

**GREEN LOGISTICS PRACTICES AMONG SUPERMARKETS
IN NAIROBI, KENYA**

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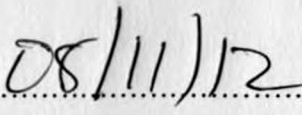
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**A research project submitted in partial fulfillment of the requirement for the
award of a degree of Master of Business Administration (MBA), School of
Business, University of Nairobi**

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DECLARATION

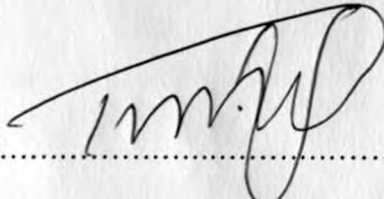
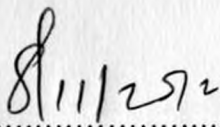
I declare that this research project is my original work and has never been submitted to any other University for assessment or award of a degree.

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DEDICATION

I dedicate this project to my heavenly creator, God, whose passion and enlightenment have brought me this far, and secondly to my late parents, Benjamin and Mamie Whiegar, for laying the foundation upon which I will continue to build.

ACKNOWLEDGEMENT

This study would not have been successful without the encouragement, support, criticism and tireless assistance from my family, friends, MBA colleagues, lecturers and my courageous supervisors. I salute Mr. Thomas Ombati and Mr. Tom Kongere who supervised this project; they were instrumental in leading me through even at their busiest hours. Their suggestions, advice, criticisms and encouragement during the study cannot be over emphasized.

Gratitude goes to my dear wife Gbanco and the kids, Wakay, Aaron, Mamie and Ma-Bee who endured two years of my absence away from home (Liberia) while I pursue this noble academic sojourn. I highly cherish their courage and support.

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I thank all the respondents who participated in the filling of the questionnaires leading to a successful completion of this research project.

ABSTRACT

Green logistics is a relatively new field of green supply chain management among developing countries. The need to protect the environment has led to the implementation of green supply chain management practices in various industries across the globe. By implementing green logistics, organizations are dealing with the issue of sustainability in the supply chain.

There is a need for integrating logistics into a sustainable development process. One of the biggest challenges facing the supply chain at present is creating a long term sustainable society with the least possible negative environmental impact.

The study establishes the various green logistics practices implemented by supermarkets in Nairobi and their effect on customer service delivery. The study adopted a descriptive survey design which questioned respondents on the extent to which green logistics practices are employed by supermarkets in Nairobi and what is the impact of green logistics practices on customer service delivery among supermarkets in Nairobi? The respondents in this study consisted of personnel who are logistics managers, transportation managers, and procurement officers or their equivalent in supermarkets with in Nairobi.

The sample in this study consisted of 50 respondents who were drawn from supermarkets in Nairobi. Data collected was analyzed by use of Likert scale, regression model, frequency, percentage, and tables. Findings of the study indicate that supermarkets in Nairobi have adopted the following green logistics practices: use of lead free fuels to avoid damaging the environment, recycling of materials, complying with the National Environmental Management Authority (NEMA) requirements concerning environmental protection and using environmental friendly packaging materials.

Even though the study was successful, it experienced some limitations from respondents who could not fill in the questionnaire for fear that information provided will be leaked to their competitors. Moreover, because the supermarkets are very busy during week days the officers who responded were hesitant to take off time, hence the data collection time frame extended well beyond the period expected.

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LIST OF ACRONYOMS

| | |
|-----------------------|--|
| CLM | Council of Logistics Management |
| CO₂ | Carbon dioxide |
| EU | European Union |
| GSCM | Green Supply Chain management |
| GLM | Green Logistic Management |
| IT | Information Technology |
| MB | Marginal Benefit |
| MPC | Marginal Private Cost |
| MSC | Marginal Social Cost |
| SC | Supply Chain |
| SCM | Supply Chain Management |

CHAPTER ONE: INTRODUCTION

1.1 Background of the study

The term logistics implies a degree of organization and control over freight movements that only modern technology could have brought into being. It has become one of the most important developments in the transportation industry. 'Greenness' has become a code-word for a range of environmental concerns, and is usually considered positively. It is employed to suggest compatibility with the environment, and thus, like 'logistics' is something that is beneficial. When put together the two words suggest an environmentally-friendly and efficient transport and distribution system (Rodrigue *et al* 2001).

Logistics are important function of modern transport systems. Contemporary technological and spatial developments have improved the cost, efficiency and reliability of freight and passenger transport systems. At the same time, the negative environmental impacts of transportation have gained wide recognition and are at the core issues of sustainability, especially in urban areas. Since the applications of logistics are generally positive for the efficiency of transport systems, it has been suggested that logistics are environmentally friendly, thus the concept of green logistics (Rodrigue, Slack and Comtois 2001).

The demand for environmentally friendly products has increased over the years and so is the shifting of loyalty of consumers. The ever increasing costs of energy and inputs have forced business to find new ways to reduce energy use in order to reduce costs. Supply chain management has been identified to have a significant impact on the natural environment as a result, businesses are deeply trying to green their supply chain by introducing green strategies in their organizations and in the supply chain. This has resulted in a growing need for integrating environmental thinking into supply chain management and processes (Lamming and Hampson 1996).

Today, environmental pollution presents an extremely complex problem and many environmentally conscious people are becoming increasingly aware of this fact. Throughout the life cycle of products, from the launch of an idea to the withdrawal of an old product, negative

effects are produced and reflected in the environment. The number of organizations contemplating the integration of environmental practices into their strategic plans and daily operations is continuously increasing. The worldwide economic growth has given rise to a vast consumption of goods while globalization has led to large streams of goods all over the world.

The production, transportation, storage and consumption of products have created large environmental problems. Governments, action groups and companies are asking for measures to counter this threat. As a result, there has been an excessive amount of pressure on firms to reduce the environmental impact of their logistics operations. In recent decades for instance, businesses have created and adopted strategies that are in better alignment with the best interests of the environment such as designing for recyclability, use of renewable energy, zero waste creation and designing products that do not harm the environment (Srivastava, 2007).

Aronsson & Hüge-Brodin (2006) indicate that transportation of goods has a negative impact on the local air quality, generates noise pollution, leads to accidents and, in totality, makes a noteworthy input to global warming. The impact of logistics on weather change has called for increasing attention in recent years, partially because increasing controls on pollution and road safety improvements have alleviated the other environmental problems. With the Kyoto Agreement being applied worldwide, the practical use of green logistics and supply chain management, most countries have enforced environmental legislation for companies to place social responsibility for green product design, waste disposals, reverse logistics flows including used products and manufacturing induced wastes.

1.1.1 The concept of Green logistics

Green logistics entails integrating environmental thinking into a supply chain management, including product design, material resourcing 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 (Srivastava, 2007). 'Greenness' has become a code-word for a range of environmental concerns, and is usually considered positively. It is normally used to suggest environmental friendliness and thus, like 'logistics' it is something that is beneficial. When put together the two

words suggest an environmentally-friendly and efficient transport and distribution system. The term has wide appeal, and is seen by many as eminently desirable (Rodrigue and Hesse, 2004).

Green logistics is a branch of logistics which aims to co-ordinate the movement of products through the supply chain in a way that meets customer requirements at minimum cost. In the past, this cost has been defined in purely monetary terms. However, as concern for the environment rises, companies have taken more account of the external costs of logistics associated with climate change, air pollution, noise, vibration and accidents. Green Logistics analyzes the environmental consequences of logistics and how to address them (Mudgal, Shankar, Talib, and Raj 2010).

An increasing number of organizations have introduced 'greening' requirements to both upstream and downstream supply chain activity – purchasing clauses, targets, practices, and technologies. According to Klassen and Johnson (2005), there are five possible green supply chain management practices; environmental certifications, pollution prevention, reverse logistics, life-cycle assessment and design for the environment.

Environmental certifications is an internationally recognized environmental management system standard, providing a model for companies to follow to create and achieve their policy. Erica (1995) argued that pollution prevention is the reduction or elimination of wastes and pollutants at their sources. Minimizing or avoiding the creation of pollutants and wastes can be more effective in protecting the environment than treating them, or cleaning them up after they have been created or reversing the wastes to their original source.

Carter and Ellram (1998) have defined reverse logistics as the return, upstream movement of a good or material resulting from reuse, recycling, or disposal with the minimization of waste. According to Carter and Ellram, reverse logistics operations include the following major steps: collection, separation, densification or disassembly, transitional processing, delivery and integration.

Another way to better manage the environment through the implementation of green logistics practices is during the design stage of products. According to Ishii (1995), design is a powerful

instruments by which mankind forges the management of environmental problems. The most significant benefits of design for environment can only be obtained if the product's entire life cycle, including other phases together with those specific to development and production are considered in an environmental friendly manner. That is products should be designed so that they will be reusable or recyclable to support the echo system.

1.1.2 Supermarkets in Kenya

The rise of supermarkets in developing countries has received considerable attention over the past few years (Reardon et al. 2003). It is argued that supermarkets are spreading quickly in urban areas and that supermarket chains are modernizing their product procurement and supply chain management systems, differentiating them from those used by traditional retailers and wholesalers.

In Kenya for example, Neven and Reardon (2004) show that supermarkets are growing at an annual rate of 18% and have a 20% share of the urban food market overall. The first supermarkets arose in the 1960s and they have grown in dominance. Self-service stores in general and supermarkets in particular have popped up all over the country with the current count standing at around 220 supermarkets. In the main urban areas (Nairobi, Mombasa, Kisumu) are the larger-format supermarkets (hypermarkets up to 175,000 square foot) and the larger chains. In the smaller towns and main crossroad towns, smaller format stores and smaller chains have emerged.

