Assessment Of Factors Affecting Effective Implementation Of Green Procurement In The Manufacturing Firms In Nyeri County

Martin Karanja Njoroge

A Thesis Submitted to the Department of Procurement and Logistics in Partial Fulfillment of the Requirements for the Award of Master of Science in Supply Chain Management of Dedan Kimathi University of Technology.

FEBRUARY, 2019

DECLARATION

This is my original work and has not been presented for a degree in any other university.

Signature…… Date:……..

Martin Karanja Njoroge

B212-02-0014-2014

This thesis has been submitted for examination with our approval as University Supervisor

Signature…… Date:……..

DR. DAVID KIARIE

LECTURER,

DEDAN KIMATHI UNIVESITY OF TECHNOLOGY

DEPARTMENT OF PROCUREMENT AND LOGISTICS

Signature…… Date:……..

DR. PAMELA NYABOKE

LECTURER,

DEDAN KIMATHI UNIVESITY OF TECHNOLOGY

DEPARTMENT OF PROCUREMENT AND LOGISTICS

DEDICATION

To my family for their encouragement and continuous support throughout my progress to this level.

ACKNOWLEDGEMENT

First and foremost, I would like to acknowledge our God for enabling me to reach this milestone in academics. I wish also to recognize with profound gratitude my supervisors Dr, David Kiarie and Dr. Pamela Nyaboke and for giving me the required guidelines all the way till I was through. My fellow classmates who assisted me in various ways cannot be forgotten for their contribution had a positive impact in the research study. Last but not the least, special thanks go to Dedan Kimathi University for availing current books and reference materials throughout the period of study. I salute you all.

TABLE OF CONTENTS

DECLARATION ..... **ii**
DEDICATION ..... **iii**
ACKNOWLEDGEMENT ..... **iv**
TABLE OF CONTENTS ..... **vi**
LIST OF TABLES ..... **xi**
ABBREVIATIONS& ACRONYMS ..... **xii**
ABSTRACT ..... **xiii**
CHAPTER ONE 1
INTRODUCTION 1
1.1 Background of the Study 1
1.1.1 Global Perspective on Green Procurement Implementation. 3
1.1.2 Regional Perspective on Green Public Procurement 4
1.1.3 Green Procurement Practices in Kenya 5
1.1.5 Manufacturing Firms in Nyeri County 8
1.2 Problem Statement 9
1.3 Objectives of the Study 10
1.3.1 General Objective 10
1.3.2 Specific Objectives 10
This study was guided by the following research objectives:- 10
1.4 Research Questions 10
1.5 Significance of the Study 11
1.6 Limitations of the study 12
1.7 Delimitation of the Study 12
1.8 Assumptions of the study 12
1.9 Operational Definition of Terms 12
CHAPTER TWO 14
LITERATURE REVIEW 14
2.1 Introduction 14
2.2 Theoretical Framework 14
2.2.1 GreenScor Framework 14
2.2.2 Resource-Based Theory 15
2.2.3 GSCM Life Stages Model 16
2.2.4 Green Supplier Selection Model (GSS-model) 17

2.2.6 Green Procurement Implementation Empirical literature 21
2.3 Conceptual Framework 23
2.4 Operational Framework 24
2.4.2 Eco Supplier Selection. 25
2.4.3 Information Communication Technology 27
2.4.4 Financial Resources 28
2.5 Empirical Literature 28
2.5.1 Procurement Policies 29
2.5.2 Information Communication Technology 30
2.5.3 Eco Supplier Selection 31
2.5.4 Financial Resources 33
2.6 Critique of the Existing Literature Related to Research Study 36
2.6.1 Procurement Policies 36
2.6.2 Eco Supplier Selection 37
2.6.3 Financial Resources 37
2.6.4 Information communication Technology 37
2.7 Research Gaps 38
2.8 Summary of literature 39
CHAPTER THREE 40
RESEARCH METHODOLOGY 40
3.1 Introduction 40
3.2 Research Design 40
3.3 Target Population 41
3.4 Sampling Technique 42
3.5. Data Collection 43
3.5.1 Data Collection Instrument 43
3.6 Pilot Study 43
3.6.1 Reliability of Research Instruments 44
3.6.2 Validity of Research Instruments 44
3.7 Data Analysis and Presentation 45
3.8 Ethical Issues 46
CHAPTER FOUR 47
FINDINGS AND DISCUSSIONS 47
4.1 Introduction 47

4.2 Response Rate 47
4.3 Test of Reliability 47
4.4 Demographic Characteristics 48
4.4.1 Education Level of Respondents 48
4.4.2 Work Experience of the Respondent 49
4.5 Descriptive Analysis 50
4.5.1 Procurement Policies 50
4.5.2 Eco Supplier Selection 52
4.5.3 Information Communication Technology 54
4.5.4 Financial Resources 56
4.5.5 Implementation of Green Procurement 58
4.6 Test of Regression Assumptions 59
4.6.1 Multicollinearity Test 59
4.6.2 Linearity test 60
4.6.3 Normality Test 62
4.7 Influence of Procurement Policy on the Implementation of Green Procurement. 62
4.8 Influence of Eco Supplier Selection on the Implementation of Green Procurement. 64
4.9 Influence of Information Communication Technology on the Implementation of Green Procurement. 66
4.10 Influence of Financial Resources on the Implementation of Green Procurement 67
4.11 Overall Regression Model 69
CHAPTER FIVE 73
SUMMARY, CONCLUSION AND RECOMMENDATIONS 73
5.1 Introduction 73
5.2 Summary of Findings 73
5.2.1 Procurement policies 73
5.2.2 Eco supplier selection 73
5.2.3 Information communication Technology 74
5.2.4 Financial resource 74
5.3 Conclusion of the study 74
5.4 Recommendations of the study 76

5.4 Suggestions for Future Research 76
APPENDICES 89
Appendix i: Introduction Letter 89
Appendix ii: Study Schedule……..……vii
Appendix iii: Budget……...…….vii

LIST OF FIGURES

Figure 2.1 Green supplier Selection Model (GSS -Model) ---------- 19

Figure 2.2: Conceptual Framework---------- 23

Figure 2.3: Operational Framework ---------- 24

Figure 4.1: Normal Q-Q Plot ---------- 62

LIST OF TABLES

Table 3.1 Target Population ---------- 41
Table 3.2 Sample distribution ---------- 42
Table 4.1: Results for Response Rate ---------- 47
Table 4.2: Reliability Test Results ---------- 48
Table 4.3: Education level of Respondents ---------- 49
Table 4.4: Work Experience of the Respondent---------- 49
Table 4.5: Procurement Policies ---------- 51
Table 4.6: Eco Supplier Selection ---------- 53
Table 4.7: Information Communication Technology ---------- 55
Table 4.8: Financial Support---------- 57
Table 4.9: Implementation of Green Procurement ---------- 58
Table 4.10: Multicollinearity Test ---------- 59
Table 4.11: Correlation Analysis---------- 61
Table 4.12: Procurement Policies Model Summary---------- 63
Table 4.13: Procurement Policies Model ANOVA ---------- 63
Table 4.14: Procurement Policies Model Coefficients---------- 63
Table 4.15: Eco Supplier selection Model Summary ---------- 64
Table 4.16: Eco Supplier selection Model ANOVA ---------- 64
Table 4.17: Eco Supplier selection Model Coefficients ---------- 65
Table 4.18: Information Communication Technology Model Summary ---------- 66
Table 4.19: Information Communication Technology Model ANOVA ---------- 66
Table 4.20: Information Communication Technology Model Coefficients ---------- 67
Table 4.21: Financial Resources Model Summary ---------- 68
Table 4.22: Financial Resources Model ANOVA ---------- 68
Table 4.23: Financial Resources Model Coefficients ---------- 68
Table 4.24: Implementation of Green Procurement Model Summary---------- 69
Table 4.25: Implementation of Green Procurement Model ANOVA ---------- 70
Table 4.26: Implementation of Green Procurement Model Coefficients---------- 71

ABBREVIATIONS& ACRONYMS

TPS	Toyota Production System
UNEP	United Nations Environment Programme
WSSD	World Summit on Sustainable Development
OECD	Organization for Economic Co-operation and Development
EOQ	Economic Order Quantity
GDP	Gross Domestic Product
ICT	Information Communication Technology
JIT	Just-in-time

ABSTRACT

The purpose of this study was to assess the factors affecting implementation of green procurement in the manufacturing Firms in Nyeri County. The objectives of the study were: To find out the effects of procurement policies on implementation of green procurement programs; To examine how Eco Supplier Selection affects implementation of green procurement ; To assess the influence of Financial resources on implementation of green procurement and to determine the effect of Information Communication Technology on implementation of green procurement. The study was guided by several theories. Data was collected from the three levels of management of five different organizations. Descriptive research design was used and a stratified random sampling method to pick a sample of the respondents who were provided with the questionnaires. The target population comprised 123 employees from five manufacturing organizations. A sample of 94 respondents from within each group in proportions that each group bear to the population as whole was taken using Slovin's formula. The linear regression model was used to show the relationship between the dependent variable and the independent variables. The questionnaire was pilot tested to improve the instrument reliability. Out of 94 respondents targeted by the study, 87 responded representing a respondent rate of 92.6%. Collected data was analyzed using statistical package for social sciences (SPSS) to generate descriptive which was presented using tables, charts, frequencies and percentages. Inferential statistics was employed to test the degree of relationship among the variables with a statistical confidence level of 95%. The study revealed that Information Communication, Financial resources, Eco Supplier Selection and procurement policies had positive and significant effect on Effective implementation of Green procurement. The study recommended that Nyeri manufacturing firms should develop a staff training policy geared towards training key personnel on implementation of green procurement practices. In addition, management should avail necessary monetary support to the implementation of green procurement practice i.e. reduction of wastage, increase efficacy, increase revenue, growing global requirement among other gains. Future researcher should focus on challenges of implementing green procurement by manufacturing companies.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

This section of the study introduces the following sub sections in the following order, the background of the study statement of the problem, research objectives, research questions, significance of the study, scope and limitations of the study.

Green Public Procurement has become a policy tool for many organizations due to concerns of the environment, Sustainability, climate change and its effects. Green Procurement" (formerly known as Affirmative Procurement) is the purchase of environmentally preferable products and services in accordance with one or more of the established "green" procurement preference programs. Green procurement is the acquiring of items or administrations, which have a lower sway on the earth over their entire life cycle than the standard comparable. It includes the incorporation of natural issues into buying choices taking into account value, execution and quality. This implies items or administrations that devour less regular assets ought to be given inclination over contending items or administrations applying a more noteworthy natural (Kull, T. J., & Talluri, S. 2008).

To prevent waste and pollution, these programs require considering environmental impacts, along with price, performance, and other traditional factors, when making purchasing decisions. The Typical Green Procurement program elements are: recycled content products, energy Efficient products and energy efficient standby power devices, alternative fuel vehicles, alternative fuels, and fuel efficient vehicles, bio-based products, non-ozone depleting substances, alternative fuels and fuel efficient vehicles and environmental protection. Purchasers are also encouraged to follow Environmentally Preferable Purchasing (EPP) guidelines as part of any Green Procurement Program. Green Procurement is an approach to procurement in which environmental impacts play an important role in purchasing decisions, with procurement officers concerned about more than just price and quality.

Many organizations worldwide are making an effort to purchase products and services that are less harmful to local and global environments
(Hu, A. H., & Hsu, C. W. 2010)

Both public and private Firms organizations are implementing purchasing practices that incorporate ecological (and social) contemplations of green procurement (Talluri,2008).Driving private segment associations have additionally exhibited huge development towards greening procurement practices. Numerous private firms are attempting to enhance the natural execution of their operations and items and green Procurement has been a coherent augmentation of this work (Chopra, 2012).

Private organizations have in the most recent two decades embraced green Procurement practices for particular items (e.g., reused content office paper, renewable vitality, paints, cleaners, and so on), but at the same time are taking a gander at the materials, substances and chemicals they buy that go into the items and administrations they give. This inventory network approach looks past the organization's "entryways" in an ongoing push to diminish expenses and hazard. Driving organizations are utilizing life-cycle appraisal and material following devices to distinguish materials, substances and chemicals in their items that posture huge ecological, wellbeing and dangers and re-plan their items to lessen or take out such materials. In the private division green procurement is seen as a method towards enhancing their items and operations from natural point of view to lessen hazard, complete expense of possession and enhance inventory network execution, (Chopra, 2005).

Despite differences in emphasis, green procurement activities in both the public and private Firms take four main approaches: procuring eco-labeled products or services, in-house product/service evaluations, third-party product/service evaluations and supply chain initiatives. These approaches are often initiated within administrative, procurement, environmental or operational departments of private firms (Talluri, 2008).Green procurement activities often rely on established product standards, labels and certifications that declare the environmental attributes or performance of the product.

Driven by bottom-line performance, leading private Firms firms see green procurement as a logical part of effective purchasing and supply chain management practices. Private companies often use in-house and third party evaluations to make informed green procurement decisions. Private businesses however are reluctant to establish green procurement activities unless there are clearly demonstrated business benefits for themselves and/or their customers (Sarkis, 2012).

