

**ADOPTION OF GREEN PROCUREMENT IN SUSTAINABILITY OF SUPPLY CHAINS IN
MANUFACTURING SECTOR IN KENYA**

BY;

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**A RESEARCH PROPOSAL SUBMITTED IN PARTIAL FULFILLMENT OF THE
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OCTOBER, 2019

DECLARATION

Students Declaration

We, the undersigned, declare that this proposal is our original work and has not been submitted to any other institution, college or university for examination.

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Declaration by the Supervisor

This proposal has been submitted for defense with my approval as Dedan Kimathi University of Technology Supervisor

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School of Business Management and Economics

DEDICATION

We dedicate this project proposal to our entire families and beloved parents for their moral, financial and spiritual support during our studies. We would also wish to extend our dedication to a Kenyan Hero Eliud Kipchoge on his inspiring words, "NO HUMAN IS LIMITED", which will always be a motivation to everyone's success to who believes he or she can go extra miles.

ACKNOWLEDGEMENT

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ABSTRACT

This study purposes on the adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya. The study bases on the following objectives: To ascertain how eco-suppliers determines sustainability of supply chains in manufacturing sector in Kenya. To examine the influence of reverse logistics in the sustainability of supply chains in manufacturing sector in Kenya. To establish the effect of eco-design on the sustainability of supply chains in manufacturing sector in Kenya. To identify how green packaging enables sustainability of supply chains in manufacturing sector in Kenya. Theoretically, the study will help various scholars and academicians find an invaluable source of reference material for future studies in green procurement as well as for discussions in the field of procurement sector. The recommendations from this study also guides on how manufacturing sector engaging in green procurement can ensure sustainability in green procurement adoption. It will also entail theoretical literature review and this will consist of four theories, namely: Globalization theory, Legitimacy theory, Institutional theory and Systems theory. The conceptual framework of the study will have the dependent variable as Sustainability of Supply chains that constitute economic, environmental and social factors while the independent variables will entail; Eco supplier selection, Reverse Logistics, Eco-design and Green Packaging. The research design will be a descriptive study in which census survey will be adopted. Data will be collected using a questionnaire that is administered through drop and pick later method. The target population will be 68 employees which include top management, middle management and low management and the entire population will be used since it is a census survey method. Primary data collection method will be used by administering structured questionnaires. Likert scale will also be used in the preparation of questionnaires in relation of to the topic of study and the objectives. Data will be analyzed by use of descriptive statistics data will be presented using tables, pie charts and bar graphs.

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LIST OF ACRONYMS/ABBREVIATIONS

CEC	COMMISSION FOR ENVIRONMENT COOPERATION
CIPS	CHARTERED INSTITUTE OF PURCHASING AND SUPPLIES
CSR	CORPORATE SOCIAL RESPONSIBILITY
DFE	DESIGN FOR ENVIRONMENT
EMS	ENVIRONMENT MANAGEMENT SYSTEM
ERP	ENTREPRISE RESOURCE PLANNING
GOK	GOVERNMENT OF KENYA
JIT	JUST-IN-TIME
IBM	INTERNATIONAL BUSINESS MANAGEMENT
ISO	INTERNATIONAL STANDARDS OF ORGANISATIONS
KAM	KENYA ASSOCIATION OF MANUFACTURERS
NEMA	NATIONAL ENVIRONMENT MANAGEMENT AUTHORITY
TQM	TOTAL QUALITY MANAGEMENT
SC	SUPPLY CHAIN
UK	UNITED KINGDOM

OPERATIONAL DEFINITION OF TERMS

Green: A practice to portray the environmentally friendly image of products, processes, systems and technologies, and the way business is conducted (Zailaini & Wooi, 2010)

Green Purchasing: The environmental management of purchasing and supply chain that takes into consideration Sustainability issues in purchasing of inputs in addition to the traditional purchasing criteria (Zailaini & Wooi, 2010)

Legitimacy: It is a general perception or assumption that the actions of an entity are appropriate within some socially constructed system of norms, values, beliefs, and definitions (Scott, 2004).

Remanufacturing: It is the process of repairing, refurbishing or overhauling an item so as to extend its life span or recover the lost value in the item and is commonly adopted as a sustainable strategy to achieve competitive advantage. (Hazen,2011)

Reverse logistics: It is returning the end of life product or packaging from end user back to the supplier (Lembke, 2002)

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Green Procurement, also known as sustainable procurement is one of the emerging issues in

Procurement. Sustainable procurement is about the process of purchasing goods and services that takes into account the social, environmental and economic factors. It is about considering what the products are made of, where they have come from, who has made them, how they are transported and how they are eventually disposed. Wilkinson, (2002) stated that Green Procurement is the purchase of products and services which are environmentally friendly. The products or services purchased should have a lower impact on the environment over their whole life cycle than their counterparts. It involves the integration of environmental issues, such as pollution prevention and reduction of waste into purchasing decisions along with traditional factors such as price, performance and quality. The World Summit on sustainable Development in 2002 made a call to promote public procurement policies that encourage development and diffusion of environmentally sound goods and services (Walker and Brammer, 2009). And for that matter, private companies and international agencies have increasingly included social and environmental criteria within their procurement processes in order to contribute to broader organizational goals of sustainable development (Srivastava, 2007; Brammer and Walker 2011; Preuss, 2009; Nijaki and Worrel, 2012).

Manufacturing organizations and other supply chain partners are more seriously involved in designing and implementing Sustainable Procurement policies focusing on how environmental issues and issues relating to other aspects of the sustainable development such as society and economy can be integrated in the procurement process activities. Green procurement is based on the belief that companies do

simultaneously benefit from elements of environment, economics, and society according to IBM Global Business Services (2009). CIPS (2007), also defines green procurement as a consideration to the environmental, social and economic consequences of materials used, manufacturing methods, logistics, design and disposal of the already used products. Bolton (2008), refers green procurement to the use of procurement to promote environmentally sound practices; environmentally preferable purchasing; eco-procurement; sustainable procurement, environment-orientated procurement; greener purchasing; environmentally friendly procurement; environmental procurement and environmentally responsible procurement. Bolton (2008) explained that despite the variety of terms, they all generally refer to the selection of products and services whose impact on environment are not harmful or the least harmful to the environment and human health as measured against competing products and services.

Organizations worldwide are making an effort to purchase products and services that are environmentally friendly. Lacroix (2008), identified that both public and private sector organizations are implementing procurement practices that focus on environmental. Public and private sector companies are buying green because it results in a number of benefits. Public sector organizations find that green procurement policies reduce overall costs, offer significant opportunity to use materials, resources and energy more effectively, improve employee health, and stimulate markets for innovative new products and services. According to CEC (2003) private sector organizations, green procurement policies measure a financial payback from purchasing products and services with lower environmental impacts and from selecting suppliers that are committed to improving their own environmental, health and safety performance. In China, the pollution caused by packaging waste has become the fourth-largest source of pollution, only followed to water pollution, lake and ocean pollution and air pollution. The development of green packaging, protection of the ecological environment and promoting sustainable economic development have become the consensus in the world's packaging industry in many industrialized countries. Seman (2012) provides green supply chain management studies for developed and developing countries regarding manufacturing and found that in terms of implementation and

adoption, there were very few studies. Large, Chiou, and Cetinkaya (2011) found that most research cited are those from Europe and United States with China following closely and Africa occupies the lowest position. In South Africa there is literature on supply chain management relating to the construction industry but hardly any in green supply chain management (Ojo, Akinlabi and Mbohwa, 2014). Ruteri (2009) shows that the food industry sector in Tanzania, failed to acquire the benefits of supply chain management due to poor understanding of the concept. Sustainable procurement is an international hassle and therefore, Kenya is not an exception. The motive of this assignment is to find out the extent to which procurement practice in Kenya, embraces sustainability issues. Secondly, to carry out ability challenges current in procurement practices, which paintings against sustainable procurement in Kenya, hence assisting us move in the direction of sustainable procurement. In Kenya, there are few green procurement studies and are either case studies or sub-sector specific with none addressing the adoption of green procurement. This study explains on the significance of adoption of green procurement in manufacturing sector of. The Kenya Vision 2030 in assessing the impact of external environment envision that the growing world economy and population offers an expanded potential market for Kenyan products. The government retaliates that other global economic trends such as out sourcing, environmental concerns and increased demand for raw materials are likely to impose greater competition for countries like Kenya. A report by KAM (2017) shows that there are 14 manufacturing sectors in Kenya, namely: textile and apparel sector, food and beverage sector, agro-processing case study tea, edible oils sector, paper and board sector ,automotive sector, metal and allied sector, pharmaceutical and medical equipment sector, leather products and footwear, timber, wood and furniture sector, energy, electrical and electronics sector, chemical and allied sector, plastic and rubber sector and building, construction and mining sector. Moreover, there are 750 leading manufacturing and value-added companies in Kenya as by KAM, (2019).

1.2 Statement of the Problem

Green procurement has become a necessity as environmental issues have remained key on the debate of global, international, regional and local social interests and thus

sustainability of supply chain is realized through the practice. Manufacturing processes affect the resource footprint primarily through their use of energy, the relative efficiency and the creation and disposal of waste and toxic materials. Conversely, with the trends of outsourcing and offshore manufacturing, this may not always be apparent to the customer what impact manufacturing strategy decisions can have on supply chain sustainability in manufacturing sector (Christopher, 2011). Due to the rising environmental concerns and awareness among various stakeholders in the supply chain as well as interest groups such as consumers, manufacturing sector organizations may find it appropriate to adopt sustainable or green procurement practices. It is not clear, given the absence of legislation in Kenya on green procurement, to what extent manufacturing sector organizations are practicing green procurement and if so, the adopting of the same and the challenges they face in the process. Walker and Brammer (2009) notes that little research has investigated sustainable procurement practices in the UK public sector. Manufacturing processes affect the environment primarily through their use of energy, their relative efficiency and the creation and disposal of waste, toxic materials or effluents. Conversely, with changing trends of outsourcing and offshore manufacturing, it may not always be apparent to the customer on the influence that manufacturing strategy decisions can have on supply chain sustainability in manufacturing sector (Christopher, 2011).

