

**GREEN SUPPLY CHAIN INITIATIVES AND CHALLENGES BY
MANUFACTURING FIRMS IN KENYA**

BY

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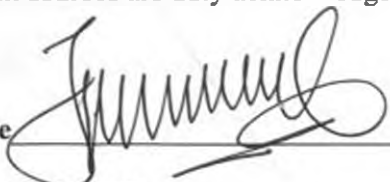


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DECLARATION

I declare that this research project is the result of my own independent investigation and that all sources are duly acknowledged in the bibliography.

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Date 22/11/2011

D61/71158/2008

This research project has been submitted for examination with my approval as the University Supervisor

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DEDICATION

To my parents Mr. and Mrs. Murange and my sister Molly it is through your support, prayers and selfless assistance that this was possible. I will forever remain indebted for you all.

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ABSTRACT

It is important that government of Kenya realize that sustainable business development is among the main goals of the Millennium Development Goals. In this realization, it would be therefore critical for the government to be on the fore front in terms of policy formulation to towards development of green businesses. Green Economies will be more competitive and more cost effective and with a growing proportion of the customers being more eco conscious it would be inevitable for the authorities not to take action.

Incentives on the manufacturers should be on the forefront in this course since only incentives with an economic benefit will entice the business community to embrace GSCM. Relevant technologies could be also subsidized where appropriate. Enforcement of laws such as the requirement to submit an EIA/EA should be implemented to the core as slackening does not help the development of GSCM. The government could also take up partnerships with developed GSCM practioners in other countries and enable our manufacturing industry take this as a benchmarking and learning opportunity.

CHAPTER ONE: INTRODUCTION

This chapter will focus on the current trends as appertains to the adoption of Green Supply Chain Management (GSCM) by manufacturers in Kenya. It will explain what is meant by manufacturing and the reasons as to why adoption of the GSCM is an important concept today in the world of business and commerce. The chapter gives an insight on what is the problem or challenge under review and the justifications of why this is an issue that needs to be addressed urgently.

1.0 Background

Climate change, air and water pollution and poor waste disposal continue to be the most persistent challenges of the 21st century (Diane et al 2010). According to UNEP (2009) Nairobi generates 1530 tonnes of waste a day, of which 68 per cent comes from domestic sources while 32 per cent is from industrial sources. The City council of Nairobi (CCN) collects 40 per cent while the private sector collects 20 per cent and the balance is left uncollected (UNEP 2009). Wei and Hu (2010) note that industrial activity in today's world has the capacity to wipe out species and cause fatalities through pollution from toxic compounds disposed of irresponsibly by manufacturing industries. Globally GSCM is a concept that has been put into use. Governments especially in the developed countries have put in incentives to push organisations to adopt and implement GSCM initiatives (Zhu et al 2006). According to Zhu, Sarkis and Lai (2006) Chinese companies have also experienced environmental pressures through their international customers. For example, Myers Squibb, IBM and Xerox have encouraged their Chinese suppliers to develop environmental management systems consistent with ISO 14001 while Ford , GM and Toyota have required their Chinese suppliers to obtain the ISO 14001 certification(Zhu, Sarkis and Lai 2006).

The effects of environmental neglect in Kenya have been evident especially in the capital Nairobi (Mwirigi 2007). Mwirigi (2007) noted that while manufacturing entities are subjected to Environmental Impact Assessment (EIA) and Environmental Audit (EA), the Nairobi river bears testimony of chronic pollution levels from agricultural nutrients and raw sewerage to highly toxic industrial waste. According to the Kenya National Cleaner Production Centre (KNPC), the solution to reduce this pollution and to restore the quality of the river lies in the adoption of contemporary tools of environmental management such as green supply chain management, eco design, environmental accounting and lifecycle analysis (www.cpkkenya.org/projects) 2011. Kenya still lags behind in implementing GSCM even though there is substantial information among managers. It is therefore important to understand why managers are not keen in employing GSCM when it is actually meant to improve operational processes and ensure sustainability of the industries.

Investing in GSCM has a number of benefits. According to Vermeulen and Ras (2005) developing synergies between operational performance and environmental excellence may lead to a more globalised level of customer satisfaction, one that includes both cost competitiveness and environmentally sound products and services. Dianne et al (2010) noted that GSCM aids in overcoming the traditional assumption that being environmentally sound reduces productivity. Samson and Dayna (2008) noted there is a general consensus that green supply chain management promotes efficiency and synergy among business partners and their lead corporations, and helps to enhance environmental performance, minimize waste and achieve cost savings. According to Russel (1998), Africa particularly has been on the receiving end in terms

of the effects of climate change and environmental impacts that come along with the effects of rapid industrialisation. Harris and Crane (2002) note that industrialisation is being advocated for as a driver for economic growth and improved livelihoods but at the same time warnings are being sent out that unless the economic growth and industrial development are done in a sustainable manner, then the end goals might not be realised in the long run.

The balancing act between development and conservation to achieve sustainable development is a challenge that managers today have to factor in their strategic and operational plans. Investing in GSCM by any organisation should not be viewed as an extra unnecessary cost but as a long term investment endeavour meant to facilitate the long term interests of the organisation.(Russel 1998).

1.1 Green Supply Chain Management

GSCM is an approach that seeks to respond to environmental concerns brought about by industrial development such as; pollution of both aquatic and land systems by effluent and toxic fumes, climate change and abnormal weather patterns such as acid rain and rising of sea levels, loss of biodiversity and species and chronic and cancer related ailments (Hockey and Gale 2001). Green Supply Chain Management (GSCM) is a relatively new concept with little structured literature (Holt and Ghobadian 2009).

Johnsson (2008) cites that from the business point of view, the environmental consequences of the logistics system can in certain situations constitute part of consumer service. Customers are increasingly making specific demands for environmentally friendly products and services (Johnsson 2008). They include

packaging with environmentally friendly material which is directly degradable upon disposal or which can be reused or recycled. Zhu Sarkis and Lai (2006) point out the use of threatened or protected species of plants such as sandal wood and animals in the production process or the use of chemicals that are deemed as environmentally unpalatable e.g. Ozone depleting chemicals also constitute environmentally unfriendly products (UNEP 2009). Environmental demands have therefore become order qualifiers and at times order winners to some customers and therefore in response most organisations have to ensure that the entire value supply chain is environmentally sound.

1.2 Manufacturing Firms in Kenya

Kenya has a large manufacturing sector serving both the local market and exports to the East African region. The sector has both subsidiaries of multi-national corporations and locally owned and franchised around the region such as the East African Cables Limited. Manufacturing contributed approximately 20% of the Gross Domestic Product (GDP) in 2009(<http://www.pwc.com/ke/en/industries/industrial-manufacturing.jhtml>) Apr 2011. Manufacturing also contributed 13% of formal employment and also contributed to 12.5% of Kenya's total exports in 2008 (<http://www.roundtableafrica.net>) 2011. Therefore, this is one of the sectors that contributes to the national economy and can not be ignored as illustrated in the table below;

Table 1 GDP average contribution per sector.

INDUSTRY	GDP (average contribution 2009/2010)
Agriculture	26%
Building and construction	2%
Tourism	12.7%
Transport	8%
Financial services	10.5%
Fishing	0.5%
Mining and Quarrying	0.3%
Forestry	4%
Manufacturing	20%
ICT,(Information & comm.)	8%
Energy	8%
TOTAL	100%

Source: www.epzakenya.com (2011)

Despite the fact that manufacturing makes a noticeable contribution to the economy of this country, not many researches have been carried out on the challenges faced by the same firms in the effort to try and conform to the green manufacturing practices and especially in terms of their supply chain management practices. According to the Kenya Association of Manufacturers (KAM 2011), there are 670 registered members. These are classified as large, medium and small scale manufacturing firms according to annual average turnovers made. As Sunil et al (2004) put it, manufacturing is a critical member of the supply chain since manufacturing has the capacity to source for raw materials, transform them into useable goods and even transport them to the users. Therefore the environment from which the raw materials come and upon which the infrastructure rests is important for the supply chain operations as well as manufacturing.

The KAM defines small scale manufacturers as those manufacturing firms with a turnover of between Kenya shillings ten million and twenty million Kenya shillings. Medium scale manufacturers range in turnover between twenty million and two hundred and fifty million while the large manufactures have turnovers in excess of Kenya shillings two hundred and fifty million. The manufacturing firms range in terms of what they produce and in sub sectoral categories and thus they may have different challenges within their different supply chains. The Kenya Economic Sector Survey (2005), documented that major manufacturing exports from this sector included horticultural products, processed coffee and tea, iron steel, soda ash and fish products. Manufacturing imports mainly included petroleum products, industrial machinery, motor vehicles, iron and steel, plastics in primary and non-primary form, medicinal and pharmaceutical products, chemical fertilizers and animal and vegetable oils and fats. Manufacturing firms face major challenges in terms of managing their supply chains which range from logistical marketing, purchasing and operational emphasis on greener products worldwide (Russel 1998). The threat to ban Kenyan flower and other horticultural products from the European markets by the European Union (E.U) in 2002 was because they were produced in conditions that lead to high emissions of carbon dioxide. GSCM can help such manufacturers look critically into the role played by each channel member in the effort to meet customer needs and at the same time meet desired environmental standards (Shane 2003).

KAM notes that 80% of the 670 members are based in the city of Nairobi. These firms by law are required to carry out periodic environmental audits to ensure that they conform to set standards and mitigate against damages to the environment as a result of their activities. The Environment Management and Coordination Act of

1999. mandates the National Environment Management Authority, (NEMA), to see to it that all industrial establishments are subject to annual Environmental Audits and new establishments have to have an initial Environmental Impact Assessment report carried out by an expert and submitted to the authority. Manufacturing firms are still responsible for a significant proportion of the pollution incidences in the city and in the country at large (UNEP 2009). NEMA notes that compliance to the annual mandatory Environmental Audits (E.A's) has been wanting and some manufacturers have been taking advantage of the lean staff capacity of NEMA to avoid inspections and submitting their reports as required (State of the environment report 2008).