1.1.1 Global Perspective on Green Procurement Implementation.

The World Summit on sustainable Development in 2010 made a call "to promote public procurement policies that encourage development and diffusion of environmentally sound goods and services (Walker & Brammer, 2011)." In light of that government, private companies and international agencies have increasingly included environmental criteria within their procurement processes in order to contribute to broader organizational goals of sustainable development (Srivastava, 2007; Brammer & Walker 2011; Preuss, 2009; Nijaki & Worrel, 2012). Public procurement has been identified as a tool that can shape supply selection decisions, waste management and disposal, pollution reduction and compliance with environmental regulations (Testa, F., Iraldo, F., Vaccari, A., & Ferrari, E. (2015)

Globally, green procurement (GP) has taken over as the new competitive frontier (Rao & Holt, 2010).In 2003, the European Commission (EC) adopted a communication on Integrated Product Policy (IPP). This outlined its strategy for reducing the environmental impact caused by products. In this communication, the commission decided on several actions to stimulate continuous improvement in the environmental performance of products throughout their complete lifecycle. On the Green public procurement (GPP), the commission encouraged member states to come up publicly with available National Actions Plans (NAPs) for greening their public procurement (Zuzana, 2012).

These ought to contain an appraisal of the current circumstance and aggressive focuses for the following coming years. The NAPs ought to likewise obviously state what measures will be taken to accomplish this. They ought to be composed up interestingly before the end of 2006 and after that reconsidered at regular intervals. These NAPs won't

be lawfully authoritative yet will give political stimulus to the way toward actualizing and bringing issues to light of Green Public Procurement (GPP). They will likewise permit part states to pick the alternatives that best suit their political structure and the level they have achieved (European Commission, 2003).

Japan has pioneered Green Public Procurement to protect forest resources that were nearly extinct. The country began by introducing a government procurement policy for local sustainable forest management, then went on to introduce a global one. In the global policy, wood and wood products for government needs to have to be confirmed to have legality of harvesting on the timber of which they are composed, and the sustainability of the management level of the forest from which they have originated from taken into account positively. Japan after seeing results of the government effort to reduce carbon dioxide emissions under the green public procurement law had paid off (Harad, 2006).

1.1.2 Regional Perspective on Green Public Procurement

In Africa, many manufacturing organization view effective implementation of green procurement practices as an adds-on or an approach that is costly. Truly, sustainable solutions can often cost less over the whole life of the purchase. Some key benefits include: value for money, protection and enhancement of the environment, more efficient use of resources, greater social inclusion, air and ethical trade, support for innovation, better risk management, and lower whole-life costs improved supplier relationships, a diverse and flexible supply chain and a competitive edge in your industry (Talluri, 2008). South Africa recognizes the risk of general environmental decay and global warming, and is committed to responding to the climate change challenge (RSA 2009). To this end, the country has taken a number of steps to address this challenge through green policy formulation. Among the progressive green policies is the National Climate Change Response White Paper of 2011 (DEA 2011). One of the identified areas in which climate change can be addressed is through green (sustainable) public procurement, a concept suggested at the World Summit on Sustainable Development (WSSD, 2002). Given that metropolitan municipalities are both centers of production and consumption, activities that significantly lead to greenhouse gases (GHG)

emissions resulting in global warming and ultimately climate change, this study sought to analyse the extent to which green procurement is legislated in such. As a global player and ranked among the top 15 GHG emitters globally, it is inevitable that South Africa, and especially its local government, be seen to be doing something regarding GHG mitigation interventions through green procurement.

Matters of sustainable public procurement have been debated at length through the work of Helen Walker and colleagues and other authors (Walker and Brammer 2009; Brammer and Walker 2011; Crespin-Mazet and Dontenwill 2012; Testa *et al.,* 2012; Correia *et al.,* 2013; Touboulic and Walker 2015; Testa *et al.,* 2016)

1.1.3 Green Procurement Practices in Kenya

Kenya ranked 83 out of 132 countries in the global environmental performance index with a rate of 51.4%(Burgess, 2006). This indicates that there is need to be more environmental conscious through the implementation of Green procurement so as to be highly rated while preserving the mother earth from further destruction. Kenya is a signatory to the Kyoto Protocol, thus Green procurement is not a choice, but must be practiced to relieve the environment from pollution Green economy has emerged as a useful framework for focusing development on a basis that ensures the quality of the environment is sustained for future generations. Macro-economic policies and financial instruments have been adopted to support the green economy in selected Firms including agriculture, water, energy, housing, transport and tourism (Michuki, 2011).

The Kenya Vision 2030, the Kenya Constitution 2010 and the national strategies provide policy measures for a sustainably managed environment as a constitutional right for all. According to the minister, Kenya has created an enabling environment for investment in renewable energy technologies like wind-power, geothermal and hydro-electric power; and promoted programs for energy efficiency. All these will trigger and support investment in clean development including conversion of waste into clean energy like biogas. It is noted that many manufacturing firms are not managing the environment, but are hiding away from the law by functioning at night when they may not be seen by law enforcement officials (Michuki 2011).

The Green Belt Movement, which is an afforestation project with more than 100,000 participants, was launched by Wangari Maathai as a non-governmental organization (NGO) in 1977. To date, they have planted over 40 million trees on the African continent, including Kenya. By advancing the movement, Maathai has not only protected the environment; she also worked on poverty eradication and improving the status of women. In recognition of her significant contributions to the democratic movement in Kenya, she was awarded the first Nobel Peace Prize for work in the environmental field in 2004 (UNEP, 2005).

The National Environment Management Authority in Kenya (NEMA) is also a government body that safeguards and enhances the quality of the environment for collective participation towards sustainable development. One of its main roles is to publish and disseminate manual codes or guidelines relating to environmental management and prevention or abatement of environmental degradation. It also ensures that all follow waste management regulations, though their challenge is that some manufacturers operate at night and therefore are not emphasizing on laid down procedures on waste minimization, cleaner production and segregation of waste at source (NEMA, 2013). The execution of GSCM will therefore assist NEMA in its work and safeguard the natural resources that continue to deplete day

1.1.4 Manufacturing Firms in Kenya

Kenya has large manufacturing Firms serving both the local market and exports to the East African region. It is the third leading Firms contributing to gross domestic product (GDP) in Kenya. The Firms has experienced the fluctuations over the years under different financial conditions. It experienced the lowest real GDP growth rates in 2008 to 2009 as 1.7 percent in 2008 and improved to 2.6 percent in 2009, 5.6 percent in 2010 and 5.7 percent in 2011 (East African community, 2012). According to Odhiambo (2008), many private firms in Kenya are working to improve the environmental performance of their operations and products and green procurement has been a logical extension of this work. Similar to public buyers, private Firms organizations have in the last two decades

adopted green procurement practices for specific products (e.g., recycled-content office paper, renewable energy, paints, cleaners, etc.), with a few others have developed green procurement policies that cover a wider range of products, services and Environmental issues (Odhiambo, 2008). As the business benefits of these efforts become better known, green procurement is continuing to grow in the private Firms (Brooks, 2008). For manufacturing and process-oriented firms, green procurement practices look at the materials, substances and chemicals in the products and services they provide (Theyel, 2010). In Kenya's first Green Economy National Workshop**,** the Environment Secretary of Kenya highlighted that Kenya's new adopted constitution provides a fresh foundation that places the right to a clean environment at all levels at a center stage (UNEP, 2010

The Green Belt Movement, which is an afforestation project with more than 100,000 participants, was launched by Wangari Maathai as a non-governmental organization (NGO) in 1977. To date, they have planted over 40 million trees on the African continent, including Kenya. By advancing the movement, Maathai has not only protected the environment; she has also worked on poverty eradication and improving the status of women. In recognition of her significant contributions to the democratic movement in Kenya, she was awarded the first Nobel Peace Prize for work in the environmental field in 2004 (UNEP, 2005). Green procurement is rooted in the principle of pollution prevention, which strives to eliminate or to reduce risks to human health and the environment (Bolton, 2010). It means evaluating purchases based on a variety of criteria, ranging from the necessity of the purchase in the first place to the options available for its eventual disposal (Berger & Luckmann, 2007).

Subsequently, this approach looks beyond the company's "gates" to include the materials, substances and chemicals its suppliers use. According Chong (2011) the ongoing efforts to reduce costs, leading companies in Kenya use life-cycle assessment and material tracking tools to identify materials, substances and chemicals in their products that pose significant environmental, health and safety risks and re-design their products to reduce or eliminate such materials. The Kenya government has put in place a wide range of policy, institutional and legislative to govern all business activities to ensure there is protection of the environment (Odhiambo, 2008)

By broadening the responsibility of manufacturers, the players in the industry should integrate environmental considerations in their product design, choice of raw materials, technology and even their suppliers and business partners. Further, to make greening of production a reality, the participation and involvement of workers in the organization also has to become reality. It is however not so by the Kenya manufacturing industry. Green procurement also known as environmental purchasing is the purchase of environmentally friendly products and services, the selection of contractors and the setting of environmental requirements in a contract. The need for better procurement system arose after the realization that the effects of environmental problems on the living conditions of the world's population were becoming more apparent and an emphasis on environmental awareness was becoming more prominent. The general public has started to pay more attention to the potential consequences of this global environmental problem (Palmujoki, Parikka-Alhola, & Ekroos, 2010).

Some of the most pressing environmental issues include ozone layer depletion, global warming, and hazardous wastes. In an effort to mitigate the negative impacts of such environmental problems, many nations have passed laws and regulations and have set environmental standards aimed at reducing industry carbon and greenhouse gas emissions to the atmosphere and thus a need to have pollution principles and activities (Caranta, & Trybus, 2010).

1.1.5 Manufacturing Firms in Nyeri County

According to Muturi, P. (2015), there are 5 manufacturing companies in Nyeri that have already incorporated green procurement policy in their strategic plan. For the past ten years, many manufacturing companies have continued to emerge a result of spontaneous response to the increasing demand for goods and services necessitated by the increasing population (Thomson 2014). The cost of running manufacturing company has thus increased due to increase in procurement of Green raw materials. This has created unrests in many companies and effective procurement measures are being demanded to help in

cutting down the fees as an effort to make their products quality and affordable (Bernard 2015).

Green procurement is rooted in the principle of waste management and pollution prevention, which strives to eliminate or to reduce risks to human health and the environment (Bolton, 2010). It means evaluating purchases based on a variety of criteria, ranging from the necessity of the purchase in the first place to the options available for its eventual disposal (Berger & Luckmann, 2007). In spite of the development of encouraging policy frameworks internationally relatively little research has addressed implementation of green procurement in a manufacturing Firms context (Walker & Brammer, 2009). According to Odhiambo (2008), many private firms in Kenya are working to improve the environmental performance of their operations and products that are Eco friendly.

1.2 Problem Statement

Given the rising environmental concerns and awareness among various stakeholders in the supply chain as well as interest groups such as consumer groups, private Firms organizations may find it appropriate to adopt sustainable or green procurement practices. (Wanjiru,2014). According to Kenya Solid Waste Management (2013), industrial wastes constitute about 23% of the total waste generated in the Nairobi city, only about 25% of the estimated 1,500 tones of solid waste generated daily get collected. Given the above scenario, the government of Kenya has put into place Environmental Management and Coordination Act, it provides for the establishment of an appropriate legal and institutional framework for the management of the environment and related matters (Okidi, Kameri-Mbote, & Akech, 2008).

Recent research has shown that green procurement is related to a variety of positive benefit for both individuals and organizations; these includes eliminating the cost of waste and or hazardous material management, positive public relations, improved employee health**,** reduced solid waste, conservation of water and protection of natural resources (Martinsons,2010). Despite the important role green procurement plays in

ensuring environmental performance and public health and safety, most of the studies on this subject had been conducted in developed countries, yet not much research had been conducted in Kenya leading to insufficient empirical literature on green procurement (Eyaa & Oluka, 2011) It is against this background that this study sought to analyze factors affecting implementation of green procurement in manufacturing Firmss in Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The main objective was to Assess Factors affecting Effective Implementation of Green Procurement in the Manufacturing Firms in Nyeri County.

1.3.2 Specific Objectives

This study was guided by the following research objectives:-

i. To assess the effect of Procurement Policies on effective implementation of green procurement in manufacturing Firms in Nyeri County.
ii. To establish the effect of Eco supplier selection on effective implementation of green procurement in manufacturing Firms in Nyeri County.
iii. To explore the effect of ICT on effective implementation of green procurement in manufacturing Firms in Nyeri County.
iv. To evaluate the effect of Financial Resources on effective implementation ofgreen procurement in manufacturing Firms in Nyeri County.

1.4 Research Questions

This study was guided by the following research questions:-

i. What is the effect of procurement policies on effective implementation of green procurement in manufacturing Firms in Nyeri County?
ii. What is the effect of Eco supplier selection on effective implementation of green procurement in manufacturing Firms in Nyeri County?
iii. How does ICT affect effective implementation of Green procurement practices in manufacturing Firms in Nyeri county

iv. What is the effect of financial resources on the effective implementation of the Green procurement practices in manufacturing Firms in Nyeri County?