Mageto (2009) maintained that the supermarkets sector composed of three tiers, first, second and third tiers. The clear market leaders Uchumi, Nakumatt and Tuskys supermarkets belong to the first tier. They have domestic-capital chains representing 65% of the supermarket sector (Neven and Reardon, 2004).

The second tier, Ukwala and Naivas chains, have 28% of the large format stores in Kenya. Supermarkets in the second tier sector have surpassed the other supermarkets and are growing at a faster pace, increasing their dominance over time (Mageto,2009). The third tier consists of small chains of which there are about 40 and independent (single stores) supermarkets. Here we

find the smaller towns as well as those that have traditionally catered to high-income groups and expatriates, Mageto (2009).

Supermarkets in Kenya play a very significant economic role. The growth of supermarkets has provided thousands of jobs to many people in the country who would otherwise be jobless. By providing employment they are assisting the government in its efforts to alleviate poverty among the citizens. The supermarkets have also brought about development of other businesses in the towns where they are established. The services that have been associated with this include banking services and other related businesses (Ndongeri, 2010).

Green logistics is evident among leading supermarkets in Kenya such as Nakumatt, Tuskys, Uchumi and Ukwala. The supermarkets encourage re-use and recycling of packaging materials in order to limit the level of pollution to the environment. For instance Nakumatt introduced a recyclable bag produced from environmentally friendly materials and has been encouraging customers to use the same instead of the polythene bags. Most of the supermarkets always indicate on their printed packaging materials the need to re-use or recycle the materials (Kimani 2011).

1.2 Statement of the problem

The need to protect the environment has led to the implementation of green supply chain management practices in various industries across the globe. By implementing green logistics, organizations are dealing with the issue of sustainability in the supply chain. There are increased pressures from lobby groups for organizations to conduct their activities in a more environmentally friendly manner. Toke *et al.* (2010) argued that if goods delivery policies do not change such that logistic operators can use the advantages of each mode of transport more rationally, heavy goods vehicle traffic alone will increase by nearly 50% over its 1998 level. This increase in heavy goods vehicle traffic is likely to increase carbon dioxide emissions by 50% in comparison with 1990 levels.

Taniguchi *et al* (2007) provide a useful presentation of the objectives of Green Logistics. According to their paper the three guiding pillars for the future development of green logistics

are sustainability, mobility and accessibility. These in turn support more specific goals such as environmental friendliness and energy conservation. Salhaye and Li described goals for city logistics, with respect to their environmental friendliness; Jonsson (2008) considered the reasonableness to extend these objectives to all logistics components such as order processing, transportation, packaging, warehousing, material handling, communication, reverse logistics, training, education and technology.

Browne and Allen (1999) in their study on the environment argued that climate change resulting from greenhouse gases has economic and social implications as well as negative externalities associated with logistics systems. Externalities such as traffic congestion, resource waste, the use of non-renewable fuel, the effects of waste products such as tires and oil fossil fuel, ecosystem destruction and species, negative public health impacts of pollution extinction, crop destruction, injuries and deaths resulting from traffic accidents, noise, visual intrusion, congestion deterring passenger travel, loss of green field sites and deterioration of buildings infrastructure affect the public if organizations fail to put in place an efficient environmental friendly green logistics policy.

Toke *et al* (2010) also conducted a study on Green Supply Chain Management. The study focused on the critical research and practices. The study found out that distribution and outbound logistics are very important in the green supply chain management. Painting logistics “green” is not easy. As the public becomes more aware of environmental issues and global warming, consumers will be asking more questions about the products they are purchasing. Companies will have to expect questions about how green their manufacturing processes and supply chain are, their carbon footprint and how they recycle (Murray, M. 2012).

In Kenya, related research includes Masese, (2001) who studied on the factors supermarket consider in selecting their suppliers; Mwanoyota (2004) studied on integrating the supply chain management and enterprise resource planning in supermarkets in Nairobi. Imbuga, (2005) studied on the determinants of customer satisfaction in supermarket in Nairobi and Mageto, (2009) studied the relationship between supply chain performance and supply chain responsiveness: a survey of supermarkets in Nairobi, Kenya. Considering the various studies, it is clear that there is no known study on the implementation of green logistics practices among

supermarkets in Nairobi and the impact of green logistics practices on customer service delivery thus creating a research gap.

It is on the basis of this existing gap that this study seeks to examine the green logistics practices among supermarkets in Nairobi. The study will seek answers to two questions: what are the green logistics practices employed by supermarkets in Nairobi? And what is the impact of green logistics practices on customer service delivery among supermarkets in Nairobi?

1.3 Objectives of the study

The following were the objectives of the study:

- i. To establish the extent to which green logistics practices are employed by supermarkets in Nairobi, Kenya.
- ii. To examine the impact of green logistics practices on customer service delivery among supermarkets in Nairobi, Kenya.

1.4 Value of the study

Upon completion, the findings of this study will be of benefit to a number of people. The government agencies responsible for the conservation of the environment will get to understand the various practices that supermarkets in Nairobi have put in place through green logistics practices to reduce damage to the environment.

Managements of other supermarkets located in Liberia and Kenya will also be able to understand the best green logistics practices that have already been employed by supermarkets in Nairobi. This will enable them to benchmark and adopt best practices in the sector.

The findings of the study will also benefit those in the academic realm. Those interested in conducting further research in this area will be able to find materials for reference. Other organizations interested in understanding green logistics practices will also be able to benefit from the findings of the study.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter outlines existing studies regarding Green Logistics practices in the field of supply chain management to support new findings that the researcher may wish to add to existing knowledge. Nachmias (1996) argued that literature review is necessary to set the stage of the study by summarizing past research in a logical way to form the basis for the researcher to reduce the chances of just stating what already exists by aligning the study to solve existing problems.

2.2 Overview of Green Logistics

The Council of Logistics Management (CLM) defines Supply Chain Management as the strategic coordination of the core functions and tactics across these functions within a specific organization and across its partners within the supply chain for the purposes of improving the long-term performance of the individual organizations and the supply chain as a whole. 'Supply Chain Management has been defined to explicitly recognize the strategic nature of coordination between trading partners and to explain the dual purpose of Supply Chain Management: to improve the performance of an individual organization and to improve the performance of the whole supply chain' (Li *et al*, 2006).

There is a need for integrating logistics into a sustainable development process. One of the big challenges facing the supply chain at present is creating a long term sustainable society with the least possible negative environmental impact. In response to this pressure, a new approach to logistics emerged in the early 1990s, which went beyond the standard logistical imperatives for efficient, effective, and fast handling and movement of goods, and took into account measures for protecting the earth's environment: the "green logistics" approach (Geroliminis & Daganzo, 2009).

Cooke (1991) suggests that the issue of the times for logistics industry will be to handle the burgeoning environmental restrictions imposed on transportation and distribution. The growing

importance of environmentalism is suggested to have two major impacts on logistics management: a broadening of the scope of logistics and an influence on the way logistics managers do their jobs (Muller, 1992). The logistics discipline has generally focused on producer-to-consumer movement of products, considering transportation, warehousing and inventory management (forward distribution). But the desire for “greenness”, led in the early 1990s to the concept of “reverse” distribution, where consumer-to-producer movements become equally important. “Reverse logistics” is the process of continuously taking back products or packaging materials to avoid waste or high energy consumption through the incineration process (Byrne and Deeb, 1993).

2.3 Green Logistics Implementation and practices

Environmental and social factors have necessitated the need for green logistics. Green Logistics is concerned with producing and distributing goods in a sustainable way, taking account of the environment. Thus the objectives are not only concerned with the economic impact of logistics policies on the organization carrying them out, but also with the wider effects on society, such as the effects of pollution on the environment (Sbihi and Eglese, 2007).

Companies are focusing a lot of energy and resources in making modification to their supply chain to make it more environmentally sound, or green. Heying and Sanzero (2009) in their study about Walmart’s green logistics suggested various ways of implementing green logistics. They argued that it is important to create zero waste and provide products which do not harm the environment. They suggested that actions such as reduction of greenhouse gases, increased fuel efficiency, reduced energy use at the stores, use of diesel electric and refrigerated trucks, and purchase of only compliance appliances from suppliers were some of the ways of adopting green logistics.

Green awareness is the key element of a green strategy. Gamero et al. (2010) found that if the environmental strategies are driven from green awareness, and are not driven from legislation, then their effect on environmental management is significantly positive. Hart and Ahuja (1996) demonstrated that firms that have an early awareness may be opting for more advanced environmental strategies that build on low emissions. Sarkis (2006) indicated that enterprises that

develop an early strategy in pollution-reducing processing equipment benefit from a higher profit growth than later followers.

Wikerson (2005) identified four green supply chain implementation best practices; align green supply chain goals with business goals, evaluate the supply chain as a single life cycle system, use green supply chain analysis as a catalyst for innovation, focus on source reduction to reduce waste. Green Logistics activities include measuring the environmental impact of different distribution strategies, reducing the energy usage in logistics activities, reducing waste and managing its treatment. Reverse logistics is also an important practice in green logistics since it deals with the complete life cycle of a product including disposal (Sbihi and Eglese, 2007).

2.4 Impact of green logistics

According to Byrne and Deeb (1993) the traditional logistics practices focused mainly on forward logistics. The advent of green logistics has made organizations to direct their focus on exploiting new market opportunities. While traditional logistics seeks to organize forward distribution, that is transportation, warehousing, packaging and inventory management from the producer to the consumer, environmental considerations opened up markets for recycling and disposal, and led to an entire new sub-sector: reverse logistics. This reverse logistics involves the communication of information, transportation of waste and the movement of used materials back to the supply chain.