1.3 Statement of the Problem.

According to the Kenya Economic Survey (2006), NEMA's major challenges were solid waste disposal and emerging environmental health issues, whereas those faced by the Nairobi City Council were plastic bags, noise, river, and water and air pollution. The Kenya Bureau of Standards (KEBS) notes that in Kenya only 7 out of 670 (six hundred and seventy) manufacturers are concerned with the greening of their supply chains and complying with ISO 14001 standards whilst the rest of them are just content with the information they have at hand as regards GSCM and rarely take any effort to implement GSCM (www.kebs.org) 2011.

At present, the Public Procurement Act of 2006 does not have a guideline on green supply chain management despite this being the legal guide to matters involving public purchasing and procurement. UNEP (2009) notes that the biggest challenges in the country today are emission of greenhouse gases, loss of biodiversity and ecosystem pollution. These can be largely mitigated by taking better initiatives in the

manufacturing sector. GSCM provides the manufacturing sector in Kenya a chance to mitigate against irreversible damages to the environment and an opportunity to create sustainable partnerships in commerce. Rao (2005) notes that there exist potential linkages between GSCM as an initiative for environmental enhancement, economic performance and competitiveness. Hence GSCM can be employed in attaining competitive advantage.

Sarmiento and Thomas (2010) note that GSCM has the capacity to tremendously address the eco concerns raised due to industrial activity especially in Africa. Ever increasing pressure to use resources sustainably are being echoed from KAM, UNEP, the Kenya Government and even development partners (UNEP country report 2009). According to UNEP, Nairobi's river system is under constant threat especially from industry pollution through effluent disposal. This calls for cleaner and more responsible methods of waste handling in Kenyan industries (UNEP country report 2009). As water resources diminish and as the population increases, there is the need to evaluate how efficient the resource utilisation is at manufacturing industry level and what can be done to improve the supply chains so as to create more efficient and leaner supply chain relationships among manufacturing firms. Rao and Holt (2005) also note that consumers have become more informed as they pursue more eco friendly products, and consequently the effect is taken down to the manufacturers who have to give in to enlightened customer demands. Eco friendly products are products and services that comply with environmental regulations or are environmentally friendly and reflect manufacturer's voluntary efforts to care for the environment (Sweetman and Simon 1996). The concept of customers demanding for eco friendly products is demonstrated by the recent launch of eco friendly Dura coat range of

paints by Basco paint manufacturers in Nairobi (DN 20/04/2011). The management cites customer demands as the main driver for the company to invest in the new brand of paints (DN 20/04/2011).

The concept of GSCM is not foreign to local manufacturers since calls to have them go green have been emphasised by KAM, UNEP NEMA among others in the past (UNEP country report 2009). KAM and CEEC have also emphasised the need to have energy auditing a common practice among Kenyan Manufacturers (<http://www.kam.co.ke/?itemId=2>) 2011. This study wants to establish why local manufacturing firms do not implement GSCM even though they have adequate information. This is illustrated by the fact that only 7 of the 670 conform to ISO 14001 as seen in the table below.

Table 2.0 List of companies complying to ISO 14001 standards

Organisation	Scope	Certification	License expiry date
Central Glass Industries Ltd	Manufacture, Printing, Packaging, Warehousing and Distribution of Glass bottles	ISO 14001	13th July 2013
East African Maltings Ltd	Malt Production Activities at Nairobi Plant and, Agricultural Activities at Molo Plant	ISO 14001	16th April 2012
Bidco Oil Refineries Ltd	Manufacturing and Marketing of Edible Oils, Fats, Margarine and Hygiene Products	ISO 14001	31st October 2011
The Nairobi Hospital	Provision of Healthcare Services and Education	ISO 14001	19th November 2010
Bidco Oil Refineries? Elianto Division	Extraction of edible oil from oil bearing materials and sale of by products to animal feed user	ISO 14001	5th October 2011
United Nations Office at Nairobi? Publishing Services Division	Intake of raw materials, preparation of materials for printing, management of raw materials before, during and after printing	ISO 14001	20th October 2011
Kenya Breweries Limited	Manufacture and distribution of beverages (soft drinks, Beers, Spirits and Liqueurs)	ISO 14001	24th June 2013

Source: www.kehs.org (2011)

Although few researches have been carried out in the manufacturing sector, none has been entirely focused on understanding the reason why manufacturers hesitate to use GSCM in their operations. The need for GSCM in Kenya calls for exploration and at the same time looking at the current state of affairs and comparing this with the trends in other parts of the world in an attempt to answer the question: What challenges do manufacturers face in implementing GSCM? This study tries to look into some of the reasons that have prevented manufactures from putting in place GSCM despite the fact that they know and are presently aware of the ecological concerns raised locally and internationally.

1.4 Objectives of the study

1. To establish the green supply chain management initiatives by manufacturing firms.
2. To identify the challenges manufacturing firms in Kenya face in using the GSCM.

1.5 Research questions

1. Are Kenyan manufacturing firms conversant with GSCM initiatives?
2. Do Kenyan manufacturing firms employ GSCM?
3. What are the challenges in implementing GSCM initiatives among manufacturing firms?

1.6 Value of the study

The finding of this study will add to the pool of knowledge in the field of eco manufacturing and production and operations management.

It will also be of importance in aiding the government of Kenya in formulating policies relating to cleaner production practices and more specifically pertaining to Green Supply Chain Management.

Manufacturing and service organisations are also expected to borrow insights from this reading as they practically engage in supply chain activities in their operations.

This paper will also aid the consumers in their choice of green suppliers and their products and other benefits that may accrue from an environmentally guided decision.

This study will also lay a platform for further research as regards the use of green production practices.

This study will aid organisations to develop and realise the value of employing environmental concerns in their supply chains and thus promote a more sustainable manufacturing sector.



CHAPTER TWO: LITERATURE REVIEW.

2.1 Introduction

This chapter will look into what other authors and scholars have said about the concept of Green Supply Chain Management (GSCM) .It will also review the need for GSCM in a bid to avert environmental challenges presented by manufacturing activities. The Literature reviewed will present various studies and theories in support of the adoption of GSCM by manufacturing firms and challenges therein adopting the GSCM at organisational levels.

2.2 The Concept Supply Chain Management

The term Supply Chain Management (SCM) was coined by Keith Oliver in 1982 (Sherer 2005). SCM is underpinned by the control of fulfilment activities that support the linear physical flow of goods from suppliers to manufacturers to distributors and to retailers. Lysons and Farrington (2006), defines a supply chain as that network of organisations that are involved through upstream and downstream linkages in the direct processes and activities that produce value in the of products and services in the hands of the ultimate consumer or customer. This implies some form of close associations or coordination in an attempt to deliver value to the customer. Handfield et al (2009) notes that Supply chain management is a strategic approach to planning for and acquiring organisations current and future needs through effectively managing the supply base, utilizing a process orientation in conjunction with cross functional teams to achieve the organisational mission.

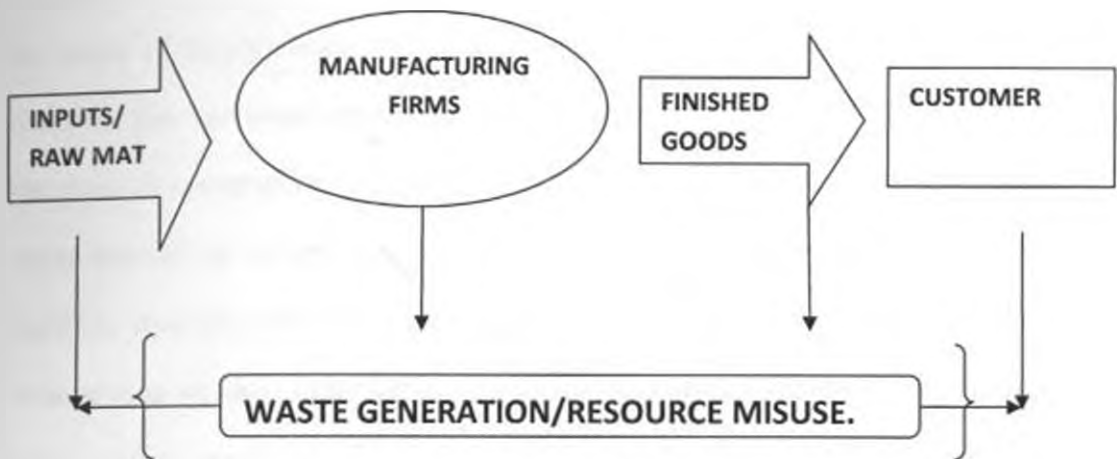
Supply chain management is integrally linked to the process of consumption in society and consumer demands determine how organisations set their expectations

and justify adaptation to their operations. The first step of meeting new supply chain management challenges is therefore radically redefining the basic structure of the entire supply chain by accommodating environmental considerations associated with waste management and resource minimization. Mentzer (2003) defines a supply chain as the systematic strategic coordination of the traditional business functions within a particular company and across businesses within the supply chain for purposes of the individual companies and the supply chain as a whole. Burgess et al (2006) concedes that supply chain management is broad and not confined to any specific discipline and adequately caters for the breadth of issues that are usually covered under this term. Supply chain today will encompass the functions of buying or purchasing of the raw materials or inventories and how they are converted to final products in the value addition process. Henricks and Singhal (2005) who defines the concept of supply chains as one that encompasses three interrelated elements: The management of all the activities associated with the flow and transformation of goods, from the raw material stages to the final user, the associated information flows up and down the supply chain and the management of supply chain relationships.

Samson and Dayna (2008) note that supply chain management is not a new name for purchasing but a more inclusive concept that caters for the strategic approach to planning for and acquiring the organisations current and future needs in an attempt to ensure that it delivers maximum value to the organisation and ultimately to the customer. In this regard then Supply chain is thus the identification, acquisition, access, positioning and management of resources and related capabilities an organisation needs or potentially needs in the attainment of its strategic objectives. Supply chain management often takes a process approach to obtaining the required

goods and services. Supply chain management is a progressive approach to managing the supply base that differs from the traditional arms-length or adversarial approach with sellers.

Fig 2.0 Theoretical Framework.



Source: Author 2011.

