4.6: Exchange of information with supply chain partners**  
**Exchange of information with supply chain partners**



Source: Researcher (2012)

The researcher sought to establish from the respondents the extent supermarkets in Nairobi kept each other informed about events or changes that may affect them and disrupt supply chain operations. The study findings presented in table 4.7 indicate that 55.3% of the respondents agreed to large extent that supermarkets in Nairobi keep each other informed about events or changes that may affect them and disrupt supply chain operations.

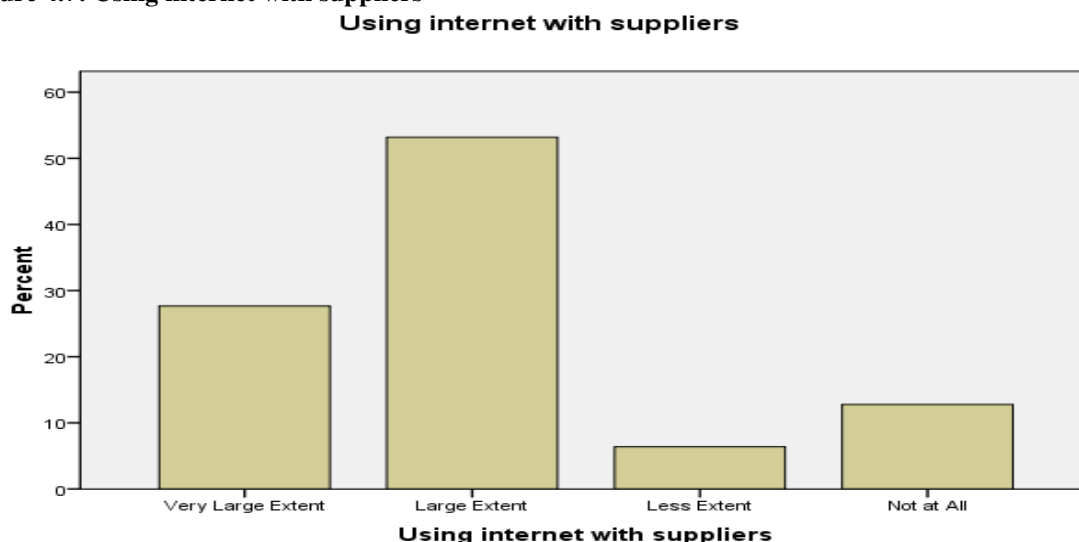
**Table 4.7: Keeping each other informed about events or changes**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 9         | 19.1    |
| Large Extent      | 26        | 55.3    |
| Less Extent       | 6         | 12.8    |
| Not at All        | 6         | 12.8    |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The study sought to determine from the respondents whether supermarkets in Nairobi make use of the internet with their respective suppliers. From the study findings presented in the figure 4.7 below, majority of the respondents who participated in the study agreed to large extent that supermarkets in Nairobi use the internet with suppliers.

**Figure 4.7: Using internet with suppliers**



Source: Researcher (2012)

The researcher also sought to establish from the respondents whether supermarkets in Nairobi participated in the design of products for recycling or reuse. From the research findings tabulated in table 4.8, majority of the respondents representing 34.0% of the study participants agreed to very large extent that supermarkets in Nairobi participate in the design of products for recycling or reuse.