Humphrey, P. K. (2003) provides a framework on incorporating environmental criteria into the selection of the suppliers' process. The best evaluated tender or bid should be the one that offers the best in all the three sustainability issues. The concept of green packaging design is adapted to the demand of the times, in order to explore the application of the green idea in the packaging design. Green packaging design needs to consider packaging materials and this will affect the packaging cost. The 60% to 80% of the packaging cost have been confirmed in product design stage. The structure of the reasonable design of packaging reduces cost and adverse impact on the environment (Zhou, 2014). The logistics processes are distinguished by activities such as JIT, fulfilment, lot size management, quality management, and all of them are closely related to the environmental aspects.

Despite the fact that there are certain self-advanced strategies that are already being

adopted by the different sectors of the economy, there are also external efforts that need to be taken so as to facilitate the green procurement practice. The Kenya Government through Vision 2030 initiative aim to build a just and cohesive society with social equity in a clean and secure environment, these kinds of secure and conducive environment can be found through Green Procurement (Brammer, 2011). GOK (2010) report shows that without stringent regulatory and enforcement mechanisms, manufacturing sector would not be paying attention to issues of environmental degradation. In Kenya, the green procurement concept is yet to be adopted by many organizations. Manufacturing sector faces challenges in maintaining competitiveness, through quality, increased operating costs especially energy related costs and sustainable end to end supply of raw materials in order to ensure continued regional leadership in growth and most profitable share (Kiereini, 2011). Given the social, environmental and economical relevance of green procurement, the absence of studies on green procurement practices in the manufacturing sector in Kenya provide a gap in literature that the present study seeks to bridge.

1.3 Objectives of the Study

1.3.1 General Objective

To determine the effectiveness of adopting green procurement in sustainability of the manufacturing sector in Kenya.

1.3.2 Specific Objectives

- i. To ascertain how eco-suppliers determines sustainability of manufacturing sector in Kenya.
- ii. To examine the influence of reverse logistics in the sustainability of manufacturing sector in Kenya.
- iii. To establish the effect of eco-design on the sustainability of manufacturing sector in Kenya.
- iv. To identify how green packaging enables sustainability in manufacturing sector

in Kenya.

1.4 Research Questions

- i. In what ways do eco suppliers determine sustainability of manufacturing sector in Kenya?
- ii. How can reverse logistics influence the sustainability of Manufacturing sector in Kenya?
- iii. To what extent will eco-design affect the sustainability of Manufacturing sector in Kenya?
- iv. How will green packaging ensure sustainability in Manufacturing sector in Kenya?

1.5 Scope of the study

The study is based generally on the manufacturing sector in Kenya and the focus will be on various manufacturing firms within Nyeri county where we will select various employees from the top, middle and the lower levels of management in the selected manufacturing firms. The sampled employees will be interviewed on the various parameters that would influence sustainability of the supply chain in the adoption of green procurement that is; recycling, cost, remanufacturing and waste prevention

1.6 Significance of the study

This study is of great importance to the manufacturing sector in Kenya as far as adoption of green procurement is concerned. This study contributes both theoretically and practically. The first theoretical contribution is that the research will add on to the increasing body knowledge of green procurement by adoption in developing countries as well as providing evidence of some applications where there is no legislation on the same. Another theoretical contribution is that scholars and academicians will also find this study as an invaluable source of reference material for future studies in the area as well as for discussions in the field of procurement sector. This will aid in future adoption of green procurement in the studied firms as well as other sectors of the economy. In practicality, manufacturing firms will gain the knowledge of cost reduction through green purchasing as green products use less energy and work better than the

toxic ones. This study will also help manufacturing firms with the knowledge of increasing product reputation since it will help them go green and a firm gone green is considered as a good corporate citizen. On social basis, this study will be of help to organizations since it will equip them with the knowledge of promoting work safety and employee health through selection of eco-suppliers. Customers will also benefit from this study as they will learn on how to purchase eco products and the ethical means of disposal of the same through recycling, re-use and remanufacturing. Firms, wishing to adopt green procurement will find this study very useful in terms of the barriers they are bound to encounter in the process and how to mitigate on such challenges.

Salam, (2008) indicates the benefits of green procurement adoption as natural conservation because eco-friendly products are produced in a manner that consumes fewer natural resources and energy and uses them more sustainably from the process of acquiring raw materials, processing and manufacturing parts, transporting, use, and final disposal. The recommendations that will be given here will guide on how manufacturing sector engaging in green procurement can ensure sustainability of their supply chain in the of adoption green procurement.

1.7 Limitations of the study

Firstly, some respondents may be uncooperative during the researcher due of lack of interest in the study. Most will that the study was of less importance to them therefore no need to participate. However, as the researcher, this challenge can be solved by explaining to the respondents the reasons as to why they should cooperate. Secondly, respondent availability and responsiveness may pose some challenges to the researcher in regard to distribution of the questionnaires and time taken to obtain feedback. The challenge is overcome by follow-up and replacement of misplaced data collection instruments through email or hard copies as dictated in the methodology. However, the researcher should also assure the respondents that their names are kept anonymous and the information they provide would be treated with confidentiality and for academic purpose only. A study of the public procurement sector by Walker and

Brammer (2009) shows that absence of information on the effect of the environment is major challenge, especially on the delivery of products, sourcing for suppliers and absence of clear guidelines on sustainable environmental issues

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter reviews various studies that have been conducted in the adoption of green procurement in the sustainability of supply chains. The issues discussed in this section include various sustainability variables in relation to the adoption of green procurement. The section discusses in detail the sustainability of procurement and the parameters indicating adoption of green procurement in supply chain.

2.2 Theoretical Review

Theoretical review dwells on the past theories and studies in relation to the adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya. A theory is composed of logically interconnected, empirically provable prepositions. Theoretical framework provides the research the lens to view the world clearly, (Jones, 2018). Stafford and Harthman, (2010) are among the first to explain the adoption of practices within the environmental context that may include green procurement. Several scholars have subsequently investigated the positive impact of these institutional pressures on green procurement (Zhu, 2009). This study will be discussed using the following theories: Globalization theory, Legitimacy theory, Institutional theory and Systems theory

2.2.1 Globalization Theory

In the past, sourcing for a supplier considered the following elements; price, flexibility and quality in order to identify and select the right supplier. (Bai and Sarkis, 2010) shows that in the recent years, the basis of selection has widened to include more parameters on green issues, over and above the traditional criteria. Medu, (2002), shows that an increase in environmental concern by organizations has gradually become part of the overall corporate culture and thus this has helped to re-engineer the strategies of manufacturing sector. Sarki and Tamarkin (2005) observed that environmental sustainability comes from globalization rather than localization. Zou, (2008) describes the best supplier is selected by choosing a goal and weighting the values of all evaluation factors based on the characteristics of materials to be sourced based on demand patterns. As such, there is some level of uncertainty in the decisions

related to eco supplier selection. In such an environment, it is important to develop certain indicators or criteria; qualitative or quantitative that the eco supplier can be subjected to before selection. Buyers will preferably choose suppliers with certified processes ISO 14001. To create a balance in green procurement, companies will encourage suppliers who have a low raw material consumption, controlled emissions and pollution levels and raw material tracking. The preparation and the delivery for the competition by host industries translate to strategic and operation requirements that include cost quality improvement which constitutes some aspects of manufacturing process such as TQM, JIT, ERP and environmentally friendly suppliers. Therefore, there is need to understand globalization theory when determining the eco supplier's selection as independent variables and their influence on the sustainability of the manufacturing sector Kenya.

2.2.2 Legitimacy Theory

Legitimacy serves as either a source of additional external resources (Bitektine, 2011) or as a tool for consolidating organizational reputation, either externally or internally. Legitimacy implies the existence of a social contract between an organization and its constituents who will be the stakeholders. The adoption of green procurement by manufacturing firms in Kenya will therefore constitute reverse logistics hence sustainability of supply chains. Russo and Cardinali, (2012) indicates that reverse logistics practices reduce the customer's risk when buying a product and increase the customer value. However, the success of reverse logistics implementation requires the coordination of forward and backward flows of both materials and information between the seller and consumers through environmentally friendly transportation, Lane and Porter, (2007). Oliver, (2005) affirms that firm's response to external institutional pressure emphasizes the importance of obtaining legitimacy for purposes of demonstrating social worthiness and responsibility. Reverse logistics enables organizations to become more environmentally capable through remanufacturing, recycling, reusing and reducing the amount of materials that will be used (Marron, 2013). This theory is important to the study because reverse logistics which is part of organizational structure has impact on organization financial position and the

consumers and therefore organizations are open systems and depend on their environment for support.

2.2.3 Institutional Theory

Beyond requirements that procurement departments have traditionally been promoting over the years, such as the respect of work conditions and non-discrimination, new issues arise about the organization in reinforcing environmental requirements towards suppliers and the green product designs. Singh (2011) points out that close cooperation of suppliers and buyers would promote the successful completion of green purchasing or Procurement activities. In the process of green purchasing and green procurement, suppliers must consider the ultimate nature of the materials and components that enter the firm, purchasing managers can ask upstream members of the supply chain to commit waste reduction and provide environmentally friendly product that meets the proper design standards. i.e. ISO 140062. Green Procurement enables better compliance with existing norms, improvement of brand image for consumers and better ranking by non-financial notation organizations. The Global Cosmetic Industry (2017) claims that 88% of consumers tend to be more loyal to the institutional brands with positive commitments to the sustainability. Furthermore, they tend to select products made out of a large proportion of recycled and recyclable materials, and stamped by reliable eco-labels (Loebich and Donval, 2011). This theory is therefore applied here to explain the conscious decisions towards procuring green designed products and how it enhances procurement sustainability.