1.5 Significance of the Study

Effective implementation of green procurement play a significant role towards enhancing sustainability of organizational operations with less negative impact to environmental issues (Wanderi, 2007). Organization that successfully manages to effectively implement green procurement rarely experiences operational disruptions and this not only impacts positively on organization productivity but also helps in minimizing procurement expenditure and sustaining organization operations continuously (Oburu, C. K. 2010).

The first theoretical contribution is that the research could add on to the growing body knowledge of green procurement by introducing the practice in developing countries as well as providing evidence of voluntary practice where there is no legislation on the same. The second theoretical contribution is that scholars and academicians would also find this study an invaluable source of reference material for future studies in the area as well as for discussions in the field of procurement management. Another practical contribution is that other firms wishing to engage in green procurement practices find this study very useful in terms of the challenges they are bound to face in the process and how to mitigate on such challenges.

This study provided a systematic and comprehensive insight into the state of procurement in manufacturing firms in Kenya. The study could be of great significance to all other manufacturing companies in Kenya since study recommendations would assist them to overcome the major challenges that hinder effective implementation of Green procurement

1.6 Limitations of the study

It was be possible to study all the factors that influence implementation of green procurement in manufacturing Firms in Nyeri County. The study only explore green procurement in the manufacturing Firms and excluded other Firms such as the service, processing, operations.

1.7 Delimitation of the Study

Adequate time was allocated to all the respondents to ensure that they fill all the questionnaires and return them for easier data analysis. A pilot study was carried out to ensure that the data collection tools yield valid results.

1.8 Assumptions of the study

The study assumed that, the respondent were honest and gave accurate Responses to the items in the data and the sample size chosen were adequate to help draw a valid conclusion and was unbiased.

1.9 Operational Definition of Terms

Green Procurement" (formerly known as Affirmative Procurement) is the purchase of environmentally preferable products and services in accordance with one or more of the established "green" procurement preference programs (Lacroix, 2009). Green procurement is the purchasing of products or services, which have a lower impact on the environment over their whole life cycle than the standard equivalent. It involves the integration of environmental issues into purchasing decisions based on price, performance and quality (UNDP, 2008).

Disposal Management: Refers to the decommissioning, clearance and removal of unserviceable, redundant and obsolete assets (Hawkins ,2009).

Eco Supplier Selection: This is a business process that allows a company to adequately select its vendors who are incorporated green products in their policy statament and negotiate the best prices for goods and services that it purchases. Senior managers also

monitor the corporate supply chain to ensure that vendors familiarize themselves with the company's operating activities and manufacturing processes (Arthur 2009).

Procurement: The process in which public or private organizations buy supplies or services to fulfill various functions such as shelter, transport and need for infrastructures, among many others (Talluri, 2008). Procurement policies: These are rules and regulations for governing procurement procedures in an organization (Bartik, 2009).

Information Communication Technology (ICT): Is a technology that involves use of computers, software and internet connections infrastructure for supporting information processing and communication functions (Crompton, 2007).

A green procurement policy is a document that shows the objectives, responsibilities and authority of the procurement function (Lysons & Gullingham, 2003). It brings out the terms and conditions of procurement functions, supplier selection and evaluation and all other issues on how green procurement policy should be implemented in an organization

Financial Resources: The resources from which the enterprises obtain the funds they need to finance their investments, capital and current activities. An enterprise obtains the funds it needs from 3 general resources; Financial Institutions, Capital Markets, Owners Equity (Ramasesh , 2007)

Manufacturing: The process of converting raw materials, components, or parts into finished goods that meet a customer's expectations or specifications (Ombuki-2014)

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter explores the existing literature on factors affecting effective implementation of green procurement in the manufacturing Firms. The chapter covers conceptual framework, theoretical framework, empirical literature, and critical review and research gaps.

2.2 Theoretical Framework

This section looks at the various theories that are related to the area of study and their contribution to the research. This study therefore used the greenscor framework, resource based theory, Greiner's lifecycle theory, GSCM life stages model and model of green supplier selection decision-making process.

2.2.1 GreenScor Framework

Greenscor framework was developed by the Supply Chain Council (SCC) which is a non-profit body affiliated to the institute of supply chain management with the aim of carrying out research and improving supply chains. The framework aimed to govern and steer green initiatives in the industries (SCC, 2008). It integrates environmental best practices and metrics into the entire supply chain planning process which enables the execution of Green procurement. It incorporates all the partners in the supply chain thereby minimizing waste and pollution. The metrics measure the effects of greening including cost saving measured in different levels: energy costs as a percentage of production cost, emission costs, and waste produced as percentage of production, and remanufactured goods. SCC (2008) in the Supply Chain Operations Reference (SCOR) version 9 also included processes to address waste management during production and testing including nonconforming product.

Various best practices in the supply chain activities are listed on GreenScore framework including: transport management, storage and handling, and inventory management from sourcing to disposal. Since the main problem in Kenya is solid waste disposal (UNEP,

2005), the GreenScore framework guided this study on formulation of the questionnaire to investigate if financial resources and policies play a role in the effective implementation of green procurement activities. The Supply Chain Operations Reference Model (known as SCOR Model), provides a unique framework that links business process, metrics, best practices and technology features into a unified structure. The aim is to support standard communication among supply chain partners thus improving the effectiveness of the whole supply chain (Laforet, 2010).

The SCOR model has been developed to describe all business activities developed for satisfying customer demand. The model is organized in the five main processes characterizing a generic supply chain: plan, source, make, deliver and return. These processes involve all phases in a supply chain from customers interactions (order entry through paid invoice) to physical material transactions (including equipment, spare parts, bulk products, software.) and market informative interactions (from aggregate demand planning to order fulfillment (Jae Mather, 2010). SCOR levels start with the five fundamental processes that represent the Level 1. Complex supply chains are made up of multiple combinations of these basic processes (Elia *et al.,* 2010). Next, at Level 2, processes are further decomposed into process categories depending on the specific management logic characterizing the process: Make-to-Stock, Make-to-Order and Engineering-to-Order. These process categories contain elements representing the third level in SCOR model: each process at Level 3 is decomposed in sub-activities characterizing each specific management logic (Eyraud *et al*,. 2011).

2.2.2 Resource-Based Theory

Penrose (1959) worked on the basics of resources-based view (RBV) theory asserting complementary resources create value. The resource-based view was furthered by Barney (1991) who argues that to achieve competitive advantage; firms should possess resources that are valuable and rare to create competitive advantage and ultimately superior long-term performance. When a company finds that their own resources are not competitive, for instance they are easy to imitate, add little value, or are not scarce and can be replaced easily, they will seek a company outside that has valuable resources to form an alliance or

sell out their organization to venture into new industry, market or product for competition's sake (Barney, 1991).

Miller and Freisen (1982) divided resources into property-based resources and knowledge-based resources according to their imitation obstacles. The property-based resources are the tangible resources that include financial (current debt, credit lines, equity, reserves), technological (patents, trademarks, copyrights and trade secrets) or physical (plant & equipment, inventories, supplies, fixtures) (Lin, Huang & Stockdale, 2011). Knowledge-based resources are the intangible resources and they include human (managerial capability, organization routines, employee training, experience, knowledge, trust and innovation), reputation(brand name, supplier and customer perception, product quality, durability and reliability), organizational (reporting lines, structures, planning mechanisms, controls and coordinating systems) or socio-cultural (culture, history, work system and policies) resources (Laforet, 2010). Resource availability determines the organizational capability and ultimately organizational performance (Laforet, 2010). In this research, RBV theory will be used to evaluate the effect of financial resources on performance of the large manufacturing firms in Kenya

2.2.3 GSCM Life Stages Model

Neto, J. Q. F., Bloemhof-Ruwaard, J. M., van Nunen, J. A., & van Heck, E. (2008) identified five stages of GSCM implementation in the manufacturing industry. GSCM is implemented by choice of the top management and resources available making it a sequence rather than a one off process. The stages identified are: not started and/or defensive stage - where a firm is wholly ignoring or at best taking actions solely to suite the stakeholders by disclosing to them their exposure to environmental and social risks; Problem solving stage - where information gathering process takes place to understand GSCM based on the resources of the firm but they do not have a corporate sustainability statement or report, but have initiatives in progress; Compliant stage - where a firm is adhering to current and emerging regulations to save its image and avoid regulatory fines and the related damage to their reputation that such fines could cause; Eco-efficient stage - where a firm sees Green procurement as an opportunity for growth and captures it.

These companies see sustainability as an opportunity for growth; to capture this growth, these companies are reframing existing products and introducing new products to appeal to the sustainability conscious consumer; and Sustainable stage - where a firm re-designs its corporate vision in line with Green procurement therefore re-engineering its processes and include technology in order to eliminate wastes of energy, water and waste inefficiencies while adhering to strict ethics and moral standards. This model guides the research to look at the relationship between technology and effective implementation of green procurement in the 5 manufacturing companies in Nyeri County. It would be interesting to investigate if firms in different stages of implementation of GSCM are performing differently

2.2.4 Green Supplier Selection Model (GSS-model)

Most organizations are the two providers and clients in the inventory network, and in this manner assume a part in going through ecological prerequisites all through the production network. Research proposes that this procedure isn't without challenges (Nawrocka, 2008; Preuss, 2002). Viable GSS must incorporate an evaluation of the more extensive hierarchical and between authoritative setting. In that way, the central association can end up noticeably mindful of its impediments and conceivable outcomes with regards to greening the provider choice process. Igarashi, De Boer and Fet (2013) raise several questions. Is the purchasing organization aware of the power balance in the supply chain? Do suppliers understand and accept the green criteria put forward by the purchasing organization, and just as important, do the suppliers understand why the purchasing organization uses these criteria, i.e., do they understand the connection (alignment) between the green selection criteria and the overall green strategy of the purchasing organization? How much pressure can or should the purchasing organization exert on different suppliers to adapt to demands for more sustainability?

Walker et al. (2008) found out that suppliers not necessarily wish to share environmental information. But also, does the purchasing organization really understand the supplier's strategic view on “green”, and how the supplier has aligned its functional strategies with this view? Is the purchasing organization aware of possible supplier initiatives, for

example, voluntary and industry-specific certification (Walker et al., 2008)? The answers to these questions are likely to have implications for one or more of the first three dimensions. To answer these questions Igarashi et al. (2013) examined 60 papers they could find in the scientific literature using the search engines, and developed a theoretical GSS model, shown in Figure 2. They rely mainly on the GSS conceptual model that could be used in the manufacturing industry to assist in the implementation of decisions.

Key dimensions of GSS research should cover four dimensions: (1) "Alignment"– a conceptual, strategic dimension, aimed at providing a decision context and at securing alignment with the overall strategy, (2) "Tools"– a technical, operational dimension aimed at devising and choosing appropriate tools for information processing and decision support, (3) "Process" – an operational and processual dimension aimed at drawing appropriate attention to the interrelated stages in a GSS process, and (4) "Supply chain context" – a supply chain positioning dimension, also of strategic importance, and necessary for considering how to make effective green supplier selection decisions, given the power structure in the chain.

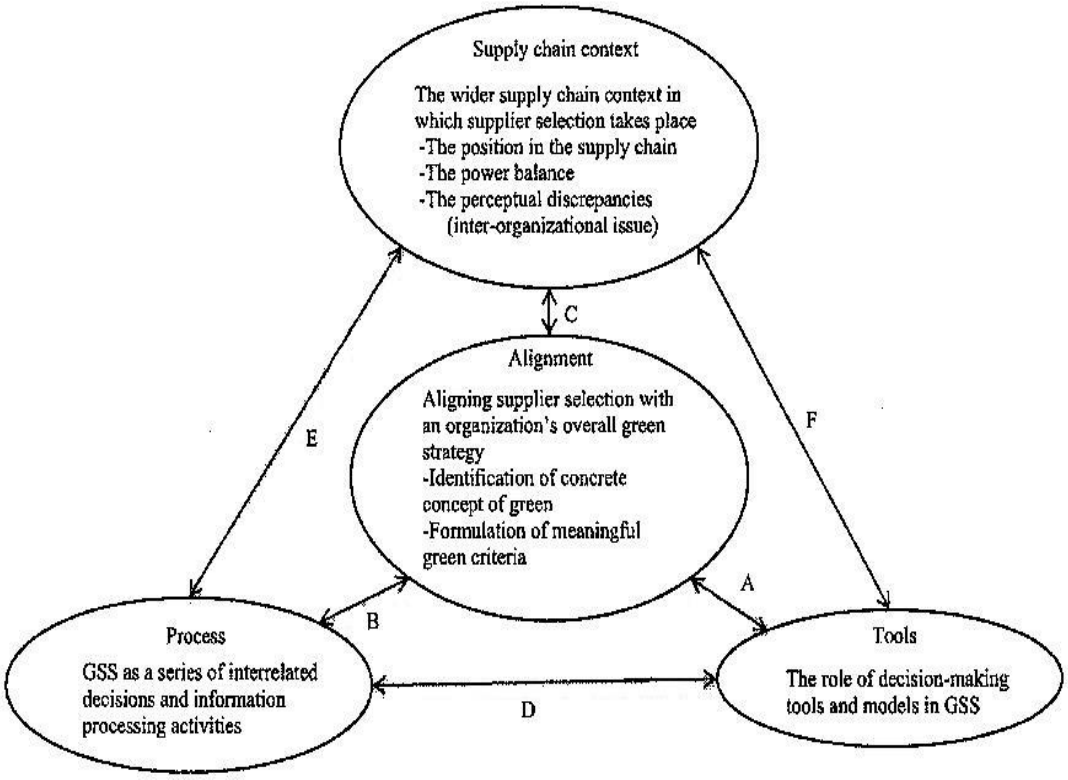

Figure 2.1 Green supplier Selection Model (GSS -Model)

An important feature of the conceptual model is the recognition of the interrelationships between the four key dimensions. Considering these relationships, both researchers and practitioners can achieve a more comprehensive and holistic approach to GSS (Igarashi *et al.*, 2013).

