

**GREEN SUPPLY CHAIN PERFORMANCE MANAGEMENT
PRACTICES IN LARGE MANUFACTURING FIRMS IN
NAIROBI, KENYA**

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Business, University of Nairobi.**

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DECLARATION

This research project is my original work and has not been presented for a degree award
in any other University.

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DEDICATION

I dedicate this research project to my mum Naomi Uhuru, my dad Andrew Uhuru, my brothers Enock Ouru, Joash Ouru, Rogers Ouru and Steve Uhuru and my friends Juliet Makali, Fatma Ali, Sosan Woldemichael, Viva Muzungu and Lauren Mutinda who gave me moral and financial support.

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ABSTRACT

This study examines the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya. The study had three objectives: To establish the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya, To determine the factors and establish the impacts of green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya. The study used research design (descriptive survey) to collect data and descriptive statistics (frequency distribution, cumulative frequencies and standard deviation) to analyze quantitative data. Factor analysis was also used to analyze the factors influencing green supply chain performance management practices. The study found out that green supply chain performance management practices have been implemented in large manufacturing firms in a great and very great extent. The study also found out that five components of factors were extracted using factor analysis method (values greater than one were considered and interpreted as factors because they explain 72% of the variants in the data matrix). The study through regression analysis found that 70.0 % of the changes in impact of green supply chain performance management could be attributed to the combined effect of the independent variables (implementation of balanced scorecard, benchmarking, use of cleaner production philosophy and focusing on key performance indicator). However, there were limitations in the study. For instance, the data collection was collected by Likert scale questionnaires, which have a degree of biases in their responses. Some firms identified also did not participate, citing lack of time and privacy issues. The study recommends that green supply chain performance management practices are important in ensuring impact of green supply chain performance management because of positive relationship between dependent variable and independent variables. The study recommends that all large manufacturing firms in Nairobi need to implement all the green supply chain performance management practices. The study suggests further research to be done on green supply chain performance management practices in the service industry.

CHAPTER ONE: INTRODUCTION

1.1 Background

There has been increasing emphasis on environment-friendly corporate activity in today's business world and many progressive companies are embracing green supply chain management. The rise in greenhouse emissions and pollution of the environments by firms has precipitated the need for organizations to realign their supply chain operations with a view of conserving the scarce resources. Green supply Chain Management (GSCM) is an approach to improve performance of the process and products according to the requirements of the environmental regulations (Hsu & Hu, 2008). Green supply-chain management (GSCM) is gaining increasing interest among researchers and practitioners of operations and supply chain management. The growing importance of GSCM is driven mainly by the escalating deterioration of the environment, e.g. diminishing raw material resources, overflowing waste sites and increasing levels of pollution (Srivastava, 2007). However, it is not just about being environment friendly; it is about good business sense and higher profits. In fact, it is a business value driver and not a cost centre (Wilkerson, 2005).

With increase in environmental concerns during the past decade, a consensus is growing that environmental pollution issues accompanying industrial development should be addressed together with supply chain management, thereby contributing to GSCM (Sheu, Chou & Hu, 2005). In response to the increased external environmental demands, such as stricter regulations and increased customer demands, companies need to develop their capabilities in assessing, managing and controlling the environmental performance of

their operations. A growing number of companies have begun developing and using environmental sustainability indicators (Veleva, Hart, Greiner & Crumbley, 2003). Supply chain managers must consider the impact of their performance on the natural environmental.

Success in the environmental protection is contributed to both build a positive image for customers and provide many new opportunities to expand business, especially benefit for the international business. Sustainable developments require that companies need to reduce their environmental impact and promote the energy efficiency (Zhu, Sarkis & Lai, 2007). Companies pay more attention on the improvement of the management in the environmental way. Many approaches are used as green management practice, reduced the negative impact during the supply chain, such as environmental management system, lifecycle assessment, eco-design, green packaging and so on (Zhu, Sarkis & Geng, 2005).

1.1.1 Green Supply Chain Performance Management

A number of definitions of GSCM exist (Zhu and Sarkis, 2004). GSCM has its roots in both environment management and supply chain management literature (SCM). Adding the 'green' component to SCM involves addressing the influence and relationship between SCM and natural environment. The definition and scope of GSCM in the literature has ranged from green purchasing to integrated green supply chains flowing from supplier to manufacturer to customer and even reverse logistics (Zhu & Sarkis, 2004). Srivastava (2007) described GSCM as integrating environment thinking into Supply Chain Management, including product design, material sourcing and selection, manufacturing process, delivery of the final product to the consumers and end-of life management of the product after its useful life. Ageron, Gunasekaran & Spalanzani

(2012) defined GSCM as the achievement of economic, environmental, and social goals in the systematic coordination of key inter-organizational business processes to improve performance in the long-term for the organization and its partners in the supply chain.

Corporate performance measurement and its application continue to grow and encompass both quantitative and qualitative measurements and approaches. The variety and level of performance measures depends greatly on the goal of the organization or the individual strategic business unit's characteristics. For example, when measuring performance, companies must consider existing financial measures such as return on investment, profitability, market share and revenue growth at a more competitive and strategic level. Other measures such as customer service and inventory performance (supply, turnover) are more operationally focused, but may necessarily be linked to strategic level measures and issues (Hervani, Helms & Sarkis, 2005).

Performance, a quality of any company, is achieved by valuable outcome such as higher returns. It can also be measured by the levels of efficiency and this can be analyzed by a variety of methods, such as the parametric (stochastic frontier analysis) and non parametric (data envelopment analysis). The management of any company would like to identify and eliminate the underlying causes of inefficiencies, thus helping their firms to gain competitive advantage and attain sustainable competitive advantage, or at least, withstand the challenges from others (Yang, 2006).

There are two models of measuring/managing performance: Life cycle analysis (LCA) model emphasizes the close linkage between life cycle analysis and GSCM methods (Naim, Potter, Mason & Bateman, 2006). The core aspect of this an assessment matrix

that scores various emissions stressors and data confidence values for six major steps within an organization's individual supply chain including, material acquisition, pre-production, production, use, distribution and disposal. Maps are an output of this process and graphically represent the values of the environmental impacts along the supply chain. The tool can evaluate various products for comparison, but it is not clear the tool's applicability extends to multiple partners within the supply chain. The scoring methodology may also be rather subjective on many dimensions. The balanced scorecard is another popular tool within the corporate performance management literature. It is a management/measurement system purporting to aid organizations develop corporate visions, strategy and cascading them into action. It provides feedback on internal business processes and external outcomes in order to continuously improve strategic performance and results. The balanced scorecard suggests organizational performance be viewed from four perspectives, and to develop metrics, collect data and analyze the organization relative to each of these perspectives (Li, 2011).

1.1.2 Large Manufacturing Firms in Nairobi, Kenya

Kenya has a large manufacturing sector which serves both the local market and East African region. The sector which is dominated by subsidiaries of multinational corporations, contributes to an average of 15% towards the Gross Domestic Product (GDP) as it has the potential of generating foreign exchange earnings through export and diversification of the country's economy (Kinya, 2013). The manufacturing sector in Kenya has been growing since the late 1990s and into the new century. The most common industries in Kenya include: small-scale consumer goods (plastic, furniture, batteries, textiles, clothing, soap, cigarettes, and flour), agricultural products, horticulture,

oil refining, aluminum industries, steel industries, lead industries, cement industries and commercial ship repair. Most of these industries are located in Nairobi due to its proximity to most important markets (Awino, Kariuki & Ogutu, 2011).

Several ways of classifying manufacturing firms have been used in studies; based on the number of employees and total assets. Bigsten, Kimuyu & Söderbom (2010) used the number of employees to classify manufacturing firms in Kenya. Large scale manufacturing firms have more than 100 employees; medium sized manufacturing firms have between 51-99 workers while small sized manufacturing firms between 11-49 workers. Micro sized manufacturing firms are those with 10 or fewer workers. Haron and Chellakumar (2012) classified Kenyan manufacturing firms in terms of their total assets. Large sized companies are those with total assets above Kshs. 100 million, medium sized companies have total assets worth more than 40 million and small sized companies have total assets below Kshs. 40 million. There are 455 large scale manufacturing firms in Nairobi (KAM, 2012).

Though the sector has blossomed over time both in terms of its contribution to the country's GDP and job creation, the sector is still very small compared to that in developed countries. Its average size for tropical Africa is 8 %. This is largely due to depressed domestic demand, increased oil prices and transport costs. The sector is equally going through a major transition period largely due to the structural reform process, which the Kenya Government has been implementing since the mid-eighties with a view to improving the economic and social environment of the country (Awino et al., 2011).

1.2 Statement of the Problem

Over the past decade Green Supply Chain Management (GSCM) has emerged as an important component of the environmental and supply chain strategies for a number of companies and they have been aiming at integrating environmental concerns in their business operations and in interactions with their stakeholders in embracing environmental sustainability into business strategies (Chege, 2012).

The manufacturing industry is an important sector in Kenya as it makes a substantial contribution to the country's economic development. Unfortunately, it has been causing environmental deterioration. The manufacturing industry is one of the main contributors to the deterioration of environmental sustainability. Thus, the concept of green GSCM is now gaining importance since it can help to minimize negative impact of the industrial processes while enhancing the competitive advantage of the firms (P. Rao, 2006). Performance management practices has received an increasing attention in many manufacturing organizations in the recent past due to increased competition, improved initiatives, changing nature of work and improved technology. Hence this study wishes to establish green supply chain performance management practices and their impact on performance of large manufacturing firms.