2.2.4 Systems Theory

Systems theory clarifies the interrelatedness of all parts of an organization and how one change in one area can affect the other parts (Li and Geiser, 2009). According to Walker and Brammer (2009), organization act as systems that usually interact with the environment. Reusable delivery packages of office supply orders that weigh less than 20 pounds and are not self-contained are now being delivered in paper bags rather than corrugated cardboard cartons and being transported in reusable delivery packages that protect the product and will be returned to suppliers for reuse (Mania, 2011) Green

packaging aims to protect the environment by using environmental friendly material According to Lozano and Valles (2013), system theory views organizational structure as the established pattern of relationships among the parts of the organization of particular importance and for manufacturing firms, environmental Packaging is or has been adopted with sustainability considerations. Green packaging issue is often used to demonstrate the company's commitment to environmental sustainability and increase the brand popularity (Byrne, 2017). Recycling can be also adopted as possible so as to use low power, low-cost, low-pollution raw materials as packaging material, in particular, the selection of recycled materials should be expanded, which can not only reduce environmental pollution but also saves raw materials, and be favorable to recycling resources, such as production of recycled paper board and plastic. Systems theory supports CSR where organizations interact with their respective environments as a system to enable them cooperate. Therefore, focus is on the movement and management of products and resources after the sale and after delivery to the customer with the appropriate Packaging in use.

2.3 Empirical Review

This section tries to explain the four variables under the study and giving brief discussions on the various parameters of the given variables as will be shown in the conceptual framework. Empirical evidence links the sustainability of supply chains to the adoption green procurement.

2.3.1 Eco supplier's selection

Organization's ability to offer consistent quality and compete largely depends on its access to quality products and services (CIPS, 2013). In order to ensure sustainability of green procurement in manufacturing sector in Kenya, there is need for proper selection of environmentally friendly suppliers. Supplier selection is considered as a process of selecting key suppliers based on pre-established set criteria; this traditionally revolved around price but the now followed multi-criteria approaches require extension of such criteria to include among other issues: quality, delivery times, service, technical capabilities emerging offer evaluation and supplier selection frameworks are pursuing

sustainable development goals. Lunsford and Glader, (2007) states that in order to avoid the disastrous effect of supplier nonperformance, buyers need to take proactive steps to verify a supplier's qualifications before awarding them contracts. For the selection process issues relating to environmental procurement policies there is need for Certification with environmental regulatory bodies e.g. National Environment Management Authority (NEMA) and International Standard Organization (ISO). i.e. ISO 14001

Basically, the green or environmental supplier selection criteria can be categorized into two groups: Quantitative and Qualitative criteria. Depending on whether an organization is using a reactive or proactive environmental management strategy, one or both criteria may be used at the same time. Quantitative environmental criteria are based on the cost in monetary terms; in that environmental costs are incurred as a result of investments in environmental management processes, or because of destructive processes and may relate to pollutant costs and effects. Qualitative environmental criteria on the other hand are more subjective criteria with their application depending on the weight given to each one depending on its importance to the organization or industry and total points score obtained on the bases of the measured parameters; and relate to Management competences, Green image, DFE, Environmental Management Systems and Environment Competencies. In the selection process all suppliers are evaluated against these criteria in order to choose a more appropriate supplier that ought to be contracted. A green procurement examination should be associated with all understandings. In this manner it may be pushed that a green supplier assessment should handiest be executed to those Green purchases that are viewed as having high cost and insinuating absurd environmental peril. Eco supplier's selection requires the applicability of some factors that will include cost, EMS and Worker safety and labor Health as for this study. Perceptions regarding the cost-effectiveness of GPP do play a particularly important role in decision making from which suppliers to purchase from. Srivastava, (2013) explains on uncertainty about cost, prices and demand conditions of green products that leaves long-term and short-term contracts for manufacturing of green products and services in pharmaceutical industry inevitably incomplete. Cost implications for implementing the green procurement affect the adoption and therefore firms may have

to optimize the costs associated with the implementation of green procurement practices versus their profitability for them to adopt it. If the green procurement implementation cost is too high, less firms will adopt hence implementation has to be sustainable. For a supplier to be selected, there is need for his or her certification; buyers require suppliers to have an EMS that is certified as fully compliant with one of the recognized international standards such as the British Standard 7750, ISO 14001 from the ISO, and the European Union Eco-Management and Audit Scheme. ISO 14001 is an internationally recognized Environmental Management System (EMS) standard developed by the ISO. (Anbumozhi and Kanda, 2005) provides an understanding of ISO in that it is created to be flexible enough to be implemented by any company size within any sector and ISO 14001 does not contain performance requirements. Work safety and labor health is key in selection of eco-friendly suppliers in that suppliers will comply with quality, health, safety and environmental regulations. Bayer, (2019) advocates suppliers to have systems in place to ensure safe handling, movement, storage, recycling, reuse, and management of waste, air emissions and waste water discharges.

2.3.2 Reverse Logistics

Hawks (2006) defines reverse logistics as the process of planning, implementing, and controlling the efficient, effective flow of raw materials for in-process inventory, finished goods and related information from the point of consumption to the point of origin for the purpose of recapturing value or proper disposal. She further explains reverse logistics as the process of moving goods from their typical final destination for the purpose of capturing value or proper disposal. Product recall requires organization to be able to reverse the normal logistics flow from suppliers to customers so that inventory deemed unsuitable can be located by customers and returned to suppliers in a timely and cost-effective manner (Xie and Breen, 2012). An increasing number of organizations in developed nations in, Europe, America and Australia engage in voluntary or mandatory end-of-life product management. These developments have a great impact on environmental and economic values. (Geyer and Jackson, 2009).

According to Martel; Vieira (2010), laws which aim at protecting the environment have become more stringent. The recognition of the need to meet the legislation being also

sustainable, have made companies consider initiatives that deal with reverse logistics, i.e., what is the final destination of the products? and how they can be reintroduced in the chain? The reverse logistics process is illustrated in Figure 2.1.

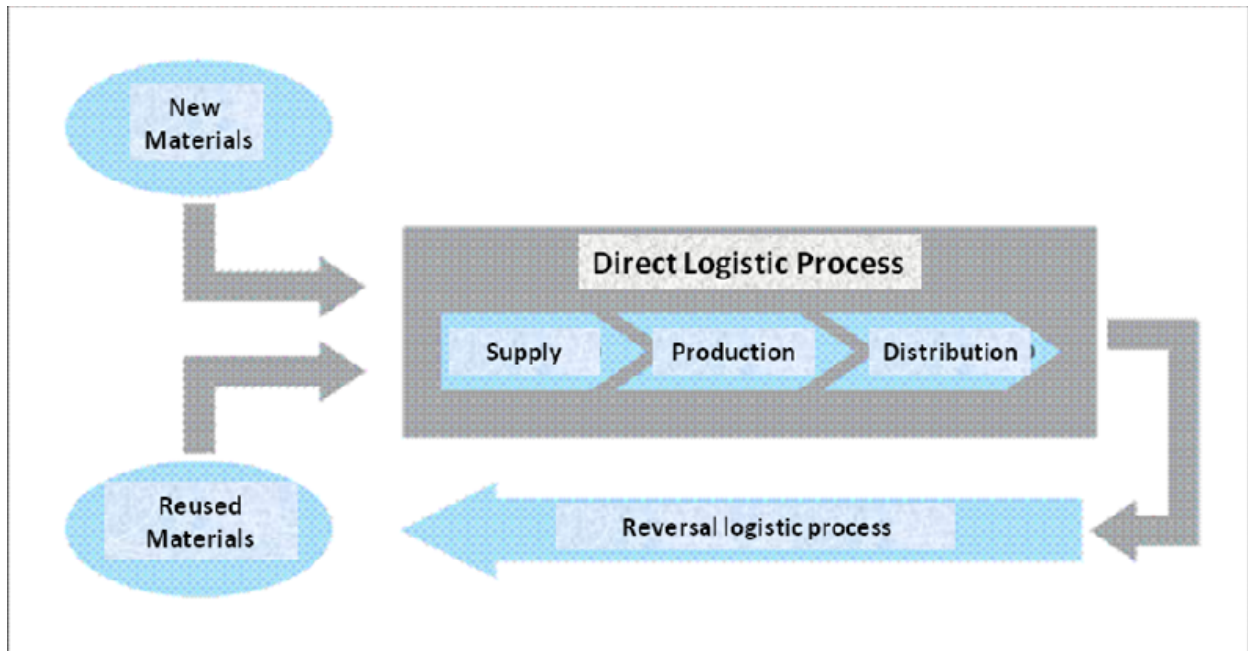


Figure 2.1 Schematic representation of the direct and reverse logistics processes.
Source: Lacerda, (2002)

Various parameters pertaining to reverse logistics could include: Return on investment, remanufacturing, increase in public participation. Reverse logistics provides benefits to manufacturing companies in economic terms. (Ilgun, 2010) provides the knowledge on Return on investment whereby the return of product quantities, return timings, how favorable the recovery of the returned product is having an impact on cost analysis in reverse processes. In addition, a good information flow system needs to be setup in order to calculate the costs of the reverse processes. Hazen, (2011) defines remanufacturing as the process of repairing, refurbishing or overhauling an item so as to extend its life span or recover the lost value in the item. When a product becomes unusable, the only strategy to restore the usability of the product is through remanufacturing. Remanufacturing is commonly adopted as a sustainable strategy to achieve competitive advantage. If managed strategically, remanufacturing can enhance

productivity and improve operational performance of the organization. Remanufacturing includes recycling-integrated manufacturing that aims at reclaiming value from materials that have reached the end of their life span (Sarkis, 2010).

Gray and charter, (2014) describe remanufacturing as mainly driven by the market demand, government regulations and international standards that calls on manufacturers to guarantee customer product quality thus it is considered a proactive production method that an organization can use to improve product value and enhance environmental responsiveness. Remanufacturing includes recycling-integrated manufacturing that aims at reclaiming value from materials that have reached the end of their life span (Sarkis, 2010). Reverse processes that portray positive environmentalist image tend to attract more customers to the business and market share is always preserved (Fleischmann, 2001). Therefore, customer perception towards a firm's operations grows with regards to attractiveness of reverse logistics processes.