The central dimension of the model, ´the alignment of supplier selection with the overall green strategy of the organization' (Igarashi *et al.,* 2013), by definition has important implications for all three other dimensions. The outcome of the alignment process is an understanding of what "green" means for the organization, and, more specifically, is a basic set of green criteria for supplier selection that is relevant for the organization. Choosing and using of decision-making tools in GSS requires the specification of relevant green criteria and information about the decision-maker's preferences. Without

knowing the results of the alignment process, i.e., what the relevant green criteria are, there will not be a clear basis for using a decision-model

2.2.5 Legitimacy theory

Legitimacy implies the existence of a social contract between an organization and its constituents (or stakeholders). Though scholars define it with varying degree of specificity, one of the broadly adopted definitions of legitimacy is that 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 (Chien, M. K., & Shih, L. H. 2007).

Given its unique ability to connect organizational actions to stakeholder expectations, there is a widespread support for the notion that legitimate behaviour can lead to superior rewards and benefits. Legitimacy of organizations has historically been approached from two opposing theoretical perspectives – institutional and strategic. From the institutional perspective, legitimization is envisioned as a process of institutionalization, whereby external norms and beliefs are adopted without much thought. On the other hand, the strategic theoretical perspective envisions legitimacy as instrumental, proactive, and more importantly, a deliberate pursuit that can ultimately enhance external beliefs, there by creating newer and enhanced levels of legitimacy.

Given its ability to explain organizational initiatives that do not follow the norms of profit maximization, the legitimacy-based view provides a sound theoretical basis for explaining environmentally-oriented initiatives. Studies relying on the institutional theory suggest that pressures from a firm‟s institutional fields will drive it to seek legitimacy in the eyes of its stakeholders.

In the words of Oliver, (2005) a firm‟s response to external institutional pressure “emphasizes the importance of obtaining legitimacy for purposes of demonstrating social worthiness”. At the same time, given that institutionalization highlights “organizational scepticism” when legitimacy-seeking behaviors conflict with other firm objectives such

as profit maximization, institutional theory also signals that firms might pursue only basic environmental initiatives that could sufficiently satisfy stakeholder needs. Following these ideologies within the institutional view of legitimacy, extant research has identified regulatory compliance, competitive advantage, and social concerns as key proponents of corporate environmental initiatives. More importantly, organization theorists contend that the visibility of an organization can invite increased institutional pressure to pursue environmentally sound practices. Organizational visibility suggests that an organization is publicly recognized, and hence more closely scrutinized by external stakeholders – customers, media, environmentalists, as well as government agencies when it comes to environmental issues.

Accordingly, visible organizations will have to consciously respond to stakeholder demand to maintain their reputation and legitimacy (Scott, 2004). This theory is used explain environmentally-oriented benefit of green procurement adoption.

2.2.6 Green Procurement Implementation Empirical literature

Stephen and Helen, (2011) study proposed a conceptual framework that explains the implementation (or lack thereof) of green procurement. The propositions steamed from, firstly, a differentiated materialist viewpoint on organizational culture to understand the level of desire exhibited by the organization and by the procurement department (Sarkis, J., Zhu, Q., & Lai, K. H. (2011).

Secondly, the study drew upon the resource-based view of the firm to explain how the procurement manager's capability to respond to a given level of desire moderates the degree to which that desire is realized in the organization's procurement activity (Stafford *et al.,* 2010). The framework drew upon the political theory of the firm as defined by Miles and Covin, (2010) to explain a lack of or illegitimate engagement in GP activities and that effort to remedy any misalignment between organizational subcultures and/or the procurement manager's inability to respond due to a lack of resources is a potential solution Song, (H., Yu, K., & Zhang, S. (2017).

The principal contribution to extant literature lies in exploring the workings inside the organization, how the effects of organizational culture influence implementation of GP (Polonsky, 2009). Scholars have contributed to understanding of SERP from a variety of perspectives (Dickinson *et al*., 2010). However, these contributions remain haphazard with a weak theoretical base (Seuring & Muller, 2008). Furthermore, scholars have examined the implementation of SERP as a problem that exists between the buyer and supplier (Preuss, 2009).

However, studies at this level of analysis assume, if only implicitly, that organizations, regardless of size and multiple locations, act as coherent entities. Therefore, they overlook the friction and disunity at lower levels of analysis that may influence the problem of SERP implementation before it emerges in the buyer-supplier relationship at the organizational level of analysis (Emilsson & Helm, 2013).In comparison with the disjointed literature on organizational culture, the RBV is coherent despite minor levels of conflict (Rimmington *et al*., 2010).

Mainstream definitions, however, have not strayed significantly from Bolton, (2010) original assertion that resources are "all assets, capabilities, organizational processes, firm attributes, information, knowledge, etc.controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness". This definition is adopted in the current study (Min & Galle,2011). Corporate support plays a pivotal role in the institutionalization of responsible behavior (Maignan *et al.,* 2012). Maignan and McAlister, (2012) reported how senior management made conspicuous efforts to the implementation of green procurement in the organization. Faith-Ell *et al.*, (2010) conducted a study on Green Purchasing Strategies: Trends and Implications.

The findings of the study were; the biggest challenge to the effective implementation of green purchasing is the cost and income, and the environment friendly packaging is the key to the success of the project. Zhu *et al.,* (2009) also noted the importance of dedicating (physical) resources successful implementation of green procurement. An organization's top leadership sets the ethical tone." Indeed, the issue which lies at the core is in, namely, senior management's function as a repository of institutionalized

authority affording the manager the ability (dutiful, discretionary and perhaps even involuntary) to mould an organization's culture (Chkanikova, O., & Lehner, M. 2015).

2.3 Conceptual Framework

A conceptual framework forms a simplified familiar structure, which is meant to help gain insight into a phenomenon that one needs to explain (Orodho, 2009). Conceptual research is that related to some abstract ideas or theory. It is generally used by philosophers and thinkers to develop new concepts or to reinterpret existing ones, the conceptual literature concerning the concepts and theories and explain how the variables relate (Kothari, 2004). In conducting the study, a conceptual framework was developed to show the relationship between the independent variables and dependent variable. In this study, the dependent variable is effective procurement practices and the independent variables are; procurement policies, supplier selection, information technology and firm (Financial) resources.

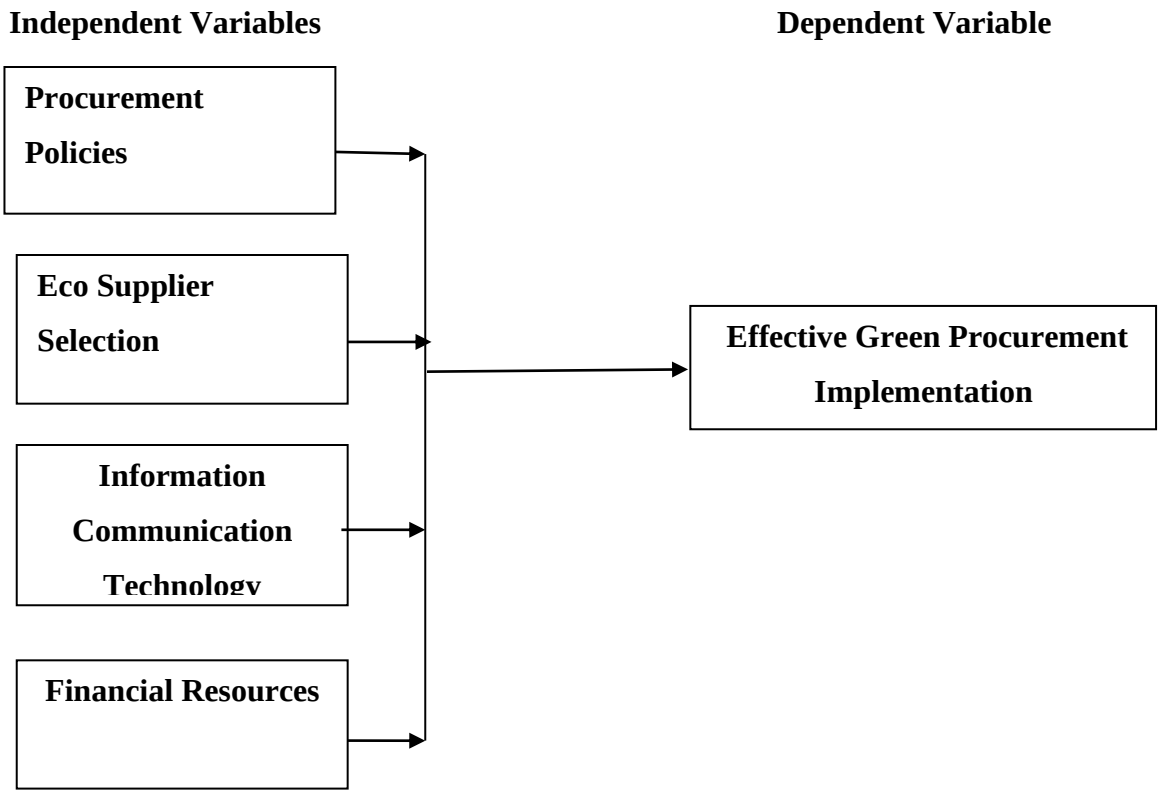

Figure 2.2: Conceptual Framework

2.4 Operational Framework

For the purpose of the study the dependent variables shall be factors affecting effective implementation of Green Procurement in manufacturing Firms in Nyeri County. The independent variables are each discussed in the literature review.