The above Figure 2.0 depicts a typical production process framework under the manufacturing context. Waste generation is an unavoidable in any manufacturing process however some of the GSCM initiatives aim to make use of some of these by products by appropriately channelling them into areas in the value chain where they can be of value. Such initiatives would include Design For Environment, Reverse logistics, Manufacturing for environment among others.

2.3 Green Supply Chain Management

Manufacturing industries have in the last decade grown and commensurate with this growth is an environmental burden (Zhu, Sarkis and Lai 2006). To mitigate this

situation eco friendly operations have been suggested as a solution. GSCM is one of the fronted approaches in this effort and in spite of the increasing number of studies and interests to GSCM, there is no consensus regarding a well accepted definition of it and its related practices (Vachon and Klassen, 2006; Zhu et al 2008). GSCM may elicit varied definitions and philosophies (Sarkis 2006). It is evident however that GSCM initiatives would have to necessarily cover the different aspects that fall within the scope of supply chains management namely the activities associated with the make up, flow and transformation of the raw materials from the point of extraction to the point of consumption (Hu and Hsu 2010). For example, Rao and Holt (2005) wrote that GSCM encompasses environmental initiatives in areas such as inbound logistics, production or the internal supply chain, out bound logistics and in some cases reverse logistics. Other authors are inclusive of various different aspects such as environmental purchasing, green marketing, design for environment and industrial eco systems management (Carter and Carter 1998).

Zhu et al (2005) notes that GSCM practice has grown in importance globally in the modern business arena. Zsidisin and Hendrick (1998) notes that in Germany, the U,K and the U.S. A, Purchasing managers identified critical factors for environmental purchasing as those providing design specification to suppliers that include; environmental requirements for purchased items, cooperation with suppliers for environmental objectives, environmental audits for supplier's internal management and suppliers' ISO 14001 certification. Zhu Sarkis and Lai (2007b) notes that GSCM advocates for the incorporation of lean and green process to continuously improve the supply chain performance. This type of environmental collaboration develops

knowledge sharing capabilities that serve as a resource for a sustainable competitive advantage through environmental efforts (Lai Sarkis and Zhu 2006).

GSCM should be viewed as a wholesome approach that is employed by sustainable organisations that have the interest of both their customers and partners at heart in their operations to the future. It has to be understood that GSCM is a concept backed by the principles of sustainable development that advocate for business growth with a concern for the posterity of the businesses, their customers and their sources of raw materials among others. GSCM is not a preventative or stopgap measure that should be embraced in worst case scenarios where the ecosystem has suffered irreparable damage but rather a concept that should be cultured among the young business leaders as they take over the helm of industries.

One of the most common global metric in the global arena is the ISO 14001 certification which requires procedures for identifying all environmental aspects of the site's operations, safe handling and disposal procedures for hazardous materials and waste and compliance with relevant environmental legislation (Corbett and Kirsch 2001). ISO 14001 certification is commonly used by the multinationals and these firms encourage their suppliers to apply for certification since the standards are also used for supplier selection (Chen, 2005; Miles et al. , 1999). Several factors lead firms to pursue green supply chain practices in a global context, including common global environmental standards such as ISO-14000 (Rondinelli and Berry, 2000), policies from corporate headquarters (Hansen et al., 2004), effects of environmental performance on firms' global reputations, cost reduction, pressures from stakeholders, and competitors (Zhu et al., 2005; de Brito et al., 2008).).

According to Sarkis (2006), China the fastest growing economy in the world has had environmental challenges due to industrial development as a top agenda for government. Sarkis, Zhu and Lai (2006) further point out that the scarcity of resources due to environmental degradation have caused the Chinese government to further tighten environmental regulations not forgetting pressure that Chinese companies are getting from international partners and customers such as IBM, Xerox and Myers Squibb. It is thus clear that GSCM need not be seen as an unnecessary cost by the industry players but rather as a means of gaining competitive advantage in highly competitive and dynamic market place that has more enlightened customers.

2.4 Drivers of GSCM

According to Walker et al (2008) these pressures or “drivers” can be classified into internal and external. The external pressures cover government regulations and influence, customer requirements and environmental pressures, better financial and operational performance associated with the implementation of GSCM and strong partnership with suppliers who require conformance to GSCM (Walker 2008) amongst others. Internal factors that drive the adoption of GSCM initiatives include organisational readiness, top-level leadership, cost reduction, profitability, commodity risk management and preservation of a corporate culture, cross-functional integration, effective communication within companies’ corporate environmental pro-activity and committed involvement of suppliers (Walker 2008). Chien and Shih (2007) note that GSCM as a concept comes in to bridge common gaps by offering a new perspective on issues that are important to practioners and academics. Issues that firms have to face especially in the modern world where eco management has become a global concern. Components of GSCM include;

2.4.1 Design for Environment.

Design for environment (DFE) is a structured approach that is aimed at comprehensively addressing environmental impacts arising from all stages of the product lifecycle and especially so stemming such impacts at the initial product design stage (Wright and Reyes 2001). DFE is an umbrella term used to describe the techniques that are used to incorporate the environmental components into products and services even before they enter the production process. Lippmann (1999) notes that DFE arises from the recognition that all stages of product development have the capacity to impact negatively on the environment. According to Dianne et al (2010) DFE is a particularly great way of incorporating eco-concerns in manufacturing since DFE emphasises on the need to incorporate environmental concerns during the initial stages of product and process design. DFE will often lead to Product designers who address environmental concerns in the product design process, from concept to detailed design, and who have adopted concepts such as green manufacturing, Manufacturing for environment, total quality environment management and industrial ecosystems management (Zhu Sarkis and Geng 2005).

2.4.2 Green Manufacturing

Green manufacturing also referred to as environmental –conscious manufacturing (ECM) is defined as the deliberate attempt to reduce the ecological impacts of industrial activity while maintaining or improving quality standards and reducing costs of products (Pun 2006). Russel (1998) cites that ECM is the continuous application of an integrated preventive environmental strategy to manufacturing processes products and services to increase eco-efficiency and reduce risks for humans and the environment. ECM is however yet to be fully appreciated in Kenya

especially due to the fallacious impression that ECM will require huge capital investments.

2.4.3 Manufacturing for Environment.

Hu and Wei (2010) write that manufacturing for environment is tailor made manufacturing by employing environmentally sound technologies and practices that reduce emissions, waste and pollution to develop quality products that are in conformity to laid down environmental requirements. Manufacturing for environment also will include Process remanufacturing that will entail collecting of a used product and assessing its condition and replacing broken parts to return it back to normal functionality (Vermeulen and Ras 2005). Dianne et al (2010) document that manufacturing for environment will also cater for lean and green production systems that look into aspects such energy efficiency, packaging materials used and level of toxic compound in products.

2.4.4 Total Quality Environmental Management.

Bowen et al (2001) records that total quality environment management is a harmonised approach that aims at optimising the relationship between industrialism and eco efficiency. Bowen et al (2001) further points out that it is the whole some and perpetual process of ensuring that processes and products adhere to Environmental quality standards set out such as ISO 14001 in the long term interests of the organisations and the ecosystems upon which they thrive on. Total quality environmental management will also include the component of performance measures without which it would be difficult to determine the efficiency of and/or effectiveness of the existing system or to compare competing alternative systems (Beamon 1999).

The Government through its actors such as Kenya Bureau of Standards should ensure that companies have incentive and are supported to attain ISO 14001 and other environmental standards.

2.4.5 Industrial Eco-systems Management

According to Zhu Sarkis and Lai (2007a) industrial ecosystems is a new term in describing relationships between organisations and calls for a relationship between organisations that will supplement each other in terms of ecological conservation. In such relationships organisations that are in a progressive value chain can use this concept to complement each other in the case where waste from one organisation can be used as raw materials by the next adjacent organisation in the value chain (Hervani et al 2005). In Kenya, individual manufacturers have not come up to look at the synergies they can develop to aid in making the supply chains green leaving a lot to be desired.

2.4.6 Green Marketing

Green marketing is defined as environmentally sound marketing practice that takes to account the impact of marketing channels and minimises them to the lowest possible standard (Johnsson 2008). Green marketing is a crucial factor in the success of any GSCM system as marketing takes the role of creating the connection with the customers and suppliers and more so it is a customer and demand focused (Walker et al 2008). Johnsson (2008) cites that simple concepts such as packaging and use of environmental chemistry to produce less harmful chemicals e.g. to the Ozone and communicating that to the customers is of prime importance. Johnsson (2008) emphasises the need to have an all inclusive approach in the marketing function so as

to continually communicate the green strategy in the entire logistics process and value chain. In Kenya however very few companies seem to communicate their green philosophy to customers and this has compelled some of the manufacturing firms to respond to market demands and go green such as Basco paint manufacturers in Nairobi (DN 20/04/2011).

2.4.7 Green Purchasing

Green Purchasing refers to the employment of environmentally conscious purchasing practices that reduce the sources of waste and promotes recycling and reclamation of purchased materials without adversely affecting performance requirements of such materials (Pun 2006). Vachon and Klassen (2006) points out that as more and more consumers who exhibit high levels of environmental consciousness and make more green purchasing decisions manufacturers will have no option but to also go green in their product designs and Supply networks ultimately. It is envisaged that measures of environmental consciousness will be more closely related to purchasing habits among this increasing crop of conscious consumers (Bowen et al 2001). Lippmann (1999) also points out that green purchasing should also be looked at from the perspective of organisational buying. In their study Hockey and Galle (2001) established that 78% of surveyed purchasing professionals in the U.S viewed supplier advances in developing environmentally friendly goods as an important factor in supplier selection and even acted as an order qualifier in such processes. As buying firms get increasingly attentive to green buying and environmental concerns raised, they also realise that waste prevention and reduction at the beginning of the supply chain is more cost efficient than waste elimination at the end of the supply chain (Galle and Min 2001).

2.4.8 Reverse Logistics.

Johnsson (1998) cites that reverse logistics is a common generic term for logistics systems that support the re-use of products and components and the recycling of materials. It will entail the collecting of and moving of used, damaged, unwanted or outdated products as well as the packaging materials from the point of consumption to the point of origin for the purpose of recapturing value or for proper disposal (Beamon 1999). According to Johnsson (2008) reverse logistics often includes reducing the use of resources in the logistics process. Consequently, companies may decide either to undertake the recovery of used products on their own, or to establish cooperation via local or more extended networks for the collection and recycling of similar products (Tsoufas and Pappis, 2006).