2.3.3 Eco-Design

Green design has been used extensively in the literature to denote designing products with certain environmental considerations. It is the systematic consideration of design issues associated with environmental safety and health over the full product life cycle during new production and process development. Its scope encompasses many disciplines, including environmental risk management, product safety, occupational health and safety, pollution prevention, resource conservation and waste management. A common approach is to replace a potentially hazardous material or process by one that appears less problematic. This seemingly reasonable action can sometimes be undesirable if it results in the rapid depletion of a potentially. Eco-design requires that manufacturers design products that minimize consumption of materials and energy and that which facilitate the reuse, recycle, and recovery of component materials and parts and that avoid or reduce the use of hazardous products in the manufacturing process. Eco-design will include packaging design for reduced environmental impact, packaging re-cycle or re-use and use of biodegradable materials (Green.J., 2012).

Eco design involves the systematic consideration of design issues associated with environmental safety and health over the full product life cycle during new production and process development (Rao, 2008). According to Kriesburg (2009) medications can be designed to be more ecological sensitive, this may include: being biodegraded quickly, more efficient in lower doses, packing in bio gradable packaging is also key. It was recommended that the shelf life could be brought closer to align with real time by refining the expiring dates. Kriesburg, (2009) also observed that, in terms of medications packing, recyclable materials can be used by adding more information on proper method of disposal. The packaging can also include shapes and sizes that would be appropriate for transport and returning for economic benefits.

Life-cycle analysis is described as a process for assessing and evaluating the environmental, occupational health and resource-related consequences of a product through all phases of its life, i.e. extracting and processing raw materials, production, transportation and distribution, use, remanufacturing, recycling and disposal (Gungor and Gupta 1999). Green procurement requires that manufacturers design products that minimize consumption of materials and energy, that facilitate the reuse, recycle, and recovery of component materials and parts and that avoid or reduce the use of hazardous products within the manufacturing process. According to ISO, there is need for design standards. There has integration of environmental aspects into product design and development and thus ISO 14062 standard introduction. Also, ISO 14001 enables gaining of certification of environmental impacts inclusive of product designs.

2.3.4 Green Packaging

Green packaging is not only a package of general performance, but also with two main functions such as protecting the environment and renewable resources. The two main functions achieved by the principles of 4R1D. These are; reduce, reuse, reclaim, recycle and degradable. Molina-Besch (2016) states that green packaging includes three main identities: they are minimizing the use of hard-to-decompose packaging, using a packaging with low energy consumption, and using the environmentally friendly packaging. For instance, using the eco-friendly paper and plastic packaging is one of

Starbucks's green practices to communicate its commitment for environmental sustainability (Jeong, 2014). McDonalds also implements a similar strategy by establishing a campaign on the use of biodegradable paper for food packaging, while Walmart employs 4Rs (reduce, reuse, recycle, and rethink) strategy to reduce packaging waste.

Sustainable packaging for products enables the protection, facilitate the logistics, sales and other functions and tries to use as little material as possible. European and American countries will develop packaging reduction as the preferred measures of package. In order to implement the measure of appropriate amount of packaging, the company should design to try and make the package of thin, lightweight, and never use packaging without the need for it. Reuse, that is repeated use of packaging; after simple treatment, the containers can be reused. Reuse of containers can significantly reduce waste volume. To use reusable containers as much as possible will enhance recycling rate of packaging waste reuse. Reclaim, also calls recyclable. Refers to the use of packaging waste combustion to obtain new energy sources, and does not produce secondary pollution. Through the recycling of packaging waste, production of renewable products, such as the use of thermal incineration, composting and other measures to improve the land condition, to achieve reuse purposes.

Green packaging is a part of a product or a brand and it expresses brand attributes to shaping the brand image. The most effective way to promote eco-friendly packaging is to set standards and regulations which educates customers as well as manufacturing organizations and thus manufacturing sector does adopt green packaging for various reasons that may involve gaining competitive advantage. According to Quant, (2013), green consumers care about environmental issues hence their purchasing decisions are based on green consideration. Manufacturing firms does consider packaging cost and attraction first when choosing product packaging strategy. According to Chaves and Martins (2005), businesses are relying on reverse logistics to convey to customers the image of a corporate citizenship, respecting the principles of environmental sustainability, which is a good marketing incentive, in such way that organizations can increase brand value of their products and services.

2.4 Gaps to be filled

The above review shows that there is an empirical gap to be addressed as far as the adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya is concerned. Few studies have addressed adoption green procurement as a practice in manufacturing sector in Kenya. Among the various existing gaps would include; the considerations when selecting green suppliers, the reverse logistics problems as encountered, the design to be prepared when designing existing and new products and the packaging means that considers the social, environmental, and economical factors. Where such attempts have been made, it is on overall environmental sustainability. Furthermore, such studies have focused on developed economies. It will be worthwhile to focus on a developing country such as Kenya. Such perspective would enrich the idea on green procurement. This is the gap the present study seeks to address.

2.5 Summary

This chapter looks into the proposed explanation for the investigation. It is therefore optional information for examination and it is completed to give the hypothetical record of the examination and where it has two hypotheses: Globalization theory, Legitimacy Institutional theory, Institutional theory and Systems theory. It majors on the survey of past examinations on the point of the exploration from a worldwide view, international and local viewpoint.

2.6 Conceptual framework

The conceptual framework shows the relationship between independent and dependent variables in the study. In this study procurement sustainability is the dependent variable since its success depends on the adoption of green procurement. Measures of sustainability of supply chains includes: eco suppliers' selection, reverse logistics, eco design and Green packaging.

For this study, various parameter that do influence the selections of eco suppliers may include: cost, EMS and Work Safety and Labor Health. Reverse Logistics will be

measured using the Return on Investment, Remanufacturing and increased in public perception. Energy consumption, Waste prevention and design standards will be used for the study of green design. For green packaging, there is: product reputation, recycling and customer education are put into considerations.

Conceptual framework

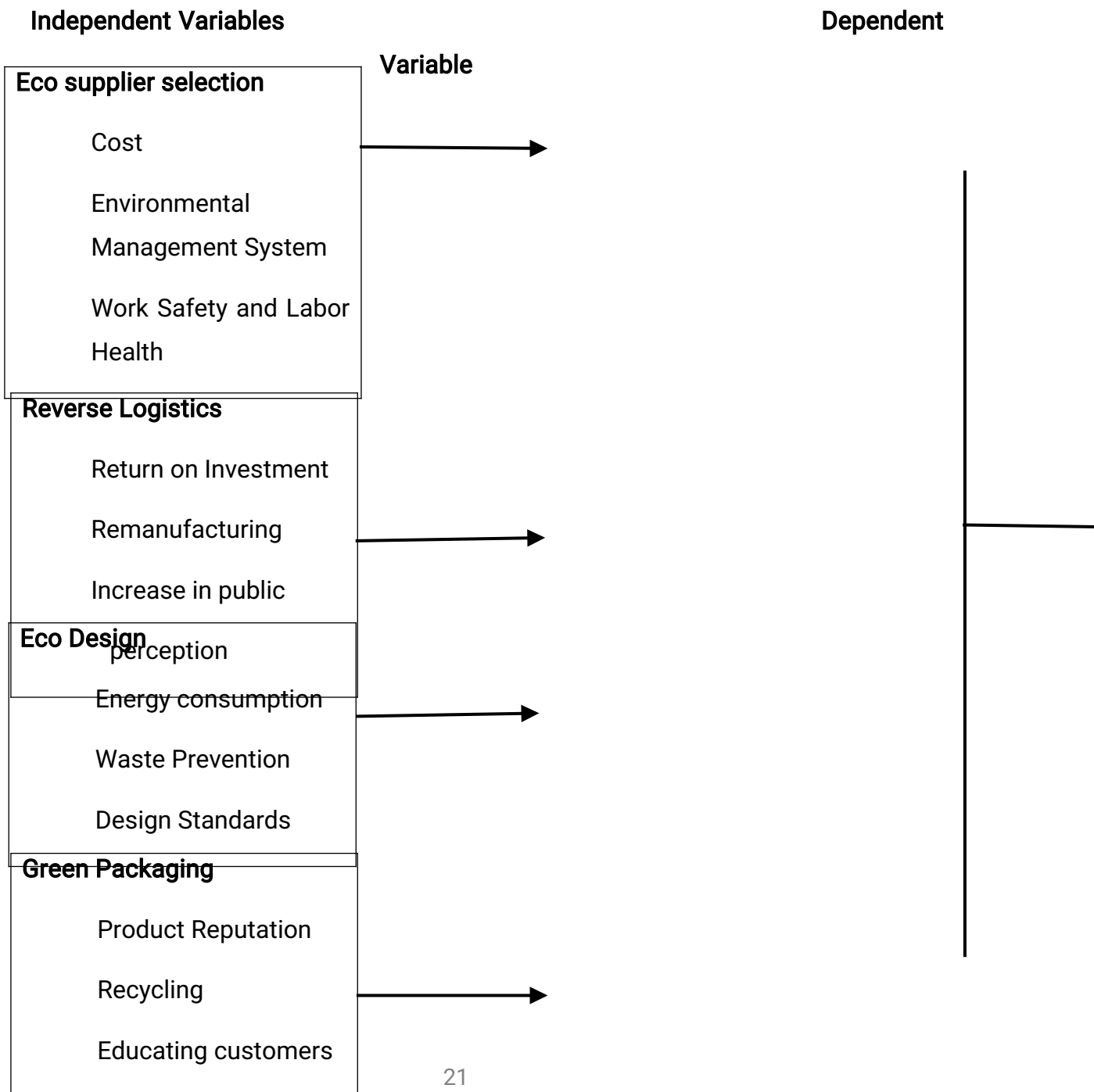


Figure 2.2 Conceptual framework

CHAPTER THREE: RESEARCH DESIGNS AND METHODOLOGY

3.1 Introduction

Research methodology is a way to systematically solve the research problem. This chapter outlines the methodology that is used to conduct the study. It discusses research design, target population, Sampling and Sample Design, data collection and procedures and data analysis and presentation methods.

3.2 Research Design

A research design is a way to achieve the research objectives through empirical evidence as required economically. Mugenda & Mugenda, (2003) The choice of a research design is determined by research purpose as described by the research problems and questions, sources of data, cost factors and categories of data needed. The aim of this study is to examine the environmental sustainability issues for the adoption of green procurement by manufacturing firms in Kenya. This study will use a descriptive research design. Hoffman and Sandelands, (2005) define descriptive design as a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. Kothari, (2005) observes that a descriptive research design is useful when collecting data to describe persons, organizational settings or events. The study focuses on manufacturing sector in Kenya. This design is preferable because the manufacturing sector in Kenya does significantly provides ease and convenience to sampling and data is representative only if collected from the entire manufacturing sector. Additionally, high reliability is easy to obtain by presenting all subjects with a standardized stimulus which ensures that observer subjectivity is greatly eliminated, Mugenda & Mugenda, (2003).