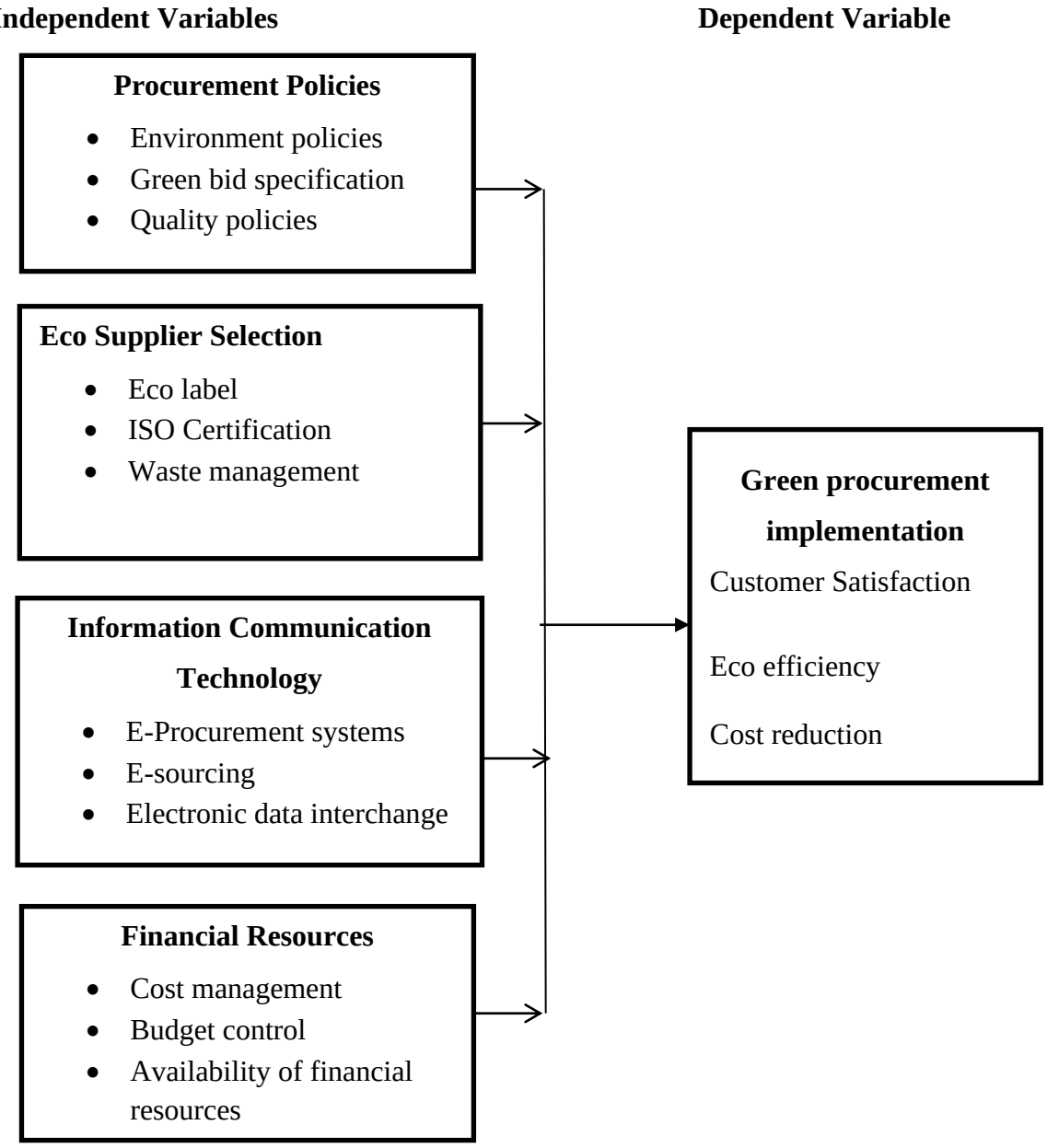

Figure 2.3: Operational Framework

2.4.1 Procurement Policies

According to Gelderman, C. J., Semeijn, J., & Vluggen, R. (2017).it is imperative to adopt and do the implementation of the ISO environmental management standard. The aim is to ensure the quality of products in compliance with customer requirements, set standards and allow for third-party control of the entire process. The company uses a process for monitoring the external classifier (e.g. a customer representative). The implementation of green environmental management and quality policy has given enterprises advantages in the choice-making process in terms of enterprise's effectiveness. The core of the GSS model is alignment of enterprise's green strategy development and establishment of green criteria. The ISO environmental management standard could be used as the basis in this case. The environmental management standard ISO 14001 has been used as the most common benchmark.

According to commonwealth policies on green procurement it is quite imperative to be considerate of the prevailing factors with regards to green procurement. The Department of General Services Green Procurement policy states that analysis is required on each material and service during the bid process to determine what green options are available. When an Environmentally Preferable Product (EPP) is comparable, statement of work or specifications are restricted to the EPP option (Green Procurement, 2017).

2.4.2 Eco Supplier Selection.

One method of including environmental criteria in green procurement is via the supplier selection. Murray and Cupples, (2014) believe that purchasing should focus on the selection of quality suppliers and thus, successful green supplier appraisal should assess the supplier rather than the product. Extensive research has been done regarding the methods and processes of selecting suppliers during the procurement process and several frameworks have been developed. Nocci (2012), for example, pinpointed performance criteria that organizations could consider during the green supplier selection process and also suggested methods for effectively selecting suppliers from an environmental viewpoint; while Shen, Olfat, Govindan, Khodaverdi and Diabat (2013), suggested a

fuzzy approach for appraising green suppliers (the fuzzy approach uses mathematical strengths to resolve uncertainties of human cognition during the appraisal process.)

The most popular individual approach in supplier selection, based on Govindan et al.'s (2013) research, was Analytical Hierarchy Process (AHP). According to Handfield, Walton, Sroufe and Melnyk (2002), AHP, originally created by Saaty (1980), provides a framework in which different types of multi-criterion decision problems are solved based on the relative priorities of each criterion in achieving a stated goal. It is a benefit measurement (scoring) model in which subjective managerial inputs on multiple criteria are converted into scores that are then used to assess each possible alternative. The significance of using AHP is that it treats a decision like it is a system. Therefore complex decision processes are made more rational by incorporating all available information (both quantitative and qualitative) about a decision (such as the decision to include environmental criteria during the supplier selection process) in a systematic manner. Also, the process of executing the analysis helps the manager to prioritize the criteria in a way that may otherwise not be possible (Handfield *et al.,* 2002; Govindan *et al.*, 2013).

Environmental standards should not make the system more bureaucratic. The company must be able to focus primarily on its core business in order to maintain their effectiveness. Green Markets Strategy will be supported in obtaining a green procurement, and a more integrated and complex production system. Also there are companies with substantial amounts of outsourcing, which operate in the international market and meet the requirements of the environmental standards without having any official environmental standard systems. Procurements are obtained thanks to the production capacity and technical capabilities. Cooperative and captive relations play a role in the production of small vessels. The selection of subcontractors requires more than just an ISO 14001 environmental management standard. The role played by technical standards and modular relationships, as well as collaborative and cooperative relations is based on interactions. In international commodity chains the green criteria are used. The operating Estonian engineering companies offer high quality services with a competitive

advantage, exact delivery, flexible pricing, and the modern type of production. The modular relations play an important role for subcontractors too (Lindroos, 2012).

The aim is to ensure that the customer purchase process and standards meet the requirements of high-quality materials and subcontracting services. It is therefore important to cooperate with suppliers to find the best solutions. Procurer is assessed regularly based on visits, audits, or other process parameters. The materials handling process is intended to ensure compliance with the requirements established for purchased materials, material traceability throughout the treatment process and the quality of the materials is maintained throughout the course of treatment. The treatment goal is to ensure the identity of the products and avoiding damage to the entire processing cycle, from reception to product delivery. Supplier optimization is required to help in developing policies that necessary towards the realization of green procurement (Igarashi, de Boer, & Michelsen, 2015).

2.4.3 Information Communication Technology

ICT software that supports green procurement should be able to ensure processes are conducive to the environment and its inputs and outputs are not harmful to the environment such are use of e-procurement. This reduces use of paper hence less destruction of the forests for papers. The hardware component should have the capacity to support the software and emerging technologies and when it has exhausted its life cycle, it should be recyclable to something usable. Philipson (2012) noted that many organizations dispose of their equipment too early and contribute to unnecessary waste, even when a system upgrade required does not have to be implemented within the whole enterprise.

Green procurement is enhanced by effective and robust system which coordinates all the aspects of the procurement function. Electronic procurement (E-procurement) systems depend on the information shared in the different stages of supply chain Preferred and green suppliers need to be routinely proposed to the requester, in case no catalog is present. Hence it is vital to choose an effective solution partner for such a strategy

(Contributor, 2017).The recent improvements in technology have assisted many corporations in their green product enterprises. The use of supply chain management systems (SCM), such as e-procurement, e-sourcing and others has undoubtedly reduced the loads and loads of paper that occasioned in unnecessary deforestation. Though there are inadequate references and policies in regards to green procurement technologies much is being done to leverage technology in the green procurement implementation (Edquist, Hommen, & Tsipouri, 2000)

2.4.4 Financial Resources

Faith-Ell et al., (2010) conducted a study on Green Purchasing Strategies: Trends and Implications. The findings of the study were; the biggest challenge to the effective implementation of green purchasing is the cost and income, and the environment friendly packaging is the key to the success of the project. Zhu et al., (2009) also noted the importance of dedicating (physical) resources successful implementation of green procurement. An organization's top leadership sets the ethical tone." Indeed, the issue which lies at the core is in, namely, senior management's function as a repository of institutionalized authority affording the manager the ability (dutiful, discretionary and perhaps even involuntary) to mould an organization's culture (Polonsky, 2009)

Financial resources are relevant to every aspect of and it can help departments such as procurement meet its obligations and its objectives. The availability of cash enables procurement department executes its mandate especially on green procurement which is a relatively new discipline in supply chain context (Great Britain. 2008). The firms resources are not confined to just the monetary aspects but extends to capture the human capital. Having people with skills and knowledge on green procurement is a factor that affects the efficiency of the whole aspect of supply chain

2.5 Empirical Literature

This section reviews the existing empirical studies on factors affecting effective implementation of green procurement. The chapter covers relations studies on; effect of procurement policies on effective implementation of green procurement; effect of information technology on effective implementation of green procurement; effect of

supplier selection on effective implementation of green procurement; effect of financial resources on effective implementation of green procurement.

2.5.1 Procurement Policies

Procurement policies are rules and regulations for governing procurement procedures in an organization. A properly designed and implemented procurement policy plays a pivotal role in providing a guiding framework for the implementation of effective green procurement practices (Bartik, 2009). Green procurement policies are applicable to all organizations, regardless of size. Green procurement programs may be as simple as purchasing renewable energy or recycled office paper or more involved such as setting environmental requirements for suppliers and contractor.

Green procurement is becoming a cornerstone of environmental policies both at European Union and Member State level (Tukker *et al.,* 2008). Since the International Conference on Environment and Development at Rio de Janeiro in 1992, the awareness on the role of green procurement in supporting sustainable consumption and production patterns strongly increased and, today, is spreading through the public authorities both as a policy instrument and as a technical tool. With the change of the social economic development level and market environment, enterprise competitive means have developed gradually from the quality competition, the service competition, the brand competition to the green competition.

In addition, customers increasingly incline to the environmentally friendly products due to a large number of unethical business practices in the consumer goods industry that have been exposed. Facing to a variety of competitive pressure from the external environment, our country's enterprises must start the green transformation and management to the whole supply chain from purchasing raw materials to delivering the products to enhance its competitiveness by reducing the number of raw materials and waste, recovering, collecting, reusing, recycling and reprocessing the scrap and old product and packing

Rao and Holt (2005) noted that green practices can help to enhance environmental performance. Rao (2002) argued that many large Taiwanese companies had adopted green procurement systems to enhance environmental performance and reduce production costs. Rha,(2010) studied the impact of green supply chain practices on supply chain performance and revealed a significant positive relationship between GSCM practices and three supply chain performance parameters namely resource, output, and flexibility

2.5.2 Information Communication Technology

According to Chai-Arayalert, S., & Nakata, K, (2011) the world is undergoing turbulent and rapid changes with adoption of the internet communication, and media as well as computerization of the business processes thus increasing the role of ICT within the society. This has contributed significantly to the growth of the size and number of data centers and other ICTs. Burtand Starling, (2008) observed that ICT generates approximately two percent of global Carbon emissions which is equal to what is generated in the aviation industry. Due to rapid change in technology, there is also an increase in disposal of old computers, monitors and other electronic components with a few years of acquiring them and hence contribute to e-waste. According to National Environmental Management Authority, (NEMA) Kenya has also become a destination for this kind of waste. They are contributing to landfills instead of being recycled and hence earth and water pollution is eminent considering that computer components contain toxic materials.

Supply Chain Management has emerged quickly throughout the early part of 21st Century due to improvement in technology. Technology is increasingly affordable and available to help organizations to take advantage of supply chain strategies. Because of the competitive pressures facing business it is critical for them to use supply chain strategies to create synergies with supply chain partners in order to succeed in the global competitive environment (Khalili-Damghani, K., & Tavana, M. 2014). High level best practice for SCM, technology can apply to any business, even though the operation may

be specific to an organization implementing a specific SCM System, for example, could be a waste of money if the overall operation is a problem. Automating a broken process does not fix the process

2.5.3 Eco Supplier Selection

Supplier selection is the process by which firms identify, evaluate, and contract with suppliers. The supplier selection process deploys a tremendous amount of a firm's financial resources. According to Lunsford and Glader, (2007) to avoid the dire outcomes of supplier non-performance, buyers typically take proactive steps to verify a supplier's qualifications prior to awarding them a contract. The primary goal of "supplier qualification screening" is to reduce the likelihood of supplier non-performance, such as late delivery, non-delivery, or delivery of non-conforming (faulty) goods. A secondary goal is simply to ensure that the supplier will be a responsible and responsive partner in the day-to-day business relationship with the buyer. Supplier qualification screening involves many aspects, The buyer may contact previous customers and ask about the supplier's delivery performance, adherence to contract terms, what (if any) problems arose and how they were resolved. The buyer might require that suppliers have ISO 9000 certification (or similar), indicating that the supplier has policies, procedures, documentation, and training in place to ensure continuous adherence to quality standards. However, in some cases the certification documents can be misleading and/or easily forged .To actually see if an adequate level of quality is achievable, the buyer may have to look deeply into the supplier's organization to ensure the supplier is capable and competent to meet the buyer's specifications.

In return, firms expect significant benefits from contracting with suppliers offering high value. This article describes the typical steps of supplier selection processes: identifying suppliers, soliciting information from suppliers, setting contract terms, negotiating with suppliers, and evaluating supplier (Chopra, 2005).Over time there has been a keen interest for research on the importance of understanding the supplier participation due to the pivotal role they play in ensuring availability of raw materials. It's important to note that the procurement activities start with the user identifying a need then comes up with

the specification and requests the supplier to satisfy the need in which the supplier promises to fulfill. However, according to Carter, Ellram & Kathryn, (2007), those promises and expectations are generally vague and uncertain in nature especially for technology-intensive procurement projects. Poor environmental performance by a supplier can affect badly the performance and image of the buying companies (Cabrita & Bontis, 2008).