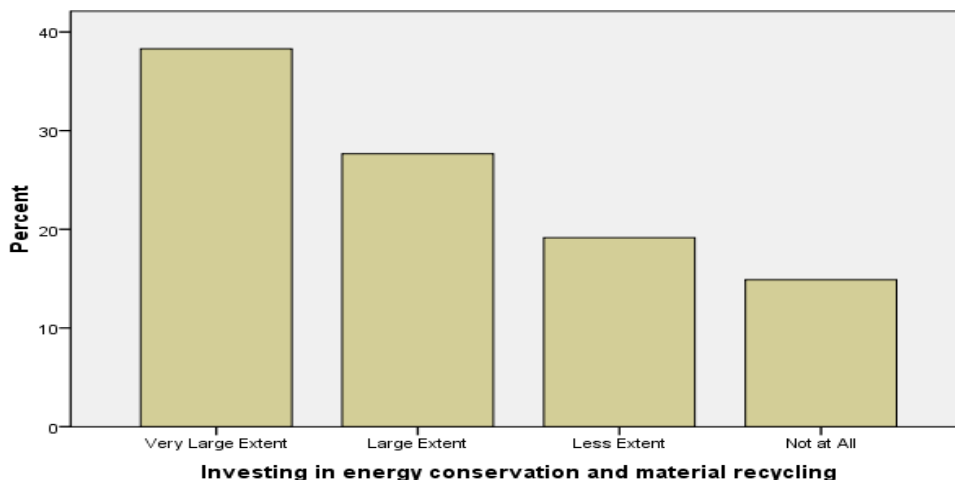
**Table 4.8: Participating in the design of products for recycling or reuse**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 16        | 34.0    |
| Large Extent      | 15        | 31.9    |
| Less Extent       | 9         | 19.1    |
| Not at All        | 7         | 14.9    |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The study also sought to establish from the respondents if supermarkets in Nairobi invested in energy conservation and material recycling. From the study findings as presented in the figure 4.8, majority of the respondents agreed to very large extent that supermarkets in Nairobi invest in energy conservation and material recycling.

**Figure 4.8: Investing in energy conservation and material recycling**  
 Investing in energy conservation and material recycling



Source: Researcher (2012)

The researcher also wanted to establish from the respondents the extent to which they agreed that supermarkets in Nairobi invested in waste minimization practices i.e. reducing packaging materials. As shown in table 4.9, majority of the respondents representing 40.4% of the study participants agreed to very large extent that supermarkets in Nairobi invest in waste minimization practices such as reducing packaging materials.

**Table 4.9: Investing in waste minimization practices**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 19        | 40.4    |
| Large Extent      | 18        | 38.3    |
| Less Extent       | 10        | 21.3    |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The researcher also sought to determine from the respondents the extent to which they agreed that supermarkets in Nairobi ensured that all their respective partners complied with human rights such as child labor laws. As shown in the figure 4.9, majority of the respondents agreed to very large extent that supermarkets Nairobi ensured that all their respective partners complied with human rights e.g. child labor laws. This is an indication that supermarkets in Nairobi protect themselves from potentially supply chain interruptions associated with suppliers' by ensuring that they comply with sustainable supply chain issues such as human rights.

**Figure 4.9: Ensuring all partners comply with human rights**  
 Ensuring all partners comply with human rights



Source: Researcher (2012)

The study sought to establish from the respondents the extent they agreed that supermarkets in Nairobi assessed supply chain operations in identifying the risks associated with non-sustainable practices. From the study findings presented in table 4.10, majority of the respondents agreed to very large extent that supermarkets Nairobi assess supply chain operations in identifying the risks associated with non-sustainable practices. This implies that the supermarkets in Nairobi protect themselves from supply chain disruptions by regularly assessing, identifying and dealing with non-sustainable events arising in their respective supply chains.

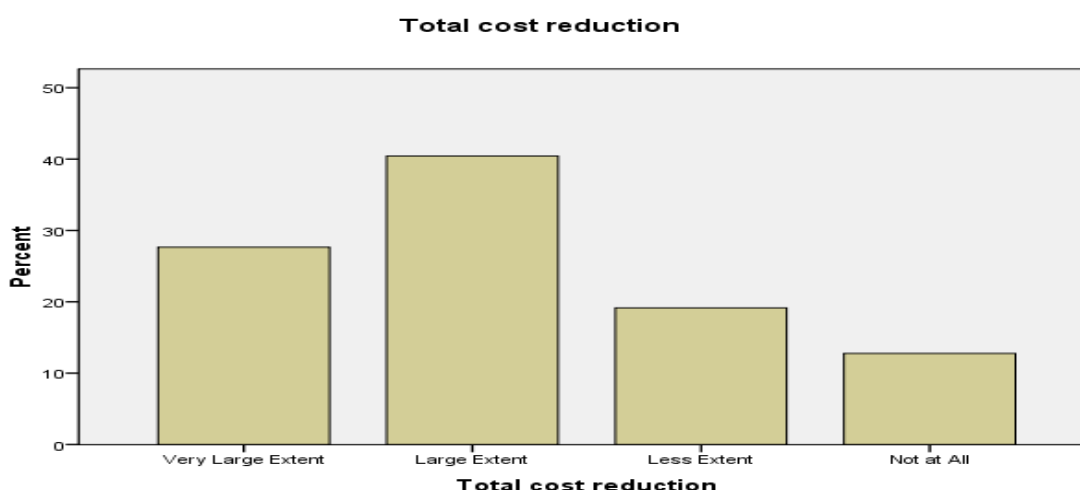
**Table 4.10: Assessing supply chain operations in identifying risks**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 20        | 42.6    |
| Large Extent      | 18        | 38.3    |
| Less Extent       | 9         | 19.1    |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The study also sought to establish from the respondents who participated in the study the extent to which supermarkets had reduced their respective total costs as a sustainability method in the supply chain. From the study findings presented in figure 4.10 below, majority of respondents agreed to a larger extent that supermarkets in Nairobi had reduced their respective total costs as a sustainability method in the supply chain.

