

GREEN SUPPLY CHAIN MANAGEMENT PRACTICES IN THE KENYAN MOBILE TELECOMMUNICATION INDUSTRY

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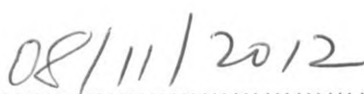
DECLARATION

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

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This research project has been submitted for examination with my approval as the university supervisor.

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DEDICATION

This research project is dedicated to my family, relatives and friends. I dedicate it to my Almighty God.

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ABSTRACT

Kenya boasts of the most vibrant mobile telecommunication industry in the region that rakes in billions of profits. Stiff competition exists between them in that it seems the society tends to ignore their green policy and concentrate on their price wars. For the companies to perform optimally they have to adopt the green supply chain practices to enhance proper integration with the environment. The study sought to investigate the Green Supply Management practices, the drivers and challenges of implementing it in the mobile telecommunication industry in Kenya.

In order to achieve the set objectives of the study, a survey was done on the four mobile telecommunication companies in Kenya. The study findings showed that most firms were found to have adopted green supply chain management practices. Company's environmental vision and mission application was found to be the most practice used by telecommunication firms in Kenya followed design for environment practices in product development implementation. ISO 14001 certification for suppliers was found to be the least adopted green supply chain management practice.

The study therefore recommends for green supply chain to be fully implemented by all most mobile telecommunication firms in Kenya. They need to re-evaluate their green practice. Benchmarking should be used to borrow best practices on these. Moreover more funds should be sourced since it was established that cost was the major green supply chain management driver that affected telecommunication firms in Kenya. The green supply chain concept should be addressed with great concern and all challenges that hinder full implementation removed. These challenges include high investment costs and lack of qualified personnel.

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CHAPTER 1: INTRODUCTION

1.1 Background of the Study

A supply chain consists of all parties involved in fulfilling a customer request directly or indirectly. It includes the suppliers, manufacturers, transporters, warehouses, retailers and customers. It encompasses all functions involved in customer request fulfillment including new product development, marketing, operations, distribution, finance and customer service (Chopra et al, 2004). It includes all the activities associated with raw material procurement, manufacturing and final product delivery (Beamon et al, 1999). Supply chain management is the integration of major business processes from end user to the raw material suppliers to ensure provision of products, services and information for value addition to the customers and stakeholders in the chain (Lambert et al. 1998). According to CIPS it is the continuous planning, developing, controlling, informing and monitoring of actions within and between supply chain links so that an integrated supply process results which meet overall strategic goals.

A green supply chain may involve use of environmentally friendly inputs and transforming them into products that can improve or be recycled within the existing environment. Green supply chain management entails a decision making process with several processes. The initial process is identification of the environmental costs within the process, determination of opportunities yielding cost savings and reduction of environmental impact, calculation of benefits of the proposed alternatives and finally implementation and monitoring of the improvement solutions (Patrick et al, 2007). Green Supply Chain Management is a method to design and/or redesign the supply chain that incorporates recycling and remanufacturing into the production process and it involves minimization of the firm's total environmental impact from start to finish of the supply chain and also from beginning to end of the product life cycle (Purba et al, 2005).

Green Supply Chain Management endeavors in the optimization of the supply chain for economic performance, environmental and social benefit with high resource efficiency. It requires close cooperation between sections inside the company and the enterprises, thus integrating environmental management into the supply chain management harmoniously. The theory of green supply chain management is still not systematic but progressive in nature. Green supply

chain management can be divided into four research fields: green manufacturing, green purchasing, green logistics, green marketing. Perfecting the environmental law, strengthening the supervising ability of government, cultivating the environmental habit of consumers, advancing the information and environmental protection technology of enterprises will be needed in carrying out Green Supply Chain Management in our country (Wang et al, 2010).

Green supply chain management can be referred to as “closing the loop” due to integration of green purchasing to integrated supply chains starting from supplier, to manufacturer, to customer and reverse logistics (Zhu et al, 2004). (Srivastava et al, 2007) also defined it as integrating environmental thinking into supply chain management, including product design, material sourcing and selection, manufacturing process, delivery of the final product to the consumers as well as end-of-life management of the product after its useful life. Green supply chain management embodies a sustainable development strategy in manufacturing enterprises. The supply chains can apply it in reducing environment pollution and enhancing competitiveness of manufacturing enterprises in the society (Xing et al, 2010). Environmental protection and conservation of natural resources has become an absolute necessity at national and international levels. Management of hazardous waste is an important part in attaining environmental protection throughout the world. Minimization of hazardous waste generation, waste recovery for valuable products and prevention of environmental degradation, require utmost attention for a firm to operate optimally (Kannan et al, 2010).

The results of the research carried by Purba et al (2005), demonstrated that greening the inbound function, as well as greening production, lead to greening outbound, as well to competitiveness and economic performance of the firm. This refers to supply chain management functions which include Green purchasing (in-bound logistics), Design for the environment (internal supply chain) Green marketing (out-bound logistics) and Reverse logistics.