The reverse flow of materials and waste products has contributed a great deal in reducing the harm that is done on the environment. This has also led to another approach of reverse logistics where the manufacturer or distributor take responsibility for the delivery of new products as well as transporting back any used materials or waste for disposal or recycling. This would mean environmental considerations through the whole life-cycle of a product (Giuntini and Andel, 1995).

The need for green logistics requires organizations to shift freight from modes with relatively high carbon intensities, such as air and road, to those with much lower carbon emissions, such as rail and water-borne services, can substantially decarbonizes freight transport operations. As

explained earlier, however, trucking and airfreight, the more carbon-intensive modes have been increasing their share of the freight market in most parts of the world. Governments and multi-national organizations such as the European Union, are endeavoring to reverse this trend in various ways, by investing in rail, inland waterway and port infrastructure, providing subsidies for the purchase of vehicles and equipment and revenue-support for rail and water-borne services. The Marco Polo II programme in the EU, for example, has the objective of shifting the equivalent of the forecast increase in cross-border road tonne-kms (20.5 bn) between 2007 and 2013 onto rail or water (Millan and Lastra, 2007).

Full internalization of the marginal social costs of transport, incorporating a realistic valuation of the social cost of carbon emissions, as currently proposed by the European Commission, would also be likely to induce a significant shift to greener modes. This would, for example, correct the current fiscal anomaly which exempts aviation from taxation on the kerosene that it uses, despite the fact that burning this fuel at high altitude has a global warming effect between 2 and 4 times greater than running trucks on diesel fuel.

Browne and Allen (1999) argued that without intervention logistics firms only pay the marginal private cost (MPC), resulting in market equilibrium conditions at which MPC equals the marginal benefit (MB). However, the equilibrium point which maximizes social welfare occurs where the marginal social cost (MSC) equals MB, since MSC accounts for the combined cost incurred by the logistics companies and the general public. Externalities occur outside the typical market process, and therefore cause a form of market failure, since actors in the market do not incur the full costs of production and consumption. As a result, members of the society may be negatively impacted by the activities for which the full social cost is not incurred (Brown and Allen 1999).

Green logistics also requires that firms utilize their vehicle capacity well. A broad range of measures can be applied to improve vehicle loading, save fuel and cut CO₂ emissions. These include improved back loading (McKinnon and Ge, 2006), the use of more space efficient handling systems and packaging (Kearney, 1997), the adoption of more transport efficient order cycles (for example encouraging customers to adhere to an ordering and delivery timetable and

thus concentrating distribution in particular zones on particular days) and consolidating freight in larger/heavier vehicles (Vierth *et al* 2008]. The last of these measures, however, can have the 'second order' effect of displacing freight from lower carbon rail and water-borne modes. To reach high levels of vehicle loading it is often necessary for companies to collaborate and share vehicle capacity. For instance, Kelloggs and Kimberly-Clark, firms with similarly low density products and complementary transport demands, have worked with TDG, their logistics service provider in the UK, to save jointly around 430,000kms per annum by coordinating their transport (Anon 2008).

2.5 Challenges of Green Logistics

Lack of Information Technology (IT) implementation is major challenge in logistics. IT systems support collaborative supply chain processes and enhance supply chain performance (Rogers *et al*, 1998). An efficient information and technology system is very necessary for supporting the GSCM during various stages of product life cycle. It can be very useful for product development programs encompassing the design for the environment, recovery and reuse. Efficient information systems are needed for tracking and tracing the returns of product, linking with the previous sales (Ravi & Shankar, 2005). Information support is necessary for developing linkages to achieve efficient GSCM. It is required to handle information's flows associated with both forward and backward flow of materials and other resources to manage green SC efficiently (AlKhidir & Zailani, 2009). IT enablement reduces lot of paper usage, which supports GSCM philosophy. So, lack of IT implementation is an important barrier to achieve efficient GSCM.

Jonsson (2008) argued that a prerequisite for rational decision-making is access to complete, up-to-date and correct information. Such information is also essential for managing industrial activities and for the efficient flow of materials and use of resources. Information system in logistics management entail communication that relate to different methods aimed at communicating information within and between companies, such as between customer companies and supplier companies and between trucks and stationary distribution systems (Jonsson 2008).

There is also lack of organizational encouragement. Informal linkages and improved communication help the organizations to adopt Green's practices (Yu Lin & Hui Ho, 2008). Training and education are the prime requirements for achieving successful implementation of GLM in any organization (Ravi & Shankar, 2005). Management may encourage employees to learn green information. Organizations may provide rewards for green employees. Employees may be helped when they face green problems and may be provided support to learn green information (Hsu & Hu, 2008).

Higher quality of human resources such as better training or education will help in implementing green logistics practices. Quality human resources can provide new ideas for companies, learn new technologies easily, share knowledge with each other and use new technologies to solve problem (Yu Lin & Hui Ho, 2008). However, due to financial constraint; quality of human resources is barrier. Therefore poor quality of human resources is an important barrier to implement green logistics practices.

Government regulation can also encourage or discourage the adoption of innovation, as government sets the environmental regulations for industry (Scupola, 2003). Time consuming regulatory requirements, fees or levies may discourage smaller firms. Tax structures that distort incentives can discourage industry to implement green logistics practices. Government institutions are considered as barriers to development in the environmental management in the sense that institutional process for implementing green logistics practices are going on but very limited institutional support is given for new ideas to implement green logistics practices. The tendency of government to encourage old practices is major barrier (AlKhidir & Zailani, 2009). Therefore lack of government support systems is a barrier to implement efficient green logistics practices.

Lack of implementing green practices is also another challenge to green logistics. Innovative green practices are associated with the explicitness of green practices, accumulation of green related knowledge, organizational encouragement and quality of human resources (Yu Lin & Hui Ho, 2008). Innovative green practices involves hazardous solid waste disposal, energy conservation, reusing and recycling of materials. Innovative green practices promote innovative

design, new market opportunities and makes their quality better than others. However, due to market competition and cost implications, organizations try to save cost. Implementing green logistics practices initially involves high investment. Financial constraints also lead to resistance to implementing green practices (Ravi & Shankar, 2005).

Top management support and commitment are necessary for any strategic program success (Hamel & Prahalad, 1989; Zhu & Sarkis, 2007). Top Management support is especially useful for environmental practices such as GSCM. Top management has significant ability to influence, support actual formation and implementation of green initiatives across the organization (Sarkis, 2009). Top management provides continuous support for green logistics practices in the strategic plans and action plans for a successful implementation (Ravi & Shankar, 2005).

Historically, cost has been used as the prime performance measure. Usually, high cost is a big pressure in green logistics practices as compared to conventional SCM. The initial investment requirement by green methodologies such as green design, green manufacturing, green labeling of packing etc. are too high. Engaging in environmental management involves two types of costs, direct cost and transaction cost. Both types of costs are likely to constitute significant barrier to implement green logistics practices (AlKhidir & Zailani, 2009). IT enablement, Technology advancement adoption, hiring good quality of employees, motivating and training of employees towards green logistics innovation will require high initial investment. Therefore, cost implication is a major barrier among the barriers to implement efficient green logistics practices. The writer did not suggest alternative cost saving measure in green logistics implementation.

Strengthened relationships with suppliers result in lower inventory levels, costs and higher accuracy. Involvement of the suppliers in design process and technology affects overall performance of the whole supply chain (Sarkar & Mohapatra, 2006). Suppliers' reluctance to change towards GSCM is due to traditional mindset and suppliers' interests being different from those of the total network (Mudgal *et al.*, 2010). The manufacturers cannot produce green products unless they work together with suppliers. Suppliers need to meet the requirement of buyers to maintain business relationship. So Supplier reluctance to change towards GSCM is a very important barrier to implement GSCM.

2.6 Customer Service

A customer may be defined as someone who has a direct relationship with, or is directly affected by, your agency and who receives, or relies on, one or more of your agency's services or products. There are three principles that must be observed to achieve good customer service. The first principle is integrity. It is related to the intent or meaning behind one's actions. It requires service delivery that is impartial and professional, and advice that is frank, apolitical and based on comprehensive research that allows for objective decision making. The second principle is respect for customers that is demonstrated by treating them with dignity, fairness and sensitivity, according to their circumstances and specific needs. Accountability is the last principle and it is about fair and consistent decision making, where innovative solutions are sought and issues of confidentiality are respected (Government of South Australia, 2010).

The level of customer service will determine the level of customer satisfaction. Customer satisfaction is buzzword today, everyone using this customer's satisfaction is affected by the importance placed by the customers on each of the attitudes of the product/ service. Customer satisfaction measurement allows an organization to understand the key drivers that create satisfaction or dissatisfaction; and what is really driving their satisfaction during a service experience. Customer satisfaction is the state of mind that customers have about a company when their expectations have been met or exceeded over the lifetime of the product or service (Kevin, 1995 and Kumbhar, 2010). It is also feeling or attitude of a customer towards a product or service after it has been used.

According to Oliver (1980) satisfaction appears to mediate changes between pre-exposure and post-exposure attitudinal components. It is a major outcome of marketing activity whereby it serves as a link between the various stages of consumer buying behavior (Jamal & Nasser, 2002). When customers pay money to buy a service they have some minimum expectations from the transaction. These expectations from the purchase have to be met substantially, if not entirely for the customer to become a loyal customer of the service (Akbar and Parvez, 2009).