Previous studies have touched on various aspects of GSCM, which includes green purchasing (Zhu and Geng, 2001). They found that the understanding of green purchasing was high among senior managers in large and medium, but they were lacking ways of integrating it into green supply chains. On the other hand, mid-level managers and employees were found as having poor understanding of green purchasing. In addition, it was reported that most large and medium-sized state-owned enterprises (LMSOEs) cared

little about some aspects of green purchasing such as evaluation of second-tier suppliers and product packaging. That was because green purchasing practices of Chinese firms were still in the early stages, lagging behind practices in developed countries, as Zhu and Sarkis (2006) noted. However, these studies did not cover green supply chain performance management practices hence creating a gap.

Zhu (2006) study on GSCM pressures, practices and performance within the Chinese automobile industry found that increasing pressures from a variety of directions have caused the Chinese automobile supply chain managers to consider and initiate implementation of GSCM practices to improve both their economic and environmental performance but the study failed to touch on the performance management practices hence there is need to know if large manufacturing companies in Nairobi are aware of green supply chain performance management practices and if they are aware, which are the impact of the practices in large manufacturing firms in Nairobi.

Other studies have not done an in-depth analysis on green but have combined with other supply chain concepts such as lean. This can be seen through a study by Mollenkopt, Hannah, Wendy & Monique (2009) which combined the concept of green with lean and global supply chain in USA hence, the studies were not conducted in Kenya thus creating a need for such studies in Kenya.

In Kenya, the most recent studies on GSCM is by Korir (2014) GSCM Practices and Performance of Firms in Automotive Industry in Nairobi, Kenya. The study concludes that the firms in automotive industry in Nairobi, Kenya are considering the usage of Green Supply Chain Management Practices and there are challenges associated with the

adoption of the practices. However, the study was only on a small portion of large manufacturing industries in Nairobi and thus, creating a need to study all the large manufacturing firms in Nairobi. Also, the study did not address performance management hence creating a need for further research in these areas.

Many of these studies show that GSCM practices can improve environmental performance but the linkage also depends on organizational capacity (Judge & Elenkov, 2005). Relationships between GSCM (and other corporate environmental practices) and economic performance have been studied but results are also conflicting and none has been able to address the impact of green supply chain performance management in manufacturing firms (Wagner *et al.*, 2001; Sarkis & Cordeiro 2001). Limited work has examined performance management in GSCM and these studies are not based in Kenya. For instance, Yan Li (2011) studied Performance Measurement of Green Supply Chain Management in China. Hervani *et al.* (2005) conducted a study on Performance Measurement for Green Supply Chain Management but the study did not address the factors that are influencing green supply chain performance management hence, creating a need for further research in this area. There was a need to fill this knowledge gap by determining the factors influencing green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya.

This has led to a research gap in manufacturing firms that seek to justify GSCM implementation thus this research tried to address the gap by carrying out a study on Green Supply Chain Performance Management practices in large manufacturing firms in Nairobi, Kenya. In view of the foregoing discussion and considering the green supply chain performance management, this research sought to answer the following questions:

What are the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya? What is the impact of the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya? What are the factors influencing green supply chain performance management in large manufacturing firms in Nairobi, Kenya?

1.3 Objectives of the Study

The objectives of the study were:

1. To establish the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya.
2. To determine the factors influencing green supply chain performance management in large manufacturing firms in Nairobi, Kenya.
3. To establish the impact of the green supply chain performance management practices on the performance of large manufacturing firms in Nairobi, Kenya.

1.4 Value of the Study

This research project will assist the large manufacturing firms to be more aware of the importance of managing their green supply chain performances. The management will be in a position to identify the measurements in GSCM.

The findings of this paper will assist the corporate managers to make sound and informed strategic management decisions and enable them to focus on their customers more efficiently.

This research paper will give room for further research on GSCM not only in large manufacturing firms in Nairobi but also in other areas and sectors.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter presents a review of the relevant literature on green supply chain performance management. The chapter covers green supply chain; performance management and performance management practices; linking green supply chain and performance management.

2.2 Green Supply Chain

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, 2007). Green supply-chain management has its roots in both environment management and supply chain management literature. Adding the 'green' component to supply-chain management involves addressing the influence and relationships between supply-chain management and the natural environment. Similar to the concept of supply-chain management, the boundary of GSCM is dependent on the goal of the investigator. The definition and scope of GSCM in the literature has ranged from green purchasing to integrated green supply chains flowing from supplier to manufacturer to customer, and even reverse logistics (Zhu and Sarkis 2004).

Green supply chain (GSC) covers wide areas of GSCM practices and SCM's participants and practices from green purchasing to integrated supply chains flowing from suppliers, to manufacturers, to customers, and to the reverse supply chain (Zhu and Sarkis, 2006; Holt, 2005). Bowen, Cousins, Lamming & Faruk (2001) suggests two main types of

GSCM process: greening the supply process and product-based GSC. Greening the supply process stands for accommodations made to the firm's supplier management activities for considering environmental perspectives. On the other hand, Product based GSC focuses on changes to the product supplied and attempts to manage the by-products of supplied inputs. Whichever of the two, an organization decides to consider, it is necessary that leaders of logistics and supply chain department balance low cost and innovation process while maintaining good environmental performance (Pagell, Yang, Krumwiede & Sheu, 2004).

2.3 Green Supply Chain Performance Management Practices

Corporate performance management and its application continue to grow and encompass both quantitative and qualitative measurements and approaches. The variety and level of performance measures depends greatly on the goal of the organization or the individual strategic business unit's characteristics. For example, when measuring performance, companies must consider existing financial measures such as return on investment, profitability, market share and revenue growth at a more competitive and strategic level. Other measures such as customer service and inventory performance (supply, turnover) are more operationally focused, but may necessarily be linked to strategic level measures and issues (Hervani *et al.*, 2005).

2.3.1 Implementation of Balanced Scorecard

The balanced scorecard is a popular tool within the corporate performance management literature. It is a management/measurement system purporting to aid organizations develop corporate visions, strategy and cascading them into action. It provides feedback on internal business processes and external outcomes in order to continuously improve

strategic performance and results (Kaplan and Norton, 1992). The balanced scorecard suggests organizational performance be viewed from four perspectives, and to develop metrics, collect data and analyze the organization relative to each of these perspectives: The learning and growth perspective, the business process perspective, the customer perspective; and the financial perspective.

Tsang (1998) adapted the balanced scorecard developed by Kaplan and Norton (1992) to bring a strategic approach to maintenance performance measurement. The balanced scorecard includes operational measures on customer satisfaction, internal processes and the organization's innovation and improvement activities, as well as financial measures. Tsang argues that considering maintenance as a purely tactical matter is myopic. Maintenance also has a strategic dimension covering issues such as design of facilities and their maintenance programs, upgrading the knowledge and skills of the workforce, and deployment of tools and manpower to perform maintenance work. Tsang (1998) advocates that the balanced scorecard, as specifically applied in maintenance, should consist of a mix of both outcome measures and performance drivers. Outcome measures reflect outcome of past decisions, performance drivers have the power to predict future outcomes.

2.3.2 Benchmarking

Benchmarking can be defined as a structured approach for learning about processes and operations from other organizations and applying that knowledge gained in the organization. It consists of dedicated work in measuring, comparing and analyzing work process among different organizations in order to identify causes for superior performance. However, it must be adapted and implemented in order to have a complete

cycle of learning. Due to its external focus, benchmarking is a way of challenging internally accepted standards and prejudices. Hence, it helps businesses align their practices with market demands and strategic dimensions (Dale, 1996).

Benchmarking is a technique that is increasingly being adopted as a mechanism of achieving continuous improvement. It is a continuous process of measuring a firm's products and services against the other best performing organization, either internal or external to the firm. The objective is to ascertain how the processes and activities can be improved. Ideally, it should involve external focus on the latest developments, best practice and model examples that can be incorporated within various business organizations. It is worth noting that technologies and conditions vary between different industries and markets but the basic concept of benchmarking and measurement is of general validity. The objective is to produce products and services that conform to the requirements of the customers in an ever ending improvement environment. That is, benchmarking can best be accomplished by using a continuous improvement cycle in all the operations. Thus, benchmarking is not a separate science, rather another strategic approach to getting the best out of the people and the processes in order to deliver improved performance (Sereti, 2012).

2.3.3 Use of Cleaner Production (CP) Philosophy

Cleaner Production is a preventive, company specific environmental protection initiative intended to minimize waste and emission and maximize production output (Yacooub, 2006). The UNEP Cleaner Production Program, established in 1989, popularized the Cleaner Production concept. A number of related terms have been used to describe the concept. These include low or no-waste technologies; waste minimization (India); waste

and emissions prevention (Netherlands); source reduction (United States); eco-efficiency (World Business Council on Sustainable Development) and environmentally sound technology (United Nations Council on Sustainable Development) (Hamner, 1996). Hamner (1996) notes that all these terms essentially describe the same concept of integrating pollution reduction into the production process and even in designing products. There have been various definitions of Cleaner Production, however, the most recognized and widely used definition was developed by UNEP in 1989. It states that Cleaner Production is a process of continuous application of an integrated preventive environmental strategy to processes, products, and services to increase overall efficiency, and reduce risks to humans and the environment (UNEP, 1994).

According to UNIDO (2002) Cleaner Production is a preventive, integrated strategy that is applied to the entire production cycle in order to increase productivity by ensuring a more efficient use of raw materials, energy and water. It also promotes better environmental performance through reduction at source of waste and emissions and reduces the environmental impact of products throughout their life cycle by the design of environmentally friendly but cost-effective products. Prevention, which is the basis of Cleaner Production, contrasts earlier end-of-pipe treatment approaches in which waste and emissions were cleaned up after they had already been generated.