Green purchasing is the initial stage of the supply chain. It involves procurement of raw materials that are environmental friendly, substitution of environmentally questionable raw materials and education of the suppliers to have environmental programs like ISO

ISO 14001 certification (Sristava et al, 2007). It helps in reduction of solid/liquid wastes, emissions reduction, resource wastage reduction and consumption of toxic substances (Eltayeb et al, 2010). Companies can use it for tendering and supplier selection by providing design specifications which include environmental requirements for raw material, only the compliant ones are selected (Allen et al. 2010).

Design for the environment incorporates all the operations done on a product during manufacture. It involves eco-design which refers to design for environment, green design, design for green manufacturing, design for reduction, reuse design, recycling design, design for waste reduction and resource efficiency design. This will promote better efficiency, better productivity, cost saving, emission reduction, quality improvement and waste reduction (Hu et al. 2008). Life cycle analysis can be considered in this stage, it assesses the environmental, health and resource impacts a product contributes during all the phases of its life. The phases include raw material procurement, production, transportation, usage, re-manufacturing, recycling and waste disposal. It spans over the development, manufacturing and disposal stages of a product (Gungor et al, 1999).

Green marketing involves all the activities required to deliver the final product to the consumer. It may involve packaging, transportation, location analysis, warehousing and inventory management. The firms have to consider a mode of transport with less carbon print, better packaging methods like recyclable containers, well designed warehouses and improved inventory management skills. Green marketing focuses on the green products like hybrid vehicles and the greening of processes like reducing carbon footprints. These practices are geared towards reducing the impact of the product to the environment (Sarkis et al. 2012).

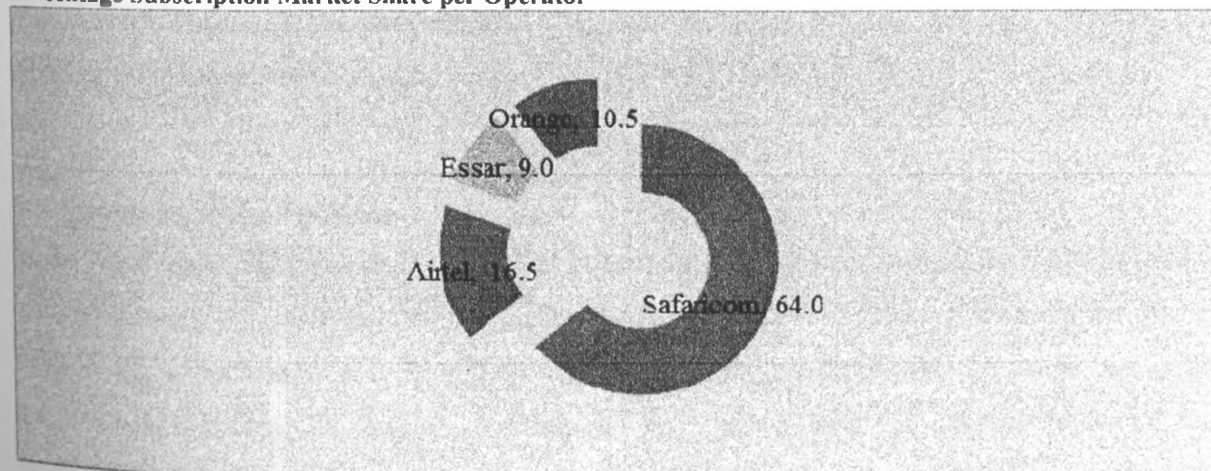
Reverse logistics is the process of retrieving a product from the end consumer back to the firm for the purposes of capturing value or proper disposal (Hock et al, 2000). It is known as 'closing the loop' and the closed-loop supply chain. The product being retrieved may be reusable, recyclable or may have remanufacturable characteristics. The reverse

logistics function may feed directly back to an organization's internal supply chain or to an external vendor, starting the cycle again. The functions may include transportation, triage, repair, after sales support and use of a third party reverse logistics provider. The firms should ensure reductions in energy usage and waste generation are throughout the supply chain(Ajeetet al.2012)

1.2 Mobile Telecommunication industry in Kenya

There are four mobile operators in operation namely Safaricom Ltd, AirtelLtd,Essar Telecom Kenya Ltd and Orange Kenya Ltd. The mobile telecommunication industry in Kenya has exhibited a tremendous growth since its inception. Mobile telephones were first introduced in the Kenyan market in 1992, but thereal diffusion of this technology and of affordable services started in 1999 when theCommunications Commission of Kenya (CCK).Safaricom and Airtel Kenya (previously known as KenCell Communications)were licensed to provide mobile services (Luca et al).Currently we have new players namely Telkom Kenya Limited (Orange) and EssarTelecom Kenya Limited. According to the Communication commission of Kenya (CCK) quarterly reports of 2012, Safaricom controls a market share of 64%, Airtel controls 16.5%, Orange controls 10.5% and Essar has 9% as shown below.

Percentage Subscription Market Share per Operator



Source: CCK, Operators' Returns.