3.3 Target Population

According to Paul J, (2008), target population for a research is the entire set of units for which the research data is to be used to make inferences. Therefore, it defines those units for which the finding of the survey is meant to generalize. The 2018 KAM directory has listing of members (firms) by sectors which contains a register of 14 sectors of those in manufacturing firms spread all over the country with a total of 750 registered manufacturing companies. The KAM directory classifies members per sector which is defined by the products they manufacture. 80% of the manufacturing firms are based in Nairobi and surrounding areas. In this study, the target population will involve 110 employees from various manufacturing organizations within Nyeri county. The study shall involve Procurement officials from these organizations who will include the top, middle and lower levels of management.

Source: Author (2019)

Level of Management	Target population	Percentage (%)
Top	10	10
Middle	35	36
Low	55	55
	100	100

Table 3.1 Target Population

3.4 Sampling and Sample Design

Sampling refers to rules and procedures by which some elements of the population are included into sample. The portion of the selected population becomes the sample of the study. Scholars have examined the specimen size required to help specialists achieve their desired outcomes with increased trust from respondents. Our study will employ the simple random sampling method whereby employees from the selected organization will have an equal chance of being selected for administration of the questionnaires. According to Gravetter and Forzano, (2011), the logic behind simple random sampling is that it removes bias from the selection procedure and should result

in representative samples. Kothari, (2004) states that a sample size of 30 to 45% could be considered. The sample size of 54 respondents out of the 100 targeted respondents will represent 54 % which will be appropriate according to the above consideration.

Source: Author (2019)

Level of Management (%)	Sample size	Percentage
Top	12	18.5
Middle	20	33.3
Low	28	48.1
	54	100

Table 3.2 Target Population

3.5 Data collection and Procedures

Mugenda & Mugenda (2003), proposes that the accuracy of data to be collected largely depended on the data collection instruments in terms of validity and reliability. In this study, questionnaires will be used as a source of primary data. Chandran (2012), states that questionnaires give a high level of information appropriation of summed up data among any population. They are helpful in a relevant report which have to rapidly and effectively get data from individuals in a non-undermining way. Structured questionnaires will be applied as the primary data source. The questionnaire will contain open and closed ended questions. Closed ended questions will enable collection of quantitative data for analysis, while the open-ended questions enable the researcher to collect qualitative data on the respondent view of the adoption of green procurement in manufacturing sector in Kenya. The study will use primary data. The questionnaire will contain 6 sections (A-F) that include: general information, adoption of green procurement, Eco supplier's selection, Reverse Logistics, Eco design and green packaging respectively. A five-point Likert scale will be used for questionnaire regarding to the objectives of the study as well on the adoption of green procurement.

3.6 Data Analysis and Presentation on the methods

Upon data collection, it will be checked for completeness, coded and recorded. It will then be cleaned for any errors before final analysis is done. In this study, we use descriptive analysis to analyze the demographic data in form of percentages. An analysis of questions relating to the extent of adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya will be administered. Data will be presented by use of tables and pie charts.

CHAPTER FOUR: DATA ANALYSIS, PRESENTATION AND INTERPRETATION OF FINDINGS

4.1 Introduction

This chapter discusses the interpretation and presentation of the findings. The purpose of the study was to investigate the adoption of green procurement in sustainability of supply chain in Manufacturing sector in Kenya. The finding was intended on answering the study's research questions. Data composed was collected and reports were produced in form of tables, graphs and pie charts. A total of 68 questionnaires were administered to employees and 54 were filled and returned. This indicated a response rate of 79.4%.

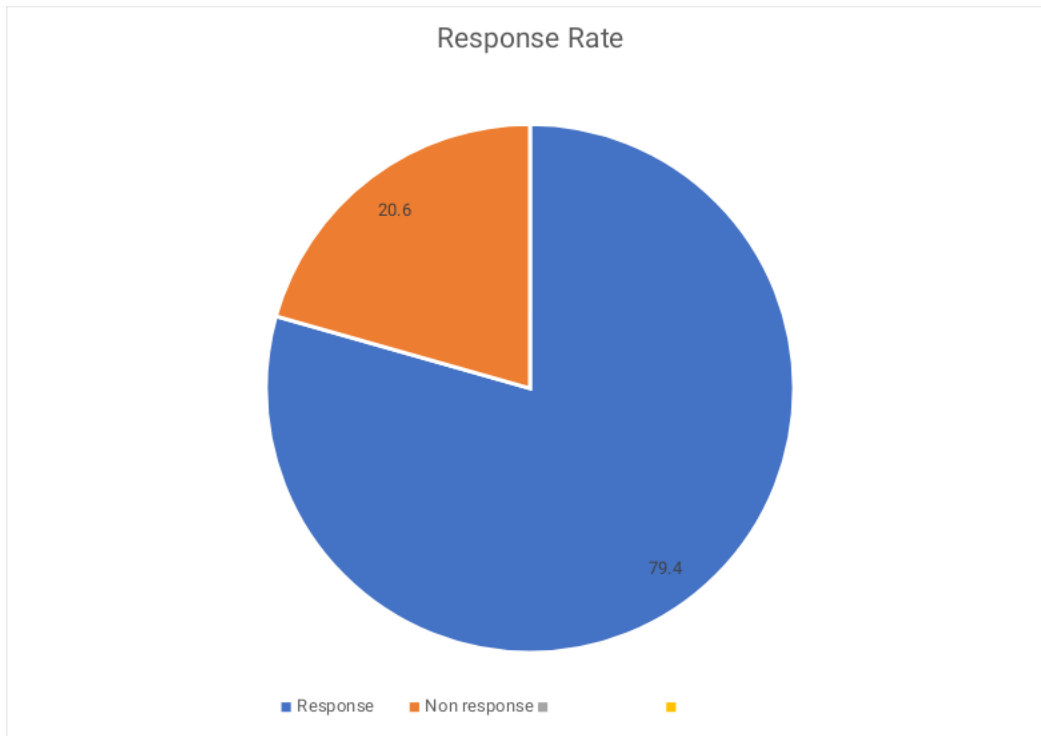


Figure 4.1: Response rate

From the analysis in 4.1 representation of the population. Out of 68 questionnaires distributed 54 were returned, that is 79.4 % of the total population and only 14 which is 20.6% were not returned.

4.2 Presentation of findings

The study presented findings from the data collected regarding the general information and the adoption of green procurement which constituted information concerning eco supplier’s selection, reverse logistics, eco design and green packaging.

4.2.1 General Information

In this section, results of the demographic information sought from the respondents are presented. General information is important since it helps to know who is filling in the survey. Further it helps in determining whether the actual target respondent is reached and whether or not the researcher is gathering the information that is effectively being

sought. The demographic information included the gender of the respondents, age of the respondents, the level of education and Work experience.

Gender of the Respondents.

The distribution of respondents by gender is shown in Figure 4.2. The figure shows that male respondents accounted for 61% of the respondents, whereas 39% of the respondents were female. This indicated that the majority of respondents were male.

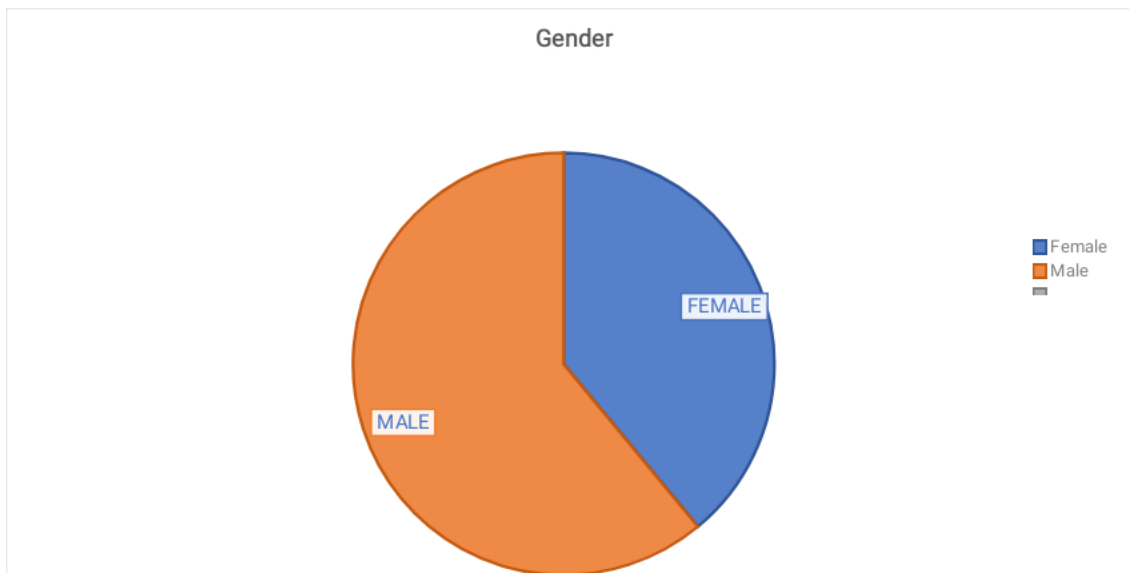


Figure 4.2 Gender of the Respondents

Age of Employees

The study found out that 48.1 % of the employees were aged below 35 years, 33.3 % were aged between 35-40 years while the remaining 18.5 % had an age of years between 51-60. These results are shown in table 4.1. This means that most employees are below 35 years.

Number of Employees	Frequency	Percentage
Below 35	26	48.1
35-50	18	33.3

51-60	10	18.5
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Table 4.1: Age of employees

Level of Education

The study revealed that out of the 54 respondents, 46.3% had attained Diploma certificate, 37% of the respondents had attained Bachelor's degree and 16.7% of the respondents were Master's degree graduates. This indicates therefore that most of the respondents were learned. Table 4.2 shows the distribution of the respondents by level of education.