2.3.4 Focusing on Key Performance Indicators

A Performance Indicators are general indicators of performance that focuses on critical aspects of output (Chan and Chan, 2004). Different categories of maintenance performance indicators can be identified from literature. The total productive maintenance (TPM) concept (Nakajima 1988), launched in the 1980s, provided a

quantitative metric called overall equipment effectiveness (OEE) for measuring productivity of manufacturing equipments. It identifies and measures losses of important aspects of manufacturing namely availability, performance/ speed and quality rate. This supports the improvement of equipment effectiveness and thereby its productivity. The OEE concept has become increasingly popular and has been widely used as a quantitative tool essential for measurement equipment performance in industries (Huang and Dimukes 2003, Muchiri and Pintelon 2008).

Campbell classifies the commonly used measures of maintenance performance into three categories based on their focus (Campbell 1995). These categories are: measures of equipment performance (e.g. availability, reliability, etc.), measures of cost performance (e.g. maintenance, labor and material cost) and measures of process performance (e.g. ratio of planned and unplanned work, schedule compliance, etc.) Ivara Corporation developed a framework of defining the key performance indicator for managing maintenance function based on the physical asset management requirements and asset reliability process (Weber and Thomas 2006).

2.4 Factors Influencing Green Supply Chain Performance Management Practices

Lee (2008) has identified the drivers of participation in green supply chain initiatives by considering small and medium-sized suppliers and their most important stakeholders, including buyers and the government. Nawrockaet, Brorson & Lindhqvist (2009) found that Sweden, has concentrated on the role of ISO 14001 in environmental supply management practices in Swedish companies. They described the existing and potential role of ISO 14001 for three key operational tasks of environmental supply chain management: to communicate the requirements to the supplier, to motivate and enable

the supplier, and to verify that the supplier follows the requirement. Shang, Lu & Li (2010) explored key green supply chain management (GSCM) capability dimensions and firm performance based on electronics related manufacturing firms in Taiwan. On the basis of a factor analysis, six green supply chain management dimensions were identified: green manufacturing and packaging, environmental participation, green marketing, green stock, green suppliers, and green eco-design. Chiou, Chan, Lettice & Chung (2011) found that Taiwan has explored the correlation between greening the supplier and green innovation in Taiwan Company by using Structural Equation Modeling. They concluded that greening the supplier through green innovation leads to significant benefits to the environmental performance and competitive advantage of the firm. Liu, Yang, Qu, Wang, Shishime & Bao (2011), in China has analyzed the relationship between green supply chain management level (LGSCM) and the classified determinant factors. They confirmed that a company's environmental management capacities will be strongly enhanced by frequent internal training of employees to increase its involvement in GSCM practices.

2.5 Impact of Green Supply Chain Performance Management

There are two ways of looking at performance in relation to GSCM practices: environmental performance and Economic Performance. The environmental performance deals with reducing substances that pollute the environment while Economic Performance emphasizes more on the element of cost (Zhu et al., 2004).

Several studies that have attempted to link practices of GSCM with firm performance. Large & Thomsen (2011) study on drivers of GSCM Performance found that the degree of green supplier assessment and green collaboration has direct influence on

environmental performance. Some researchers found a positive relationship between GSCM and performance such as (Zhu and Sarkis, 2004) study on Relationship between Operational Practices and Performance Among Early Adopters of Green Supply Chain Management Practices and Performance Chinese Manufacturing Enterprises found that ; (Rao and Holt, 2005) study on Do green supply chains lead to competitiveness and economic performance, found that greening the different phases of the supply chain leads to an integrated green supply chain, which ultimately leads to competitiveness and economic performance; (Korir, 2014) study on green supply chain implementation practices and supply chain performance of battery manufacturing firms in Kenya found that that green supply chain implementation practices are important in the supply chain performance. Likewise Chege (2012) study on green supply chain management practices and supply chain performance of private hospitals in Nairobi, Kenya found that GSCM practices revealed a significantly positive relationship with the SCP parameters. Since GSCM practices affected SCP in this regard, implementing GSCM practices improves organizations' capacity to handle the supply chain disruption.

However, Azevedo, Carvalho & Machado (2011) study on the influence of green practices on supply chain performance; (Wu and Pagell, 2011) study on environmental sustainability and supply chain management, found a combination of positive and other relationships while (Zhu *et al.*, 2007) study on Green Supply Chain Management Pressures, Practices and Performance within the Chinese Automobile Industry, recommended that economic performance remains the top priority for manufacturers.

Madsen and Ulhui (2003) argue that corporate adoption of environmental management is to harmonize an environmental strategy with other strategic issues such as corporate

goals and product positioning. According to them, result of proactive pollution prevention programs could actually reduce production cost and improve product value or the image of the company. Monera and Oritas (2010) also discovered that environmental performance has a positive correlation with financial performance of the firm. Khanna and Anton (2002) believe that corporate environmental management is a self regulatory business approach not only to protect the environment, but also strategically integrate environmental considerations into corporate strategic decisions.

Strategy researchers have recommended that companies need to adopt production performance and financial performance so as to improve the organizational performance (Im and Workman, 2004; Paladino, 2007). Production performance involves green product innovation which is defined as the performance of product innovation that is related to green concept. Such product innovations include eliminating pollution, conservation of energy, waste recycling and green product designs (Chen et al., 2006). Financial performance relates to the level of firms' profitability to that of its competitors (Clemens, 2006; Judge & Douglas, 1998). However, Wagner et al. (2001) argues that there has been contradiction in the relationship between firm's financial performance and environmental management because of corporate environmental practices which have contributed to both positive and negative economic performance.

2.5 Empirical Review

Table 2.1: Empirical Review

Author	Focus of the Study	Research Findings	Research Gap
Korir (2014)	Green Supply Chain Management Practices and Performance of Firms in Automotive Industry in Nairobi, Kenya.	The firms are considering the usage of Green Supply Chain Management Practices and there are challenges associated with the adoption of the practices.	Failed to reveal the performance managements in green supply chains and also the study was conducted on service industry.
Korir (2012)	Green Supply Chain Implementation Practices and Supply Chain Performance of Battery Manufacturing Firms in Kenya	Supply chain effectiveness and efficiency is ensured by the organization	Conducted in a small portion of large manufacturing firms and the study did not address performance management practices.
Omonge (2012)	green supply chain management practices and competitiveness of commercial banks in Kenya	GSCM practices had a positive relationship with the environmental performance of banks.	Conducted in service industry and failed to outline performance management concept.
Lee, Kim & Choi (2012)	Green supply chain management and organizational performance.	A direct link between GSCM practice implementation and business performance thus business performance will be improved when GSCM enhances operational efficiency	Not based in Kenya and failed to look at performance management
Claudia, Rosa & Manatos (2012)	School performance management practices and school achievement	Self evaluation and performance management are not developed in schools	Failed to link performance management with green supply chain
Hervani <i>et al.</i> (2005)	Performance Measurement for Green Supply Chain Management	Provides an integrative framework for study, design and evaluation of GSCM performance tools	did not address factors influencing GSCPM

Source: (Author, 2015)

2.6 Summary

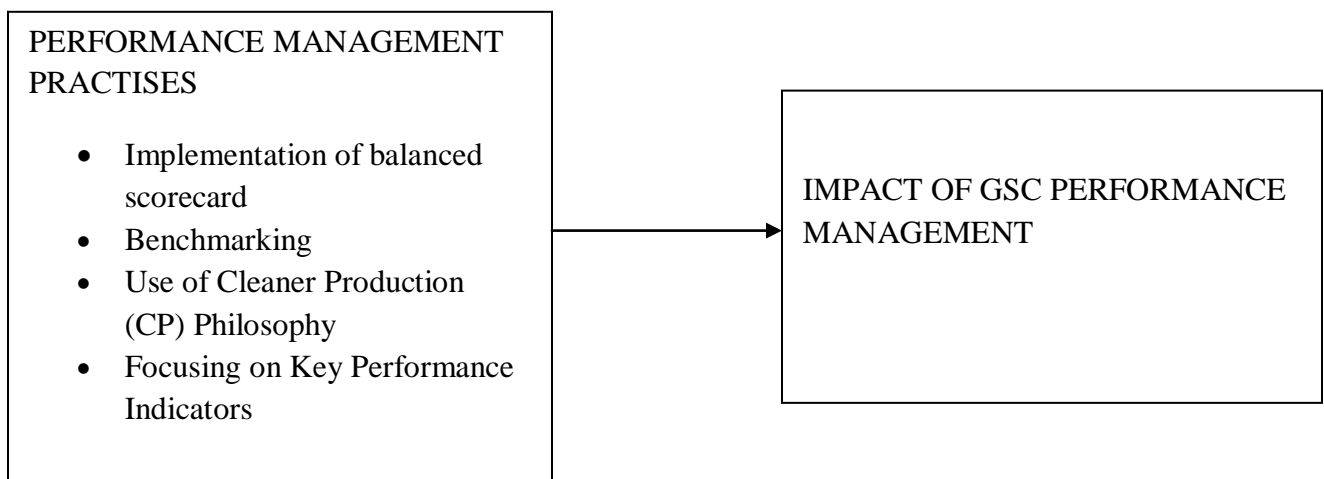
This study aims to establish the linkage between GSC and performance management of firms in large manufacturing firms in Nairobi, Kenya. In summary, the concept of GSCM is evident however in Kenya, few researches have been done. The performance management in the aspect of GSCM has not been explored in Kenya. It is therefore clear that there is need to find out the GSC performance management in large manufacturing firms in Nairobi, Kenya.