Typically, large buyers pass on ecological pressure along the supply chain to their suppliers, thus increasing the exposure of upstream supply chain members to environmental regulations (Caniels *et al,*. 2013). One approach to accomplish better environmental supplier performance is via diffusion of standardized environmental management systems such as ISO 14001 (Corbett & Krisch, 2001, Caniels *et al,*. 2013). Focal companies might establish this as an order qualifier, which has to be met before a supplier is considered for an order at all (Min & Galle, 2001). The chain leader has the power to influence the environmental policies and strategies of its suppliers and dictate supplier participation in green supply chain activities (Caniels *et al,*. 2013). Carter and Easton (2011) consider sustainability the license to do business in the 21st century. To obtain this license, sustainable practice must be implemented throughout the supply chain.

Caniels, (2013) gives an example of the German automotive industry where original equipment manufacturers develop their own standards that usually go beyond the requirements of ISO, particularly when it comes to environmental issues. These green standards are defined by the end-product manufacturer, but sometimes they are developed together with key suppliers. According to Fet, (2011); Igarashi, (2013), an appropriate balancing of the efforts is dedicated to each of the dimensions. Overemphasizing certain dimensions by writing elaborate “green strategy” documents without considering the appropriate decision tools for executing green supplier selection is unlikely to be effective. The same would be true for the opposite: spending a lot of resources on developing advanced systems for evaluating green criteria in supplier tender may prove difficult without having a sense of direction in terms of how suppliers are supposed to contribute to the overall strategy of the organization. Both the operational decision tools

and the green strategy of the organization should match the position and role of the organization in the supply chain.

2.5.4 Financial Resources

Scholars also suggest that financial resource of firms can increase their visibility among external stakeholders. Additionally, financial resource is also considered as a source of organizational slack, in the form of excess resources (Sharma, 2000; Bowen, 2000). Accordingly, superior financial resource could lead to visibility, thereby leading to more pressure from external constituents. External stakeholders could also perceive firms with financial resources to be in a position to use the excess discretionary slack resources to overcome the risk and unpredictability in adopting the proper supply-side environmental practices (Menguc *et al*,. 2010).

Accordingly, following organizational scholars espousing the institutional view of legitimacy.Igarashi, (2013), propose that superior financial performance will promote basic supply side environmental initiatives such as green procurement (Shittu & Bake, 2010). Additionally, investments in development initiatives are far more uncertain than basic green procurement investments. Therefore, firms would exercise skepticism when allocating their limited resources to such advanced initiatives, and rather invest in basic green procurement initiatives that would sufficiently satisfy the needs of their external stakeholders.

Green products or services utilize fewer resources, are designed to last longer and minimize their impact on the Environment from cradle to grave. In addition, green products and services have less of an impact on human health and may have higher safety standards. Whilst some green products or services may have a greater upfront expense, they save money over the life of the product or service (Miles, 2010)

Hanner, (2006) argues that the production of green products does not necessarily mean a firm has embraced a green supply chain initiative, but could be responding to external pressure. For example, companies worldwide stopped using chlorofluorocarbons (CFCs)

in production due to bans imposed on those materials by buyers and regulations, but no evidence exists of corresponding worldwide wave of companies becoming green as a result. Chien *et al,*. (2007) posit that international environmental agreement, such as the Kyoto agreement, the climate Change Treaty and the Montreal Protocol influence governments and firms‟ response to green issues. In Kenya, the Environmental Management Act 27 (1999) states the responsibility of firms concerning environment issues but some manufacturing firms may just get licensed not because it is part of their strategic policy to be environmentally friendly but to simply comply with the law. However, the current Public Procurement Regulations in Kenya have entrenched green issues in the repealed Public Procurement and Disposal Act, 2005 which now referred to as the Public Procurement and Asset Disposal Act, 2015 (GOK, 2016) .

Organization face complex deliberations whether to adopt the green purchasing (Davila, 2003). The organizational decision to adopt green procurement is commonly taken by boards and managers who consider information about both the alternatives and consequences into account. Hence, with the numerous advantages of green procurement there is a need to research on those factors influencing the implementation

Faith-Ell *et al.,* (2010) conducted a study on Green Purchasing Strategies; Trends and Implications. The findings of the study were; that the biggest challenge to the effective implementation of green purchasing is the cost and income, and the environment friendly packaging is the key to the success of the project. Zhu *et al.,* (2009) also noted the importance of dedicating (physical) resources to successful implementation of green procurement. An organization's top leadership sets the ethical tone." Indeed, the issue which lies at the core is in, namely, senior management's function as a repository of institutionalized authority affording the manager the ability (dutiful, discretionary and perhaps even involuntary) to mold an organization's culture (Polonsky, 2009).

As much as resources are always limiting companies should look at the green procurement as a critical investment and set aside adequate financial resources in their budgeting process.

2.5.5 Green Procurement Implementation

With increasing awareness of environmental protection worldwide, the green trend of conserving the Earth's resources and protecting the environment is overwhelming, thereby exerting pressure on organizations in Kenya. The pressure and drive accompanying globalization has prompted enterprises to improve their environmental performance (Madu and Sarkis, 2010). Consequently, corporations have shown growing concern for the environment over the past ten years (Sheu *et al.*, 2010). The pressure on organizations to improve their environmental performances comes from globalization rather than localization (Sarkis and Tamarkin, 2005). Increasing environmental concern has gradually become part of the overall corporation culture and, in turn, has helped to reengineer the strategies of corporations (Madu *et al.*, 2011).

Green procurement compares price, technology, quality and the environmental impact of the product, service or contract. Lozano (2013) proposed that before a green procurement program can be executed, current acquiring practices and approaches must be explored and surveyed. An existence cycle evaluation of the natural effects of items or administrations is required and an arrangement of ecological criteria against which buy and contract choices are made must be created. The result is a consistently surveyed green buying strategy that is coordinated into other authoritative plans, projects, and strategies. A green buying arrangement incorporates date-stamped needs and focuses on, the task of duties and responsibility and a correspondence and advancement design.

Obstructions to executing a green acquisition program include: absence of promptly accessible natural well disposed items; costly or zero ecological choices; incorrect investigations; absence of hierarchical help; and wrong or unsupported ecological claims by makers and providers. Enactment, authoritative approaches, orders, natural administration frameworks or multi-sidelong assertions regularly expect associations to execute a green acquirement program (Jae Mather, 2010).According to Morrison (2010), 70% of the organizations have specific allocations made to tackle this issue, but still many organizations consider this from a corporate reputation and that the competitors are doing it which forces them to do it as well. It is nothing more than a marketing

gimmick or advertisement agenda for the firm. Governments of different nations are encouraging both private and public firms to become green in which ever ways possible and have been creating policies and providing with incentives for initiatives taken by these firms. Environmental issues have been the core of sustainable procurement. The ozone depletion, reduction of carbon emission, bio-degradable materials, eco-friendly products, alternate energy sources to effectively use the natural sources have all been important factors. Socio-economic development of the local, like the social welfare of people, health care, employment opportunities also form the core of sustainable procurement

2.6 Critique of the Existing Literature Related to Research Study

The theoretical and the empirical literature demonstrate that, the existing literature on implementation of effective green procurement is not extensive in Africa and in Kenya in particular. Most studies on implementation of effective green Procurement are common in many developed countries such as Europe, America and Canada. This is explained by studies by Bovaird, (2007), Ryall, (2001), Murray, (2009) and Stonebraker,(2007).

2.6.1 Procurement Policies

A study by Testa, F., Iraldo, F., Frey, M., & Daddi, T. (2012) notes that in Africa, many government corporations lack effective green procurement policies and this greatly hinders effective implementation of sustainable procurement practices. However, the study failed to suggest how organizations should design and implement effective green procurement policies for supporting implementation of sustainable procurement practices. In Kenya, there is lack of a specific study that highlights how public and private training institutions should improve on procurement policies in order to create a guiding framework for implementing effective green procurement practices. The Public Procurement and Disposal Act, (2015) has also failed to offer guidelines on how government training institutions should embrace efficient and sustainable procurement policies.

2.6.2 Eco Supplier Selection

Varnäs, A., Balfors, B., & Faith-Ell, C. (2009) found that over 46% of firms in Canada had succeeded in implementing effective green procurement through application of strategic sourcing strategies such as global sourcing, multiple sourcing and supplier development. However, the author failed to explain how each of the sourcing strategies can support implementation of effective green procurement in manufacturing firms. This indicates that, there lacks a specific study that clearly recommends the best sourcing strategies for supporting implementation of effective green procurement

2.6.3 Financial Resources

A study by Michelsen, O., & de Boer, L. (2009) recalls that in Africa, ability of the firm to have enough finances could greatly support implementation of effective green procurement practices in the manufacturing firms. However Michelsen, O., & de Boer, L. (2009) failed to highlight the key procurement best practices that support implementation of green procurement. According to Simpson and Power, (2011) many African organizational do not have enough money to support such a heavy investment.The study, however, failed to give recommendations on how manufacturing firms should utilize this finances to support green procurement

This clearly demonstrates that financial resources remain a major critical issue affecting implementation of green procurement.

2.6.4 Information communication Technology

A study by Tanzi, (2009) found that in Canada, innovation in technology has played a major role in enhancing many organizations to adopt sustainable procurement practices. Tanzi, (2009) study did not clearly elaborate how organizations should innovate technology to succeed in implementing efficient procurement. A study by the author found that in Kenya many organization fail to succeed in embracing green procurement due to lack of effective waste recycling technology and effective technology for utilizing renewable energy sources such as wind and solar energy. However, George (2008) failed to explain the type of technology that should be embraced by manufacturing companies in order to effectively implement green procurement.

According to Nasiche, F., & Ngugi, G. K. (2014) in Kenya, the concept of green procurement has only attracted attention in private Firms organizations while in public Firms; no measures have been made to promote implementation. However, author did not offer any practical explanation of measures to be employed to support implementation of green procurement in the manufacturing firms. On the other hand, Nasiche, F., & Ngugi, G. K. (2014) notes that over 50% of private Firms organizations could realize increased level of performance if effective green procurement measures were put in place. Moreover, Edward still failed to support his argument by explaining how these organizations should adopt effective green procurement to promote realization of increased organizational performance. The empirical review shows that the awareness and implementation of green is still comparatively low in most developing countries and no measures have been made to promote implementation in Kenya. Recognizing the important role that effective green procurement can play in promoting realization of increased organizational performance, this study addressed the major critical issues as an effort to promote implementation of green procurement in the manufacturing firms in Kenya

2.7 Research Gaps

In Kenya few studies have been done on various Organization pertaining the green procurement. A study done at Kenya pipeline corporation on determinants of adoption of green procurement revealed that incentives and pressures (Bjorklund,2011) and organization green capacity (Iraldo *et al.,* 2007; Hart,2005; Francesco *et al.,* 2012), are the main determinants of green public procurement adoption at Kenya Pipeline Corporation. The other factors studied; cost of green products and green supply capacity were not found to be significant. The results are an indication that the success of green public procurement relies heavily on enhancing the internal capacity rather than focusing on the exogenous environment.

According to Odhiambo, (2008) many private firms in Kenya are working to improve the environmental performance of their operations and products and green procurement has

been a logical extension of this work. Similar to public buyers, private Firms organizations have in the last two decades adopted green procurement practices for specific products (for example, recycled-content office paper, renewable energy, paints and cleaners), with a few others have developed green procurement policies that cover a wider range of products, services and environmental issues (Odhiambo, 2008). As the business benefits of these efforts become better known, green procurement is continuing to grow in the private Firms (Nderitu, K. M., & Ngugi, K. 2014). In most counties studies have been done on tea firms especially on IT (Information Technology) Firms but no study has been done on green procurement. Therefore, the study will seek to address this gap by carrying out an in-depth research where it will be confined to Five manufacturing organizations as a representation of other organizations in this discipline.

2.8 Summary of literature

This chapter discussed the existing literature on factors affecting effective Implementation of green procurement in the manufacturing Firms in Kenya. The chapter explained the conceptual framework, theoretical framework, empirical literature, critical review and research gaps. The next chapter covers the methodology adopted to undertake the study

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter discussed various steps that were used to facilitate execution of the study to satisfy the study objectives. These steps include research design, study population, sample and sampling techniques, data collection instruments, validity and reliability of research instruments, data collection procedures, data analysis techniques and ethical considerations.

3.2 Research Design

Research design is the blue print for the collection, measurement and analysis of the data. It is a plan and structure of investment so conceived as to obtain answers to research questions (Coopers & Schindler, 2008). According to Lavrakas (2008), a research design is a general plan or strategy for conducting a research study to examine specific testable research questions of interest. A research design is the structure, or the blueprint of research that guides the process of research from the formulation of the research questions and hypotheses to reporting the research findings.

This study adopted a descriptive research design. Descriptive survey designs are used in preliminary and exploratory studies, to allow researchers to gather information, summarize, present data and interpret it for the purpose of clarification (Zikmund *et al.,* 2010; Creswell, 2003).Cooper and Schindler, (2011) state that a descriptive study that assesses the bivariate relationship between variables, determines if the variables are independent and if they are not, then determine the strength or magnitude of the relationships is more valuable than one that does not.