**Figure 4.10: Total cost reduction**



Source: Researcher (2012)

The researcher sought to determine from the respondents whether supermarkets in Nairobi set environmental criteria that suppliers must meet. From the study findings presented in table 4.11 below, majority of the respondents agreed to a very large extent that supermarkets in Nairobi set environmental criteria that suppliers must meet. They represent 46.8% of the total number of respondents who participated in the study.

**Table 4.11: Setting environmental criteria that suppliers must meet**

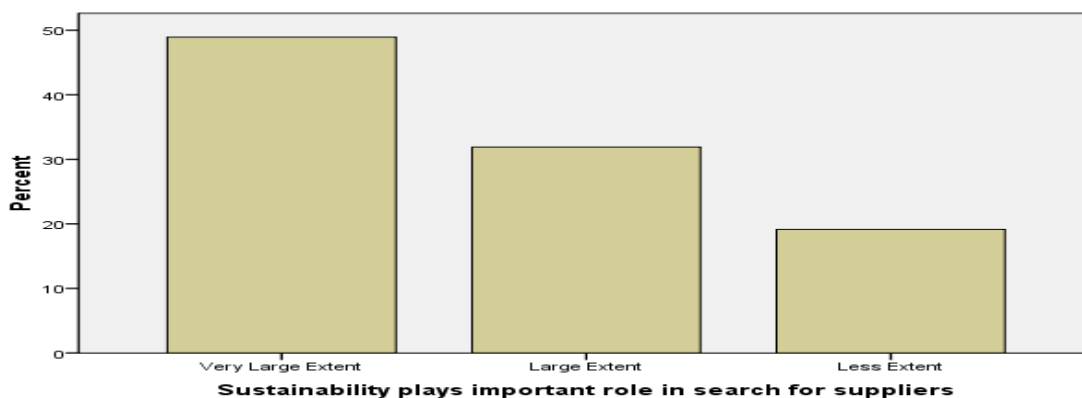
| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 22        | 46.8    |
| Large Extent      | 15        | 31.9    |
| Less Extent       | 7         | 14.9    |
| Not at All        | 3         | 6.4     |
| Total             | 47        | 100.0   |

Source: Researcher (2012)



Further, the research sought to ascertain from the study participants whether sustainability plays an important role in search for suppliers among supermarkets in Nairobi. As shown in the figure 4.11, majority of the respondents agreed to very large extent that sustainability plays an important role in search for suppliers among the supermarkets in Nairobi. This is an indication that majority of the supermarkets in Nairobi source from suppliers who can enable them deliver on their commitment to sustainable growth.