The mobile telecommunication industry can be analysed using the PESTEL model. PESTEL is an acronym that stands for Political, Economical, Social, Technological, Environmental and Legal. It analyses the risks and opportunities of global expansion. The mobile industry can be affected by the political situation in the country. The political class can determine how it operates by passing legislation. The economical situation of the country can determine the uptake of its products. If the citizens are well off then more sales can be made. The mobile industry is affected by the social cultural factors like education. If the population is educated its able to make informed decisions on the products offered and also gauge whether the mobile firms are environmentally conscious. The mobile industry adapts rapidly to technological changes worldwide due to its dynamic nature of its operation. The mobile industry is affected by environmental legislation in the country. It has to abide by them in order to operate in the country failure to which it will face legal consequences. Legally the mobile industry has to abide by the country laws governing the sector failure to which prosecution is eminent. Fines can be imposed which will affect its operational cost.

The mobile telecommunication companies in Kenya concentrate on increasing their customer base subscriptions and products diversification. Stiff competition exists between them in that it seems the society tends to ignore their green policy and concentrate on their price wars. For the companies to perform optimally they have to adopt the green supply chain practices to enhance proper integration with the environment. They tend to ignore some of the CSR activities that entail environmental conservation.

1.3 Statement of the Problem

In the last decade, the rapid development of information technology around the world has led to globalization of the communication industry. Universal access to telecom services has grown beyond all expectations and is greatly improving people's lives. At the same time, the continuously deteriorating natural environment and climate, and the unbalanced social and economic development of the world, pose severe challenges. Thus, sustainable development has now become a common concern across the globe.

Green supply chain management as an innovation helps to achieve sustainability by incorporating functions that help to save the natural environment. Various firms have adopted the practice worldwide for benefits accrued with it. Green supply chain management implementation has various drivers promoting it namely; regulation, costs, Markets and company initiatives like corporate social responsibility (CSR). The barriers to its implementation may vary worldwide.

According to study done by Italian researchers on over 4000 manufacturing firms in seven developed countries showed that Green supply chain management increases environmental performance. They found that the main motivating factor to Green supply chain management adoption was to improve the firms' reputation and improve market image. Green supply chain management can be used as a managerial tool for improving environmental performance. The benefits of Green supply chain management may not lead to short term increase in profits but the enhanced reputation and innovation may take time to affect the profits (Testa et al,2010).In India, most manufacturing small and medium enterprises' have adopted green warehousing and distribution due to the improved efficiency achieved. Most firms have not adopted it fully due to lack of awareness and lack of knowledge on the Green supply chain management concept (Nimawat et al,2012).

In the UK research done to examine the implementation of Green supply chain management showed it is highly adopted due to regulation and internal drivers (Diane et al, 2009). In China, environmental awareness has improved but Green supply chain management adoption is low (Qinhua et al, 2004). In Taiwan, not all companies have adopted the practice due to the perception that it does not lead to better profits in the firm though it does improve both environmental and financial performance (Chien et al, 2007). A survey done in Mexico on 87 Mexican companies on Green supply chain management adoption showed that there is some interest but had a low adoption due to the perception that it was not cost effective (Gioconda et al, 2011).

According to Xiao(2006) a comparison study on Green supply chain management implementation in the construction industry between UK and China showed that UK exhibited

better performance than China. This was attributed to better supplier relationship in UK than in China. A study conducted in Hong Kong on implementation of reverse logistics in the mobile phone industry, exhibited poor adoption of the system which is part of Green supply chain management (Felix et al, 2008).

In Kenya, Obiso (2011) found that Green supply chain management implementation in the Petroleum marketing industry was lowly adopted and hence not fully implemented. Most of the companies applied either some of the functions like Reverse logistics while others ignored the whole practice. According to Mwirigi (2007) the adoption of Green supply chain management by Kenyan manufacturing firms was way below the expectation.

Kenya boasts of the most vibrant mobile telecommunication industry in the region that rakes in billions of profits. The players are usually embroiled in price wars and the consumers tend to enjoy the competitive prices. Little concern is given to their impact on the environment and Green supply chain management adoption. Currently no known research has been conducted in Kenya to explore the extent and nature of greening of the supply chain in the telecommunication sector. This study is geared towards the knowledge gap through a study of Green supply chain management adoption in Kenya mobile telecommunication firms and checking the drivers influencing the breadth and depth of greening in this industry. The research will try to explore the level of adoption. It will also try to check the challenges the firms face in adopting the practice.

1.4 Objectives of the Study

The purpose of this research was to investigate the current green supply chain management strategies practiced by Mobile telecommunication companies in Kenya. The objectives of the study were:

- i) To determine the green supply chain management practices adopted by the four mobile telecommunication companies in Kenya.
- ii) To determine challenges encountered in implementing supply chain management practices.
- iii) To determine the drivers of green supply chain management practices in the mobile telecommunication industry.

1.5 Value of the Study

Green supply chain management as a practice is now a growing trend worldwide and the various industries have to conform to the laid standards to be acceptable nationally and globally.

The findings of this study will be beneficial to the Mobile telecommunication companies may use the findings to improve their operations and enhance competitiveness. Also conformance to the growing trends of Green supply chain management. The Government regulatory bodies can like National Environmental Management Authority (NEMA) and Communications Commission of Kenya (CCK) can use the findings during formulation of policies beneficial to the whole industry. The academicians and researchers can use the findings to add knowledge, do comparative studies and further research since Green supply chain management is a relatively new study.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter tried to review the various studies and literature on green supply chain management practices applied by organizations.