Level of Education	Frequency	Percentage
Diploma certificate	25	46.3%
Bachelor's Degree	20	37%
Master's Degree	9	16.7%

Table 4.2 Level of Education

Work Experience

The study showed that out of the 54 respondents, 22.25 of employees had worked for 0-3 years, 16.7% had worked for 4-6 years, 27.7% had worked for 7-9 years and 33.3% had worked for more than 10 years. This is illustrated in Table 4.3

Work Experience	Frequency	Percentage
0-3	12	22.2
4-6	9	16.7
7-9	15	27.7
10 years and above	18	33.3

Table 4.3: Work Experience

4.2.2 The of Adoption of green procurement

This section sought to show the summary of findings by establishing the extent of adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya. The extent was measured by inquiring issues on economic, environmental and social sustainability.

Enhancing economic stability through adoption of green procurement

Out of the 54 respondents, basing on the enhancement of economic stability through adoption of green procurement, 27.8% agreed to a very large extent, 37% agreed to a large extent, 27.8% to a moderate extent, 5.6% to a small extent and 1.8% to a very small extent. This is illustrated in Figure

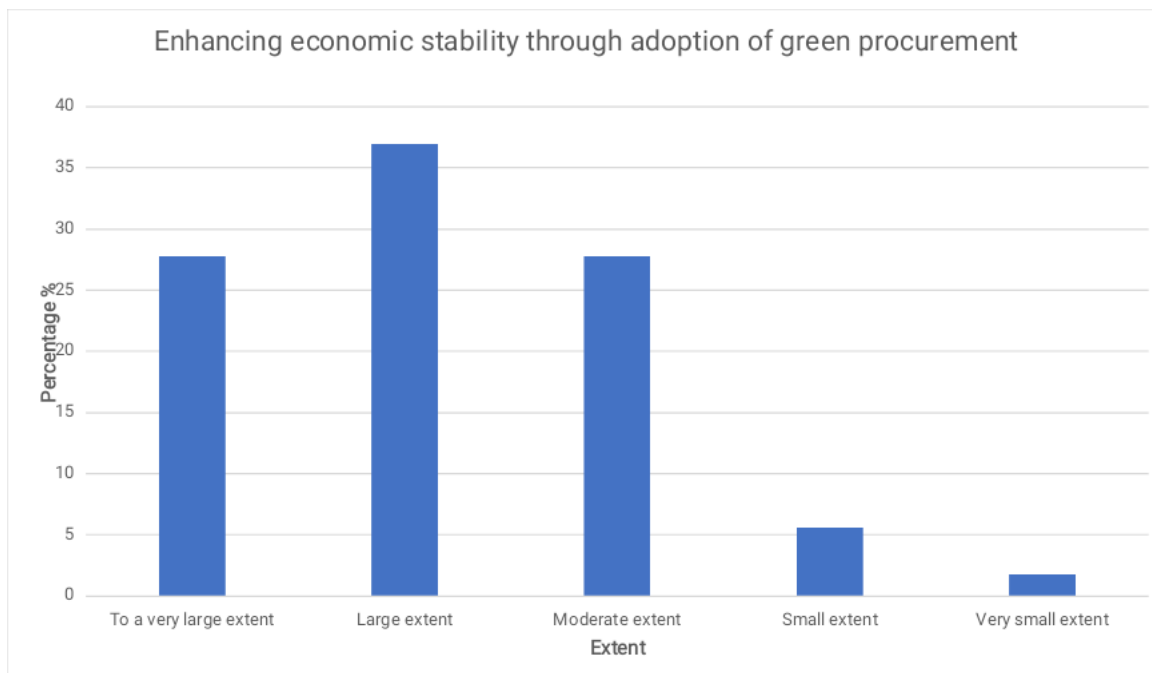


Figure 4.3 Enhancement of economic stability through adoption of green procurement

Ensuring of environmental sustainability by adopting green procurement

Out of the 54 respondents, as illustrated in figure 4.3, 42.6% agreed to a very large

extent, 29.6% to a large extent, 22.2% to a moderate extent, 1.8% to a small extent and 3.7% to a very small extent.

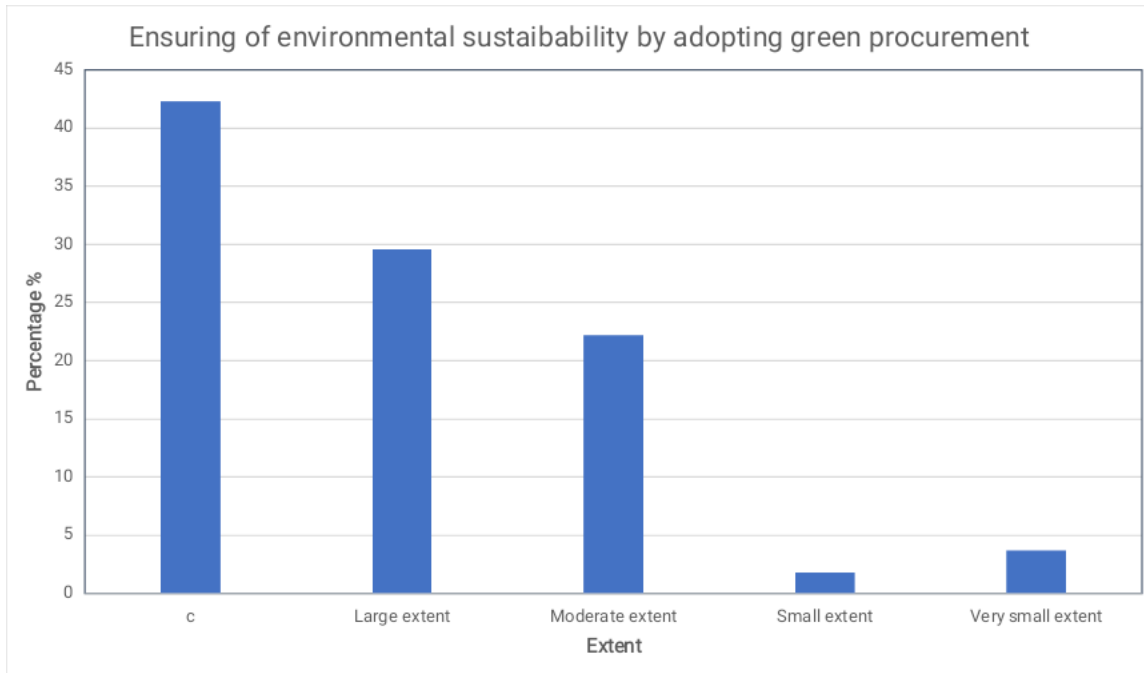


Figure 4.4 Ensuring of environmental sustainability by adopting green procurement

Ensuring a socially responsible environment through adoption of green procurement

From the 54 respondents who participated in the study, 55.6% agreed to a very large extent, 22.2 Large extent, 16.7% to a moderate extent, 3.7% a small extent and 1.8% to a very small extent.

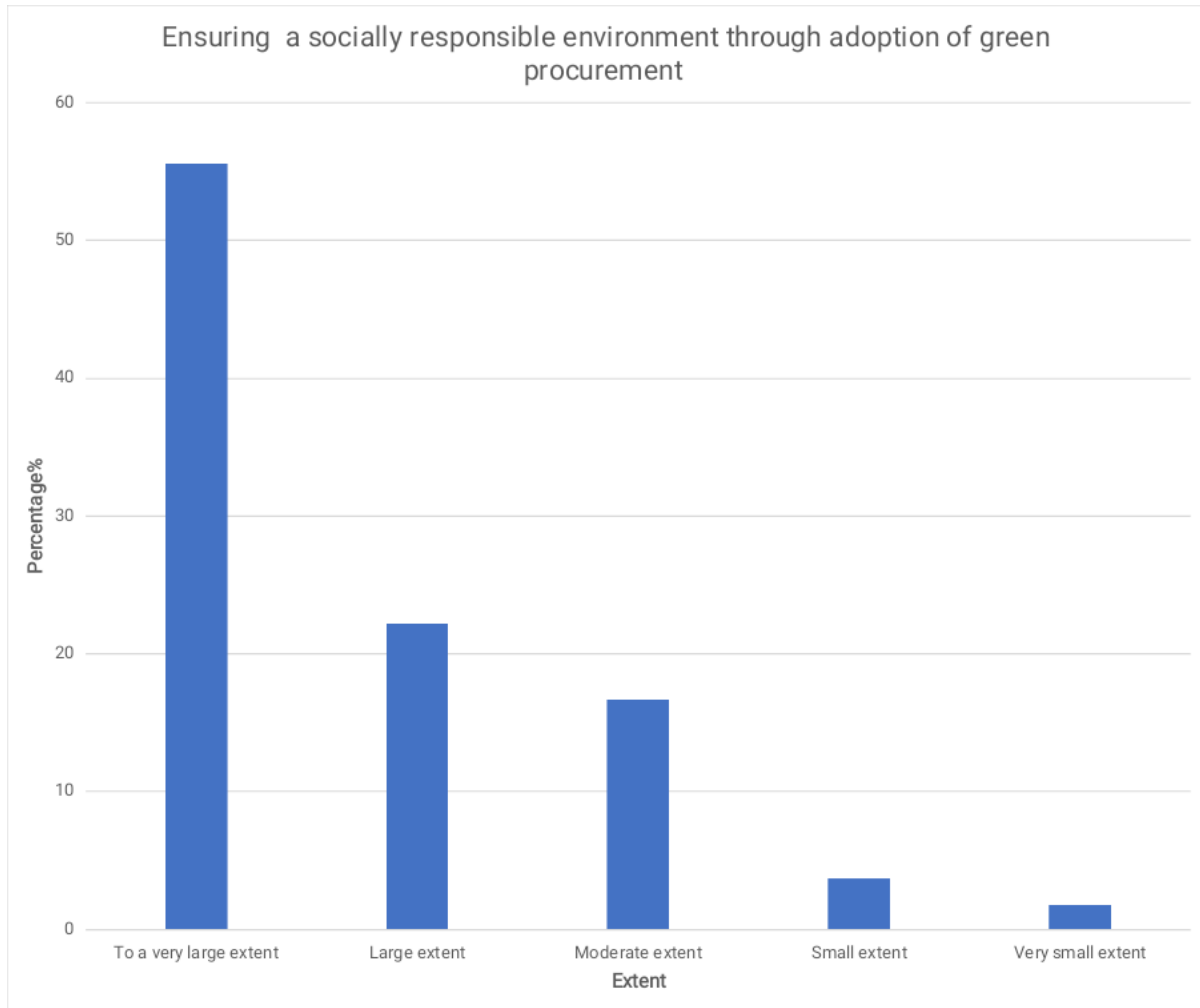


Figure 4.5 Ensuring a socially responsible environment through adoption of green procurement.