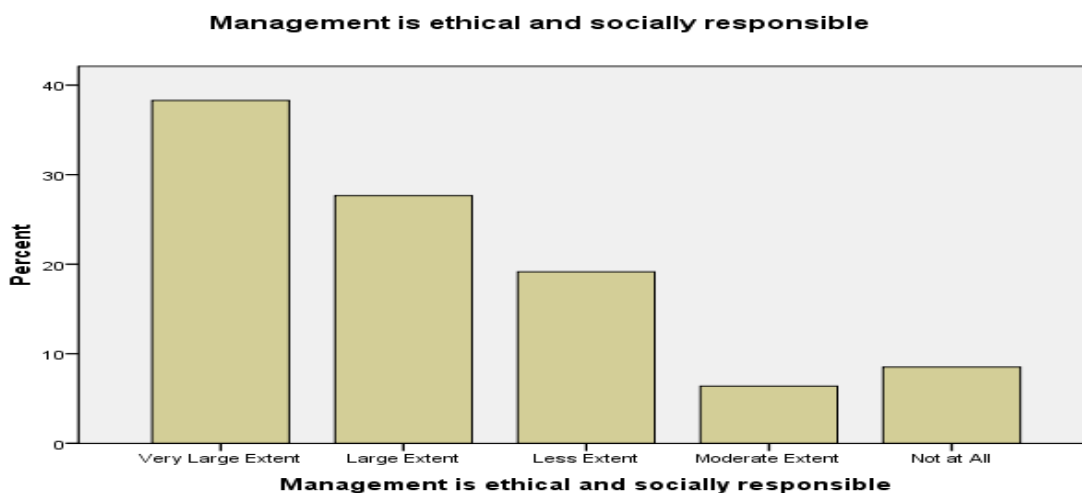
**Figure 4.11: Sustainability plays an important role in search for suppliers**



Source: Researcher (2012)

The study sought to establish from the respondents whether top management among supermarkets in Nairobi was highly ethical and in a socially responsible manner. From the study findings presented in the figure below, majority of the respondents agreed that to very large extent, top management among supermarkets in Nairobi is highly ethical and acts in a socially responsible manner.

**Figure 4.12: Top management is ethical and socially responsible**



Source: Researcher (2012)

The study also sought to establish from the respondents the extent to which supermarkets in Nairobi managed transport efficiencies through better vehicle utilization. It is evident from the study findings tabulated below that majority of the respondents representing 46.8% of the respondents who participated in the study agreed to large extent that supermarkets in Nairobi managed transport efficiencies through better vehicle utilization.

**Table 4.12: Managing transport efficiencies through better vehicle utilization**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 13        | 27.7    |
| Large Extent      | 22        | 46.8    |
| Less Extent       | 12        | 25.5    |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

The researcher also wanted to ascertain from the study respondents whether supermarkets in Nairobi complied with environmental and social regulations. From the findings of the study tabulated below, majority of the respondents representing 59.6% of the study participants agreed to large extent that supermarkets in Nairobi complied with environmental and social regulations.

**Table 4.13: Complying with environmental and social regulations**

| Response          | Frequency | Percent |
|-------------------|-----------|---------|
| Very Large Extent | 16        | 34.0    |
| Large Extent      | 28        | 59.6    |
| Less Extent       | 3         | 6.4     |
| Total             | 47        | 100.0   |

Source: Researcher (2012)

#### 4.4 Regression Analysis

In this section, the researcher sought to determine the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi. The study used a multivariate linear regression model in analyzing the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi.

The regression equation used in the model was of the form:  $Y = a + b_1x_1 + b_2x_2 + b_3x_3 + b_4x_4 + b_5x_5 + e$ . Whereby Y is the dependent variable (sustainability in supply chain), a is the y-intercept when x assumes a constant value of zero,  $b_1 - b_5$  are the weights associated with supply chain sustainable strategies i.e. the coefficients of the regression model,  $x_1$  is supply chain collaboration,  $x_2$  is risk management,  $x_3$  is cost minimization,  $x_4$  is supplier engagement,  $x_5$  is e-procurement and e is the error term which is signified by the model's significance.

**Table 4.14: Model Summary**

| Model | R                 | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1     | .758 <sup>a</sup> | .574     | .523              | .394                       |

Predictors: (Constant), e-procurement , Risk management , Cost minimization , Supplier engagement , Supply chain collaboration

Source: Researcher (2012)

The Adjusted  $R^2$  known as the coefficient of determination shows how the variation in sustainability in the supply chain varies with variations in supply chain collaboration, risk management, cost minimization, supplier engagement and e-procurement among supermarkets in Nairobi. From table 4.14, the value of Adjusted  $R^2$  is 0.523. This implies that a variation of 52.3% in the level of sustainability in the supply chain among supermarkets in Nairobi varies with variations in supply chain collaboration, risk management, cost minimization, supplier engagement and e-procurement at a confidence level of 95%.