2.5 The challenges in Implementing GSCM by Manufacturing firms In Kenya.

Kenya's manufacturing sector is set to benefit a lot from integrating the principles of green business practices which include GSCM. Zhu et al (2006) note that in Chinese automotive industry the initial challenges in GSCM were immense and it took a lot of government and investor cooperation to implement GSCM. It is thus clear that in Kenya the apparent slow pace in adopting GSCM will come as no surprise. One of the most probable causes that could present challenge is the fear of financial investment and in supporting frameworks by industries in mechanisms that will facilitate the operationalization of GSCM. Managers have previously often been sceptical about investing in GSCM since they see no resultant cash flows (Rao 2005). This notion however changing as we see more Kenyan firms adopting cleaner business practices Such as Dura Coat and Nakumatt retail Stores. Lack of state economic incentive is

cited as an avenue that has yet to be explored in luring manufacturers to go green (Geffen and Rothenberg 2000). The Kenya government to date has not put in enough incentives to facilitate the manufacturers to restructure their supply chain management systems to comply to GSCM. Such incentives would include Tax waivers on firms or groups of firms which come together to implement GSCM. The lack of legal mechanisms to fast track the implementation of GSCM also could be a challenge since currently there are no legal instruments to compel manufacturers to adhere to any requirements pertaining to GSCM. Sarmiento and Thomas (2010) note that GSCM as a new concept has to have legal backing if it is going to succeed in any country. GSCM like any change process is bound to face challenges and even resistance but it will be up to the stakeholders and authorities to follow up and ensure that the practice is integrated in mainstream operations.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This section describes to the reader the methods and procedures adopted in investigating the GSCM practice by manufacturing firms in Kenya. It will give an account of the sampling procedures and the justifications for the same and also elaborate on the data collection procedures employed in trying to evaluate reasons as to why the GSCM initiatives are not adopted among Kenyan manufacturing firms.

3.2 Research Design

Kombo and Tromp (2009) define a research design as the structure of research or as the glue that holds all the elements of the research process. This study employed a descriptive research design which according to Kombo and Tromp (2009) entails a description of the state of affairs at present which at the same time could lead to documenting possible solutions and formulation of important principles after fact finding. This design will be employed since it allows the respondents to be observed and provide data without altering normal behaviour. It will also be useful because the population in question is large and therefore measurement and observation in the most natural settings is only most convenient using the descriptive design. Descriptive design will also enable the researcher to describe the situation, get opinion on the subject and behaviour without forming any relationships between variables.

3.3 Population

The target group which is the subject of study and whose characteristics were being described as appertains adoption of GSCM are the registered members of the KAM as

at 2011 falling in and around the Nairobi region. The population as per the KAM register 2011 has 670 members who make up the target population. They are categorised into 14 sectors namely: Building, Construction and Mining, Chemical and Allied, Energy, Electrical and Electronics, Food, Beverages and Tobacco, Leather Products and Footwear, Metal and Allied, Motor Vehicle Assembly and Accessories, Paper and Paperboard, Pharmaceutical and Medical Equipment, Plastics and Rubber, Textile and Apparels, Timber, Wood Products and Furniture, Affiliate association, Consultants and Industrial Service. However for the purpose of this study focus is on the first 12 sectors from the above list total up to 598 members. Therefore this study strictly focussed on the 598 members only as the target population.

3.4 Sample Design

Sampling procedure is a question that many scholars and practioners have grappled with over the years but it has been agreed that there is no standard sample size rule. The arrival of the sample size will depend on a number of factors among them; the purpose of the study, precision levels required, population size, level of confidence or risk and the degree of variability of the attribute to measure. (www.osra.org/it/lpj/bartlettкотrlikhiggins) 2011. A sample size of less than 30 is however deemed to be unrepresentative in statistical studies and therefore for any inferences to be made the sample size has to be >30 or $n \geq 5\%$ of the population at the bare minimum (Israel 1996). A sample size of 71 was arrived at for this study and this was to cater for the cases of non response during the period of data collection. This represented 12% (Twelve Per cent) of the target population which the researcher considers acceptable. This was arrived at using the membership register from KAM as a guiding sampling frame from which Stratified Random Sampling (SRS) will be

employed to get a representative sample to form the respondent group. SRS involves the division of a population into smaller groups known as strata. In stratified random sampling, the strata are formed based on members' shared attributes or characteristics. A random sample from each stratum is taken in a number proportional to the stratum's size when compared to the population. These subsets of the strata are then pooled to form a random sample (Kombo and Tromp 2009). There will be 12 Strata from which a proportionate sample will be drawn from each of them. Each of the Strata contributed 12% .The Affiliate associations and Consultants and Industrial service categories will not form part of the respondent list as they are special groups not in mainstream product manufacturing. This is illustrated in table 3.0.

Table 3.0 Sample population

SECTOR	MEMBERS	%	Sample @.12%
Building, Mining & Construction	19	3.18%	2
Chemical & Allied Sector	70	11.70%	8
Energy, Electrical & Electronics	36	6.02%	4
Food & Beverages	146	24.4%	18
Leather & Footwear	7	1.17%	1
Metal & Allied Sector	61	10.21%	7
Motor Vehicle & Accessories	28	4.68%	3
Paper & Board Sector	66	11.04%	8
Pharmaceutical & Medical Equipment	24	4.02%	3
Plastics & Rubber	67	11.20%	8
Textile & Apparels	56	9.36%	7
Timber, Wood & Furniture	18	3.02%	2
TOTAL	598	100%	71

Source KAM, 2011

3.5 Data Collection.

The researcher used a questionnaire designed to collect data on impacts of manufacturing activities on the environment and opinion as to why GSCM has not been employed. The questionnaire also sought data on the GSCM initiatives among the respondents and challenges in adoption of GSCM. They specifically targeted Supply Chain managers and /or Operations managers at the selected respondent firms. The Questionnaire contained both open ended and closed questions and the researcher adopted both the pick and drop method and e mails. This ensured that the respondents had enough time to respond to the data collection instrument and also ensured anonymity. To minimise non response the researcher pre-notified the respondents and followed up the respondents via Email and telephone periodically. The questionnaire was also be carefully designed to avoid ambiguity, bias and keep away from being overly lengthy. Finally the research emphasized the importance of the survey to the respondents in their industry and how it could help bring out in a scientific manner the dynamics behind GSCM.

3.6 Data analysis.

Content analysis and thematic analysis was used for the qualitative data sought. Content analysis was used to gauge the intensity and frequency of use of words and phrases in the open ended questions. Thematic analysis was used where coded answers that are regarded as being similar or referring to identical concepts. The second objective seeks to be addressed here where the challenges will be coded to and inferred upon. Content analysis was also used to address the second objective in addressing the challenges fronted by the industry stakeholders. In cases where quantitative data was sought or where numerical values form part of the data

collected, descriptive statistics such as the mean, mode and median and graphical representations were used. This will include objective one whereby ranking of the GSCM practices were tallied as per industry sector. An analysis of the most prevalent practices was arrived at and correlated to supporting factors. This was by use of statistical programs such as Statistical package for social sciences (SPSS) and MS EXCEL Spread sheet. This is because both SPSS and EXCEL Spread Sheet are quite elaborate and offer a wide choice in analysis and presentation of data.

CHAPTER FOUR: DATA ANALYSIS AND FINDINGS

4.1 Introduction.

This chapter contains the summary of the respondent's data and a careful analysis of the questionnaires that were used in the data collection process. The purpose of the study was to investigate the Green Supply Chain Management initiatives in place today and challenges therein in operationalizing them. It will put forth a general outcome of the research and where appropriate include the detail as required.

4.2 Respondent Characteristics.

Forty one companies out of the targeted Seventy one responded to the Questionnaire. This represented a 62% response rate. The table 4.0 below shows how the respondents were spread out among the sectors.

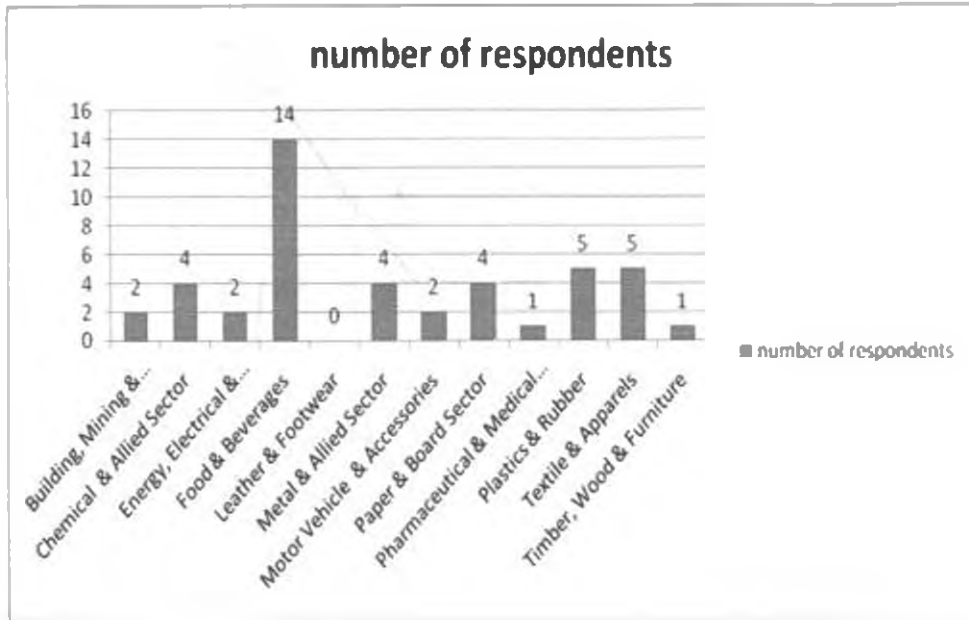
Table 4.0 Respondent Distribution

SECTOR	MEMBERS	%	Sample @.12%	Response	%
Building, Mining & Construction	19	3.18%	2	2	100
Chemical & Allied Sector	70	11.70%	8	4	50
Energy, Electrical & Electronics	36	6.02%	4	2	50
Food & Beverages	146	24.4%	18	14	72
Leather & Footwear	7	1.17%	1	0	0
Metal & Allied Sector	61	10.21%	7	4	57
Motor Vehicle & Accessories	28	4.68%	3	2	66
Paper & Board Sector	66	11.04%	8	4	37.5
Pharmaceutical & Medical Equipment	24	4.02%	3	1	33
Plastics & Rubber	67	11.20%	8	5	62.5
Textile & Apparels	56	9.36%	7	5	57
Timber, Wood & Furniture	18	3.02%	2	1	50
TOTAL	598	100%	71	44	62%

Source: Research Data

From the data above the food and beverages sector formed most of the respondent list largely attributing this to the proportionate fraction it also takes up in the sample frame.