4.2.3 Eco Supplier's Selection

In this variable, the findings were based on the extent which respondents agreed eco supplier's selection is significant and the extent to which the respondents agreed on the parameters that included: Cost minimization, Acquisition of Environmental Management Systems Policies (EMS) and Work safety and employee health. This is

illustrated in Table 4.4

EXTENT	Significance of Eco Supplier's Selection		Cost minimization		FMG selection		Work safety and employee health	
	frequency	Percentage (%)	frequency	Percentage (%)	frequency	Percentage (%)	frequency	Percentage (%)
To a very large extent	30	55.6	35	64.8	28	51.9	32	59.2
Large extent	14	25.9	4	7.4	17	31.5	8	14.8
Moderate extent	6	11.1	9	16.7	6	11.1	8	14.8
Small extent	3	5.6	4	7.4	2	3.7	4	7.4

Very small extent	1	1.8	2	3.7	1	1.8	2	3.7
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Table 4.4 Eco Supplier's Selection

4.2.4 Reverse Logistics

The findings for this study involved the analysis on the extent to which the organization do observe reverse logistics, the extent of how reverse logistics ensures a high and timely investment, the extent reverse logistics will allow for remanufacturing processes in the organization and the extent of improved public perception as a result of reverse logistics. This is illustrated in table 4.5 below.

EXTENT	Observation of reverse logistics		Return on investment		Remanufacturinn		Improvement of public perception	
	frequency	Parentage (%)	frequency	Parentage (%)	frequency	Parentage (%)	frequency	Parentage (%)
To a very large extent	3	5.6	5	9.3	7	13	5	9.3
Large extent	10	18.5	10	18.5	16	29.6	10	18.5
Moderate extent	26	48.1	29	53.7	18	33.3	23	42.6
Small extent	14	25.9	8	14.8	8	14.8	9	16.7

Very small extent	1	1.8	2	3.7	5	9.3	7	12.9
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Table 4.5 Reverse Logistics

4.2.5 Eco Design

From this variable, the analysis involved the agreement by the respondents on the extent to which they agree that sustainability of supply chains is greatly influenced by eco design, sustainable design ensures energy conservation, green design help in ensuring waste prevention and minimization and the extent to which green design ensures the organization observe and follow set design standards (ISO 140062). This is summarized in table 4.6

EXTENT	Influence of green design on		Energy Conservation		Waste Prevention and Minimization		Observation of Set Design Standards (ISO	
	frequency	Percentage (%)	frequency	Percentage (%)	frequency	Percentage (%)	frequency	Percentage (%)
To a very large extent	6	11.1	12	22.2	18	33.3	8	14.8
Large extent	15	27.8	18	33.3	20	37.3	17	31.5
Moderate extent	18	33.3	16	29.6	10	18.5	14	25.9
Small extent	11	20.3	6	11.1	5	9.3	7	13.0
Very small extent	4	7.4	2	3.7	1	1.8	8	14.8

Table 4.6 Eco Design

4.2.6 Green Packaging

Green packaging was analyzed basing on the extent to which sustainability of supply chains is achievable through introduction and use of green packaging, the response based on extent to which green packaging helps in building and maintaining product image, the extent to which green packaging provides for recycling measures and extent through which green packaging keep educating customers on various product usability, disposal and handling measures. This is summarized in table 4.7

EXTENT	Achievement of Sustainability through green packaging		Product Image		Recycling Measures		Education of	
	frequency	Percentage (%)	frequency	Percentage (%)	frequency	Percentage (%)	frequency	Percentage (%)
To a very large extent	17	31.5	17	31.5	10	18.5	10	18.5
Large extent	16	29.6	12	22.2	13	24.1	8	14.8
Moderate extent	7	13.0	13	24.1	19	35.2	22	40.7
Small extent	8	14.8	9	16.6	7	13	11	20.3
Very small extent	6	11.1	3	5.6	5	9.3	3	5.6

Table 4.7 Green Packaging

4.3 Summary of data analysis

This section summaries data that was contained in the general information, the adoption of green procurement, eco supplier's selection, Reverse Logistics, Eco design and Green packaging.

4.3.1 General Information

Out of 68 questionnaires distributed 54 were returned, that is 79.4% of the total population and only 14 which is 20.6% were not returned. The gender analysis shows that 61% of the respondents were male while 39% were Female. This can be interpreted that majority of the respondents were Male. The analysis of age indicates 48.1% are below 35 years, 33.3% are aged between 35-50, while 18.5% are aged between 51-60. The analysis of the level of education showed that Diploma certificate holders were 46.3%, 37% had Bachelor's degree and 16.7% had Master's degree. From the analysis of work experience, 22.2% had worked between 0-3 years, 16.7% had worked between 4-6 years, 27.7% had worked between 7-9 years and 33.3% had worked for than 10 years.

4.3.2 The adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya

The finding was based on the agreement by the respondents on the extents that included: to a very large extent, Large extent, Moderate extent, Small extent and to a very small extent.

Enhancing economic stability through adoption of green procurement

Based on the analysis of findings for enhancing economic stability through adoption of green procurement, 27.8% agreed to a very large extent, 37% agreed to a large extent, 27.8% to a moderate extent, 5.6% to a small extent and 1.8% to a very small extent.

Ensuring of environmental sustainability by adopting green procurement

Out of the 54 respondents, the analysis pertaining to ensuring environmental sustainability by adopting green procurement showed that, 42.6% agreed to a very large extent, 29.6% to a large extent, 22.2% to a moderate extent, 1.8% to a small extent and 3.7% to a very small extent.

4.3.3 Eco Supplier's Selection

The study showed that eco supplier's selection is significant to sustainability of supply chains as majority of respondents agreed to a very large extent by 55.6%, large extent was agreed by 25.9%, 11.1% agreed on a moderate extent, 5.6% agreed to a small extent and 1.8% agreed to a very small extent as it had the least number of respondents. Therefore, this data analysis indicated that selection of eco suppliers is key to the sustainability of supply chains.

From the findings on the extent which eco supplier's selection is helpful in cost minimization, majority agreed to a very large extent by 64.8%, 7.4% to a large extent, 16.7% to a moderate extent, 7.4% to a small extent and the least response of 3.7% was agreed to a very small extent.

The response on the extent which eco supplier's selection enables acquisition of environmental management systems indicated that majority agreed to a very large extent of 51.9%, 31.5 % to a large extent, moderate extent had 11.1% agreement, 3.7% agreed to a small extent and 1.8% agreed to a very small extent. These findings show that there is need for suppliers to have acquired EMS policies in their operations.

The findings regarding the extent to which eco supplier's selection ensure work safety and employee health, showed that 59.2% agreed to a very large extent, 14.8% agreed to a large extent, 14.8% to a moderate extent, 7.4% agreed to a small extent and 3.7% to a very small extent.

Therefore, basing on these extents summarized above, eco supplier's selection becomes a very significant issue that is required when adopting green procurement in sustainability of supply chains since majority of respondents agreed on it to a very large

extent.

4.3.4 Reverse Logistics

The findings on whether the organization observe reverse logistics as important aspect to sustainability of supply chains indicated that 5.6% agreed to a very large extent, 18.5% to a large extent, 48.1% to a moderate extent, 25.9% to a small extent and 1.8% to a very small extent.

From the return on investment analysis as ensured by reverse logistics, the findings showed that 9.3% agreed to a very large extent, 18.5% to a large extent, 53.7% as the majority agreed to a moderate extent, 14.8% to a small extent and 3.7% to a very small extent.

The study of findings about the extent which reverse logistics allows for remanufacturing found out that 13% agreed to a very large extent, 29.6% to a large extent, 33.3% to a moderate extent, 14.8% to a small extent and 9.3% to a very small extent.

Improvement of the public perception arising from reverse logistics indicated that, 9.3% agreed to a very large extent, 18.5% agreed to a large extent, 42.6% to a moderate extent, 16.7% to a small extent and 13% to a very small extent.

Generally, the concept of reverse logistics was found that some organizations do observe it mostly on moderate extent and also observed at low extents,

4.3.5 Eco Design

The concept of eco design having great influence on sustainability indicated that, majority of respondents agreed to a very small extent of 33.3%, 27.8% agreed to a moderate extent, 20.4% agreed to a large extent, 11.1% agreed to a very large extent and 7.4% agreed to a small extent. This means that the idea of green design is still very low as indicated by large number of respondents.

The idea of extent that green design to ensure energy conservation was agreed by 22.2% to a very large extent, 33.3% to a large extent, 29.6% to a moderate extent, 11.1%

to a small extent and 3.7% to a very small extent. Therefore, this idea is considered important since majority of the respondents agreed on it to a large extent.

From the findings that green designs help in the waste prevention and minimization, 33.3% agreed on it to a very large extent, 37.3% to large extent, 18.5% to a moderate extent, 9.3% to a small extent and 1.8% to a very small extent. Thus, this concept is key in the adoption of green procurement.

The study also found the extent that green design ensures observation and follow up of the set design standards and this was indicated by 14.8% respondents who agreed to a very large extent on it, 31.5% to a large extent, 25.9% to a moderate extent, 13% to a small extent and 14.8% to a very small extent.

The study of this concept showed that most respondents do agree to a large extent on the green design issues while others agree to a very small extent.

4.3.6 Green Packaging

The summary of data analysis pertaining to extent which sustainability of supply chains is achievable through introduction and use of green packaging indicated that 31.5% agreed on this to a very large extent, 29.6% to a large extent, 13% to a moderate extent, 14.8% to a small extent and 11.1% to a very small extent.