2.7 Conceptual Framework

The researcher will use a conceptual model below to explain the relationship between performance management practices and their impact on performance of large scale manufacturing firms in Nairobi, Kenya. The independent variables influence the dependent variable. Below is the conceptual framework:

Independent variables

dependant variables



Source: (Author, 2015)

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The chapter provides a blueprint or outline for conducting the study. Section 3.2 identified research design and described researcher's overall plan for obtaining answers to the research questions guiding the study. Section 3.3 identified the population. Section 3.4 described the sample size which was used in the study. Section 3.5 described data that was used in the study and how that data was collected. Section 3.6 described how the data was analyzed and summarized identifying and explaining conceptual and empirical models that was applied.

3.2 Research Design

The study used descriptive survey because of the large target population, which involves both qualitative and quantitative approaches. The descriptive research design was deemed appropriate to enable the generalization of the study findings on green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya.

3.3 Population

The target population of the study comprised all of the 455 large scale manufacturing companies operating in Nairobi. This information is listed in the KAM (2014) directory that contains the list of all the manufacturing and exporting companies that are registered in Kenya. The basic idea behind sampling is that by selecting some of the elements in a population, one can draw conclusions about the entire population. Stratified random sampling technique was used because it can representatively sample even the smallest and most inaccessible subgroups of the population (Castillo, 2009).

3.3 Sample Size

The sample size for this study involved 46 respondents. This is arrived at through a formula developed by Kelley and Maxwell (2003) as shown below: $0.101 = \text{Sample Size} / \text{Total population}$ ($0.101 * 455 = 46$). This formula is derived from a series of samples assuming non-zero probability. This method is considered appropriate when using a descriptive survey research design and a regression model (Kelley and Maxwell, 2003). The sample was drawn from the population of 455 large scale manufacturing firms calculated at 95% confidence level.

Table 3.1 Sampling Frame

Sector	No. of Firms	%	Sample
Building, Mining & Construction	6	1.3	1
Chemical and Allied	62	13.6	6
Energy, Electrical and Electronics	42	9.2	4
Food and Beverages	100	22	10
Leather and Footwear	8	1.8	1
Metal and Allied Sector	38	8.4	4
Motor Vehicle and Accessories	17	3.7	2
Paper and Board Sector	48	10.5	5
Pharmaceutical and Medical Equipment	20	4.4	2
Plastics and Rubber	54	11.9	5
Textile and Apparels	38	8.4	4
Timber, Wood and Furniture	22	4.8	2
Total	455	100	46

Source (KAM, 2014)

3.4 Data Collection

This study used primary data that was collected by use of a structured questionnaire. The questionnaire had four sections. Section A, dealt with general information of the organization. The second section intended to answer the first objective; the third section answered the second objective, while the last section answered the third objective questions. The respondents to the questionnaire were procurement and supply chain managers or their equivalents at the head offices of the large manufacturing firms in Nairobi Kenya. The questionnaire was administered on drop and pick later method. Section two to four used the Likert scale to allow the measuring of satisfaction, likelihood, frequency, quality and more.

3.5 Data Analysis

Before processing the responses, the completed questionnaires were edited for completeness and consistency. Descriptive statistics analysis methods such as the use of frequency distribution, cumulative frequencies and standard deviation were used to analyze quantitative data. Factor analysis was also used to this effect to determine the relationship between green supply chain and performance management practices of large manufacturing firms. Regression analysis was done to determine the relationship between green supply chain and performance management practices of large manufacturing firms.

The regression model used was as below:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y= dependent variable (Impact of Green Supply Chain Performance Management)

α = constant

β_i = coefficient of respective independent variables

X1 = Implementation of balanced scorecard

X2 = Benchmarking

X3 = Use of Cleaner Production (CP) Philosophy

X4 = Focusing on Key Performance Indicators

ε = error term

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRESENTATION

4.1 Introduction

This chapter discusses the interpretation and presentation of the findings. The purpose of the study was to investigate the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya. The finding was intended on answering the study's research questions. The findings are presented in percentages and frequency distributions, mean and standard deviations. A total of 46 questionnaires were issued out and 39 were returned. This represented a response rate of 85%.

4.2 General Information

The general information considered in this study included one's current title or position in the organization and length of continuous service with the organization.

The respondents were asked to indicate their current title/position. 39% of the respondents were supply chain/procurement managers, 18% were assistant supply chain managers and 41% of the respondents were in the category of others, which included accountants, production managers, general managers and operation managers. Only 1 respondent did not indicate their title/position in the organization. The findings indicate that the respondents were from different positions thus will give out independent opinions about the study.

The respondents were asked to indicate how long they have been working in their respective companies. 15.4% of the respondents have worked in their respective organizations for less than 2 years, 25.6 % of the respondents indicated that they have

worked in the organization between 2 – 5 years, 30.8% of the respondents said they have worked in the organization between 6 - 10 years, while 25.6% of the respondents have worked in the organization between 10 – 15 years. The results indicates that majority of the respondents have worked in their organization for more than 5 years an indication that they understand the green supply chain performance management practices in their organizations.

4.3 Green Supply Chain Performance Management Practices

The first object of the study was to establish the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya.

Green supply chain performance management practices includes: implementation of balanced scorecard, benchmarking, use of cleaner production philosophy and focusing on key performance indicators.

The respondents were requested to indicate the extent the firm has implemented green supply chain performance management practices in their work place in a five point Likert Scale. The range was “No extent at all (1)” to “Very great extent (5). The scores of “No extent at all” and “Small extent” have been taken to represent a variable which had a mean score of 0 to 2.5 on the continuous Likert scale;(0≤ S.E <2.4). The scores of “moderate extent” have been taken to represent a variable with a mean score of 2.5 to 3.4 on the continuous Likert scale: (2.5≤M.E. <3.4) and the score of both “Great extent” and “Very great extent” have been taken to represent a variable which had a mean score of

3.5 to 5.0 on a continuous likert scale; ($3.5 \leq L.E. < 5.0$). The results are shown on table 4.1.

Table 4.1: Green Supply Chain Performance Management Practices

Practices	Mean	Std. Deviation
1. Implementation of Balanced Scorecard		
Customer Satisfaction due to reduced wait time	4.3846	.81484
Cost saving and increased revenues	4.1538	.93298
Increased process efficiency	4.0789	.94101
Encouraged innovation by improved tools and technology	3.9487	.88700
2. Benchmarking		
Customer requirement products and services	4.2821	.85682
Focus on latest development	3.9231	1.10940
Measuring, comparing and analyzing work with different organization	3.7179	1.02466
3. Use of Cleaner Production Philosophy		
Minimizes wastes and emission and maximize production output	4.2564	.81815
Better environmental performance	4.2821	.85682
Reduced environmental impact	3.9744	1.03840
4. Focusing on Key Performance Indicators		
Cost performance management	4.1795	.82308
Process performance management	4.0256	1.08790
Performance management of equipment	3.8718	.92280

Source: Research Data, 2015

The results indicate that the green supply chain performance management practices have been implemented in large manufacturing firms in a great and very great extent. From the data collected, the activities in implementation of balanced scorecard show that the practice has been adopted between very large extent and large extent. This is shown by a

mean score between 4.3 and 3.9. The activities in benchmarking show that the practice has been adopted between very large and large extent. This is shown by a mean score between 4.2 and 3.7. The activities in use of cleaner production philosophy indicate that the practice has been adopted between very large and large extent. This is shown by a mean score between 4.2 and 3.9. Similarly, the activities in focusing on key performance indicators show that the practice has been adopted between very large and large extent. This is shown by a mean score between 4.1 and 3.8.

The results indicated that most large manufacturing firms in Nairobi have adopted all the performance management practices in their respective organizations at a large extent. These findings seem to be consistent with Malaki (2013), who found out that implementation the performance management practices have been adopted to a greater extent and a study by Chan and Chan (2004) that found that focusing on key performance indicators is a general indicator of performance that focuses on critical aspects of output. These findings are contrary with Hervani *et al.* (2005 who found that the performance management practices adopted are analytical hierarchy processes and lifecycle.

4.4 Factors Influencing Green Supply Chain Performance Management Practices

The second objective of the study was to determine the factors influencing green supply chain performance management in large manufacturing firms in Nairobi, Kenya.

The respondents were requested to indicate the extent to which the factors listed were influencing green supply chain performance management practices. The range was “No extent at all (1)” to “Very great extent (5). The scores of “No extent at all” and “Small

extent” have been taken to represent a variable which had a mean score of 0 to 2.5 on the continuous Likert scale;(0≤ S.E <2.4). The scores of “moderate extent” have been taken to represent a variable with a mean score of 2.5 to 3.4 on the continuous Likert scale: (2.5≤M.E. <3.4) and the score of both “Great extent” and “Very great extent” have been taken to represent a variable which had a mean score of 3.5 to 5.0 on a continuous likert scale; (3.5≤ L.E. <5.0). The results are shown in table 4.2.