Fig 4.0 Number of Respondents



Source: Research Data

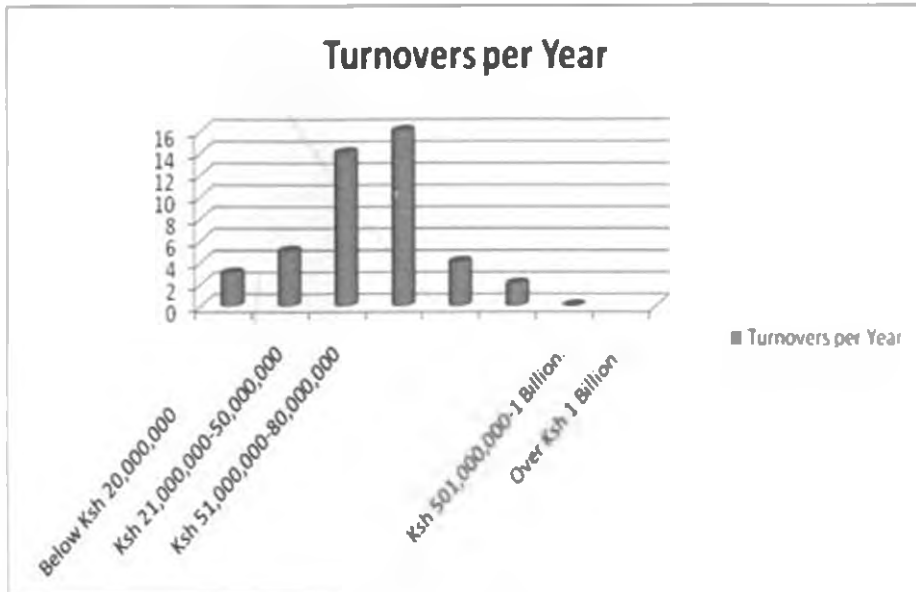
4.2.1 Duration of existence of Organisation.

From the data analysis, most of the organizations had been in existence for over five years and therefore had considerable experience in the Kenyan manufacturing environment.

4.2.2 Organizational size in Turn- overs per Year

In a bid to establish the relative financial size of the respondents, the data sought to categorize the respondents and evaluate if at all there is a co relation between financial size and response to GSCM.

Fig 4.1 Organizational Size in Turnovers



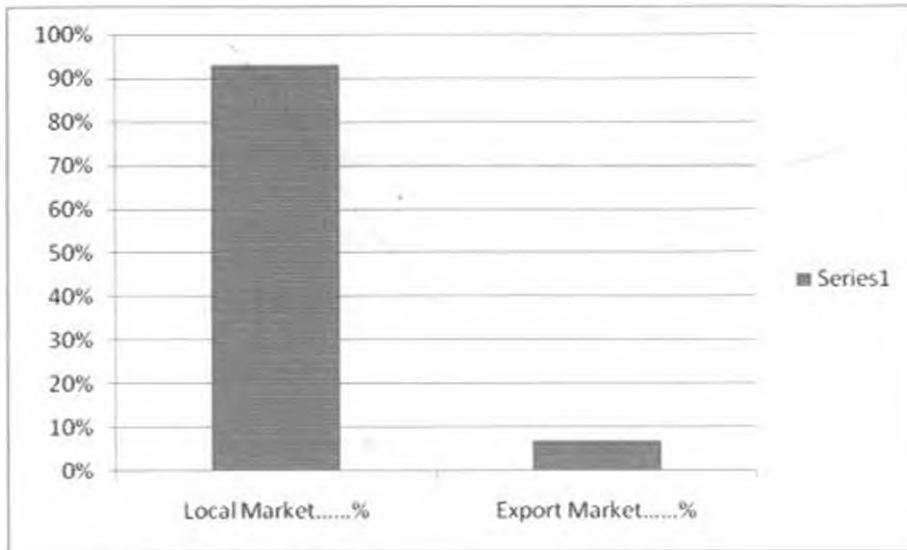
Source: Research Data

From the data analysis there was a general correlation between the bigger firms in turnovers and their efforts in implementing GSCM initiatives at firm level.

4.2.3 Distribution of Market Share for Products

This was aimed at establishing the main target markets for the goods manufactured by the respondents. Largely most indicated to mainly thrive in the local market. With only 3% indicating they have a firm export interest for their goods. It was noted that for the few who had ventured into the export markets, they had taken up greater interest in streamlining GSCM as compared to counterparts who were a bit reserved while they manufactured for the local market. This is largely attributed to the high international standards within which these companies must operate.

Fig 4.2 Target Market for respondents



Source: Research Data

4.2.4 Raw Materials and the Supply chain.

In reference to raw materials, 98% of the respondents cited they would not consider their raw materials as being harmful to the environment. They however cited that the raw materials are important determinant in the supply chain cycle and one that would determine the extent to which the supply chain they are in is compliant to GSC requirements.

4.2.5 Compliance to the requirement to submit an annual

Environmental Audit Report to NEMA and Energy saving initiatives

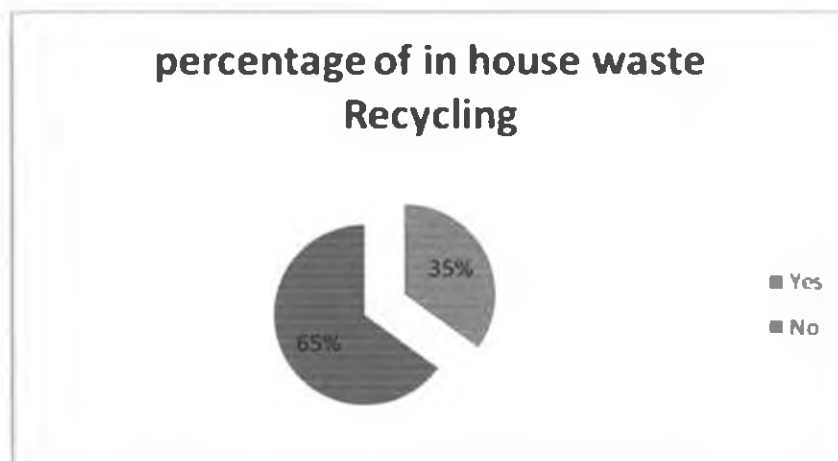
In general, most of the respondent cited as adhering to the requirements by the National Environment Management Authority (NEMA) to submit an annual audit report as a means of curbing environmental challenges brought about by

manufacturing activities. In addition 98% noted that they have employed energy saving techniques in a bid to try and initiate GSCM and also remain Competitive.

4.2.6 Recycling of wastes from own production process

It was noted that Recycling remains a great challenge in the process of GSCM. Although recycling is a big component of GSCM most of the companies who recycled their waste did it only at piecemeal and relatively low scales citing high investment costs to fully capture the recycling wholly.

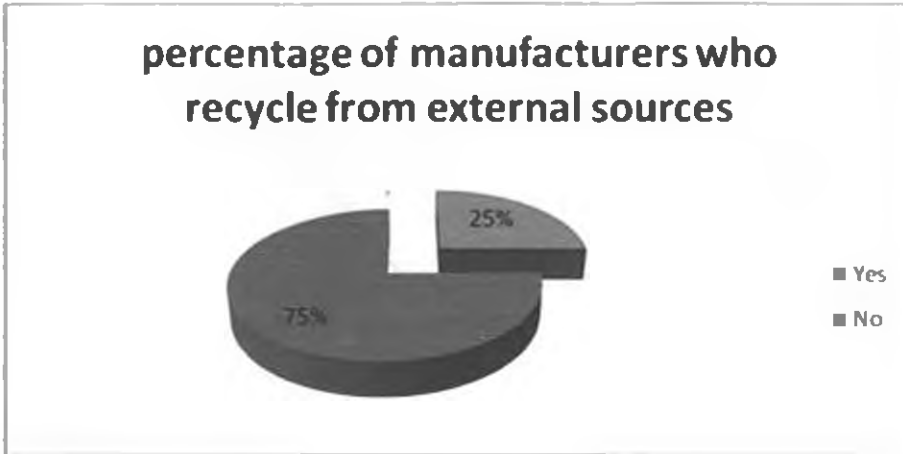
Fig 4.3 In house waste recycling



Source: Research Data

In the same manner a majority of the respondents sighted to part of a recycling process for wastes that emanates from outside their operations. This was largely attributed to high investment costs in acquisition of appropriate machinery and a lack of government incentive to fast track recycling and Supply chain recovery mechanisms.

Fig 4.4 External waste Recycling

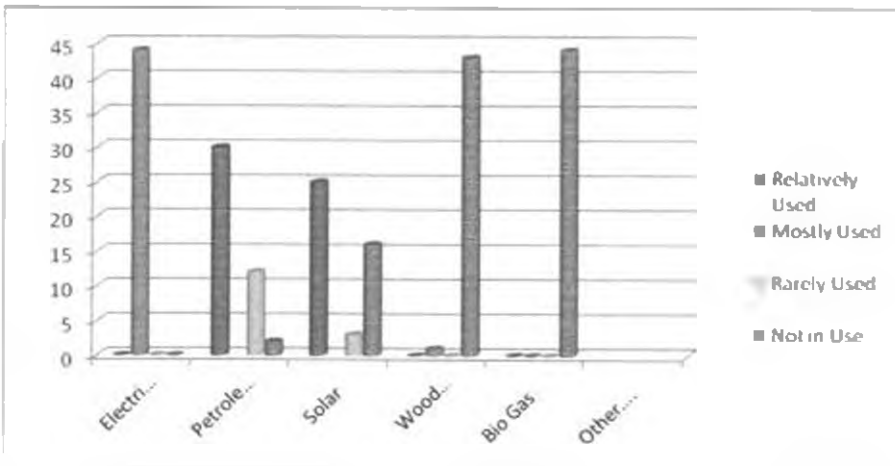


Source: Research Data

4.2.7 Energy Sources and Frequency of Use

Most of the respondents rely heavily on electricity from the national grid. Only few manufactures have taken the initiative to put up green energy sources for their in house operations. In such cases the installation are very minimal in comparison to the requirements of the manufacturer but still is an effort in GSCM initiatives.