Orodho, (2003) also indicated that the descriptive research answers research questions who, what, where, when and how. The purpose of employing this method is to describe the nature of a situation, as it exists at the time of the study and to explore the causes of particular phenomena .This method enabled finding answers in the questions relating to existing relationships on GSCM, lifecycle stages and implementation of green

procurement in the manufacturing firms which the other research designs would not do exhaustively.

3.3 Target Population

Agarwal, (2009) describes population as a large collection of individuals or objects that is the main focus of a scientific query and have similar characteristics. Zikmund *et al*,. (2010) view population as the large collection of all subjects from where a stratified sampling is drawn. According to Kothari (2004), a population refers to all items in any field of inquiry and is also known as the 'universe'.

According to Muturi, P. (2015), there are 5 manufacturing companies in Nyeri that have already incorporated green procurement policy in their strategic plan and the researcher selected all of them for study. A total of 5 companies formed the target population for the study. This population was chosen because of their activities in green procurement implementation. The distribution of target population for the study is shown in the subsequent table.

Table 3.1 Target Population

Manufacturing Firm	**Top management (CEO & Directors)**	**Middle Management**	**Bottom management (Dept. Heads)**
Mt Kenya bottlers	5	12	15
Highland mineral water	4	7	12
E-Kas Technologies	5	5	15
Bradegate holdings	3	8	13
Maisha millers	3	6	10
Sub Total	**20**	**38**	**65**

Total= 123

Source: Respective Human resource Office (2018)

3.4 Sampling Technique

Sampling design is a procedure, process or technique of choosing a sub-group from a population to participate in the study that is representative of a larger group (Ogula, 2005). The sample size was determined by use of Slovin's formula:

$n=N/ (1+Ne^2)$ as follows

Where; n=sample size

N=total population i.e.123

e=Error tolerance. The study confidence level 95% which gave a margin error of 0.05

Therefore;

$n=123/ (1+123*0.05^2)$

n=123/1.307

n= 94

Sample size= 94 respondents

According to Kothari (2004) a representative sample is one which is at least 10% of the target population.

To determine the sample size of each category of the target population proportionate Stratified sampling was used. Using proportional allocation the proportion of the size for each stratum was presented in table 3.2.

Table 3.2 Sample distribution

Strata	Target	Formula	Sample size	Percentage
Top management	20	(20*94)/123	15	16%
Middle level	38	(38*94)/123	29	31%
Lower level	65	(65*94)/123	50	53%
Total	**123**		**94**	**100%**

The respondent from every subgroup was then selected for inclusion in the sample size using simple random sampling. This was to ensure that the sampling unit has equal chance to be picked for the study.

3.5. Data Collection

Data collection is the process of gathering and measuring information on targeted variables in an established systematic fashion. An introductory letter was obtained from the University to allow data collection. Questionnaires was issued to the sampled population and picked after five working days to allow respondents sufficient time to answer the questions appropriately.

3.5.1 Data Collection Instrument

A self-administered questionnaire was the main tool of data collection. Questionnaire is a technique of data collection in which each person is asked to respond to the same set of questions in a predetermined order (Sekaran, 2006). To a large extent the study used five likert scale structured questionnaires where 5= Strongly Agree, 4=Agree, 3=Neutral 2= Disagree; 1=Strongly Disagree. According to Kothari (2008), the information obtained from questionnaires is free from bias and researchers' influence and thus accurate and valid data were gathered.

According to Krishnaswamy, Sivakumar and Mathirajan (2006), questionnaire as an instrument of data collection is good because anonymity and confidentiality of the respondents is assured and they are able to complete them when it is convenient for them. Drop and pick method was used, follow ups though email, phone calls, short messages and visits was done to encourage timely and higher response rate.

3.6 Pilot Study

A pilot study is a small scale preliminary study conducted in order to evaluate feasibility, time, cost, adverse events, and in an attempt to predict an appropriateness of research tools, clarity of questions, and study design prior to performance of a full-scale research (Hulle y & Stephen, 2007).Newing, (2011) states that the importance of field piloting cannot be overemphasized since you will almost find that there are questions that people fail to understand or interpret in different ways, and questions that turn out simply not to elicit useful information. Mburu, D. M., & Mwangangi, P. (2014) suggested 10 – 30 participants are sufficient for a pilot study. The study used 10 participants who were later

excluded during data collection stage. Mertens, (2010) points that the sample used in a pilot study should be large enough to enable the researcher gather reliability and validity of information. The pilot study facilitated reliability tests for data collection instrument and the clarity of questions and ability to collect relevance information, the language used and the content validity of the research instrument.

3.6.1 Reliability of Research Instruments

The reliability and validity of the research instruments should be confirmed prior to actual data collection (Drost, 2011). To maintain accuracy, data reliability and validation was carried out. Data reliability is the degree to which a research instrument yields consistent results or data after repeated trials. (Ng'ang'a, Kosgei, & Gathuthi, 2008).A pilot study was done by administering the research instruments to 10 respondents who were not to take part in the main study to ascertain the appropriateness of the questionnaire wording and the clarity of the instructions a pilot study aimed at refining the research instrument to minimize the chances of the respondents experiencing difficulties in answering the questions and also problems in data recording (Saunders, 2009). Cronbach's alpha is the most commonly used measure of reliability dependability or stability of a test (Nachmias & Nachmias, 2006). The closer Cronbach's alpha coefficient is to 1.0 the greater the internal consistency of the items in the scale. An Alpha values of 0.7 or above was considered to indicate that the instrument is reliable.

3.6.2 Validity of Research Instruments

Nachmias and Nachmias, (2006), defines validity as the extent to which a test measure measures what it is supposed to measure. Validity of a test instrument therefore is defined as the accuracy and meaningfulness of the inferences, which are based on the study results. Thus, validity is the degree to which results obtained from analysis of the data collected actually represents the phenomenon under study (Mugenda & Mugenda, 2009).The study used content related technique which measures the degree to which the questions items reflects the specific areas covered and construct validity is the extent to which a test is viewed as covering what it purports to measure.

According to Mugenda and Mugenda, (2003) validity of an instrument is improved through expert judgment. This was done by consulting two experts in supply chain management in developing the questionnaire to ascertain the degree to which results from the analysis of the data actually represent the variables of the study. Content and construct validation of research instruments was done in testing the suitability of the questions, the clarity of the instructions, sequence and relevance of questions presented to the respondents.

3.7 Data Analysis and Presentation

Agarwar (2009), defines data presentation as the process of organizing the collected data in a way that meaningful conclusion can be drawn. Quantitative and qualitative approaches were used for data analysis. Primary data from the questionnaire were coded for computation of descriptive statistics which was analyzed with the support of Statistical Package for Social Sciences (SPSS) version 22.0 and presented inform of frequencies, mean, percentages and standard deviation using tables with explanatory discussion. Inferential statistics, in form of Pearson correlation coefficient and ANOVA was used to measure the relationship between variables. The study used a 95% level of significance. Multi linear regression analysis was used to investigate the relationships between independent and dependent variables. Alan, (2009) posits that, regression analysis is the suitable statistical tool for investigating relationships between variables and to ascertain the causal effect of one variable upon another by measure the association between the dependent and independent variable. The study adopted the following multi linear regression equation

$Y = \beta_0 + \beta_1 x_{1+} \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + e$

Where:

Y= Effective Green Procurement Implementation,

$\beta 0$ = Constant

x1= procurement policies

x2= Eco supplier selection

x3=information technology

x4= financial resources

β = Are the slope coefficients

e= error term

The coefficients represent the unit change of dependent variable as a result of a change in the independent variables. Quantitative data from the findings was presented in tables while qualitative data was summarized and categorized into themes guided by the objectives of the study

3.8 Ethical Issues

Research ethics refer to the appropriateness of researcher's behavior in relation to the rights of those who become the subjects or informants of the research work, or are affected by it (Willis and Onen, 2005). According to Kombo and Tromp (2006), argues that researchers must consider the conduct by paying attention to the ethical issues associated with carrying out their research. The researcher maintained confidentiality and considered right to privacy of the respondents during the research process including the right to voluntary participation. Moreover the researcher ensured dissemination of findings which might enable firm to improve efficiency across the entire supply chain to give them a competitive edge in the industry. According to Mugenda & Mugenda (2009), if the findings are sensitive, modalities of releasing them should be agreed upon rather than shelving the finding completely. In addition to being unethical, it is waste of resources to undertake research only to conceal the findings.

CHAPTER FOUR
FINDINGS AND DISCUSSIONS

4.1 Introduction

The study sought to analyze factors affecting implementation of green procurement in manufacturing Firmss in Kenya. The specific objectives were to investigate the effect of procurement policies, Eco-supplier selection, information communication technology and financial resources on effective implementation of green procurement in manufacturing Firms in Nyeri County. This chapter presents the results of analysis of data collected from the field using questionnaire. Data interpretation was done in line with the research objectives and research questions. The techniques proposed in chapter three for data analysis and presentations were used to do the analysis and presentation.

4.2 Response Rate

The study was conducted with a total sample of 94 respondent. According to Mugenda and Mugenda, (2003), a response rate of 50% is adequate, 60% is good and 70% and above is very good. Therefore, 92.6% response rate in this study was very good and adequate for analysis.

Table 4.1: Results for Response Rate

Details	Numbers	Percentage (%)
Targeted	94	**100**
Returned	87	**92.6**

4.3 Test of Reliability

Pilot study was conducted to pretest the data collection tool. Questionnaire was administered on ten respondents drawn from the total population,who were not part of the sample. To ensure the reliability of the instrument, Cronbach's Alpha was used to test the reliability of the proposed constructs. The acceptable alpha coefficient should be at least 0.70. Pilot test of this study gave the alpha values of all variables which were above 0.70 as shown in Table 4.2.

Table 4.2: Reliability Test Results

Variables	Number of items	Cronbach's Alpha
Implementation of Green procurement	4	0.845
Procurement policies	5	0.767
Eco supplier selection	7	0.799
Information communication technology	6	0.767
Financial resources	6	0.938

Implementation of Green procurement had alpha of 0.845, procurement policies had 0.767, Eco supplier selection had 0.799, and Information communication technology had 0.767 while financial resources had 0.938. This indicates strong internal consistency among measures of variable items. This implies that the data collection instrument was therefore reliable and acceptable for the purposes of the study.

4.4 Demographic Characteristics

An assessment was done on the respondents according to their level of education and work experience. The results were as shown in Figure 4.1 to 4.2.

4.4.1 Education Level of Respondents

The study sought to establish the level of education of the respondents. As shown in Table 4.3 below 12.6% of the respondents had certificate, about a quarter of the respondents 26.4% had diploma qualification while slightly above half of the respondents 54.0% had bachelor degree qualification while 6.9% had master degree. This indicates that the respondents had necessary knowledge and skills to rate the factors affecting implementation of Green procurement in the manufacturing Firms in Nyeri County.

Table 4.3: Education level of Respondents

Education level of Respondents	Frequency (n)	Percent (%)
Certificate	11	12.6
Diploma	23	26.4
Degree	47	54.0
Master	6	6.9
Total	**87**	**100.0**

4.4.2 Work Experience of the Respondent

The study sought to establish how long the respondents had worked in the company. The study considered this information relevant given that the longer the period they had worked, the more familiar they would be able to understand the factors affecting implementation of green procurement in the manufacturing Firms in Nyeri County. The results as presented in Table 4.4.shows that 8.0% had worked for less than 1 year, 26.4% for a period between 1-5 years, 40.2% for 5-10 years while 25.3% had worked for more than 10 years. This implies that majority of the respondents are experienced due to their long service in the companies with 65.5% having worked for more than five years. In this case, given that more than 50% of the total respondents had more than five years in service, it is expected that the respondents had in-depth information regarding the research topic and would be able to rate the variable under consideration effectively.

Table 4.4: Work Experience of the Respondent

Work Experience	Frequency (n)	Percent (%)
Less than 1 year	7	8
1 - 5 years	23	26.4
5 - 10 years	35	40.2
More than 10 years	22	25.3
Total	**87**	**100.0**

4.5 Descriptive Analysis

In this section, the researcher sought to find out the extent to which the respondents agree with various statements regarding procurement policies, ecosupplier selections, information communication technology and financial resources. The extent was measured on a Likert Scale of 1-5 with the following equivalences: 1-Strongly Disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly Agree. The results of the study are as shown in Table 4.3 to 4.6

4.5.1 Procurement Policies

The first objective of the study sought to assess the effects of procurement policies on the implementation of green procurement in the manufacturing Firms in Nyeri County. Table 4.5 displays the findings obtained from descriptive statistics analysis.