**Table 4.15: Regression Coefficients**

| Model                      | Unstandardized Coefficients |            | Standardized Coefficients |
|----------------------------|-----------------------------|------------|---------------------------|
|                            | B                           | Std. Error | Beta                      |
| 1 (Constant)               | .840                        | .247       |                           |
| Supply chain collaboration | .160                        | .241       | .172                      |
| Risk management            | .141                        | .098       | .169                      |
| Cost minimization          | -.252                       | .143       | -.222                     |
| Supplier engagement        | .305                        | .160       | .384                      |
| e-procurement              | .159                        | .076       | .279                      |

**Source:** Researcher (2012)

The regression equation established from the data in table 4.15 above is as follows:  $Y = 0.840 + 0.160x_1 + 0.141x_2 - 0.252x_3 + 0.305x_4 + 0.159x_5$ .

The regression model indicates that sustainability in the supply chain among supermarkets in Nairobi would be at 0.840 when holding supply chain collaboration, risk management, cost minimization, supplier engagement and e-procurement to a constant zero and by holding all the other relevant factors constant. A unit increase in supply chain collaboration, risk management, supplier engagement and e-procurement will lead to increase in sustainability in the supply chain among supermarkets in Nairobi by factors of 0.160, 0.141, 0.305 and 0.159 respectively while a unit increase in cost minimization would lead to a decrease in sustainability in the supply chain among supermarkets in Nairobi by a factor of 0.252.

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

### 5.1 Introduction

This chapter presents a summary of the findings from the study, discussions, conclusions and the recommendations made by the researcher based on the findings as well as suggestions on the areas the researcher felt may require further investigation through research activity.

The aim of this study was to ascertain Strategies for Sustainable Supply Chains among Supermarkets in Nairobi. The study had two objectives. The first objective was to establish the extent to which supermarkets in Nairobi had adopted sustainable supply chain strategies and the second objective was to determine the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi.

### 5.2 Summary of Findings

The study analyzed various strategies for sustainable supply chains based on the responses from the study participants to establish the extent to which they were adopted among supermarkets in Nairobi. From the study findings, it was established that to a lesser extent, most of the supermarkets in Nairobi collaborate with other companies to reduce carbon dioxide emissions in the supply chains. This is an indication that supermarkets in Nairobi do not take joint actions to reduce carbon dioxide emissions in the supply chains. Thus, the effects of their business operations on the environment and society are dreadful.

On the other hand, the study established that to large extent, supermarkets in Nairobi involve other firms to develop sustainable products that meet environmental requirements; suppliers among the supermarkets consistently meet requirements set by the supermarkets such as observing guidelines on product quality; the supermarkets support local communities and they as well donate to charitable organizations. The study also ascertained that to large extent, most of the supermarkets in Nairobi work with their suppliers to improve their quality in the long run thus integrating sustainability into their core business strategy and throughout their operations. Equally, the study determined that to large extent, exchange of information with supply chain partners takes place frequently and in a timely manner among supermarkets in Nairobi an indication that the supermarkets work closely with suppliers to develop a shared mindset about supply chain sustainability issues.

Further, the study established that to large extent, majority of the supermarkets in Nairobi keep each other informed about events or changes that may affect them and potentially disrupt supply chain operations, they use internet with suppliers an indication that they may be procuring their goods and services through the internet thus reducing the supermarkets' carbon footprint and environmental waste as well as sourcing products and services that have less impact on the environment. The study also found out that majority of the supermarkets in Nairobi participate in the design of products for recycling or reuse, they invest in energy and material recycling as well as in waste minimization practices and they ensure that all their respective partners comply with human rights such as child labor laws an indication that they protect themselves from potential

supply chain interruptions associated with suppliers.

The study also established that to a very large extent, majority of the supermarkets in Nairobi assess their supply chain operations in order to identify the risks associated with non-sustainable practices. To larger extent, the supermarkets have reduced their respective total costs as a sustainability method in the supply chain. Majority of the respondents also agreed to a very large extent that supermarkets in Nairobi set environmental criteria that suppliers must meet and to larger extent sustainability plays an important role in search for suppliers among supermarkets. It was also established from the study findings that to very large extent, the top management among supermarkets in Nairobi is highly ethical and in a socially responsible manner, the supermarkets manage transport efficiencies through better vehicle utilization and they comply with environmental and social regulations.