2.2 Supply Chain Concept

The term 'supply chain' was first used in the mid 70's as a term used for transferring electricity to the final consumer (Banbury et al, 1975). In the mid 80's 'supply chain management' came into force by integration of business functions like purchasing, manufacturing, sales and transportation (Weber et al, 1982). Supply chain management has evolved to creation of relationships with suppliers to ensure better performance and reduce vulnerability of the firms (Harland et al, 1996)

According to the Supply chain council (2007), supply chain management (SCM) is defined as every process involved in the production and delivery of a final product or service. SCM processes include demand and supply management, raw material and parts sourcing, assembly and manufacturing, warehousing and inventory management and logistics.

The mobile telecommunication industry as a case study adopts to the Supply chain management practice by procuring, assembly, warehousing, marketing, distribution and reverse logistics. The nature of the company's is not very complex since it has outsourced some functions to third party providers. It also has various suppliers and distributors hence a defined supplier relationship management strategy has to be employed.

2.3 Green Supply Chain Management Concept

Green supply chain management is a new field that tries to complete some of the traditional supply chain weaknesses like environmental efficiency. The green supply chain revolution started in the early 1990's" has promoted businesses to become more environmentally conscious

(Srivastava et al, 2007). It has gained popularity with both academics and practitioners and aims at reducing waste and preserving the natural resources. Green supply chain management promotes Eco-efficiency and remanufacturing processes as best practices to the supply chain.(Ashley et al, 1993).Francoise(2010) conducted an analysis of Green supply chain management as a marketing tool versus revolution and found that firms trying to become greener gained more visibility, credibility and enhanced their leadership reputation. Other factors like employee loyalty and retention were less significant to going green but a defined sustainability strategy will help in attracting top talent for hire. It can also be viewed as a revolution trying to preserve the ever diminishing environmental resources.

The Huawei company report shows how it has worked to reduce energy consumption and carbon emissions. It incorporated environmentally friendly concepts into various processes throughout planning, design, R&D, manufacturing, delivery and service of products and developed solutions to reduce carbon emissions of the telecom industry itself (Huawei report, 2009).Increasing awareness about environmental protection in India and the world, the green trend of conserving the Earth's resources and protecting the environment is overwhelming, thereby exerting pressure on industries in India and worldwide(Chetan et al, 2011).

Firms are going green by embracing IT operations to help them reduce corporate energy consumption hence becoming environmentally responsible. Some IT shops are responding by seeking help from professional services providers that assess, plan, and implement green initiatives for procurement, operation, and disposal of IT assets and processes (Christopher et al, 2008). Supply chains achieve performance improvements or resource development through either building specific capabilities over time or by looking to the supply relationships to gain access to new resources (Eisenhardt et al, 1996)

Mwirigi(2007) conducted a research on green supply chain management practices by manufacturing firms in Kenya. In her study to establish the major green supply chain practices and the challenges being faced by manufacturing firms in Kenya, she established four green supply chain management practices namely green marketing, design for environment, reverse

logistics and green marketing. The major challenges in green supply chain management practices were lack of government support, high investment costs and lack of understanding on the Green supply chain management concept. In the petroleum marketing firms, Obiso (2011) found that Green supply chain management implementation was below the expected standards. Few firms implemented only a few Green Supply Chain Management Practices.

A study exploring the adoption of the Green supply chain management practices in the UK firms and found that it was highly influenced by Legislation and internal drivers but least influenced by societal drivers and customer pressure (Diane et al, 2009). According to the study conducted by the supply chain and logistics Canada on the Canadian firms, Green supply chain management was found to reduce distribution cost by improving distribution efficiency, improved energy reduction, waste reduction and reduced packaging in distribution services. Rha et al. (2010) found that implementation of Green supply chain management practices enabled organizations to strengthen sales, profit, on-time delivery and the customer service level. However Green supply chain management practices may not improve supply chain resource performance due to the cost problem, internal management and external management factors.

According to a survey conducted on 87 Mexican companies on Green supply chain management adoption showed that there is some interest but had a low adoption trend. This was due to the perception that it was not cost effective. This was attributed to the fact that they had poor guidance and leadership on green practices effect on their company strategies (Gioconda et al. 2011). Felix et al (2008) conducted a survey on reverse logistics systems of mobile phone industry in Hong Kong they were important to the industry but were regarded lowly relative to the other issues hence poor implementation. In the telecommunication industry a study showed there is a true uncertainty regarding the non-thermal effects of mobile phones & their associated base-stations to humans (Elaine et al, 2012).

In china, the firms have increased their environmental awareness. This has been promoted by regulatory pressure, competitive pressure, marketing pressure and industry drivers. However this has not been translated into strong Green supply chain management practice adoption as expected.

No improvements have been exhibited (Qinhua et al 2004). However, the barriers are for this implementation may no be clear, but the lack of necessary tools, management skills and knowledge and lack of an economic justification in terms of performance(Qinghua et al 2005).