2.7 Empirical Studies in Green Logistics

There are a number of studies that have focused on real practices in the field of green supply chain management. Several empirical studies in the area have been published. They consist mainly of case studies and surveys. Most case studies deal with green design (product and logistics) and green operations (remanufacturing, recycling, RL, etc.). According to Bhateja *et al* (2011), an environmentally conscious supply chain, also called a green supply chain, is a new concept appearing in recent literatures. Although this environmental issue has been realized very important for business, its introduction to supply chain management has only been developed recently.

The literature about environmentally conscious supply chain is very limited. "Sustainable Development" was the key concept of the 1992 Earth Summit in Rio, where governments and international organizations committed themselves to take action to protect the environment as an integral part of long-term economic development. Environmentally-responsible consumption and production are seen as essential parts of the strategy to improve environmental quality, reduce poverty and bring about economic growth, with resultant improvements in health, working conditions, and sustainability, and is today's highlighted Agenda.

Qinghua, Sarkis & Kee-hung (2006) studied Green supply chain management: pressures, practices and performance within the Chinese automobile industry in which they observed that increasing pressures from a variety of directions have caused the Chinese automobile supply chain managers to consider and initiate implementation of green logistics practices to improve both their economic and environmental performance. Expanding on some earlier work investigating general green logistics practices in China, the authors explored the GSCM pressures/drivers (motivators), initiatives and performance of the automotive supply chain using an empirical analysis of 89 automotive enterprises within China.

In another study Robert & Benjamin (2010) introduced Green Transportation Costs in Supply Chain Modeling in which they thought that escalating environmental concerns with prevalent transportation modes had led to an increased interest in the adoption of "green", sustainable practices in the area of supply chain management. As a part of an overall green supply chain

strategy, the amount of carbon emissions resulting from the transportation element of a supply chain is a growing concern for supply chain managers and corporate executives alike. The authors tried to review methods for quantifying carbon emissions and estimating the cost of going green in a selected set of supply chain optimization models.

Shang *et al* (2010) also conducted an empirical study based on six dimensions of green supply chain management i.e. eco design, green manufacturing and packaging, environmental participation, green marketing, stock and suppliers. The results inferred that the firms which were focusing on green marketing had been successful competitors against the rivals. Lamming and Hampson (1996) also explored the concepts of environmentally sound management and linked them to supply chain management practices such as vendor assessment, collaborative supply strategies, establishing environmental procurement policy and working with suppliers to enable improvements.

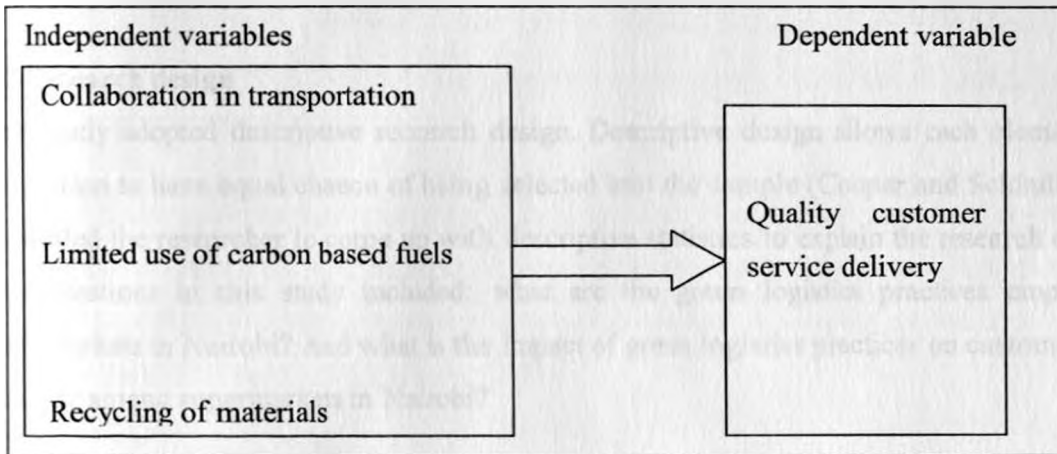
2.7 Summary of Literature review

The studies reviewed so far have shown a number of research gaps. Geroliminis & Daganzo (2009) in their study of green logistics schemes used in cities around the world failed to come out clearly with the various approaches that can be used to protect the earth's environment. Byrne and Deeb (1993) also insisted on the use of incinerators in the reduction and treatment of waste. It is however worth noting that in most developing countries, access to incinerators is minimal. This scarcity may make it difficult to dispose waste effectively. The study failed to address the role of green logistics management in the transportation and disposal of waste within the supply chain for which there is need to examine same.

Ravi & Shankar (2005); Hamel & Prahalad (1989); Zhu & Sarkis (2007) and Sarkis (2009) also mentioned the role of top management in GLM. The studies however failed to capture in detail the role that the board of directors plays in implementing green supply chain practices. The board of directors is an important institution that must play a leading role in GLM within organizations. AlKhidir & Zailani (2009) also failed to enumerate various cost saving techniques that can enhance GLM. There is need to identify cost saving techniques that enhance GLM.

2.8 Conceptual framework

The conceptual framework discussed in this study illustrates the relationship between the independent variables and the dependent variable. The independent variables in this study are: collaboration in transportation, limited use of carbon based fuels and recycling of materials where as the dependent variable is quality customer service delivery.



Source : researcher (2012)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter gives the methodology that was used to accomplish the already established research objectives. This section includes the research design, target population, sampling design, sample size, data collection and data analysis which are discussed in preceding paragraphs.

3.2 Research design

This study adopted descriptive research design. Descriptive design allows each element of the population to have equal chance of being selected into the sample (Cooper and Schindler 2006). It enabled the researcher to come up with descriptive statistics to explain the research questions. The questions in this study included: what are the green logistics practices employed by supermarkets in Nairobi? And what is the impact of green logistics practices on customer service delivery among supermarkets in Nairobi?

3.3 Target Population

The study targeted all eighty-four (84) supermarkets located in Nairobi, Kenya (www.yellowpageskenya.com 2012). Mageto (2009) used a list from the Yellow pages of the Nation Business Directory that contained supermarkets in Nairobi. The same list has also been used by Mwanyota (2004). The list of supermarkets in Nairobi is attached as Appendix II.

3.4 Sample size and sampling procedures

The study adopted a stratified sampling technique to select 50 supermarkets which is 59.52 % of the population. The sample size of 50 was representative and substantial to satisfy the objectives of this study. Mugenda and Mugenda (2003) recommend a sample size of at least 10% of the target population. Further, previous researchers who undertook similar studies on supermarkets in Nairobi used the sample size of 50. For instance, Ngatia (2000), Sailewu (2001), and Mwanyota (2004) used a sample size of (50) supermarkets in Nairobi. Similarly, Mageto (2009) used a sample of (50) supermarkets. The four studies consisted of a population of all supermarkets in Nairobi, similar to this study.

The sample in this study consisted of respondents who are logistics manager, transportation manager or their equivalent in the selected supermarkets. Data from the study came from self-administered questionnaire which were distributed to fifty respondents, that is one questionnaire to each of the selected fifty (50) supermarkets. Similar approach was adopted by Mageto (2009) and Norizan (2005). The sample constituted 70% supermarkets with more than one branch and 30% of single branch supermarkets draw from Mageto (2009). Ten supermarkets (Acacia, Chandarana, Cleanshelf, Nakumatt Holdings Ltd, Naivas, Safeway, Tuskys, Tusker Mattresses Ltd, Uchumi Holdings Ltd, and Ukwala) are supermarkets with more than one branch in Nairobi (www.mocality.co.ke 2012).

Information for supermarkets with several branches was taken from the head office branch, thus treating the multi-branch supermarkets as a single business unit. Mwanyota (2004) used similar methodology for his study comprising of all supermarkets in Nairobi as listed in the yellow pages of the Nation Business Directory, 2003.

3.5 Data collection

The study made use of primary data that was collected through a structured and semi structured questionnaire. The questionnaire which was dropped and picked up later comprised of questions framed using the Likert scale format to determine the extent to which green logistics practice impacts customer service delivery among supermarkets in Kenya. Likert Scale is a psychometric response scale primarily used in questionnaires to obtain participant's preferences or degree of agreement with a statement or set of statements (Bissonnette 2007). The instrument was divided into three sections; the first section sought general demographic information of the respondents. Section two sought information on green logistics practices in supermarkets in Nairobi and the final section sought data concerning the impact of green logistics practices on customer service delivery.

3.6 Data analysis

Upon successful completion of the data collection exercise, the researcher arranged and coded the quantitative data accordingly. The data collected for the two objectives were in quantitative and qualitative form.

The following regression model was also used to show the relationship between green logistics practices and customer service delivery among supermarkets in Nairobi: $Y = a + b_1x_1 + b_2x_2 + b_3x_3$
Where: Y is the level of customer service delivery; a is the Y intercept when X is zero; x_1 is collaboration in transportation; x_2 is limited use of carbon based fuels and x_3 is recycling of materials. b_1 , b_2 and b_3 represent the regression weights attached to each variable. The three independent variables: collaboration in transportation, limited use of carbon based fuels and recycling of materials are practices of green logistics that are likely to have an impact on the level of customer service delivery among supermarkets in Nairobi since changes in customer service delivery may depend on the independent variables.