Table 4.2: Factors influencing green supply chain performance management practices

Factors	Mean	Std. Deviation
Technological advancement	4.3846	.67338
Expected business gains	4.3846	.74747
Competition	4.3784	.79412
Market Demand	4.3077	.79980
Customer responsiveness	4.2895	.84173
Manufacturer’s top priority	4.2308	1.11122
Corporate image	4.2308	.76786
Financial measure like ROI, market share	4.1842	.86541
Customer expectations	4.1538	.74475
Customer service	4.1282	.92280
Long-term investment decisions	4.1026	1.02070
Flexibility of systems to meet customer needs	4.0513	.72361
Cost of Implementation	4.0263	.88491
Top management commitment	4.0256	.90284
Supplier involvement	4.0000	.80539
Economic interest	4.0000	.88852
International Organization for Standardization	3.9429	.90563
Inventory performance	3.9167	1.15573
Social responsibility	3.8462	.84413
Success of other firms' regulatory system	3.6571	1.02736

Source: Research Data, 2015

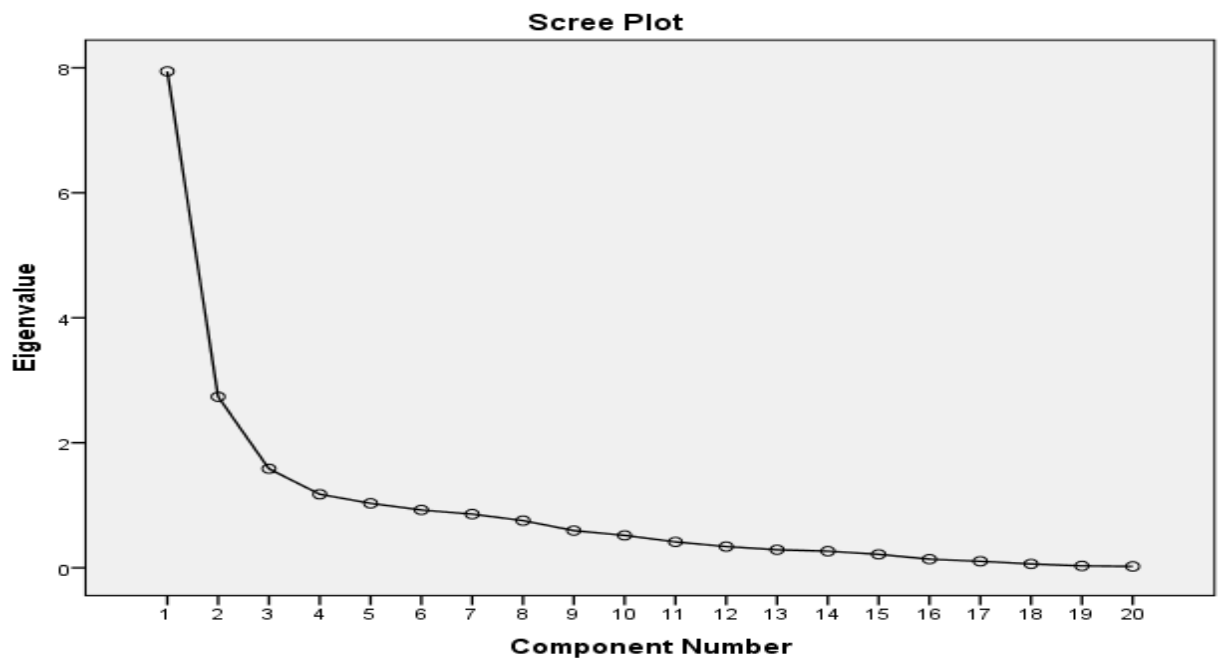
From the data collected majority of the respondents reported that Market Demand, Cost of Implementation, Technological advancement, Customer responsiveness, Competition, Flexibility of systems to meet customer needs, Financial measure like ROI, market share, Manufacturer's top priority, Customer service, Inventory performance, International Organization for Standardization, Long-term investment decisions, Customer expectations, Expected business gains, Social responsibility, Corporate image, Supplier involvement, Economic interests and Top management commitment factors to a very large extent influence green supply chain performance practices in large manufacturing firms in Nairobi, Kenya. This is shown by a mean score of 4.3846, 4.3846, 4.3784, 4.3077, 4.2895, 4.2308, 4.2308, 4.1848, 4.1538, 4.1282, 4.1026, 4.0513, 4.0263, 4.0256, 4.0000, 4.0000, 3.9429, 3.9167 and 3.8462. Similarly, success of other firms' regulatory system factor, to a great extent influence green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya. This was shown by a mean score of 3.6571.

These findings concur with a study by Nawrockaet, Brorson and Lindhqvist (2009) that found that the existing and potential role of ISO 14001 in environmental supply chain management: to communicate the requirements to the supplier. A study by Yan Li (2011) found that enterprises have increased their environmental awareness due to regulatory, competitive, marketing pressures and international organizational standards as ISO9000 serial and ISO14001 certification, internal environmental management, especially commitment from top-level managers and support from mid-level managers, and education (raising awareness) of management. Moreover, these findings seem to contradict the findings of a study by Hervani *et al.* (2005) which found out that the major

factors are financial resources, the type of organizational structure, influence of the strategic adaptation competence against changes in the enterprises, managers' environmental training and orientation, staffs' environmental awareness and training, the status of the environmental issues in the company.

Factor analysis was further conducted on the factors to describe variability among the factors by collapsing a large number of factors into a few interpretable underlying factors.

Figure 4.1 Factor Analysis (Factors influencing green supply chain performance management practices



Source: Research Data, 2015

From table 4.3 and figure 4.1, the results indicate that five components of factors were extracted. Values greater than one were considered and interpreted as factors. The five factors explained 72.359% of the variants in the data matrix. Component one explains

about 39.7% of the variance, component two explains 13.7% of the variance, component three explains 7.9% of the variance, component four explains 5.9% of the variance and component five explains 5.1% of the variance. The first five factors shows where the upward part of the curve was seen hence the extraction of the five components. The first two components explain much more of the variance than the other three components.

Table 4.3: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.943	39.717	39.717	7.943	39.717	39.717
2	2.737	13.684	53.401	2.737	13.684	53.401
3	1.585	7.927	61.328	1.585	7.927	61.328
4	1.176	5.879	67.206	1.176	5.879	67.206
5	1.031	5.153	72.359	1.031	5.153	72.359
6	.925	4.624	76.984			
7	.859	4.293	81.277			
8	.754	3.772	85.049			
9	.595	2.975	88.024			
10	.518	2.588	90.612			
11	.414	2.071	92.683			
12	.339	1.696	94.378			
13	.289	1.444	95.822			
14	.265	1.324	97.146			
15	.215	1.077	98.222			
16	.137	.687	98.910			
17	.104	.521	99.430			
18	.062	.311	99.741			
19	.030	.151	99.892			
20	.022	.108	100.000			

Source: Research Data, 2015

Extraction Method: Principal Component Analysis.

4.5 Impact of Green Supply Chain Performance Management Practices

The third objective was to establish the impacts of the green supply chain performance management practices on the performance of large manufacturing firms in Nairobi, Kenya.

The respondents were requested to indicate the extent their respective organizations rate the performance of green supply chain performance management practices with regards to the impacts listed. The range was “No extent at all (1)” to “Very great extent (5). The scores of “No extent at all” and “Small extent” have been taken to represent a variable which had a mean score of 0 to 2.5 on the continuous Likert scale; ($0 \leq S.E. < 2.4$). The scores of “moderate extent” have been taken to represent a variable with a mean score of 2.5 to 3.4 on the continuous Likert scale: ($2.5 \leq M.E. < 3.4$) and the score of both “Great extent” and “Very great extent” have been taken to represent a variable which had a mean score of 3.5 to 5.0 on a continuous likert scale; ($3.5 \leq L.E. < 5.0$). The results are shown in table 4.4.

From the data collected, the majority of the respondents reported that Leads to competitiveness, Improvement in customer loyalty, Improvement in company image, Reduces substances that pollute, Wastes and emissions, Production cost reduction, Improves reuse, recycling and remanufacturing opportunities, Product innovation, Improves product value, Increases profits and Improves capacity to handle SC disruptions as the major impacts of green supply chain performance management practices which is to a very great extent. This was shown by a mean of 4.5128, 4.4872, 4.4872, 4.4615, 4.4103, 4.3333, 4.3333, 4.3077, 4.2895, 4.2821 and 4.0513 respectively.

Table 4.4: Impact of Green Supply Chain Performance Management Practices

Impacts	Mean	Std. Deviation
Leads to competitiveness	4.5128	.72081
Improves the company image	4.4872	.72081
Improves customer loyalty	4.4872	.75644
Reduces substances that pollute	4.4615	.85367
Wastes and emissions	4.4103	.90954
Production cost reduction	4.3333	.92717
Improves reuse, recycling and remanufacturing opportunities	4.3333	.77233
Product innovation	4.3077	.79980
Improves product value	4.2895	.92730
Increases profits	4.2821	.88700
Improves capacity to handle SC disruption	4.0513	.85682

Source: Research Data, 2015

4.5.1 Impact of Green Supply chain Performance Management Practices on Performance

The respondents were requested to rate performance of their firm with regards to the green supply chain performance management practices listed. The range was “No extent at all (1)” to “Very great extent (5). The scores of “No extent at all” and “Small extent” have been taken to represent a variable which had a mean score of 0 to 2.5 on the

continuous Likert scale;(0≤ S.E <2.4). The scores of “moderate extent” have been taken to represent a variable with a mean score of 2.5 to 3.4 on the continuous Likert scale: (2.5≤M.E. <3.4) and the score of both “Great extent” and “Very great extent” have been taken to represent a variable which had a mean score of 3.5 to 5.0 on a continuous likert scale; (3.5≤ L.E. <5.0). The results are shown in table 4.5.