According to Chien (2007) firms had a belief that stressing environmental performance would increase operational cost against the decreasing market share and competitiveness. Nevertheless, the study found that Green supply chain management implementation had a positive effect on both environmental and financial performance, an increase in environmental performance will be accompanied by increased corporation profit and market share. These conclusions effectively dispel the doubts of those corporations in Taiwan that have not yet implemented Green supply chain management practices. A survey conducted to compare the adoption of Green supply chain management in the UK and China construction industry showed that companies in both countries have been implementing it, however, the UK companies were better off since they had better supplier relationship. The survey also showed that the Green supply chain management pressures were different for both countries (Xiao et al, 2006)

The Green Supply Chain Management process can be classified into two categories namely: greening the supply chain and product-based supply. Greening the supply process stands for accommodations made to the firm's supplier management activities for considering environmental perspectives. In addition, product-based green supply focuses on changes to the product supplied and attempts to manage the by-products of supplied inputs (Arntzen et al. 1995).

2.4 Drivers of Green Supply Chain management

Green Supply Chain Management has been adopted by many companies to enhance their performance and preserve the environment. The companies have to achieve a balance in their operations to ensure sustainability. There are various drivers and pressures propelling the Green supply chain management practice in the industry.

Government regulation is the most influential driver of Green supply chain management. The government provides legislation by passing laws and regulations on standards of practice. It also enforces the regulations to ensure compliance. In Kenya, two agencies are delegated this task are National Environmental Management Agency (NEMA) and Environmental Protection Agency (EPA). It also promotes use of Environmental Management Systems (EMS) like the ISO 14000 series. The government may offer incentives to encourage adoption of Green supply chain management, this may be through financial incentives, education, pilot projects and tax breaks (Scupola et al, 2003).

The market and competitors influence the green initiative, customer defines the market of the products. The customer demand for a green product is a key driver in Green Supply Chain Management. According to Zhu and Sarkis (2006) the environmental properties of the products and services must meet customer requirements. Rao and Holt (2005) pointed out that organizations implementing Green Supply Chain Management improved competitiveness. Improved efficiency, quality improvement, productivity improvement, and cost savings.

Corporate Social Responsibility of a company determines its approach towards the green supply chain management practices. It refers to the obligations of a firm to society and its stakeholders (Smith et al 2003). It is an important driver to environmental management. The firms may have a policy towards environmental protection. The policy may promote activities like tree planting, reclamation of natural resources and waste management. The CSR activities are sponsored in the firms budget. Firms with relevant CSR programs may win the customers leading to better performance.

Costs Implications of implementing the green supply chain management practices affects the adoption. The firms may have to optimize the costs associated with the implementation of Green supply chain management practices versus their profitability for them to adopt it. If the Green supply chain management implementation cost is too high less firms will adopt, hence the implementation has to be sustainable.

Green Supply Chain Management is also promoted other factors like rising energy costs, global concerns about green house gases, climate change, technology innovations and increased public awareness of environmental issues.

2.5 Barriers to adoption of the GSCM strategy

The implementation of Green Supply Chain Management practices can be hindered by various factors like lack of government support, Lee (2008) found that the government can boost awareness by involvement through funding, taxation policy and business training to promote the green supply chain initiative. Failure to take part can be a barrier in green supply chain development. Cramer (2002) found other barriers lack of information regarding environmental benefit led to fewer firms adopting the green initiative, lack of management support, high investment costs, existence of other techniques, lack of information about the green supply chain best practices, few software tools for enabling end-to-end optimization of supply chain along with environment management and global sourcing makes tracing of carbon footprint difficult. Walker *et al.* (2008) categorized them as external barriers including regulation, poor supplier commitment and industry specific barriers, whereas the internal barriers are cost and lack of legitimacy.

2.6 Benefits of Green Supply Chain Management

Green Supply Chain Management (GSCM) helps in the reduction of waste and emission to the environment. However, the benefits are not limited only less toxic consuming or less waste. The GSCM principle can be applied to all departments in the organization. Duber-Smith (2005) identified ten reasons that the company should adopt the green: target marketing, sustainability of resources, lowered costs/increased efficiency, product differentiation and competitive advantage, competitive and supply chain pressures, adapting to regulation and reducing risk, brand reputation, return on investment, employee morale, and the ethical imperative. Stevels (2002) demonstrated the benefits of GSCM to different roles of supply chain including environment and society in terms of different categories: material, immaterial, and emotion. For material, GSCM helps lower environmental load for environment, lower cost prices for supplier,

lower cost for producer, lower cost of ownership for customer, and less consumption of resources for society. In terms of immaterial, GSCM helps overcoming prejudice and cynicism for environment, less rejects for supplier, easier to manufacture for producer, convenience and fun for customer, and better compliance for society. For emotion, GSCM helps motivation of stakeholder for environment, better image for supplier and producer, feel good and quality of life for customer, and make industry on the right track for society.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter explained the methods and tools that were used in data presentation and analysis. The information obtained helped to justify the relevance of the topic studied.

3.2 Research design

A descriptive survey design was conducted to collect the information about the implementation of green supply chain management in the four companies of interest. A descriptive research involves gathering data that describes events, then organizes, tabulates, depicts and describes the data collection (Glass et al, 1984). A census survey was conducted for data collection. It was preferred due to its high accuracy as compared to the other survey methods since the respondents are members of a given population. Its weaknesses included the high cost, more time consuming and physically demanding.