Qualitative data was analyzed by using content analysis. Content analysis is used in the social sciences to study communication. It is a systematic, replicable technique for compressing many words of text into fewer content categories based on explicit rules of coding (Stemler 2001). The findings were presented in tables and pie charts.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND INTERPRETATIONS

4.1 Introduction

This chapter presents data analysis, interpretation of findings and discussion of the study. During the study 42 questionnaires out of 50 sent out were returned, representing a response rate of 84% which was considered satisfactory for analysis. The data were collected from supermarkets in Nairobi, analyzed and presented in the form of tables and charts in line with the objectives of the study which are to establish the extent to which green logistics practices are employed by supermarkets in Nairobi, Kenya and to examine the impact of green logistics practices on customer service delivery among supermarkets in Nairobi.

4.2 Personal information of the respondents

For personnel who participated in this study, the researcher wanted to gather personal information such as professional qualifications, whether they worked in supply chain department, their knowledge on green logistics as well as their involvement in green logistics implementation. From the research findings, 84.3% of the logistics managers have professional qualification in green supply chain management while 15.7% of the logistics managers do not have professional qualifications in supply chain. Hiring qualified personnel in the supply chain departments is an indication that the supermarkets are concerned with producing and distributing goods taking account of the environment which is in line with the National Environmental Management Authority (NEMA) requirements concerning environmental protection.

Table 4.1 Professional qualifications in supply chain

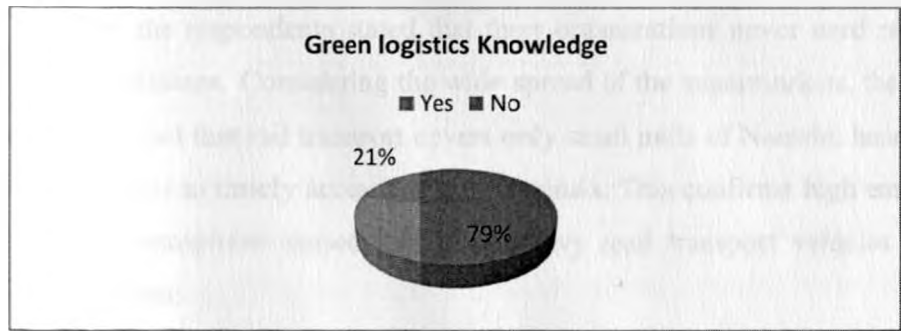
| Response | Frequency | Percent |
|-----------------|------------------|----------------|
| Yes | 37 | 84.3 |
| No | 7 | 15.7 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher further sought to find out whether the respondents worked in a supply chain department. The findings indicate that 100% of the respondents work in the supply chain departments of their respective supermarkets. The assignment of all logistics managers in the supply chain department means that their respective skills will be enhanced leading to a more efficient and responsive supply chain department.

Moreover, the researcher was interested in establishing whether the respondents who were logistics managers among supermarkets in Nairobi had some knowledge on green logistics. It is evident from the findings presented in the chart below that 79% of the managers have knowledge on green logistics. This means that a high number of the respondents are trained and knowledgeable in green logistics management.

Figure 4.1 Knowledge in green logistics



Source: researcher (2012)

The researcher was also interested in finding out whether logistics managers have been involved in green logistics implementation among supermarkets in Nairobi. From the research findings 34.3% of the respondents have been involved in green logistics implementation while 65.7% have not been involved. This means that over half of the logistics managers are not involved in green logistics implementation in their respective supermarkets even though they are knowledgeable in green logistics practices. This lack of implementation is contrary to maintaining a viable ecosystem.

Table 4.2 Involvement in green logistics implementation

| Response | Frequency | Percent |
|----------|-----------|---------|
| Yes | 14 | 34.3 |
| No | 28 | 65.7 |
| Total | 42 | 100 |

Source: researcher (2012)

4.3 Green logistics practices

In this section, the researcher sought the views of the respondents on the extent to which they agreed with various green logistics practices employed by supermarkets in Nairobi, Kenya.

The respondents were required to state the extent to which their respective firms used rail transport to minimize carbon emission from road transport. The research finding shows that 77.1% of the respondents stated that their organizations never used rail transport to minimize carbon emissions. Considering the wide spread of the supermarkets, the lack of rail use may be due to the fact that rail transport covers only small parts of Nairobi; hence, it may be difficult for supermarkets to timely access the rail terminals. This confirms high emission of carbon dioxide into the atmosphere caused by use of heavy road transport vehicles to deliver goods to the supermarkets.

Table 4.3 Use of rail transport to minimize carbon emission

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 32 | 77.1 |
| Less extent | 3 | 7.1 |
| Moderate extent | 3 | 7.1 |
| Very large extent | 4 | 8.6 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher was interested in establishing whether supermarkets in Nairobi used lead free fuels to avoid destruction to the environment. From the research finding, 50% of the respondents agreed to a moderate extent that supermarkets in Nairobi used lead free fuels to avoid devastation to the environment. This confirms that the supermarkets in Nairobi are moving towards the use of lead free fuel in their operations.

Figure 4.2 Use of lead free fuels



Source: researcher (2012)

The researcher wanted to find out whether supermarkets in Nairobi provided means for recycling of materials. The findings presented in the table below dispatched that 50% of the respondents agreed to a large extent that supermarkets in Nairobi provided means for recycling of materials. This means that over half of the supermarkets have system in place to sell environmental friendly recyclable products to their customers.

Table 4.4 Providing means for recycling of materials

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 15 | 35.7 |
| Moderate extent | 3 | 7.1 |
| Large extent | 21 | 50.0 |
| Very large extent | 3 | 7.1 |

| | | |
|-------|----|-----|
| Total | 42 | 100 |
|-------|----|-----|

Source: researcher (2012)

Respondents were asked whether supermarkets in Nairobi contracted suppliers who embraced green logistics. As tabulated in the table below 28.6% of the respondents have never contracted suppliers who embraced green logistics practices. This is an indication that not all the supermarkets in Nairobi are collaborating with suppliers that embrace environmental thinking in their logistics management.

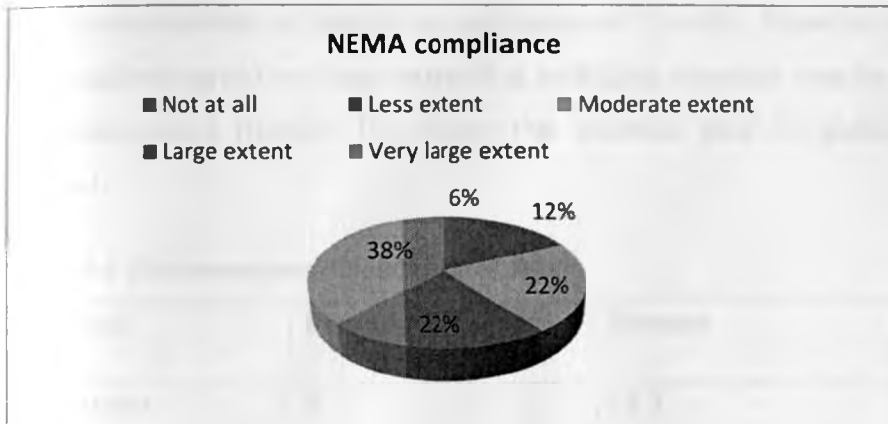
Table 4.2 Contracting suppliers who embrace green logistics

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 12 | 28.6 |
| Less extent | 6 | 14.3 |
| Moderate extent | 9 | 21.4 |
| Large extent | 6 | 14.3 |
| Very large extent | 9 | 21.4 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher was also interested in establishing whether logistics practices used by supermarkets in Nairobi comply with NEMA requirements. From the research finding, 38% of the respondents agreed to a very large extent that logistic practices used by supermarkets in Nairobi comply with NEMA requirements. The researcher found out that only 6% of the supermarkets are not NEMA compliance. Hence, it is likely that supermarkets that have not yet embraced NEMA will follow suit since 94% of the supermarkets are to some extent in compliance.

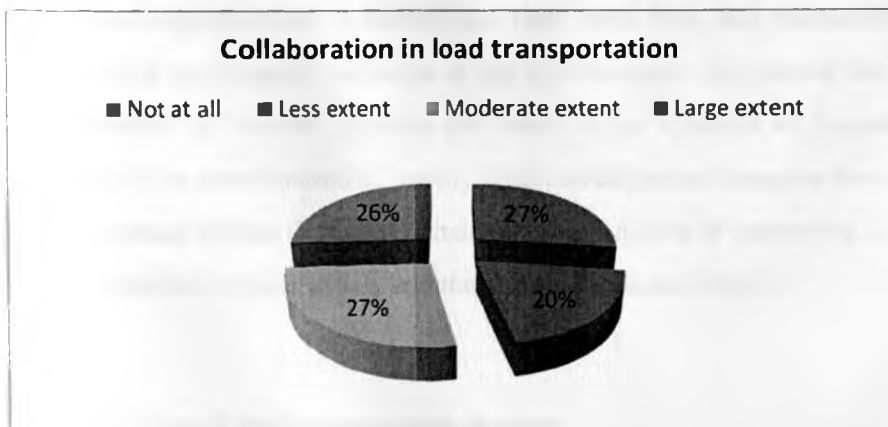
Figure 4.3 NEMA compliance



Source: researcher (2012)

The researcher further sought to find out from the respondents if supermarkets in Nairobi collaborate with other players in load transportation to reduce carbon emissions. The research finding suggests as indicated in the chart below that not very many supermarkets in Nairobi collaborate with other suppliers to reduce carbon emissions. For instance 20% of the respondents said their supermarkets have no collaboration in load transportation, and only 27% of the respondents agreed to a large extent. The low level of load transportation may be due to the fact that sometimes collaboration may be expensive and requires proper management skills as well as sacrifices among partners for collaboration to be successfully implemented.