The study derived the following regression equation that would help explain the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi:  $Y = 0.840 + 0.160x_1 + 0.141x_2 - 0.252x_3 + 0.305x_4 + 0.159x_5$ . The regression equation indicates that sustainability in the supply chain among supermarkets in Nairobi would be at 0.840 when holding supply chain collaboration, risk management, cost minimization, supplier engagement and e-procurement to a constant zero and by holding all the other relevant factors constant. A unit increase in supply chain collaboration, risk management, supplier engagement and e-procurement will lead to increase in sustainability in the supply chain among supermarkets in Nairobi by factors of 0.160, 0.141, 0.305 and 0.159 respectively while a unit increase in cost minimization would lead to a decrease in sustainability in the supply chain by a factor of (-0.252) among the supermarkets in Nairobi.

The regression equation however, does not explain fully the relationship between sustainability in supply chain and supply chain strategies among supermarkets since it caters for 52.3% of the level of sustainability in the supply chain as indicated by the coefficient of determination (Adjusted  $R^2$ ). This therefore means that apart from the five strategies analyzed in this study, there are other factors that account for the difference in the variance in supply chain sustainability among the supermarkets in Nairobi.

### 5.3 Discussions

The study findings indicate that most of the supermarkets in Nairobi have adopted strategies for sustainable supply chains. They involve other firms to develop sustainable products that meet environmental requirements; they support local communities as well as donate to charitable organizations. This is in line with the assertion by Bai and Sarkis (2010), who observe that a sustainable supply chain extends the conventional scope of supply chain by environmental and social issues and it attempts to explicitly consider all three dimensions of sustainability (environment, social and economic) in designing and optimizing the supply chain.

Supermarkets in Nairobi also involve other firms to develop sustainable products that meet environmental requirements. As pointed out by United Nations (2000) report, collaboration with suppliers on sustainability issues can foster product innovation resulting in products with fewer negative environmental impacts than traditional products or have improved end of life collection and disposal options. The supermarkets have set requirements to ensure that their respective suppliers consistently observe product quality. This corresponds with Harms et al. (n.d.) who assert that codes of conduct as well as norms and standards can serve as criteria for evaluating and selecting suppliers and to determine a minimum level of improvement in order to create more sustainable products.

The study also established that supermarkets in Nairobi work with their suppliers to improve their quality in the long run thus integrating sustainability into their core business, they exchange information with supply chain partners and work closely with them to develop a shared mindset about supply chain sustainability. This is in line with the arguments put forward by Fitzgerald, Luck and Morgan (2007) that engagement initiatives utilize custom devices, including training, and sometimes requesting suppliers to create their own goals and actions for sustainability.

### 5.4 Conclusions

To large extent, most of the supermarkets in Nairobi have adopted the following sustainable supply chain strategies: involving other firms to develop sustainable products that meet environmental requirements; ensuring that suppliers among the supermarkets consistently meet requirements set by the supermarkets; supporting local communities; donating to charitable organizations; working with suppliers to improve their quality in the long run as well as exchanging information with supply chain partners frequently and in a timely manner. The supermarkets in Nairobi keep each other informed about events or changes that may affect them and disrupt supply chain operations, they use the internet with suppliers, they participate in the design of products for recycling or reuse, and they invest in energy and material recycling as well as waste minimization practices.

In addition, the supermarkets in Nairobi ensure that all their respective partners comply with human rights such as child labor laws, they assess their supply chain operations in order to identify the risks associated with non-sustainable practices, they engage in cost minimization practices as a sustainability method in the

supply chain; they set environmental criteria that suppliers must meet, they consider sustainability issues in search for suppliers, the top management among the supermarkets is highly ethical and in a socially responsible manner and the supermarkets manage transport efficiencies through better vehicle utilization as well as comply with environmental and social regulations.

Supply chain collaboration, risk management, supplier engagement and e-procurement have a positive relationship with sustainability in the supply chain among supermarkets in Nairobi while cost minimization has an inverse relationship with sustainability in the supply chain. The strategies however do not explain fully the relationship between sustainability in supply chain and supply chain strategies among supermarkets in Nairobi since they account only for 52.3% of the level of sustainability in the supply chain leaving out 47.7%.

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