3.3 Population

The populations of interest for the study were the four mobile telecommunication companies in Kenya. They include Safaricom Ltd, Airtel Ltd, Essar Telecom Kenya Ltd and Orange Telkom. All the companies have their headquarters in Nairobi, Kenya. The research was carried out in the procurement department of the companies. The respondents included the top management and other staff in the procurement department. This ensured they had sufficient information and knowledge on the topic under study.

3.4 Data collection

To determine the Green supply chain management practices in the company, the drivers and barriers encountered in its implementation, questionnaires were employed to collect data. The questionnaire was divided into three parts according to the objectives under investigation in the study. The first part encompassed the general information of the respondent. The second part

helped to identify the Green supply chain management practices implemented in the company and the third part investigated the challenges encountered during the implementation of the Green supply chain management practices. A likert type of scale was employed having different guidelines for the different sections. A pilot test of the questionnaire was conducted to identify any unclear or ambiguous questions.

3.6 Data analysis

After the collection of the questionnaires from the respondents, checking was done to ensure accuracy and consistency of the information obtained. The data obtained was coded and tabulated. Data analysis was done using descriptive statistics. The data obtained was analysed using measures of central tendency like mean, mode, median. To measure variability Variance and standard deviation were employed. The final findings were presented using tables, proportions, frequency distributions and percentages.

CHAPTER FOUR: DATA ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter covers data analysis, discussions and findings of the research. The data was summarized by means of statistical averages (including rankings) and presented in the form of tables and charts. Out of 40 questionnaires distributed, 27 were completed and returned representing a response rate of 67.50 %, which was considered satisfactory for subsequent analysis.

4.2 General Information

The respondents were asked to indicate the nature of ownership of their firms. From the research findings, it was established that 70.37 percent are multinational while 29.63 percent were local. This suggests that the Kenyan mobile telecommunication firms were dominated by foreigners.

The researcher wanted to establish the number of employees that work in the four telecommunication firms in Kenya. From the research findings, it was established that 100.0 % of them have above 200 employees.

The researcher also wanted to establish who performed the function of purchasing in the Kenya telecommunication firms. From the research findings, it was established that 100 % of them use finance department to perform procurement functions.

Respondents were asked to indicate the duration by which the department that performs procurement functions has been operational. From the research findings, it was established that 62.96 % of them have had their finance departments for more than 10 years while 37.04 % of them have been operational for 1-5 years. None of them have had their finance department for less than one year.

According to the general information of the companies of interest the ownership structure may contribute to low adoption of the Green Supply Chain Management Practices since they may consider it as a sole responsibility of the citizens endeavoring to repatriate the profits abroad. The

companies have offered considerable employment opportunities in the country. Lack of a procurement or supply chain department in the company will affect the adoption of Green Supply Chain Management Practices since the finance department has different objectives to meet. A supply chain/procurement function would handle the implementation of the Green logistics in the companies.

4.3 Green Supply Chain Management Practices

The researcher wanted to know the green supply chain management practices that the Kenyan telecommunication firms have adopted. From the research findings, it was established that company's environmental vision and mission application had the highest mean of 4.81 followed by Design for environment practices in product development implementation with a mean of 4.78. ISO 14001 certification for suppliers had the lowest mean of 1.48 as shown in Table 4.1.

Respondents also listed other green supply chain practices being applied by their firms. From the research findings it was established that Collection of e-waste i.e. old laptops and phones was seen as another green supply chain practice that was not included in the list.

According to Certified Institute of Purchasing and Supplies (CIPS), Green Supply Chain Management involves continuous planning, developing, controlling, informing and monitoring of actions within and between supply chain links so that an integrated supply process results which meet overall strategic goals. The research findings show that the companies have set strategic goals favourable for the implementation of the Green Supply Chain Management Practices and are showing adoption of a variety of green practices. However lack of information, control and monitoring has hindered full implementation. This is confirmed by lack of ISO 14001 certification both for the companies and their suppliers.

Table 4.1 Green Supply Chain Management Practices

GSCM practices	Mean	Std. Deviation
Company's environmental vision and mission application	4.81	.483
Design for environment practices in product development implementation	4.78	.506
Product design for parts to ensure long life through easy repair and efficiency	4.37	.688
Product design for easy set up and better energy saving	4.33	.920
Recycle of returned products or scrap materials	4.30	.724
Product design with reduced consumption of material energy	4.26	.813
Reduction of carbon footprint by transport optimization	4.26	.712
Commitment of Green supply chain management by top management	4.22	1.013
Product design with reduction of hazardous emissions	4.19	.786
Commitment of Green Supply Chain Management by mid-level management	4.19	.834
Product design for reuse, recycle and recovery of material component	4.15	.718
Product design for lengthened lifecycle and less deterioration	4.15	.770
Leasing of capital Equipment to ensure full utilization.	4.11	.641
Sale of excess capital equipment	4.07	.781
Reduction of energy consumption in manufacturing and buildings	4.00	.877
Eco-labeling of Products	3.89	.801
Environmental Compliance and auditing programs	3.89	.801
Cooperation with suppliers for environmental objectives	3.81	.786
Compliance with environmental regulations	3.81	.786