Figure 4.4 Collaboration in load transportation



Source: researcher (2012)

On packaging, the researcher wanted to find out from the respondents if packaging materials used by supermarkets in Nairobi are environmental friendly. From the research findings, 51.4% of respondents agreed to a large extent that packaging materials used by supermarkets in Nairobi are environmental friendly. This means that materials used for packaging can be reused and recycled.

Table 4.6 Environmental friendly packaging

| Response | Frequency | Percent |
|-------------------|------------------|----------------|
| Less extent | 6 | 14.3 |
| Moderate extent | 9 | 21.4 |
| Large extent | 22 | 51.4 |
| Very large extent | 5 | 12.9 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher was also interested in establishing from the respondents whether fleets used by supermarkets in Nairobi were fitted with fuel management devices to avoid fuel wastage and unnecessary pollution to the environment. Form the research finding, 50% of the respondents agreed that supermarkets in Nairobi use fleet fitted with fuel management devices to avoid fuel wastage and unnecessary pollution to the environment. The use of fuel management devices by supermarkets in Nairobi supports the work of the Council of Logistics Management (CLM) which opts for coordination of supply chain strategies to integrate the core functions and tactics across partners within the supply chain for the purposes of improving the long-term performance of the individual organizations and the supply chain as a whole.

Table 4.7: Use of fuel management devices

| Response | Frequency | Percent |
|-----------------|------------------|----------------|
|-----------------|------------------|----------------|

| | | |
|-------------------|----|------|
| Not at all | 8 | 20.0 |
| Moderate extent | 15 | 35.7 |
| Large extent | 16 | 37.1 |
| Very large extent | 3 | 7.1 |
| Total | 42 | 100 |

Source: researcher (2012)

4.4 Impact of green logistics practices on customer service delivery

In this section, the study sought to establish the impact of various green logistics practices on customer service delivery among supermarkets in Nairobi, Kenya. The findings as obtained from the respondents who participated in the study have been presented and explained below.

The researcher wanted to establish whether green logistics practices enhance efficient customer service delivery. As indicated in the table below, the research finding reveals that 57.1% of the respondents agreed to a very large extent that green logistics practices lead to efficient customer service delivery in supermarkets in Nairobi. This means that when environmental thinking is incorporated into logistics management, consumer goods will be safely handled to avoid contaminations from hazardous elements.

Table 4.8 Green logistics to customer service efficiency

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 3 | 7.1 |
| Less extent | 6 | 14.3 |
| Moderate extent | 3 | 7.1 |
| Large extent | 6 | 14.3 |
| Very large extent | 24 | 57.1 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher as well sought to establish from logistics managers among supermarkets in Nairobi whether green logistics has made customer service an expensive undertaking. The

research findings presented in the graph below indicates that 47% of the respondents agreed to a large extent that green logistics practice has made customer service an expensive undertaking among supermarkets in Nairobi. This means that departing from the traditional ways of handling product movements within the supply chain to a more environment friendly movement is cost intensive especially when there is inadequate training and communication among personnel in the logistics department.

Figure 4.5 Green logistics makes customer services expensive



Source: researcher (2012)

The study also sought to find out from the respondents if green logistics has increased the cost of products and affected customer service standards. From the research finding, 42.9% of the respondents agreed to a very large extent that green logistics has increased the cost of products and affected customer service standards among supermarkets in Nairobi.

Table 4.9 Increase cost of products

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 3 | 7.1 |
| Moderate extent | 15 | 35.7 |
| Large extent | 6 | 14.3 |
| Very large extent | 18 | 42.9 |
| Total | 42 | 100 |

Source: researcher (2012)

Moreover, the researcher wanted to understand from the respondents whether green logistics practices result to longer lead time that affect customer service. As shown in the table below, 27.1% of the respondents agreed to a very large extent that green logistics led to longer lead times that affects customer service among supermarkets in Nairobi. This means that when implementing green logistics, the time the customers take to place an order and the time it takes for the customer to receive the product is longer.

Table 4.10 Green logistics leads to longer lead times

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 8 | 21.4 |
| Less extent | 6 | 14.3 |
| Moderate extent | 6 | 14.3 |
| Large extent | 10 | 22.9 |
| Very large extent | 12 | 27.1 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher sought to establish whether green logistics leads to quality customer services provided by supermarkets in Nairobi. The findings tabulated below indicate that 57.1% of the respondents agreed to a very large extent that green logistics leads to quality customer services provided by supermarkets in Nairobi. This means that through the flow of information on green practices the supermarkets will provide excellent service to customers when their logistics programs meet acceptable standard.

Table 4.11 Quality customer service

| Response | Frequency | Percent |
|-------------|-----------|---------|
| Not at all | 3 | 7.1 |
| Less extent | 9 | 21.4 |

| | | |
|-------------------|----|------|
| Moderate extent | 3 | 7.1 |
| Large extent | 3 | 7.1 |
| Very large extent | 24 | 57.1 |
| Total | 42 | 100 |

Source: researcher (2012)

The researcher was interested in establishing whether the use of rail transport among supermarkets in Nairobi delivers large loads that make products available to customers. It is clear from the table below that 50.0% of the respondents agreed that rail transport delivers large loads making it easy for customers to get their products of choice. Even though as earlier indicated in the study, lot of supermarkets in Nairobi are not using rail transport, the respondents agreed that a single train load of goods is substantial to serve their customers on a longer term basis rather than a truck load.

Table 4.12 Rail transport makes products available to customers

| Response | Frequency | Percent |
|-------------------|-----------|---------|
| Not at all | 12 | 28.6 |
| Less extent | 3 | 7.1 |
| Moderate extent | 3 | 7.1 |
| Large extent | 21 | 50.0 |
| Very large extent | 3 | 7.1 |
| Total | 42 | 100 |

Source: researcher (2012)

Table 4.13: Model Summary (b)

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|-------|---------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .726(a) | .527 | .498 | 1.039 | .527 | 18.135 | 4 | 65 | .000 |

a Predictors: (Constant), Limited use of carbon based fuels, Collaboration leads to better customer service, , Recycling leads to quality customer service

b Dependent Variable: Quality customer service delivery

Source: researcher (2012)

From the above table, it is clear that the variance in customer service is accounted by 52.7% of three variables i.e. Limited use of carbon based fuels, Collaboration leads to better customer service, and recycling. This therefore means that there are other factors that account for the remaining variance of 47.3% in quality customer service delivery. This is an indication that a larger portion of customer service depends on three factors namely: Limited use of carbon based fuels; Collaboration leads to better customer service, and recycling of materials. The relationship that exists between the dependent and the independent variables is slightly strong as can be illustrated from the significance of the beta coefficients below. Significance values of zero or close to zero imply high significance and those further from zero imply low significance.

Table 4.14 Coefficients

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. | 95% Confidence Interval for B | |
|-------|--|-----------------------------|------------|---------------------------|--------|------|-------------------------------|-------------|
| | | B | Std. Error | Beta | | | Lower Bound | Upper Bound |
| 1 | (Constant) | 1.328 | .610 | | 2.176 | .033 | .109 | 2.546 |
| | Collaboration leads to better customer service | .646 | .111 | .541 | 5.830 | .000 | .425 | .867 |
| | Recycling leads to better customer service | .193 | .153 | .163 | 1.265 | .210 | -.112 | .498 |
| | Reduced transportation costs | .288 | .099 | .285 | 2.904 | .005 | .090 | .487 |
| | Limited use of carbon based fuels | -.421 | .155 | -.374 | -2.719 | .008 | -.730 | -.112 |

Source: researcher (2012)

Dependent Variable: Quality customer service delivery

The study therefore arrived at the following equation that will help explain the relationship between green logistics practices and quality customer service delivery among supermarkets in

Nairobi: $Y = 1.328 + 0.646x_1 - 0.421x_2 + 0.193x_3 + 0.288x_4$. Using the equation derived from the table of coefficients above, one can be able to calculate the level of customer service delivery in relation to green logistics practices among supermarkets in Nairobi. That is, the variables (collaboration in transport, limited use of carbon based fuel and recycling of materials) contribute 52.7% to quality customer service delivery supports the objectives of this study which are (1) to establish the extent to which green logistics practices are employed by supermarkets in Nairobi and Kenya and (2) to examine the impact of green logistics practices on customer service delivery among supermarkets in Nairobi, Kenya.

4.5 Discussions

The study indicated that the work of logistics managers in the supply chain department needs skills to be enhanced so as to lead to a more efficient and responsive supply chain department. If this is done, it will further improve the quality of the supply chain staff as outlined by Yu Lin and Hui Ho (2008) who argued that quality human resources can provide new ideas for companies, learn new technologies easily, share knowledge with each other and use new technologies to solve problem. The study also confirmed that managers have knowledge on green logistics. This means that a high number of the respondents are trained and knowledgeable in green logistics management as detailed by Jonsson (2008), thus making the supply chain department more sustainable and responsive.

The research findings indicated that most supermarkets in Kenya never used rail transport to minimize carbon emissions. This confirms high emission of carbon dioxide into the atmosphere caused by use of heavy road transport vehicles to deliver goods to the supermarkets. The heavy use of road transport vehicles by the supermarkets in Nairobi contradicts the argument of Millan and Lastra, (2007) on environmental friendly mode of transportation. They maintained that the need for green logistics requires organizations to shift freight from modes with relatively high carbon intensities, such as air and road, to those with much lower carbon emissions, like rail and water-borne services.