Table 4.5: Impact of Green Supply chain Performance Management Practices on Performance

Practices with performance	Mean	Std. Deviation
Use of cleaner production philosophy	4.4615	.55470
Focusing on key performance indicators	4.2564	.88013
Benchmarking	4.1282	.80064
Implementation of balanced scorecard	3.7436	.99255

Source: Research Data, 2015

The findings indicate that green supply chain performance management practices affect performance between a large and very large extent. Respondents indicated that use of cleaner production philosophy, focusing on key performance indicators and benchmarking affect performance at a very large extent. This is shown by a mean score of 4.4615, 4.2564 and 4.1282 respectively, while, the implementation of balanced scorecard affect performance at a large extent. This is shown by a mean score of 3.7436.

4.5.2 Tests on Coefficients

Table 4.6: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.389	.391		.995	.327
Implementation of balanced scorecard	.211	.097	.242	2.176	.037
Benchmarking	.328	.156	.263	2.109	.042
Use of cleaner production philosophy	.198	.112	.235	1.761	.087
Focusing on key performance indicators	.260	.128	.303	2.027	.051

Source: Research Data, 2015

a. Dependent Variable: Impact Green Supply Chain Performance Management

The regression model used was:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y= dependent variable (Impact of Green Supply Chain Performance Management)

α = constant

β_i = coefficient of respective independent variables

X1 = Implementation of balanced scorecard

X2 = Benchmarking

X3 = Use of Cleaner Production (CP) Philosophy

X4 = Focusing on Key Performance Indicators

ε = error term

As per the SPSS generated table above, the regression becomes:

$$Y = 0.389 + 0.211X_1 + 0.328X_2 + 0.198X_3 + 0.260X_4$$

The multiple linear regression model indicates that all the independent variables have positive coefficient. The regression results above reveal that there is a positive relationship between dependent variable (impact of green supply chain performance management) and independent variables (Implementation of balanced scorecard, Benchmarking, Use of cleaner production philosophy and focusing on key performance indicators). From the findings, one unit change in implementation of balanced scorecard results to 0.211 units increase in impact of green supply chain performance management. One unit change in benchmarking, results to 0.328 units increase in impact of green supply chain performance management. One unit change in use of cleaner production philosophy, results to 0.198 units increase in impact of green supply chain performance management. Similarly, a unit increase in focusing on key performance indicators, results to 0.260 units increase in impact of green supply chain performance management.

The above results concur with the findings of Yan Li (2011) who found out that balanced scorecard improves operations and business performance for organizations. On contrary, Ondiek (2013), found that the level of awareness of hotels about cleaner production is fairly good but the practices are however not comprehensive enough for the realization of desired results. Thus, there is no significant relationship between star-rating and the level of cleaner production implementation in star-rated hotels.

4.5.3 Model Summary

Table 4.7: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.855 ^a	.731	.700	.57549

Source: Research Data, 2015

R-Squared is a commonly used statistic to evaluate model fit. R-square is 1 minus the ratio of residual variability. The adjusted R Square, also called the coefficient of multiple determinations, is the percent of the variance in the dependent explained uniquely or jointly by the independent variables. 70.0 % of the changes in impact of green supply chain performance management could be attributed to the combined effect of the independent variables while the remaining 30% can be attributed to the effects of other variables.

4.5.4 Analysis of Variance

Table 4.9: ANOVA

Model	Sum of Squares	Df	Mean Square	F	Sig.
1 Regression	30.637	4	7.659	23.126	.000 ^b
Residual	11.261	34	.331		
Total	41.897	38			

Source: Research Data, 2015

Independent variables: (constant), Implementation of balanced scorecard, Benchmarking, Use of cleaner production philosophy and Focusing on key performance indicators

Dependent variable: impact of green supply chain performance management.

ANOVA findings (P- value of 0.00) in the table shows that there is correlation between the independent variables (Implementation of balanced scorecard, Benchmarking, Use of cleaner production philosophy and Focusing on key performance indicators) and dependent variable (impact of green supply chain performance management). The F calculated at 5% level of significance was 23.126 since F calculated is greater than the F critical (value = 2.17), this shows that the overall model was significant.

CHAPTER FIVE: SUMMARY, DISCUSSIONS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter depicts the summary of the data findings investigating the green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya. The conclusions and recommendations are drawn. The chapter is therefore structured into summary of findings, conclusions, recommendations and area for further research.

5.2 Summary of Findings

The study established that green supply chain performance management practices (Implementation of balanced scorecard, Benchmarking, Use of cleaner production philosophy and focusing on key performance indicators) have been implemented in a great and very great extent by most large manufacturing firms in Nairobi, Kenya. From the data collected, the activities in implementation of balanced scorecard show that the practice has been adopted between very great extent and great extent. The activities in benchmarking show that the practice has been adopted between very great and great extent. The activities in use of cleaner production philosophy indicate that the practice has been adopted between very great and great extent. Similarly, the activities in focusing on key performance indicators show that the practice has been adopted between very great and great extent.

The findings of the second objective indicated that Market Demand, Cost of Implementation, Technological advancement, Customer responsiveness, Competition,

Flexibility of systems to meet customer needs, Financial measure like ROI, market share, Manufacturer's top priority, Customer service, Inventory performance, International Organization for Standardization, Long-term investment decisions, Customer expectations, Expected business gains, Social responsibility, Corporate image, Supplier involvement, Economic interests and Top management commitment factors to a very large extent influence green supply chain performance practices in large manufacturing firms in Nairobi, Kenya. Similarly, success of other firms' regulatory system factor, to a great extent influence green supply chain performance management practices in large manufacturing firms in Nairobi, Kenya. Also, through factor analysis the results indicated that five components of factors were extracted. Values greater than one were considered and interpreted as factors.

The findings on the third objective indicated that improvement in customer loyalty, improvement in company image, leads to competitiveness and reduces substances that pollute as the major impacts of green supply chain performance management practices which is to a very great extent. Other respondents indicated that reduces cost of production, improves product value, reduces wastes and emissions, improves reuse, recycling, and remanufacturing opportunities, increases profits, improves organization's capacity to handle the supply chain disruption and product innovation as green supply chain performance management practices impacts which are to great extent. The multiple regression model found that there is a positive relationship between dependent variable (impact of green supply chain performance management) and independent variables (Implementation of balanced scorecard, Benchmarking, Use of cleaner production philosophy and focusing on key performance indicators).

5.3 Conclusions

From the findings of the study, it can be concluded that large manufacturing firms in Nairobi, Kenya have implemented green supply chain performance management practices. This implies that first objective of the study has been achieved. From the findings of the study, also it can be concluded that green supply chain performance management practices are important in ensuring organization's performance. This is evident through the positive relationship between dependent variable (impact of green supply chain performance management) and independent variables (Implementation of balanced scorecard, Benchmarking, Use of cleaner production philosophy and focusing on key performance indicators). Hence, the third objective of the study has been accomplished. It is therefore vital that issues of green supply chain performance management practices implementation be at the forefront of organization's agenda on all management levels.

5.4 Recommendations

The study recommends that all large manufacturing firms in Nairobi need to implement all the green supply chain performance management practices (implementation of balanced scorecard, benchmarking, use of cleaner production philosophy and focusing on key performance indicators) to influence its performance since there is a positive relationship between impact of green supply chain performance management and the independent variables.

5.5 Limitations of the Study

The respondent rate depends on the organizations' willingness to answer the questionnaires and some firms were not ready to participate, citing lack of time and that the information is confidential.

The validity and reliability of the study's information, which was obtained from the staff, depended on how honest they were.

The findings of this study are specific to the large manufacturing firms in Nairobi, Kenya. Therefore the findings may not be applicable to other industries.

The data was collected by likert scale questionnaires which might have biases of the respondents reflected in the results. There is therefore a possibility that if respondents were different, the results might be different.

5.6 Areas for Further Research

The findings indicate there are a number of large manufacturing firms in Nairobi that have not implemented the green supply chain performance management practices. A study should be conducted to find out reasons why some of these large manufacturing firms have not implemented the practices. A similar study should be conducted out in other sectors including the service industry.

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APPENDICES

APPENDIX 1: RESEARCH QUESTIONNAIRE

Dear correspondent, this questionnaire aim to collect information related to green supply chain performance management practices in large manufacturing firms in Nairobi. This study is being carried out for a management project paper as a requirement in partial fulfillment of the Master of Business Administration, University of Nairobi. The information will be treated as confidential and used for academic purposes only. This questionnaire is for collecting relevant data for the research project. Therefore, your input and participation will be highly appreciated.

SECTION A: GENERAL INFORMATION

1. Name of your organization.....

2. What is your current title or position? (Tick in the box)

a. Supply Chain / Procurement Manager

b. Assistant Supply Chain Manager

Any other? Please specify.....