Sale of scrap and used materials	3.78	.641
Co-operation with customers for green packaging	3.78	.751
Investment recovery of excess inventory/materials	3.74	.712
Total quality management	3.63	.688
Provision of design specification to suppliers as per eco-design	3.56	1.396
Environmental Management Systems exist	3.52	1.312
Redesign of the supply chain network to reduce carbon footprint	3.44	.751
Product design in line with support regulation	3.22	1.281
Co-operation with customers for eco-design	2.74	.984
Co-operation with customers for cleaner production	2.63	1.006
Co-operation with customers for less energy use during transportation	2.15	.864
ISO 14001 certification	1.56	.698
ISO 14001 certification for suppliers	1.48	.580

Source: Research data (2012)

4.4 Challenges that hinder implementation of Green Supply Chain Management practices

Respondents were asked to select challenges that hinder implementation of green supply chain management practices. From the research findings it was established that high investment costs had the highest mean of 2.96 followed by lack of qualified personnel with a mean of 2.67. Lack of understanding on the GSCM concept had the lowest mean of 2.19 as shown in table 4.2 below.

Respondents also listed other challenges that hindered implementation of green supply chain management. From the research findings it was established that lack of the employees' goodwill to implement the GSCM practices was seen as a major challenge.

The high investment cost was considered as a hindrance to the green initiative. The companies may have a perception that the initial capital costs may be too high but according to Chien (2007) the adoption has a positive effect on both environmental and financial performance, an increase in environmental performance will be accompanied by increased corporation profit and market share. Lack of qualified personnel in the companies may hinder the implementation of the green initiative due to lack knowledge on the field. Lack of government support like education, tax breaks and incentives is also a hindrance to the green initiative.

Table 4.2 Challenges hindering implementation of Green Supply Chain Management practices

Challenge	Mean	Std. Deviation
High investment costs	2.96	.706
Lack of qualified personnel	2.67	.679
Lack of government support	2.58	.809
Lack of management support	2.30	.953
Lack of understanding on the SCM concept	2.19	.834

Source: Research data (2012)

4.5 Green supply chain management drivers

The researcher wanted to know the green supply chain management drivers that affect telecommunication firms in Kenya. From the research findings, it was established that costs had the highest mean of 4.41 followed by suppliers' development of eco friendly products with a mean of 4.26. Industrial professional group activities had the lowest mean of 2.63 as shown in table 4.3 below.

Table 4.3 Green supply chain management drivers

Drivers	Mean	Std. Deviation
Costs	4.41	.694
Suppliers development of eco friendly packaging	4.26	.764
Suppliers advances in the development of eco-friendly products	4.04	.808
Green movement activism	3.74	.656
Establishing the company's green image	3.56	.506
Regional environmental legislation	3.48	.643
Competitors green strategies	3.44	.641
Environmental partnerships with suppliers	3.41	.572
Kenyan consumers environmental awareness	3.41	.797
Government environmental legislation	3.33	.679
Demand	3.26	.594
Industrial professional group activities	2.63	.742
Valid N (listwise)		

Source: Research data (2012)

Costs as drivers of the Green supply chain management may have the greatest effect since if the cost is too high low implementation will be observed in the companies. There has to be a balance for it to be sustainable in the long run. Suppliers' development of eco-friendly products will lead the companies to adopt the new changes for compatibility hence promoting the green initiative in the companies. Industrial professional group activities may have a limited effect on the companies because they have a low influence in the Kenyan market.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

In summary, the response rate of the study was 67.50 %.The research study utilized primary data obtained from the four telecommunication companies in Kenya. Questionnaires that consisted of both closed and open ended questions were used to obtain the primary data.The questionnaires were administered to top management and other staff in the procurement department. This ensured they had sufficient information and knowledge on the topic under study. Intended beneficiaries of this study were mobile telecommunication companies in Kenya, Government regulatory bodies like National Environmental Management Authority (NEMA) and Communications Commission of Kenya (CCK), researchers and academicians.

The research problem was as a result of the continuously deteriorating natural environment and climate, and the unbalanced social and economic development of the world. The rapid development of information technology around the world has brought both positive and negative effects. Currently no known research has been conducted in Kenya to explore the extent and nature of greening of the supply chain in the telecommunication

There were three aims of the study; to determine the green supply chain management practices adopted, to determine challenges encountered in implementing supply chain management practices and to determine the drivers of green supply chain management practices in the mobile telecommunication industry. The discussions and presentations were guided by the objectives of the study.

5.2 Conclusions

From the study findings it was noted that most mobile telecommunication firms in Kenya were owned by foreigners and they have more than 200 employees. Procurement functions in these firms were found to be under finance department. These financial departments were found to be in operation for long periods of more than 10 years.

The first objective was realized as it was established that most firms were found to have adopted green supply chain management practices. Company's environmental vision and mission application was found to be the most practice used by telecommunication firms in Kenya followed design for environment practices in product development implementation. ISO 14001 certification for suppliers was found to be the least adopted green supply chain management practice. Collection of e-waste i.e. old laptops and phones was also cited to be a common practice among telecommunication firms.

The second objective was achieved by establishing that the major challenge hindering implementation of green supply chain management was high investment costs followed lack of qualified personnel. However lack of understanding on the SCM concept was seen as the least challenge to hinder implementation of green supply chain management in the Kenyan telecommunication industry. Lack of the employees' goodwill to implement the GSCM practices was also cited as a major challenge that hindered implementation of green supply chain management.