From the analysis of the extent that green packaging helps in building and maintain product image, the findings showed that, 31.5% agreed on it to a very large extent, 22.2% to a large extent, 24.1% to a moderate extent, 16.6% to a small extent and 5.6% to a very small extent.

The analyzing concerning the extent which green packaging provides for the recycling measures, found that 18.5% agreed to a very large extent, 24.1% to a large extent, 35.2% to a moderate extent, 13% to a small extent and 9.3% was agreed to a very small extent by the respondents.

The data analysis on the extent that green packaging keeps educating customer on various product's usability, disposal handling measures indicates that 10% agreed to a very large extent, 8% to a large extent, 22% to a moderate extent, 11% to a small extent

and 3% to a very small extent.

These findings therefore prove that respondents are aware and practicing the concept of green packaging since majority did rated it to a very large extent, large extent and moderate extent,

CHAPTER FIVE: SUMMARY OF THE FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter presents the main conclusions and recommendations of the study. The

conclusions are drawn from the data analyzed in chapter four and the findings thereof, while recommendations for action and direction for future research have been based on the conclusions made. These conclusions and the recommendations presented are categorized based on the objectives of the study which sought to examine the adoption of green procurement in sustainability of supply chains in manufacturing sector in Kenya.

5.2 Summary of Findings

Out of the 68 respondents, 79.4% responded and 20.6% did not respond, this showed an excellent response. Basing on the gender of respondents, male was found to be more than female as they had 61% of the total 68 respondents while 39% were of the female gender. Majority 48.1% of the respondents were found to have the age below 35 years, 33.3% were aged between 35-50 while 18.5% had an age of between 51-60. From the level of education findings, 46.3% respondents were found to have a diploma certificate, 37% were found to have Bachelor's degree while 16.7% had Master's degree.

The objectives of this study were to ascertain how eco suppliers determines the sustainability of manufacturing sector in Kenya, to examine the influence of reverse logistics in the sustainability of manufacturing sector in Kenya, to establish the effect of eco design on the sustainability of manufacturing sector in Kenya and to identify how green packaging enables sustainability in manufacturing sector in Kenya. The study revealed that Manufacturing sector in Kenya has adopted green procurement in the eco-supplier's selection in that it ensures minimization of manufacturing costs, enables suppliers to have environmental management systems i.e. the supplier certification, and ensures that work safety and employee health are gathered for. The study findings also noted that reverse logistics influence the adoption of green procurement in manufacturing sector in Kenya and the summary of findings indicate that most firms have not adopted it, those that have adopted, consider it ensuring a high and timely return on investment, allows for remanufacturing processes, and improvement in the public perception as a result of the reverse logistics. Further on the aspect of eco-design and packaging the study revealed that company has implemented the use of

biodegradable materials, reduction of packaging impact, reduction of product impact in the consumer use and the reduction of product impact within the supply chain. Also, the study revealed that the company has enhanced implementation of the waste reduction, reuse and recycling approaches, use of alternative fuels e.g. cleaner fuels, Reduction of hydro fluorocarbons (HFC) and per fluorocarbons (PFC) and the implementation of waste-to-energy process. On the aspects of internal environment, the study revealed that the following approaches has been implemented to some extent, Commitment of GSCM from senior managers, Support for GSCM from mid-level managers, Support of regulations environment and Eco-labeling of Products.

On the major drivers of the green supply chain management, the findings revealed the following were the major drivers of the green supply chain management; Government, environmental awareness by the customer, Corporate social responsibility, Market conditions and competitions, Company policies towards green supply chain management and the global competitiveness.

5.3 Recommendations

The study makes a number of recommendations for policy and for practice. First, with the global warming and environmental concerns from all sectors, there is need for the manufacturing sector in Kenya to adopt green procurement in sustainability of supply chains in order to help in the efforts to attain economic stability, conserve the environment and have a socially responsible environment. Currently, this is not the case to all the manufacturing organizations in Kenya and the major reason is because of lack of knowledge on the same.

Given the limited knowledge on the adoption of green procurement, it is important manufacturing sector organizations to train their employees and especially the procurement staff on what green procurement is and the significance of green procurement for organizations. Through this, the employees will be motivated to adopt the practice in the procurement functions of their organizations and therefore the suppliers to follow suit.

There is also need for legislation in this area to enhance green procurement practices in manufacturing sector in Kenya. At the moment, the Public Procurement and Disposal

Act 2015 is silent on green procurement. With legislation in place and enforcement of such laws by relevant authorities such as NEMA, the practice of green procurement would be adopted by most of the manufacturing sector organizations in Kenya.

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APPENDICES

APPENDIX 1: INTRODUCTION LETTER

Dedan Kimathi University of Technology,
P.O BOX 657-10100,
Nyeri.

Dear Sir/Madam,

RE: PERMISSION TO CONDUCT A RESEARCH STUDY AT YOUR ORGANISATION.

We are fourth year students at Dedan Kimathi University of Technology pursuing a Bachelor's Degree in Purchasing and Supplies Management, currently undertaking an academic research on the Adoption of green procurement in sustainability of supply chains in Manufacturing sector in Kenya.

The attached questionnaire is for gathering data, which will be useful in the mentioned research.

You have been selected as one of the respondents in this study. We therefore request you to kindly facilitate the collection of the required data by answering the questions herein.

Please note that the information sought is purely for academic purposes and will be treated with utmost confidentiality. We promise that a copy of the final report will be available to you on demand.

Your cooperation will be highly appreciated.

Yours Faithfully,

Cheptoo Harriet Mutai _____

Kipkorir Victor Ngetich _____

Hannah Gathoni Kariuki _____

APPENDIX 2: QUESTIONNAIRE

Introduction

This questionnaire has been designed for the purpose of collecting data on the Adoption of Green procurement in sustainability of supply chains for a research proposal. The data collected will be treated with a very high degree of confidentiality and it is meant for academic purpose only. A copy of analysis will be sent to you upon request. The research topic is the adoption of Green Procurement in Sustainability of Supply chains in Manufacturing sector in Kenya

Please respond to the questions by ticking where appropriate and also fill in the blank spaces for questions that need elaborate answers. You are requested to give honest information when filling in the questionnaire.

SECTION A: GENERAL INFORMATION.

1. Name of the Organization.....

2. Gender of the Respondents

Female { } Male { }

3. Age

Below 35 years { } 35-50 years { } 51-60 years { }

4. Level of Education

Diploma Level { } Bachelor’s degree { } Master’s degree { }

5. Your work experience in the organization

0-3 years { } 4-6 years { }

7-9 years { } 10 years and above { }

SECTION B: Adoption of Green Procurement

Please indicate the extent to which you agree with the following statements on the extent to which your organization has ensured sustainability of Supply chains through green procurement adoption. The scale below will be applicable:

5= To a very large extent 4= Large extent 3= moderate extent 2= small extent 1=very small extent

1. Adoption of green Procurement enhances economic stability of the organization.

To a very large extent { } Large extent { }

Moderate extent { } Small extent { }

Very small extent { }

2. Adoption of green Procurement ensures environmental sustainability.

To a very large extent { } Large extent { }

Moderate extent { } Small extent { }

Very small extent { }

3. Adoption of green Procurement has ensured a socially responsible environment.

To a very large extent { } Large extent { }
Moderate extent { } Small extent { }
Very small extent { }

SUB-SECTIONS

A: Eco supplier's selection

To what extent do you agree with the following?

1. Selection of Eco-suppliers ensures the sustainability of the supply chain in your organization.

To a very large extent { } Large extent { }
Moderate extent { } Small extent { }
Very small extent { }

2. Selecting eco -suppliers will help in minimization of manufacturing costs in the organization

To a very large extent { } Large extent { }
Moderate extent { } Small extent { }
Very small extent { }

3. Eco-supplier selection encourages the adoption of Environmental Management Systems. i.e. supplier certification

To a very large extent { } Large extent { }
Moderate extent { } Small extent { }
Very small extent { }

4. Selection of eco-suppliers ensure work safety and employee health

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

B: Reverse Logistics

To what extent do you agree with the following?

1. Your organization observe reverse logistics as an important aspect to sustainability of supply chain.

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

2. Reverse Logistics ensures a high and timely return on investment

To a very large extent	{ }	Large Extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

3. Reverse logistics will allow Remanufacturing processes in your organization

To a very large extent	{ }	Large Extent	{ }
Moderate extent	{ }	Small extent	{ }
Very Small Extent	{ }		

4. Improvement of the public perception arise as a result reverse logistics in your organization

To a very large extent	{ }	Large Extent	{ }
Moderate extent	{ }	Small extent	{ }
Very Small Extent	{ }		

C: Eco Design

To what extent do you agree with the following?

1. Sustainability of manufacturing organization is greatly influenced by green/ eco-design

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

2. Green/ sustainable design ensures conservation of energy in your organization

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

3. Green designs helps in ensuring waste prevention and minimization

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

4. Green design ensures that your organization observes and follows the set design standards (ISO 140062)

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

D: Green Packaging

To what extent do you agree with the following?

1. Sustainability of SC in your manufacturing firm is achievable through introduction and use of green packaging.

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

2. Green packaging helps in building and maintaining product image in your organization

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

3. Green packaging provides for recycling measures to be undertaken in your organization.

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

4. Green packaging keeps educating customers on various products' usability, disposal and handling measures.

To a very large extent	{ }	Large extent	{ }
Moderate extent	{ }	Small extent	{ }
Very small extent	{ }		

(THANKYOU FOR YOUR COOPERATION)

APPENDIX 3: BUDGET AND WORK PLAN

Budget

Item	Amount (shs)
Internet expenses	1000
Binding expenses	400
Photocopying expenses	600
Questionnaire preparation expenses	600
Printing expenses	900
Telephone expenses	500

Travel expenses	3000
Total Expenditure	7000

Work Plan

July-December 2019.

Activity	June	July	August	September	October	November	December
Research topic selection, approval and concept paper writing							
Writing the Project proposal							
Presentation and submission of the project Proposal							
Data collection							
Data analysis							
Submission of Research Project							