Fig 4.5 Energy Sources and Use



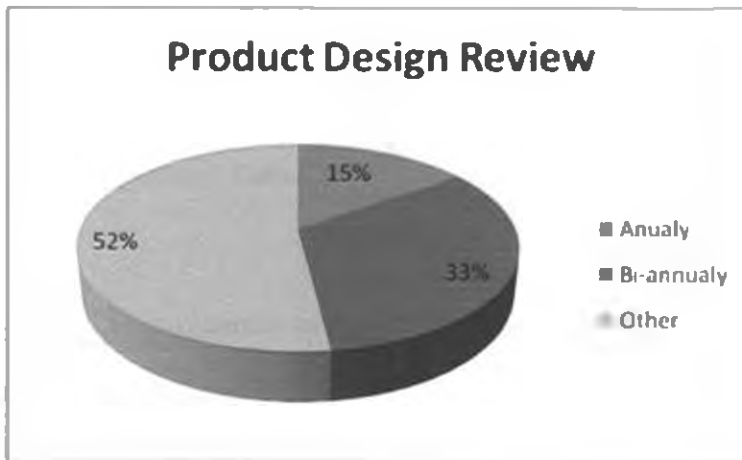
Source: Research Data



4.2.8 Frequency of review of product design.

It was noted that Manufacturers who had a higher frequency of reviewing their product design were more likely to get into GSCM initiatives such as design for environment as opposed to those who took much longer periods to review their products.

Fig 4.6 Product design review

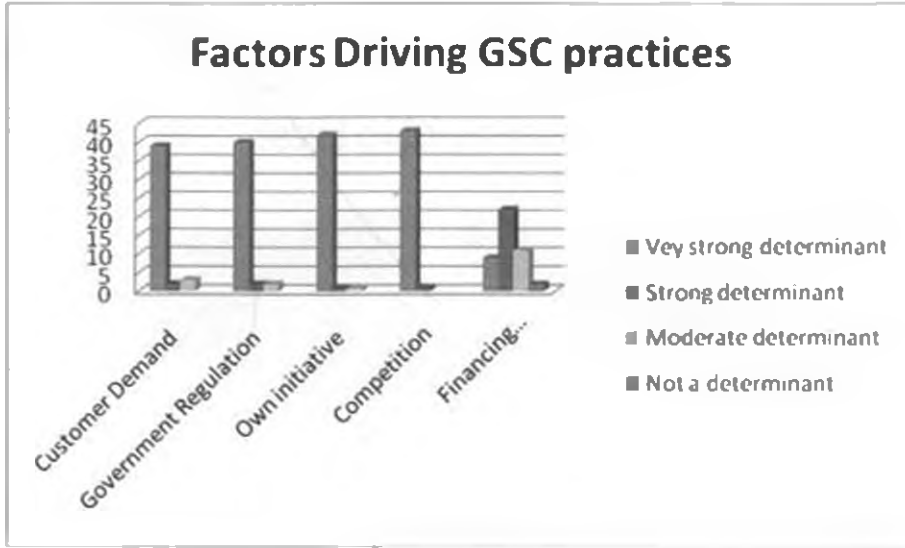


Source: Research Data

4.2.9 Driving factors of GSCM.

It was noted that Competition and customer demand coupled with in house innovative initiatives were the main driving forces behind development of GSCM

Fig 4.7 Driving factors in GSCM

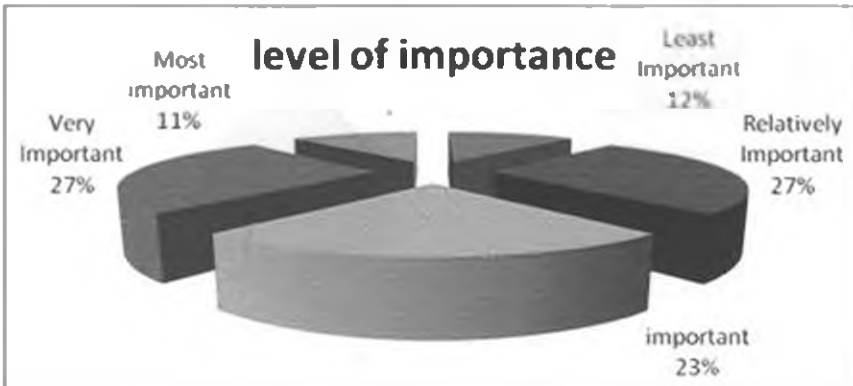


Source: Research Data

4.2.10 Importance of Environmental Considerations in the Choice of Raw Materials?

From the analysis of data, the choice of raw materials based on environmental considerations was regarded as most important by only 11 percent of the members. This indicated the low level of importance attached to the acquisition of eco friendly raw materials with most respondents noting that sourcing of the eco friendly raw materials was more expensive and therefore made the use of such raw materials quite dismall as compared to the regular raw materials.

Fig 4.8 Importance of environmental considerations in the choice of raw materials.



Source : Research data

4.2.11 Choice of suppliers and environmental considerations

In a similar manner the respondents were asked to rate how important environmental considerations were in the choice of suppliers. It was noted that only 27% of the respondents cited as very important environmental considerations in the choice of suppliers. This is overshadowed by factors such as the overall cost and the supplier credit offerings which the respondents cited as being more critical than environmental considerations. It however was noted that there is progressive growing interest in environmental considerations when sourcing for suppliers.

Fig 4.9 Environmental considerations in the choice of Suppliers.



Source : Research data

4.2.12 Green Supply Chain Practices.

Looking at Green Supply chain components of suppliers selection, eco friendly materials and green purchasing, the respondents were asked to rate their opinion on the three factors. It is important to note that while they believe and strongly advocate that eco friendly raw materials are cost saving very few of them had invested optimally in these green business practices. Very few of the respondents i.e. 1 out of 44 responded to have green purchasing procedures in place. It was noted that environmental considerations often come in last during the factors to consider. As much as the respondents claimed to understand the concepts such as green marketing and how communicating their green agenda helps boost their corporate image, It was still evident that they barely invest in GSCM and only appreciate GSCM as a concept. Only 33 respondents use returnable or recyclable packaging.

Fig 4.10 Green Supply Chain practices.

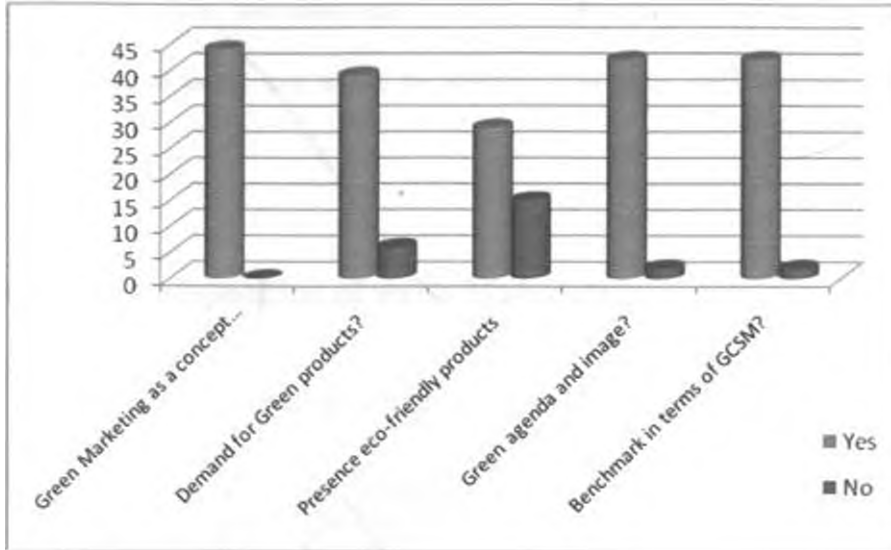
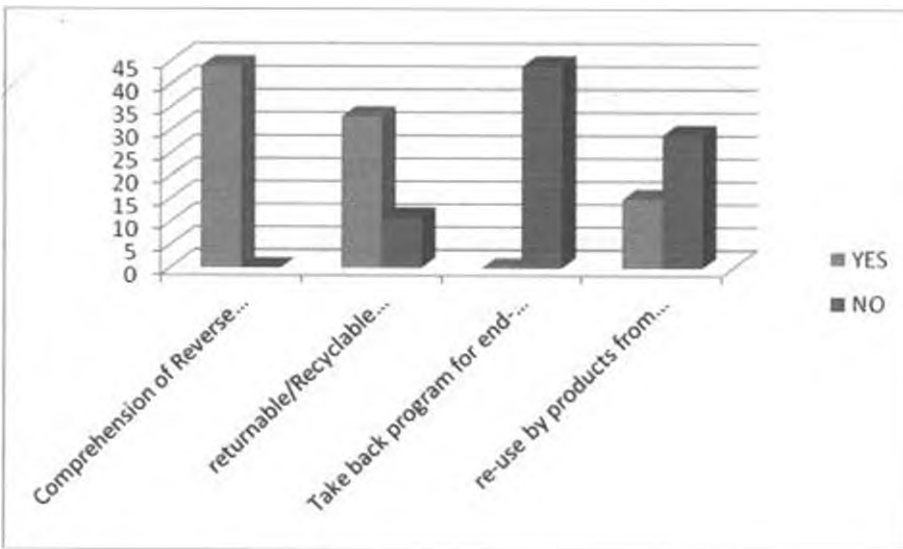


Fig 4.11 Green Supply Chain Components.