It was also clear that supermarkets in Nairobi used lead free fuels to avoid devastation to the environment. This confirms that the supermarkets in Nairobi are moving towards the use of lead

free fuel in their operations. This practice is consistent with countries such as USA, China, Japan, and the European Union (Mageto, 2009). The findings also indicate that supermarkets in Nairobi provided means for recycling of materials. This confirms the findings of Kimani (2011) when he studied the re-use and recycling of packaging materials among supermarkets in Nairobi.

There was evidence from the study that supermarkets have never contracted suppliers who embraced green logistics practices. This was a clear indication that not all the supermarkets in Nairobi are collaborating with suppliers that embrace environmental thinking in their logistics management. By not contracting suppliers who embraced green logistics, the supermarkets have failed to support the argument of Mudgal *et al* (2010) that businesses cannot provide green products unless they work together with suppliers. It was also evident that that packaging materials used by supermarkets in Nairobi are environmental friendly. The practice of using recyclable and reusable packaging materials is in support of Carter and Ellram (1998) study carried out on the management of the environment which impacts the implementation of green logistics practices during the design stage of products.

The study established that green logistics practices lead to efficient customer service delivery in supermarkets in Nairobi. This is in agreement with the work of Lamming and Hampson (1996) which argued that the demand for environmental friendly products has increased over the years and so is the shifting of customers' loyalty. Another important finding from the study is that green logistics practice has made customer service an expensive undertaking among supermarkets in Nairobi. This is in agreement with Alkhidir and Zailani (2009) when the pair indicated that costs constitute significant barriers to the implementation of green logistics management.

It was established that green logistics led to longer lead times that affects customer service among supermarkets in Nairobi. This is an indication that when implementing green logistics, the time the customers take to place an order and the time it takes for the customer to receive the product is longer. This longer lead time may be due to the lack of technology and the strengthening of relationships with suppliers as outlined by Sarkar and Mohapatra (2006). In

addition the findings confirmed that green logistics leads to quality customer services provided by supermarkets in Nairobi. The findings supports the argument of Jonsson (2008) that a prerequisite for rational customer service decision-making is access to complete, up-to-date and correct information.

The study confirmed that rail transport delivers large loads making it easy for customers to get their products of choice even though most supermarkets in Nairobi are not using rail transport. This is consistence with the study of Robert & Benjamin (2010) which introduced Green Transportation Costs in Supply Chain Modeling. The stjudy also revealed that

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter summarizes the findings and makes conclusions based on the two objectives of this study which are to establish the extent to which green logistics practices are employed by supermarkets in Nairobi, Kenya and to examine the impact of green logistics practices on customer service delivery among supermarkets in Nairobi, Kenya.

5.2 Summary of findings

5.2.1 Green logistics practices employed by supermarkets in Nairobi

The study established that most of the supermarkets in Nairobi are deficient in the use of rail transport to minimize carbon emission from road transport. This may be due to the fact that rail transport covers only small parts of Nairobi; it may be hard for supermarkets to access rail terminals thus increasing carbon emissions resulting from the use of heavy road transport vehicles moving products along the supply chain. The supermarkets are also deficient in contracting suppliers who embrace green logistics; they have less collaboration in load transport.

On the other hand, the study found out that a number of supermarkets in Nairobi made use of lead free fuels to avoid destruction to the environment. It was also established that at least half of the supermarkets in Nairobi provide means for recycling of materials. The use of recycling technology enhances the supermarkets concern about the impact of their various products on the environment. Moreover, the study established that packaging materials used by majority of the supermarkets in Nairobi are environment friendly. The study further established that logistics managers working for the supermarkets hold professional qualification and that they all work in the supply chain departments of their respective entities.

The study also recognized that green logistics practices enhance customer service delivery through collaboration in transport, limited use of carbon based fuels, and the recycling of materials. Even though the practice of green logistics leads to the increasing quality of products

delivered, the study documents that its implementation is expensive and further results to longer lead time and increases the cost of products.

5.3 Conclusions

From the findings of the study, it can be concluded that to a larger extent, majority of the supermarkets in Nairobi employ the following green logistics practices: use of lead free fuels to avoid destruction to the environment, recycling of materials, complying with the National Environmental Management Authority (NEMA) requirements concerning environmental protection, using environmental friendly packaging materials, limiting the use of carbon based fuels and using fleet fitted with fuel management devices to avoid fuel wastage and unnecessary pollution to the environment.

The impact of green logistics practices on customer service delivery among supermarkets in Nairobi, Kenya is appreciable with few draw backs. Green logistics leads to quality customer services provided by the supermarkets; it has made customer service an expensive undertaking among supermarkets in Nairobi and a longer lead time. Also, the use of fuel management technology reduces transportation costs and enhances customer service delivery among supermarkets in Nairobi.

5.4 Limitation of the Study

Even though the study was successful, it experienced some limitations from respondents who could not fill in the questionnaire for fear that information provided will be leaked to their competitors. Moreover, because the supermarkets are very busy during week days the officers who responded were hesitant to take time off, hence the data collection time frame extended well beyond the time expected.

5.5 Recommendations

Managements of supermarkets in Nairobi should consider green supply chain management as a cardinal factor to give them competitive advantage through customers' loyalty. They should

contract suppliers that consider the protection of the environment and embrace greenness in their manufacturing processes.

Collaboration in load transport was seen to be a challenge. Supermarkets in Nairobi should increase jointly transporting their products using preferably rail transport as a means of reducing emissions and moving bulk products at reduced costs. The government of Kenya should provide a good rail transport network that covers most parts of Nairobi. This will enable supermarkets in Nairobi to use rail transportation to move their products in order to minimize carbon emissions caused by road transport.

Finally, training, communication and technology should be enhanced within the supply chain departments of supermarkets in Nairobi as a means of promoting personnel efficiency and reducing lead time in the implementation of green logistics practices.

Since most respondents agreed that adoption of green logistics brings efficiency to customer delivery among supermarkets in Nairobi, all supermarkets should be encouraged to adopt this supply chain management practice since it will assist them attain efficiency in their customer service initiatives.

5.6 Suggestions for further research

This study was only able to address green logistics practices among supermarkets in Nairobi, Kenya. It will be necessary to carry out a study featuring other areas outside Nairobi in order to find out if there are any similarities and differences.

It will also be important to do a comparative study with supermarkets in either of the other East African countries such as Uganda, Sudan, Tanzania or Rwanda and Burundi to ascertain the similarities and differences in green logistics practices among the supermarkets.

Further, there are other factors which contribute 47.3% to customer service delivery within the supply chain that are not covered in this study. A future study could uncover those factors to outline their contributions to green logistics management among supermarkets in Nairobi.

This study can be replicated after sometime to find out whether the findings of this study have changed or they still remain the same.

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Appendices

Appendix I: Questionnaire

Section A: Personal Information

Kindly tick the most appropriate response to the following set of questions

| No. | Question | Yes | No |
|-----|---|-----|----|
| 1 | Do you hold professional qualifications in supply chain management? | | |
| 2 | Do you work in a supply chain department? | | |
| 3 | Do you have some knowledge on green logistics? | | |
| 4 | Have you been involved in green logistics implementation? | | |

Section B:

Kindly state to what extent green logistics practices have being implemented in your supermarket. Use a scale of 1-5 with; 1- Not at all, 2-Less extent, 3- Moderate extent, 4- Large extent, 5- Very great extent

| No. | Statement | 1 | 2 | 3 | 4 | 5 |
|-----|--|---|---|---|---|---|
| 1 | We use rail transport to minimize carbon emission from road transport | 1 | 2 | 3 | 4 | 5 |
| 2 | Our fleet uses lead free fuels to avoid damaging the environment | 1 | 2 | 3 | 4 | 5 |
| 3 | We provide means for recycling of our materials | 1 | 2 | 3 | 4 | 5 |
| 4 | We contract suppliers who embrace green logistics | 1 | 2 | 3 | 4 | 5 |
| 5 | Our logistics practices comply with National Environment Management Authority (NEMA) requirements. | 1 | 2 | 3 | 4 | 5 |
| 6 | We collaborate with other players in load transportation to reduce carbon emissions | 1 | 2 | 3 | 4 | 5 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 7 | Our packaging materials are environmentally friendly | 1 | 2 | 3 | 4 | 3 |
| 8 | We are limiting the use of carbon based fuels in our establishment | 1 | 2 | 3 | 4 | 3 |
| 9 | Our fleet is fitted with fuel management devises to avoid fuel wastage and unnecessary pollution to the environment | 1 | 2 | 3 | 4 | 3 |

11. Please list any other green logistics practices that are currently being adopted by your organization.

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12. What challenges do you face in implementing green logistics?

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Section C:

To what extent has green logistics practices imparted customer service delivery at your supermarket? Use a scale of 1-5 with; 1- Not at all, 2-Less extent, 3- Moderate extent, 4- Large extent, 5- Very great extent

| No. | Inquiry | Scale | | | | |
|-----|--|-------|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 |
| 1 | Green logistics leads to efficient customer service | | | | | |
| 2 | Green logistics has made customer service an expensive undertaking | | | | | |

| | | | | | | |
|----|---|---|---|---|---|---|
| 3 | Green logistics has increased the cost of products and affected customer service standards | 1 | 2 | 3 | 4 | 5 |
| 4 | Green logistics leads to longer lead times that affect customer service | 1 | 2 | 3 | 4 | 5 |
| 5 | Green logistics leads to quality customer service | 1 | 2 | 3 | 4 | 5 |
| 6 | Using fuel management technology reduces transportation costs and enhances customer service | 1 | 2 | 3 | 4 | 5 |
| 7 | Environmentally friendly packaging materials improves customer service | 1 | 2 | 3 | 4 | 5 |
| 8 | Recycling of materials enables us to provide better customer service | 1 | 2 | 3 | 4 | 5 |
| 9 | Use of rail transport delivers large loads that make product availability for customers | 1 | 2 | 3 | 4 | 5 |
| 10 | Collaboration with other players has enabled us to provide better services to customers | 1 | 2 | 3 | 4 | 5 |

11. Other than the areas mentioned above, kindly indicate how green logistics has impacted on your organization

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12. What is your opinion on the future of green logistics among supermarkets in Kenya?