3. How long have you worked in the company?(Tick in the box)

Less than 2 years

2-5 years

6-10 years

10-15 years

SECTION B: GREEN SUPPLY CHAIN PERFORMANCE MANAGEMENT PRACTICES

To what extent has your firm implemented the following Green Supply Chain Performance Management Practices in its work place, using a five point scale below? Please tick appropriately against each statement. The scale stand for the following: 1 = No Extent at All; 2= Small Extent; 3= Moderate Extent; 4= Great Extent; 5= Very Great Extent

Green Supply Chain Performance Management Practices	1	2	3	4	5
1. Implementation of Balanced Scorecard					
The manufacturing firm ensures customer satisfaction by reducing the wait time and improving customer retention					
The manufacturing firm saves costs and increases revenues to ensure increase in profitability					
The manufacturing firm increases process efficiency thus lowering the cycle time					
The manufacturing firm encourages innovation and improvement activities by improving tools and technology					
2. Benchmarking					
The manufacturing firm has a dedicated work in measuring, comparing and analyzing work process among different organizations					
The manufacturing firm involve external focus on the latest developments, best practices and model examples that can be incorporated within various business organizations					

The manufacturing firm has an objective to produce products and services that conform to the requirements of the customers in an ever ending improvement environment					
3. Use of cleaner production philosophy					
The manufacturing firm minimizes waste and emission and maximizes production output					
The manufacturing firm promotes better environmental performance through reduction at source of waste and emissions					
The manufacturing firm reduces the environmental impact of products throughout their life cycle by the design of environmentally friendly but cost effective products					
4. Focusing on key performance indicators					
The manufacturing firm manages performance of equipment by their availability and reliability					
The manufacturing firm manages performance of cost by measuring maintenance, labor and material cost					
The manufacturing firm manages performance of the processes by comparing ratio of planned and unplanned work and schedule compliance					

SECTION D: FACTORS INFLUENCING GREEN SUPPLY CHAIN PERFORMANCE MANAGEMENT

Identify the extent to which the following factors influence green supply chain performance management. The scale stand for the following: 1 = No Extent at All; 2= Small Extent; 3= Moderate Extent; 4= Great Extent; 5= Very Great Extent

Factors influencing	1	2	3	4	5
Market demands					
Cost of implementation					
Technological advancements					
Customer responsiveness					
Competition					
Flexibility of service system to meet customer needs					
Manufacturer’s top priority					
Financial measures such as return on investment, profitability, market share and revenue growth					
Customer service					
Inventory performance					
International Organization for Standardization (ISO)					
Success of other firms Legislation Regulatory System					
Strategic Focus: accounting for long-term investment decisions and their impacts					
Customer expectations					
Expected Business Gains					
Social Responsibility					
Top Management Commitment					
Supplier Involvement					
Economic Interest					

Corporate Image					
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SECTION D: (i) IMPACT OF GREEN SUPPLY CHAIN PERFORMANCE MANAGEMENT PRACTICES

Please tick appropriately how you rate performance of your firm with regards to the parameters listed. The scale stand for the following: 1 = No Extent at All; 2= Small Extent; 3= Moderate Extent; 4= Great Extent; 5= Very Great Extent

Impacts	1	2	3	4	5
Reduces substances that pollute the environment					
Reduces cost of production					
Improves product value					
Leads to competitiveness					
Reduces of wastes and emissions					
Improves the reuse, recycling and remanufacturing opportunities					
Increases profits					
Improves organizations' capacity to handle the supply chain disruption					
Improves the image of the company					
Product innovation that is related to green concept					
Improves customer loyalty					

(ii) GREEN SUPPLY CHAIN PERFORMANCE MANAGEMENT PRACTICES AND PERFORMANCE

Please tick appropriately how you rate performance of your firm with regards to the green supply chain performance management practices listed. The scale stand for the following: 1 = No Extent at All; 2= Small Extent; 3= Moderate Extent; 4= Great Extent; 5= Very Great Extent

Economic performance with regards to the practices	1	2	3	4	5
Implementation of balanced scorecard					
Benchmarking					
Use of cleaner production philosophy					
Focusing on key performance indicators					

THANK YOU FOR YOUR TIME AND COOPERATION!

APPENDIX 2: LARGE MANUFACTURING FIRMS IN NAIROBI, KENYA

Sector: Building, Construction and Mining (6)	
Central Glass Industries Ltd	Kenya Builders & Concrete Ltd
Karsan Murji & Company Limited	Manson Hart Kenya Ltd
Kenbro Industries Ltd	Mombasa Cement Ltd
Sector: Food, Beverages and Tobacco (100)	
Africa Spirits Ltd Highlands	Mineral Water Co. Ltd
Agriner Agricultural Development Limited	Homeoil
Belfast Millers Ltd Insta	Products (EPZ) Ltd
Bidco Oil Refineries Ltd	Jambo Biscuits (K) Ltd
Bio Foods Products Limited	Jetlak Foods Ltd
Breakfast Cereal Company(K) Ltd	Karirana Estate Ltd
British American Tobacco Kenya Ltd	Kenafric Industries Limited
Broadway Bakery Ltd	Kenblest Limited
C. Czarnikow Sugar (EA) Ltd	Kenya Breweries Ltd
Cadbury Kenya Ltd Kenya	Nut Company Ltd
Centrofood Industries Ltd	Kenya Sweets Ltd
Coca cola East Africa Ltd	Nestle Kenya Ltd
Confec Industries (E.A) Ltd	Nicola Farms Ltd
Corn Products Kenya Ltd	Palmhouse Dairies Ltd
Crown Foods Ltd	Patco Industries Limited
Cut Tobacco (K) Ltd	Pearl Industries Ltd
Deepa Industries Ltd	Pembe Flour Mills Ltd
Del Monte Kenya Ltd	Premier Flour Mills Ltd
East African Breweries Ltd	Premier Food Industries Limited
East African Sea Food Ltd	Proctor & Allan (E.A.) Ltd
Eastern Produce Kenya Ltd	Promasidor (Kenya) Ltd
Farmers Choice Ltd	Trufoods Ltd
Frigoken Ltd	UDV Kenya Ltd
Giloil Company Limited	Unga Group Ltd
Glacier Products Ltd	Usafi Services Ltd
Global Allied Industries Ltd	Uzuri foods Ltd
Global Beverages Ltd	ValuePak Foods Ltd
Global Fresh Ltd W.E.	Tilley (Muthaiga) Ltd
Gonas Best Ltd	Kevian Kenya Ltd
Hail & Cotton Distillers Ltd	Koba Waters Ltd
Al-Mahra Industries Ltd	Kwality Candies & Sweets Ltd
Alliance One Tobacco Kenya Ltd	Lari Dairies Alliance Ltd

Alpha Fine Foods Ltd	London Distillers (K) Ltd
Alpine Coolers Ltd	Mafuko Industries Ltd
Annum Trading Company Limited	Manji Food Industries Ltd 61
Aquamist Ltd	Melvin Marsh International
Brookside Dairy Ltd	Kenya Tea Development Agency
Candy Kenya Ltd	Mini Bakeries (Nbi) Ltd
Capwell Industries Ltd	Miritini Kenya Ltd
Carlton Products (EA) Ltd	Mount Kenya Bottlers Ltd
Chirag Kenya Limited	Nairobi Bottlers Ltd
E & A Industries Ltd	Nairobi Flour Mills Ltd
Kakuzi Ltd	NAS Airport Services Ltd
Erdemann Co. (K) Ltd	Rafiki Millers Ltd
Excel Chemical Ltd	Razco Ltd
Kenya Wine Agency Limited	Re-Suns Spices Limited
Highlands Canner Ltd	Smash Industries Ltd
Super Bakery Ltd	Softa Bottling Co. Ltd
Sunny Processor Ltd	Spice World Ltd
Spin Knit Dairy Ltd	Wrigley Company (E.A.) Ltd
Sector: Chemical and Allied (62)	
Anffi Kenya Ltd	Crown Berger Kenya Ltd
Basco Product (K) Ltd	Crown Gases Ltd
Bayer East Africa Ltd	Decase Chemical (Ltd)
Continental Products Ltd	Deluxe Inks Ltd
Cooper K- Brands Ltd	Desbro Kenya Limited
Cooper Kenya Limited	E. Africa Heavy Chemicals (1999) Ltd
Beiersdorf East Africa Ltd	Elex Products Ltd
Blue Ring Products Ltd	European Perfumes & Cosmetics Ltd
BOC Kenya Limited	Galaxy Paints & Coating Co. Ltd
Buyline Industries Limited	Grand Paints Ltd
Carbacid (CO2) Limited	Henkel Kenya Ltd
Chemicals & Solvents E.A. Ltd	Imaging Solutions (K) Ltd
Chemicals and Solvents E.A. Ltd	Interconsumer Products Ltd
Coates Brothers (E.A.) Limited	Odex Chemicals Ltd
Coil Products (K) Limited	Osho Chemicals Industries Ltd
Colgate Palmolive (E.A) Ltd	PolyChem East Africa Ltd
Johnson Diversity East Africa Limited	Procter & Gamble East Africa Ltd
Kel Chemicals Limited	PZ Cussons Ltd
Kemia International Ltd	Royal Trading Co. Ltd
Ken Nat Ink & Chemical Ltd	Reckitt Benckiser (E.A) Ltd