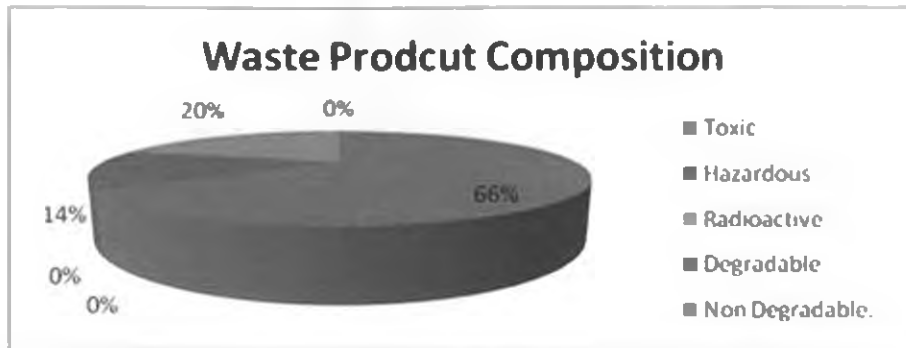


4.2.13 Composition of Waste Materials.

From the analysis 29 respondents or 66 %agree that their waste or by-products are toxic in nature and therefore concede the important need to have this addressed by the concept of GSCM. However they cite cost and logistical challenges as the main

hindrance to implementing GSCM mechanisms at firm level. Further on only 19 respondents have had their staff undertake training in GSCM at any level while the rest have not taken any effort in ensuring that their staff undergo any training in GSCM.

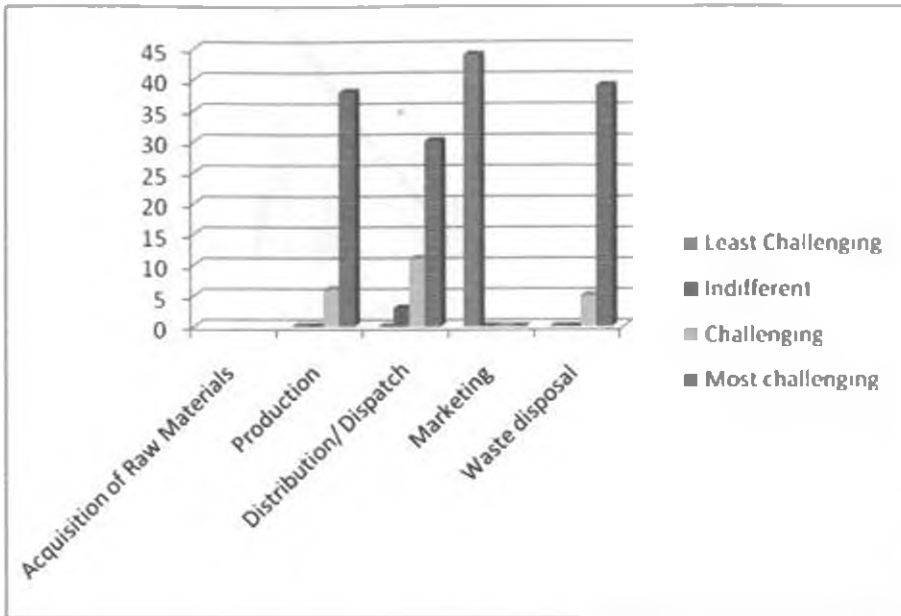
Fig 4.12 Composition of waste Materials.



4.2.14 Extent of environmental challenge encountered at different stages of the supply chain

It was noted that throughout the various stages of the supply chain, the most challenges as pertains eco concerns were experienced during Production Dispatch and Waste or By- Product Disposal. Waste oil disposal for example was a challenge that has not yet been fully exploited despite it having the potential to produce bio fuel. It was during these stages that most manufacturers felt that interventions in GSCM would come in as most handy. 39 respondents out of the 44 however indicated they had taken up considerable measures to mitigate the environmental challenges at the various stages. This included recycling of plastic waste and take back programmes of waste products such as wood chips.

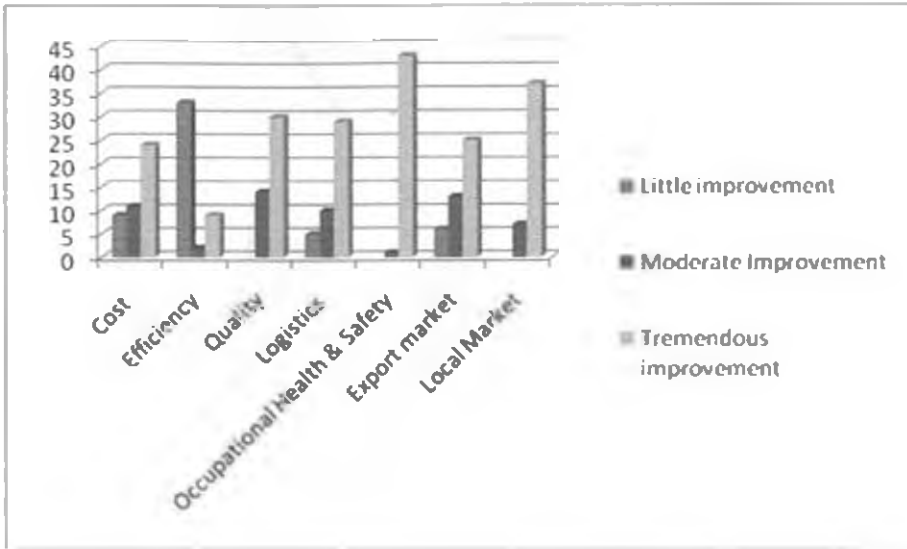
Fig 4.13. Environmental challenge encountered at different stages of the supply chain



4.2.15 Extent to which investments’ in GSCM have improved your operations.

Respondents were asked to evaluate how different aspects of business performance were affected by implementing such GSCM measures and it was established that although implementation was at minute levels, it had most impact in Occupational Health and safety in the work place. Quality of the product and the product preference in the local market improved considerably when the said GSCM practices. Costs in the long run were also cited to improve significantly when processes such as recycling were employed. The export market which is a prime market especially so in terms of foreign income earnings was reported to improve significantly when simple GSCM initiatives were embraced.

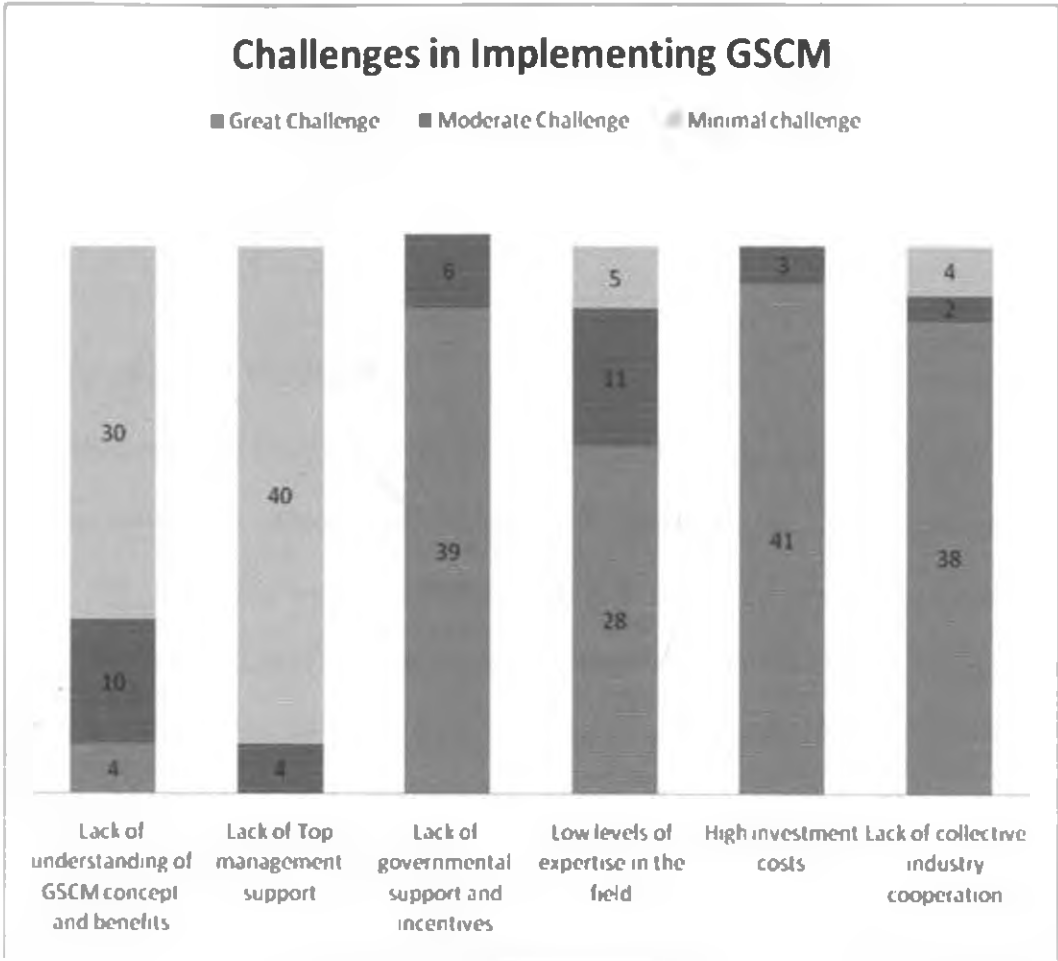
Fig 4.14. Environmental challenge encountered at different stages of the supply chain



4.2.16 Challenges in Implementing GSCM

The main challenges in the implementation of GSCM were cited as the lack of government incentives and absence of collective industry cooperation to streamline the different supply chains. High Investment costs and low expertise in the field in some cases also was cited as a challenge. The majority of the respondents i.e 39 cited that the government has the biggest responsibility in creating an enabling environment that will incentivise manufacturers pursue GSCM through such means such as tax reliefs. Recognition of manufacturers who are leaders in GSCM implementation was also suggested. Training of personell on how supply chains could be intergrated to implement cyclic recycling of wastes was also prioritised as an area that would be of importance.