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Appendix II: List of Supermarkets in Nairobi

| No | Supermarket | Location |
|----|-----------------------------------|---|
| 1 | Armed Forces Canteen Organization | Moi Airbase Eastleigh, Juja Rd, Nairobi |
| 2 | Nakumatt Holdings Ltd | Road "C" Off Enterprise Rd, Behind Panari Centre, Nairobi |
| 3 | Acacia Supermarket Ltd | Factory St, Nairobi |
| 4 | Aflose Supermarket Ltd | Rabai/Gaturo Rd Junction, Buru Buru Ph 5, Nairobi |
| 5 | African Grocers Ltd | Pan African Insurance Arcade, Gr Flr, Argwings Kodhek Rd, Nairobi |
| 6 | Amal Supermarket Ltd | 12th St, Nairobi |
| 7 | Anal Supermarket Ltd | Nairobi, Juja road |
| 8 | Banshi Supermarket | Jambo Plaza, 3rd Parklands Ave, Nairobi |
| 9 | Betccam Savers Supermarket | Kahawa West, Nairobi |
| 10 | Binka Supermarket | Mwiki Rd, Nairobi |
| 11 | Broadway Supermarket | Nairobi, Thika Road |
| 12 | Builders Supermarket Ltd | Nairobi, Ronald Ngala |
| 13 | Cash & Carry Ltd | Off Mombasa Rd Nairobi |
| 14 | Centaline Supermarket | 2nd Ave 2nd St Eastleigh Nairobi |
| 15 | Centaling Supermarket | Nairobi |
| 16 | Chandarana Supermarkets Ltd | ABC Place, Waiyaki Way, Nairobi |
| 17 | City Mattresses Ltd | Ind Area, Lusaka Rd, Nairobi |

| | | |
|----|-----------------------------|--|
| 18 | Clean Way Ltd | Valley Arc, Gitanga Rd, Nairobi |
| 19 | Cleanshelf Supermarkets Ltd | Ushirika Centre, Limuru Town Karuri |
| 20 | Continental Supermarket Ltd | ABC Place, Waiyaki Way, Nairobi |
| 21 | Country Mattresses Ltd | Manan Bldg, Gr Flr, Tom Mboya St, Nairobi |
| 22 | Daily Basket | Delta Service Station, Nairobi |
| 23 | Deepak Cash & Carry Ltd | Ole Shapara Ave, Nairobi |
| 24 | Eagles Supermarket | Mumias South Nairobi |
| 25 | Eastleigh Mattresses Ltd | River Rd, Nairobi |
| 26 | Ebrahim & Co Ltd | Wazir Hse, Moi Ave, Nairobi |
| 27 | Esajo Supermarket | Githurai off Thika Rd, Nairobi |
| 28 | Fair Price Supermarket | Mugure Village, Off Biashara St Nairobi |
| 29 | Fairdeal Shop & Save Ltd | Rahimtulla Trust Bldg, Gr Flr, Tom Mboya St, Nairobi |
| 30 | Fairlane Supermarkets Ltd | Fairlane Hse, Gr Flr, Mbagathi Rd, Nairobi |
| 31 | Fairmart Supermarket Ltd | Ongata Rongai |
| 32 | Fourty Six Supermarket | Gitanga Rd, Nairobi |
| 33 | Galmart Supermarket | Nairobi Juja road |
| 34 | General Foods (Kenya) Ltd | Off Baba Dogo Rd, Nairobi |
| 35 | Gigiri Supermarket Ltd | Limuru Rd, Nairobi |
| 36 | Goodfare Stores Ltd | City Mkt, Muindi Mbingu St, Nairobi |

| | | |
|----|-----------------------------------|--|
| 37 | Guestcare Ideal Homes Ltd | Section III, Nairobi |
| 38 | Happy Valley Supermarket Ltd | Neighbours Bldg, Kahawa Sukari off Thika Rd, Nairobi |
| 39 | Horizon Ivato Supermarket (K) Ltd | China Centre, Ngong Rd, Nairobi |
| 40 | Jack & Jill Extravaganza Ltd | Haile Selassie Ave, Nairobi |
| 41 | Janamu Supermarket | Nairobi, Tom Mboya Street Nrb |
| 42 | Jawa's Supermarket Ltd | Park Place, Magadi Rd, Nairobi |
| 43 | Jeska Supermarket Ltd | Benrose Hse, Kangundo Rd, Nairobi |
| 44 | Jopampa Provision Store | Muhuni Hse, Gr Flr, Mchumbi Rd, Nairobi |
| 45 | Jossies Suprmarket | Nairobi, Ronald Ngala |
| 46 | Joster Mini Market | General Waruingi St, Nairobi |
| 47 | Juja Rd Fancy Store Ltd | Pangani, Nairobi |
| 48 | K & A Self Selection Store Ltd | Caxton Hse, Koinange St, Nairobi |
| 49 | Karen Supermarket | Nairobi Karen |
| 50 | Kassmatt Supermarket | New Gladway Plaza, Nairobi |
| 51 | Kenton Supermarket | Kawangware Shopping Centre, Nairobi |
| 52 | Kikuyu Selfridges Supermarket | Kikuyu Rd, Nairobi |
| 53 | Leestar Supermarket | Kamiti Rd, Nairobi |
| 54 | Lumumba Drive Supermarket | Lumumba Drv, off Kamiti Rd Nairobi |
| 55 | Marketways Ltd | Gitanga Rd, Nairobi |

| | | |
|----|-----------------------------|---|
| 56 | Mesora Supermarket Ltd | Mumias South Rd, Buruburu, Nairobi |
| 57 | Metro Cash & Carry (K) Ltd | Corner of Mombasa Rd off Airport North Rd, Nairobi |
| 58 | Midas Touch Supermarket Ltd | Vumira Hse South B Shopping Centre, Daidai/Shirazi Rd, 60 |
| 59 | Mulika Mini Market | Off Thika Rd, Nairobi |
| 60 | Mustard Supermarket | Maj Kinyanjui St off 1st Eastleigh Ave, Nairobi |
| 61 | Muthaiga Mini Market Ltd | Kiambu Rd, Nairobi |
| 62 | Naivas Ltd | Ronald Ngala St, Nairobi |
| 63 | Nakumatt Holdings Ltd | Haile Selassie Ave, Nairobi |
| 64 | New Westlands Stores Ltd | Waiyaki Way, Nairobi |
| 65 | Parklands Pricerite Ltd | Parklands Rd, Nairobi |
| 66 | Rafiki Supermarket | Gr Flr, Kinyanjui Rd, Nairobi |
| 67 | Raken Supermarket Ltd | Ngong Rd, Nairobi |
| 68 | Safeway Hypermarkets Ltd | Buruburu Shopping Centre Safeway Hse, Mumias Rd |
| 69 | Satellite Supermarket Ltd | Nairobi, Kiserian |
| 70 | School Supermarkets Ltd | Hirani Bldg, Gr Flr, Cross Rd, Nairobi |
| 71 | Shoppers Paradise | Esso Plaza, Muthaiga Nairobi |
| 72 | Skymart | Bishara St, Nairobi |
| 73 | South 'C' Supermarket | Nairobi |
| 74 | Stagen Enterprises Ltd | Umoja Est, Nairobi |

| | | |
|----|---------------------------------|--|
| 75 | Superbargains Cash & Carry Ltd | Nairobi |
| 76 | Tesco Corporation Ltd | Uchumi Head Office Bldg, Yarrow Rd Off Nanyuki Rd, Nairobi |
| 77 | Trolleys & Baskets | Kasuku Centre, Nairobi |
| 78 | Tusker Mattresses Ltd | Pioneer, Nairobi |
| 79 | Tuskys Supermarkets Ltd | Embakasi, Nairobi |
| 80 | Uchumi Holdings Ltd | Uchumi Hse, Aga Khan Ave, Nairobi |
| 81 | Ukwala Supermarket (Nakuru) Ltd | Ronald Ngala St, Nairobi |
| 82 | Uncle Jim's Supermarket | Huruma Shopping Centre, Nairobi |
| 83 | Vantage Supermarket Ltd | Ruaraka/Garden Estate Rd, Nairobi |
| 84 | Westlands General Stores Ltd | Mpaka Rd, Nairobi |

Source:

<http://www.yellowpageskenya.com/search/?business=Supermarkets&locality=&category=Supermarkets&sorta=&start=300&page=1> 24/05/2012

Appendix III

UNIVERSITY OF NAIROBI

SCHOOL OF BUSINESS

PROPOSAL CORRECTION FORM

Student Name T. BENO WHEGAR

Registration Number DE1/60917/2011

Department Management Science

Specialization Procurement & Supply Chain Mgmt

Title of Project Proposal Green Logistics

Practices Among Supermarkets

In Nairobi, Kenya

The student has done all the corrections as suggested during the Proposal Presentation and can now proceed to collect data.

Name of Supervisor Ombati J. Signature [Signature] Date 24/07/2012