Magadi Soda Company Ltd	Revolution Stores Co. Ltd
Maroo Polymers Ltd	Soilex Chemical Ltd
Match Masters Ltd	Strategic Industries Limited
United Chemical Industries Ltd	Supa Brite Ltd
Oasis Ltd	Unilever Kenya Ltd
Rumorth EA Ltd	Murphy Chemical E.A Ltd
Rumorth East Africa Ltd	Syngenta East Africa Ltd 62
Sadolin Paints (E.A.) Ltd	Synresins Ltd
Sara Lee Kenya Limited	Tri-Clover Industries (K) Ltd
Saroc Ltd	Twiga Chemical Industries Limited
Super Foam Ltd	Vitafoam Products Limited
Sector: Energy, Electrical and Electronics (42)	
A.I Records (Kenya) Ltd	East African Cables Ltd
Amedo Centre Kenya Ltd	Eveready East Africa Limited
Assa Abloy East Africa Ltd	Frigorex East Africa Ltd
Aucma Digital Technology Africa Ltd	Holman Brothers (E.A.) Ltd
Avery (East Africa) Ltd	Iberafrica Power (EA) Ltd
Baumann Engineering Limited	International Energy Technik Ltd
Centurion Systems Limited	Kenwest Cables Ltd
Digitech East Africa Limited	Kenwestfal Works Ltd
Manufacturers & Suppliers (K) Ltd	Kenya Power & Lighting Co. Ltd
Marshall Fowler (Engineers) Ltd	Kenya Scale Co. Ltd/ Avery
Mecer East Africa Ltd	Kenya Ltd
Metlex Industries Ltd	Kenya Shell Ltd
Metsec Ltd	Libya Oil Kenya Limited
Modulec Engineering Systems Ltd	Power Technics Ltd
Mustek East Africa Sanyo	Reliable Electricals Engineers Ltd
Nationwide Electrical Industries	Armo (Kenya) Ltd
Nationwide Electrical Industries Ltd	Socabelec East Africa
Optimum Lubricants Ltd	Sollatek Electronics (Kenya) Limited
PCTL Automation Ltd	Specialised Power Systems Ltd
Pentagon Agencies Tea	Synergy-Pro
Power Engineering International Ltd	Vac Machinery Limited
Sector: Plastics and Rubber (54)	
Betatrad (K) Ltd	ACME Containers Ltd
Blowplast Ltd	Afro Plastics (K) Ltd
Bobmil Industries Ltd	Alankar Industries Ltd
Complast Industries Limited	Dune Packaging Ltd
Kenpoly Manufacturers Ltd	Elgitread (Kenya) Ltd

Kentainers Ltd	Elgon Kenya Ltd
King Plastic Industries Ltd	Esilon Plastics of Kenya Ltd
Kingway Tyres & Automart Ltd	Five Star Industries Ltd
L.G. Harris & Co. Ltd	General Plastics Limited
Laneeb Plastics Industries Ltd	Haco Industries Kenya Ltd
Metro Plastics Kenya Limited	Hi-Plast Ltd
Ombi Rubber Rollers Ltd	Jamlam Industries Ltd
Packaging Industries Ltd	Kamba Manufacturing (1986) Ltd
Plastics & Rubber Industries Ltd	Keci Rubber Industries
Polyblend Limited	Nairobi Plastics Industries
Polyflex Industries Ltd	Nav Plastics Limited
Polythene Industries Ltd	Ombi Rubber
Premier Industries Ltd	Packaging Masters Limited
Prestige Packaging Ltd	Plastic Electricons
Prosel Ltd	Raffia Bags (K) Ltd
Qplast Industries	Rubber Products Ltd
Sumaria Industries Ltd	Safepak Limited
Super Manufacturers Ltd	Sameer Africa Ltd
Techpak Industries Ltd	Sanpac Africa Ltd
Treadsetters Tyres Ltd	Silpack Industries Limited
Uni-Plastcis Ltd	Solvochem East Africa Ltd
Wonderpac Industries Ltd	Springbox Kenya Ltd
Sector: Textile and Apparels (38)	
Africa Apparels EPZ Ltd	MRC Nairobi (EPZ) Ltd
Fulchand Manek & Bros Ltd	Ngecha Industries Ltd
Image Apparels Ltd	Premier Knitwear Ltd
Alltex EPZ Ltd	Protex Kenya (EPZ) Ltd
Alpha Knits Limited	Riziki Manufacturers Ltd
Apex Appaels (EPZ) Ltd	Rolex Garments EPZ Ltd
Baraka Apparels (EPZ) Ltd	Silver Star Manufacturers Ltd
Bhupco Textile Mills Limited	Spinners & Spinners Ltd
Blue Plus Limited	Storm Apparel Manufacturers Co. Ltd
Bogani Industries Ltd	Straightline Enterprises Ltd
Brother Shirts Factory Ltd	Sunflag Textile & Knitwear Mills Ltd
Embalishments Ltd	Tarpo Industries Limited
J.A.R Kenya (EPZ) Ltd	Teita Estate Ltd
Kenya Trading EPZ Ltd	Thika Cloth Mills Ltd
Kikoy Co. Ltd	United Aryan (EPZ) Ltd
Le-Stud Limited	Upan Wasana (EPZ) Ltd

Metro Impex Ltd	Vaja Manufacturers Limited
Midco Textiles (EA) Ltd	Yoohan Kenya EPZ Company Ltd
Mirage Fashionwear EPZ Ltd	YU-UN Kenya EPZ Company Ltd
Sector: Timber, Wood Products and Furniture (22)	
Economic Housing Group Ltd	Rosewood Office Systems Ltd
Eldema (Kenya) Limited	Shah Timber Mart Ltd
Fine Wood Works Ltd	Shamco Industries Ltd
Furniture International Limited	Slumberland Kenya Limited
Hwan Sung Industries (K) Ltd	Timsales Ltd
Kenya Wood Ltd	Wood Makers Kenya Ltd
Newline Ltd	Woodtex Kenya Ltd
PG Bison Ltd	United Bags Manufacturers Ltd
Transpaper Kenya Ltd	Statpack Industries Ltd
Twiga Stationers & Printers Ltd	Taws Limited 64
Uchumi Quick Suppliers Ltd	Tetra Pak Ltd
Sector: Pharmaceutical and Medical Equipment (20)	
Alpha Medical Manufacturers Ltd	Dawa Limited
Beta Healthcare International Limited	Elys Chemical Industries
Biodeal Laboratories Ltd	Gesto Pharmaceutical Ltd
Bulks Medical Ltd	Glaxo Smithkline Kenya Ltd
Cosmos Limited	KAM Industries Ltd
Laboratory & Allied Limited	KAM Pharmacy Limited
Manhar Brothers (K) Ltd	Pharmaceutical Manufacturing Co.
Madivet Products Ltd	Regals Pharmaceuticals
Novelty Manufacturing Ltd	Universal Corporation Limited
Oss. Chemie (K) Pharm	Access Africa Ltd
Sector: Metal and Allied (38)	
Allied Metal Services Ltd	Booth Extrusions Limited
Alloy Street Castings Ltd	City Engineering Works Ltd
Apex Street Ltd	Rolling Mill Division Crystal Industries Ltd
ASL Ltd	Davis & Shirtliff Ltd
ASP Company Ltd	Devki Steel Mills Ltd
East Africa Foundry Works (K) Ltd	East Africa Spectre Limited
Elite Tools Ltd	Kens Metal Industries Ltd
Friendship Container Manufacturers	Khetshi Dharamshi & Co. Ltd
General Aluminum Fabricators Ltd	Nampak Kenya Ltd
Gopitech (Kenya) Ltd	Napro Industries Limited
Heavy Engineering Ltd	Specialized Engineer Co. (EA) Ltd

Insteel Limited Steel	Structures Limited
Metal Crown Limited	Steelmakers Ltd
Morris & Co. Limited	Steelwool (Africa) Ltd
Nails & Steel Products Ltd	Tononoka Steel Ltd
Orbit Engineering Ltd	Welding Alloys Ltd
Rolmil Kenya Ltd	Wire Products Limited
Sandvik Kenya Ltd	Viking Industries Ltd
Sheffield Steel Systems Ltd	Warren Enterprises Ltd
Sector: Leather Products and Footwear (8)	
Alpharama Ltd	CP Shoes
Bata Shoe Co. (K) Ltd	Dogbones Ltd
New Market Leather Factory Ltd	East Africa Tanners (K) Ltd
C & P Shoe Industries Ltd	Leather Industries of Kenya Limited
Sector: Motor Vehicle Assembly and Accessories (17)	
Auto Ancillaries Ltd Kenya	Vehicle Manufacturers Limited
Varsani Brakelining Ltd	Labh Singh Harnam Singh Ltd
Bhachu Industries Ltd	Mann Manufacturing Co. Ltd
Chui Auto Spring Industries Ltd	Megh Cushion industries Ltd
Toyota East Africa Ltd Mutsimoto	Motor Company Ltd
Unifilters Kenya Ltd	Pipe Manufacturers Ltd
General Motor East Africa Limited	Sohansons Ltd
Impala Glass Industries Ltd	Theevan Enterprises Ltd
Kenya Grange	Vehicle Industries Ltd
Sector: Paper and Paperboard (48)	
Ajit Clothing Factory Ltd	Conventual Franciscan Friars-Kolbe Press
Associated Papers & Stationery Ltd	Creative Print House
Autolitho Ltd	D.L. Patel Press (Kenya) Limited
Bag and Envelope Converters Ltd	Dodhia Packaging Limited
Bags & Balers Manufacturers (K) Ltd	East Africa Packaging Industries Ltd
Brand Printers	Elite Offset Ltd
Business Forms & Systems Ltd	Ellams Products Ltd
Carton Manufacturers Ltd	English Press Limited
Cempack Ltd	General Printers Limited
Chandaria Industries Limited	Graphics & Allied Ltd
Colour Labels Ltd	Guaca Stationers Ltd
Colour Packaging Ltd	Icons Printers Ltd
Colour Print Ltd	Interlabels Africa Ltd
Kenya Stationers Ltd	Jomo Kenyatta Foundation

Kim-Fay East Africa Ltd	Kartasi Industries Ltd
Paper Converters (Kenya) Ltd	Kenafric Diaries Manufacturers Ltd
Paper House of Kenya Ltd	Kitabu Industries Ltd
Paperbags Limited	Kul Graphics Ltd
Primex Printers Ltd	Label Converters
Print Exchange Ltd	Modern Lithographic (K) Ltd
Printpak Multi Packaging Ltd	Pan African Paper Mills (EA) Limited
Printwell Industries Ltd	Ramco Printing Works Ltd
Prudential Printers Ltd	Regal Press Kenya Ltd
Punchlines Ltd	SIG Combibloc Obeikan Kenya

Source: (KAM, 2014)