Fig 4.15. GSCM challenges



CHAPTER FIVE : SUMARRY CONCLUSIONS AND RECCOMENDATIONS

5.0 Introduction.

This chapter presents a summary of the results, discussions of the results and conclusions on the results. Also presented are limitations of the study, recommendations for further research and recommendations on policy practice.

5.1 Summary of Findings

The objective of the study was to establish the GSCM initiatives and challenges that are encountered by manufacturers during their operations in Kenya. The study established that GSCM was not a foreign concept in Kenya but one that had taken a back seat in terms of priorities that the manufacturers would have in their operations. The main reason for the low adoption of GSCM as a practice being the cost of investment in the appropriate technologies, poor supply chain collaboration in terms of having all parties in a supply chain take up the practice and lack of government support and incentives to mainstream GSCM. Generally the bigger companies in terms of turnovers were more compliant with GSCM as compared to the smaller companies.

The respondents asserted that GSCM was a core area that needed to be reinforced by all stakeholders but which however has not received the attention it deserves. GSCM however it was noted has not received enough government support and would greatly reduce the cost of business while improving on components such as quality of the products and enhance the occupational health and safety of the manufacturing firms. GSCM is a concept that would need to be encouraged through government incentives

and other relevant programmes to capitalize on the upside and downside commercial and environmental benefits that would come along with it.

GSCM it was noted is an area that would require more capacity building and prioritize it as an avenue that would impact on cost savings in the production process. This is true especially during the process of production, Dispatch and Distribution and waste management. Despite this, there is considerable effort by some manufacturers to invest in GCSM albeit in minute scales. In this cases customer demands especially in the export markets and currently increasing in the domestic market were the main driving forces. Competition and government regulation especially in the plastics industry were also factors that have driven the adoption of GSCM. Despite admitting that electricity was the most commonly used source of power with costs rising investing in renewable energy was deemed as a capital intensive component albeit the benefits to the manufacturers. This therefore kept them away.

5.2 Conclusion and recommendations

It is important that government of Kenya realize that sustainable business development is among the main goals of the Millennium Development Goals. In this realization, it would be therefore critical for the government to be on the fore front in terms of policy formulation to towards development of green businesses. Green Economies will be more competitive and more cost effective and with a growing proportion of the customers being more eco conscious it would be inevitable for the authorities not to take action.

Incentives on the manufacturers should be on the forefront in this course since only incentives with an economic benefit will entice the business community to embrace GSCM. Relevant technologies could be also subsidized where appropriate. Enforcement of laws such as the requirement to submit an EIA/EA should be implemented to the core as slackening does not help the development of GSCM. The government could also take up partnerships with developed GSCM practitioners in other countries and enable our manufacturing industry take this as a benchmarking and learning opportunity.

5.3 Limitations of the study

There were many limitations to the study particularly time constraints. During the period of data collection following up on respondents proved a challenge. Some of the respondents were difficult to follow up with their busy schedules. The scope of the study also was limited since the study only covered 44 manufacturers out of 698 according to the Kenya Association of Manufacturers database. The Study also focused on operations managers therefore giving an opinionated perspective from an operations perspective only.

5.4 Suggestions for further study

It would be imperative for the study to look into at GSCM from the customer perspective as this was not covered in this study. The researcher feels that the customers as the main focal point of any business are an important group who must not be left out. This would target the final consumers of the manufactured goods by the manufacturing firms.

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APPENDIX

FIELD QUESTIONNAIRE

This questionnaire is an information soliciting tool for academic purposes only and all information given herein by the respondent will be treated with utmost confidentiality and not let out without written consent of the respondent.

SECTION A

SECTOR

Please indicate by ticking the sector under which you are registered as per the KAM register.

	Building, Construction and Mining	<input type="checkbox"/>
	Chemical and Allied	<input type="checkbox"/>
	Energy, Electrical and Electronics	<input type="checkbox"/>
	Food, Beverages and Tobacco	<input type="checkbox"/>
	Paper and Paperboard	<input type="checkbox"/>
	Leather Products and Footwear	<input type="checkbox"/>
	Timber, Wood Products and Furniture	<input type="checkbox"/>
	Textile and Apparels	<input type="checkbox"/>
	Plastics and Rubber	<input type="checkbox"/>
	Pharmaceutical and Medical Equipment	<input type="checkbox"/>
	Metal and Allied	<input type="checkbox"/>
	Motor Vehicle Assembly and Accessories	<input type="checkbox"/>

How long has the Organization been in operation?

.....Years.....Months

Please provide an estimate of your organizations size in Turn- overs per Year

Below Ksh 20,000,000

Ksh 21,000,000-50,000,000

Ksh 51,000,000-80,000,000

Ksh 81,000,000-120,000,000

Ksh 121,000,000-250,000,000

Ksh 251,000,000-500,000,000

Ksh 501,000,000-1 Billion.

Over Ksh 1 Billion.

Please indicate Distribution of market for Your Products

Local Market.....%

Foreign Market..... %

Do you consider your main Raw Materials as potentially harmful to the environment?

Yes No

Explain how your raw materials impact your supply chain.....

.....

Do you comply with the requirement to submit an annual Environmental Audit Report to NEMA? Yes No

Please Tick the Checklist below as accurately as possible as regards Design for Environment (DFE) as a concept in Green Supply Chain Management Practices.

Do you employ energy saving techniques? Yes No

If yes please elaborate on some of the areas where you employ such.....

.....

Do you Recycle wastes from your own production process? Yes No

Do you Recycle wastes from external sources? Yes No

What is the main challenge for not recycling ?.....

Please indicate the estimated uses of the following sources of energy in a bid to evaluate design for environment. (Tick once for every Option.)

Energy Sources / Frequency of Use				
	Mostly Used	Relatively Used	Rarely Used	Not in Use
Electricity				
Petroleum				
Solar				
Wood fuel				
Bio Gas				
Other....				

Any other DFE initiative you have undertaken.....

How often do you review product design?

Annually Bi-annually other.....

Please rate the strength of the following factors as determinants for eco-friendly designs and practices (Tick once for every Option.)

	Very strong determinant	Strong determinant	Moderate determinant	Not determinant
Customer Demand	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Government Regulation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Own initiative	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Competition	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Financing Requirements/loans	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Please Tick the Checklist below as accurately as possible as regards Green purchasing as a concept in Green Supply Chain Management Practices.

Where 1=Least Important 2= Relatively Important 3= important 4=Very Important 5= Most important

How important are environmental considerations in the choice of Raw Materials?

1 2 3 4 5

How important are environmental consideration in the choice of suppliers?

1 2 3 4 5

	YES	NO
Do you use environmental considerations as a choice for supplier selection?	<input type="checkbox"/>	<input type="checkbox"/>
Do you think Eco- Friendly materials save costs in the long term?	<input type="checkbox"/>	<input type="checkbox"/>
Does the organization have any Green Purchasing mechanisms in place?	<input type="checkbox"/>	<input type="checkbox"/>

If yes please elaborate on some of them.....

.....

Please Tick appropriately the following Green Marketing.

Factor	YES	NO
Do you Understand Green Marketing as a concept?	<input type="checkbox"/>	<input type="checkbox"/>
Do you get demand for Green products?	<input type="checkbox"/>	<input type="checkbox"/>
Do you have any green/eco-friendly/ range of eco-friendly products?	<input type="checkbox"/>	<input type="checkbox"/>
Do you believe that communicating your Green agenda boosts your corporate image?	<input type="checkbox"/>	<input type="checkbox"/>
Do you consider/Benchmark against competitors or other manufacturers in terms of GCSM?	<input type="checkbox"/>	<input type="checkbox"/>

Please Tick appropriately the following Reverse logistics.

	YES	NO
Do you understand what reverse logistics is?	<input type="checkbox"/>	<input type="checkbox"/>
Do you use returnable/Recyclable Packaging?	<input type="checkbox"/>	<input type="checkbox"/>
Do you have a product take back program for end-of -life products?	<input type="checkbox"/>	<input type="checkbox"/>
Do you have any strategic arrangements to re-use by products from other manufacturers?	<input type="checkbox"/>	<input type="checkbox"/>

Please respond to the following as regards the Green supply chain Management practices.

What are your main by products in your production process?

.....

How would you classify your Waste/ By-products?

Toxic

Hazardous

Radioactive

Degradable

Non Degradable.

Highly Flammable

Briefly explain how you dispose off your waste.

.....

Are your employees trained on green supply chain management and procedures of waste minimization? [] Yes [] No

Please indicate the extent of environmental challenge encountered at different stages of the supply chain (Tick once for every Option.)

	Least Challenging	Indifferent	Challenging	Most challenging
Acquisition of Raw Materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Production	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distribution/ Dispatch	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Marketing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Waste disposal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Have you taken up any measures to conform to GSCM? Yes No

If yes please indicate some of the measure taken.....

Tick the extent to which investments' in GSCM have improved your operations in the following areas.

	Little improvement	Moderate Improvement	Tremendous improvement
Cost	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Quality	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Logistics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Occupational Health & Safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Export market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Local Market	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What are some of the challenges you face in implementing GSCM here?

Please tick from the check list.

	Great Challenge	Moderate Challenge	Minimal challenge
Lack of understanding of GSCM concept and benefits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of Top management support	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of governmental support and incentives	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low levels of expertise in the field	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
High investment costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lack of collective industry cooperation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others (please specify)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What do you think should be done to enhance more implementation of GSCM ...

.....

.....

.....

At what stage is your organization in each of the following eco-management and GSCM practices?

(Please tick once only for each factor.)

Factor	Non Existent	Basic	Average	Advanced
Problem solving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Managing for compliance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Managing for assurance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Industry best practitioner / Mentor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non Compliant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Who should be responsible for enforcing GSCM in the Kenyan Manufacturing context (Please Tick?)

Government	<input type="checkbox"/>
KAM	<input type="checkbox"/>
Individual Industries	<input type="checkbox"/>
Other (indicate).....	<input type="checkbox"/>

Please rate the level of importance in GSCM in your Organization.

- Very Important
- Important
- Least Important

What is the main challenge in the practice of GSCM

.....

.....

THANK YOU FOR YOUR TIME AND COOPERATION.