Finally the last objective was achieved by determining that costs was the major green supply chain management driver that affect telecommunication firms in Kenya followed by suppliers' development of eco friendly packaging. Industrial professional group activities was found to be the least green supply chain management driver

5.3 Recommendations

This study recommends that for green supply chain to be fully implemented by all most mobile telecommunication firms in Kenya. They need to re-evaluate their green practice. Benchmarking should be used to borrow best practices on these. Moreover more funds should be sourced since it was established that cost was the major green supply chain management driver that affected telecommunication firms in Kenya

This study recommends that the green supply chain concept should be addressed with great concern and all challenges that hinder full implementation removed. These challenges include high investment costs and lack of qualified personnel. Employees' goodwill to implement the GSCM practices should also be enhanced as it was found to be hindering green supply chain practices among telecommunication firms in Kenya.

5.4 Limitations of the Study

The researcher encountered quite a number of challenges related to the research and most particularly during the process of data collection. During the study the researcher traveled for long distances before accessing different telecommunication firms in Kenya. In addition some of the respondents had to be pushed to assist with data while others declined to respond to the questionnaires. This was done through many calls to remind them. Time allocated for the study was insufficient while holding a full time job and studying part time. However the researcher tried to conduct the study within the time frame that was specified. The resources available to the researcher were also limited.

5.5 Suggestions for Further Research

Arising from this study, the following are directions for future research in green supply chain management. This study focused on all telecommunication firms in Kenya. Therefore, generalisations cannot adequately be relied upon based on their nature of ownership and

resources they possess. Based on this fact among others, it is therefore recommended that a narrow based study should be done for instance on a single telecommunication firm. Similar surveys to this can be replicated in a few years to come to assess if the factors have changed as more firms are established in Kenya.

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Appendix I: Questionnaire

Section A: GENERAL INFORMATION

- 1. Name of the company _____

- 2. State the type of ownership of your company
 - i) Local
 - ii) Multinational

- 3. indicate the best representation of your company size in terms of employees
 - i) Below 50
 - ii) 51-100
 - iii) 101-150
 - iv) 151-200
 - v) Above 200

Section B: Supply Chain Management Practices

- 1. a) Who does procurement in your company?

b) If yes, for how long has it been in place?
 - i) Less than 1 year
 - ii) 1-5 years
 - iii) 6-10 years
 - iv) More than 10 years

- 2. Using the scale provided indicate the extent to which the following green supply chain management practices have been implemented in your company. (5-Practising it fully, 4-

Practising it to some degree, 3-Currently considering it, 2-Planning to consider it, 1-Not considering it).

Practices	1	2	3	4	5
Cooperation with suppliers for environmental objectives					
Product design for easy set up and better energy saving					
Commitment of Green supply chain management by mid-level management.					
Total quality management					
Environmental Compliance and auditing programs					
Reduction of energy consumption in manufacturing and buildings.					
ISO 14001 certification.					
Environmental Management Systems exist.					
Eco-labeling of Products.					
Compliance with environmental regulations.					
Company's environmental vision and mission application					
ISO 14001 certification for suppliers					
Provision of design specification to suppliers as per eco-design					
Product design with reduced consumption of material energy					
Product design for reuse, recycle and recovery of material component					
Product design with reduction of hazardous emissions					
Product design in line with support regulation					
Design for environment practices in product development implementation					
Commitment of Green supply chain management by top management					

Section C: Challenges to Green supply chain management practices.

1. Using the scale provided indicate the extent to which the factors below hinder the implementation of green supply chain management practices in your company. (1.Very low extent. 2. Low extent. 3. Moderate extent, 4. Great extent.5.Very great extent).

	1	2	3	4	5
i) Lack of management support					
ii) Lack of understanding on the SCM concept					
iii) Lack of government support					
iv) High investment costs					
v) Lack of qualified personnel					

2. Give any other challenges that hinder the implementation of green supply chain management practices in your company.

Product design for parts to ensure long life through easy repair and efficiency					
product design for lengthened lifecycle and less deterioration					
Leasing of capital Equipment to ensure full utilization.					
Redesign of the supply chain network to reduce carbon footprint					
Co-operation with customers for eco-design					
Co-operation with customers for cleaner production					
Co-operation with customers for less energy use during transportation					
Co-operation with customers for green packaging					
Investment recovery of excess inventory/materials					
Sale of scrap and used materials					
Recycle of returned products or scrap materials					
Sale of excess capital equipment					
Reduction of carbon footprint by transport optimization					

3. Give any other supply chain management practices that are being used in your company.

Section D: Green supply chain management drivers.

1. Using the scale provided indicate the extent to which the following green supply chain management drivers affect your company. (1. Not important at all. 2. Not important 3. Not thinking about it. 4. Important. 5. Very important.)

		1	2	3	4	5
a	Government environmental legislation					
b	Regional environmental legislation					
c	Competitors green strategies					
d	Industrial professional group activities					
e	Kenyan consumers environmental awareness					
f	Establishing the companys' green image					
g	Suppliers advances in the development of eco-friendly products					
h	Environmental partnerships with suppliers.					
i	Green movement activism					
j	Demand					
k	Costs					
l	Suppliers development of eco friendly packaging					

Thank you.