Table 4.5: Procurement Policies

Procurement policies factors	SD %	D %	N %	A %	SA %	Mean	Std. Dev
There is a current statement or policy that commits the company for sustainability and/or reducing environmental impact procurement decision taking	0.0	0.0	1.1	54.0	44.9	4.46	.50
Procurement policies set aside for implementation of green procurement are not followed to the latter to enhance successful implementation green procurement	2.3	12.6	13.8	4.6	66.7	4.21	1.22
Inadequate skilled man power poses a major challenge during implementation of green procurement	4.6	6.9	2.3	65.5	20.7	3.91	.96
There is no Regular adjustment of green bid specifications to encourage use of green products and recycled paper products	9.2	10.3	9.2	55.2	16.1	3.59	1.16
Inadequate participation in an indoor quality review have affected green procurement implementation	20.7	20.7	20.7	36.8	1.1	2.77	1.19

SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

Table 4.5 presents the analysis on the effects of procurement policies on the implementation of green procurement in the manufacturing Firms. A high percentage of the respondents 98.9 agreed that presence of current statement or policy that commits the company for sustainability and/or reducing environmental impact procurement decision taking with a mean score of 4.46 and standard deviation of 0.50. 73.1% agreed that

procurement policies set aside for implementation of green procurement are not followed to the latter to enhance successful implementation green procurement with a mean score of 4.21and standard deviation of 1.22. Inadequate skilled man power poses a major challenge during implementation of green procurement had a mean score of 3.91 and standard deviation of 0.96. There is no regular adjustment of green bid specifications to encourage use of green products and recycled paper products had a mean score of 3.59and standard deviation of 1.16 while inadequate participation in an indoor quality review have affected green procurement implementation a mean score of 2.77. The finding of the study revealed that procurement policies set aside for implementation of green procurement are not followed to the latter and there is no regular adjustment of green bid specifications to encourage use of green products and recycled paper products. Lozano (2014), had suggested that before a green procurement program can be implemented, current purchasing practices and policies must be reviewed and assessed. MelekEker (2011), opined that without losing its control and accountability mechanisms, procurement policies can better support performance management by integrating known supply chain outcomes with frequent re-forecasting of the budget and linked to analysis of performance trends. The study concludes that effectiveness of the green procurement is dependent on availability of procurement policies.

4.5.2 Eco Supplier Selection

The second objective of the study sought to evaluate how eco supplier selection affects the implementation of green procurement in the manufacturing Firms in Nyeri County. Table 4.6 displays the findings obtained from descriptive statistics analysis.

Table 4.6: Eco Supplier Selection

Eco Supplier Selection factors	SD %	D %	N %	A %	SA %	Mean	Std. Dev
Working with ISO certified suppliers makes green procurement implementation easy	0.0	4.6	4.6	39.1	51.7	4.38	.78
Supplier past performance on green-procurement implementation is an important factor for its successive implementation.	0.0	18.4	14.9	0.0	66.7	4.15	1.24
Absence of competent staff with the right technical skills, experience and lack of training is a major Factor to successful implementation of Green procurement	6.9	4.6	62.1	26.4	0.0	3.08	.77
Supplier selection team are adequately trained to support green procurement implementation	20.7	13.8	13.8	51.7	0.0	2.97	1.22

SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

As shown in Table 4.6, the study revealed that most of the respondents 90.8% agreed that working with ISO certified suppliers makes green procurement implementation easy was highly rated with a mean score of 4.38 and standard deviation of 0.78. 66.7% agreed that supplier past performance on green-procurement implementation is an important factor for its successive implementation with a mean score of 4.15and standard deviation of 1.24. Absence of competent staff with the right technical skills, experience and lack of training is a major factor to successful implementation of Green procurement had a mean

score of 3.08 and standard deviation of 0.767 while supplier selection team are adequately trained to support green procurement implementation had a mean score of 2.97. The findings revealed that most company staffs do not have the technical knowledge and experience with regard to green procurement and the supplier selection team are adequately trained to support green procurement implementation. The finding of the study support Price Water House Coopers (2009), who propounded that lack of technical expertise is a barrier to adoption of green procurement. Price Water House Coopers stated that technology keeps on changing and those implementing green procurement have to continuously undergo relevant training in order to keep up with the pace. Armstrong (2008) noted that lack of training on application of sustainable procurement strategies hinders implementation of effective green procurement practices in many organizations. Saunders (2007) reckoned that personnel in procurement are, in a sense, information processors. According to Odhiambo (2008), ignorance of use of eco supplier's selection procedure is a major barrier to implementation of Green procurement.

4.5.3 Information Communication Technology

The third objective of the study sought to assess the effect of information communication technology infrastructure on the implementation of Green procurement in the manufacturing Firms. Table 4.7 displays the findings obtained from descriptive statistics analysis.

Table 4.7: Information Communication Technology

Information communication technology factors	SD %	D %	N %	A %	SA %	Mean	Std. Dev
Inadequate ICT infrastructure, in compatibility of various ICT system and lack of modern ERP systems has been the major factor towards adoption and implementation green -procurement	4.6	5.7	0.0	27.6	62.1	4.37	1.07
Incompatibility of procurement with other ICT modules has slowed green procurement adoption	4.6	12.6	0.0	29.9	52.9	4.14	1.20
The current ICT infrastructure is well managed to support electronic data interchange which enhance implementation of green procurement	6.9	47.1	0.0	41.4	4.6	2.90	1.16
There adequate IT Infrastructure to support e sourcing which in the long run reduces paper work	9.2	49.4	0.0	41.4	0.0	2.74	1.10

SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

Results on Table 4.7 show that majority of the respondents 89.7% agreed that inadequate ICT infrastructure, in compatibility of various ICT system and lack of modern ERP systems has been the major factor towards adoption and implementation green procurement with a mean score of 4.37 and standard deviation of 1.07. a high percentage 82.8% agreed that incompatibility of procurement with other ICT modules has slowed green procurement adoption had a mean score of 4.14and standard deviation of 1.20. The current ICT infrastructure is well managed to support electronic data interchange which enhance implementation of green procurement had a mean score of 2.90and standard deviation of 1.16 while the presence of adequate IT Infrastructure to support e-sourcing

which in the long run reduces paper work had a mean score of 2.74. The finding of the study revealed that organizations offices do not have adequate IT Infrastructure to support successful implementation of green procurement hence incompatibility of procurement system with other ICT modules. Crompton (2007), stated that information technology involves use of computers, software and internet connections infrastructure for supporting information processing and communication functions. According to Wyld (2009), implementing of Green-procurement is hampered by inadequate technical infrastructure in an entity as well as by partners. Therefore Manufacturing organizations should embark on investing in information technology which involves acquisition of computers, software and internet connections infrastructure to supporting green procurement implementation. This is due to the fact that effectiveness of green procurement is dependent on availability of ICT infrastructure to support the process.

4.5.4 Financial Resources

The fourth objective four of the study sought to evaluate the effect of financial resource on the implementation of green procurement. Table 4.8 displays the findings obtained from descriptive statistics analysis.

Table 4.8: Financial Support

Financial support factors	SD %	D %	N %	A %	SA %	Mean	Std. Dev
Adequate financial resources are available to support adoption and implementation of green procurement.	20.7	32.2	31.0	12.6	3.4	2.46	1.07
There is a cost management policy reviewed and implemented by top management to support green procurement implementation	0.0	25.3	24.1	25.3	25.3	3.51	1.13
The company remain committed to supplier development through financial support	0.0	0.0	24.1	0.0	75.9	4.52	.86
Commitment to change from paperwork to electronic procurement have the support of top management	0.0	0.0	0.0	50.6	49.4	4.49	.50
The major Stakeholders (Leaders, suppliers, employees, service providers) in the company supported implementation of Green procurement	31.0	11.5	21.8	19.5	16.1%	2.78	1.47

SD=Strongly Disagree D=Disagree N=Neutral A=Agree SA=Strongly Agree

Results on Table 4.8 show that majority of the respondent 75.9% strongly agreed that the company remain committed to supplier development through financial support with a mean score of 4.52and standard deviation of 0.87. 49.4% strongly agreed that commitment to change from paperwork to electronic procurement have the support of top management had a mean score of 4.49 and standard deviation of 0.50. There is a cost management policy reviewed and implemented by top management to support green

procurement implementation had mean score of 3.51 and standard deviation of 1.13. The major stakeholders (leaders, suppliers, employees, service providers) in the company supported implementation of Green procurement had a mean score of 2.78 and standard deviation of 1.47 while adequate financial resources are available to support adoption and implementation of green procurement had a mean score of 2.46. The study revealed that inadequate financial resources and lack of support by stakeholders have been a major factor towards implementation of green procurement. According to Chêne (2009), implementation of an green procurement is a complex, risky, resource-intensive process that requires major procedural changes and often involves high-level officials who at times lack incentives to commit huge investment. Odhimbo (2011), opined that commitment of senior managers is one of the most frequently cited factors deciding the success or failure of change.

4.5.5 Implementation of Green Procurement

The study sought to find out the effect implementation status of green procurement of manufacturing companies in Nyeri County.

Table 4.9: Implementation of Green Procurement

Implementation of Green Procurement	2013	2014	2015	2016
Percentage (%) of how much the company has saved through use of green raw materials in the indicated years	2%	4%	6%	9%
Percentage (%) of waste management improvement	4%	5%	7%	10%
Percentage (%) of lead time improvement in the indicated years?	1%	3%	4%	6%
Percentage (%) of quality improvement in the indicated years?	3%	6%	7%	11%

As shown in Table 4.9, the result established an upward trend in the average improvement in quality, waste management, lead time and the amount saved through use of green raw materials for a period between 2013 and 2016. This implies that there has been reasonable improvement in terms of waste management, quality management and cost reduction over the years due to implementation of Green procurement.

4.6 Test of Regression Assumptions

The researcher conducted Multicollinearity, linearity and normality test to establish whether regression assumptions are satisfied before generating the expected regression models

4.6.1 Multicollinearity Test

The regression analysis assumes that there should be no multicollinearity between variables. To test for multicollinearity, Variance Inflation Variable (VIF) or tolerance, which is a diagnostic tool was used to detect how severe the problem of multicollinearity is in a regression model. Using the VIF method, a tolerance of less than 0.20 and a VIF of more than 5 indicates a presence of multicollinearity. The variables should not have a Variance Inflation Factor (VIF) of 5 or greater than 5, as this indicates presence of multicollinearity. The result of multicollinearity test is given in Table 4.10

Table 4.10: Multicollinearity Test

Model	**Collinearity Statistics**	
	Tolerance	**VIF**
(Constant)		
Procurement Policies	.808	1.238
Eco Supplier Selection	.659	1.517
Information Communication Technology	.785	1.274
Financial Resources	.680	1.470

From Table 4.10 there is no VIF with a value of 5 or greater than 5. The indication is that there is no presence of multicollinearity in the variables under this study.

4.6.2 Linearity test

Linearity test in this study was tested using correlation coefficient. The computation of a correlation coefficient yields a statistic that ranges from -1 to +1. Positive and negative values indicate the direction of the relationship. A positive value implies that when one variable increases, the other variable increases or when one variable decreases the other variable also decreases and hence an direct relationship. A negative relationship implies that as one variable decreases, the other variable increase and vice versa and hence an inverse relationship. 0 indicates no correlation at all. The findings of correlation analysis are as indicated in Table 4:11.

Table 4.11: Correlation Analysis

		Green Procurement Implementation	Procurement Policies	EcoSupplier Selection	Information Communication Technology	Financial Resources
Green Procurement Implementation	Pearson Correlation	1	.651**	.714**	.699**	.742**
	Sig. (2-tailed)		.000	.000	.000	.000
	N	87	87	87	87	87
Procurement Policies	Pearson Correlation	.651**	1	.504**	.948**	.507**
	Sig. (2-tailed)	.000		.000	.000	.000
	N	87	87	87	87	87
EcoSupplier Selection	Pearson Correlation	.714**	.504**	1	.543**	.965**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	87	87	87	87	87
Information Communication Technology	Pearson Correlation	.699**	.948**	.543**	1	.547**
	Sig. (2-tailed)	.000	.000	.000		.000
	N	87	87	87	87	87
Financial Resources	Pearson Correlation	.742**	.507**	.965**	.547**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	87	87	87	87	87

**. Correlation is significant at the 0.01 level (2-tailed).

From Correlation Analysis results, procurement policies had positive and significant effect on implementation of Green procurement r = 0.651, p value 0.000 < 0.05 at 0.05 significance level.Eco Supplier selection had positive and significant effect on implementation of Green procurement r = 0.714, p value 0.000 < 0.05 at 0.05 significance level. Information communication technology had positive and significant effect on implementation of Green procurement r = 0.699, p value 0.000 < 0.05 at 0.05 significance level. Financial resources had positive and significant effect on

implementation of Green procurement r = 0.742, p value 0.000 < 0.05 at 0.05 significance level. The results of correlation analysis as indicated in Table 4.9 imply that there is positive linear relationship between the independent and dependent variables.

4.6.3 Normality Test

A Q-Q test for normality was performed on the dependent variable (Green Procurement Implementation) to determine normality; the output of normal Q-Q plot was used. For data that are normally distributed, the data points will be close to the diagonal line (Scott et al 2011). The results presented in Figure 4.1. Shows a flow of data points close to the diagonal line therefore the data appear to be normally distributed.

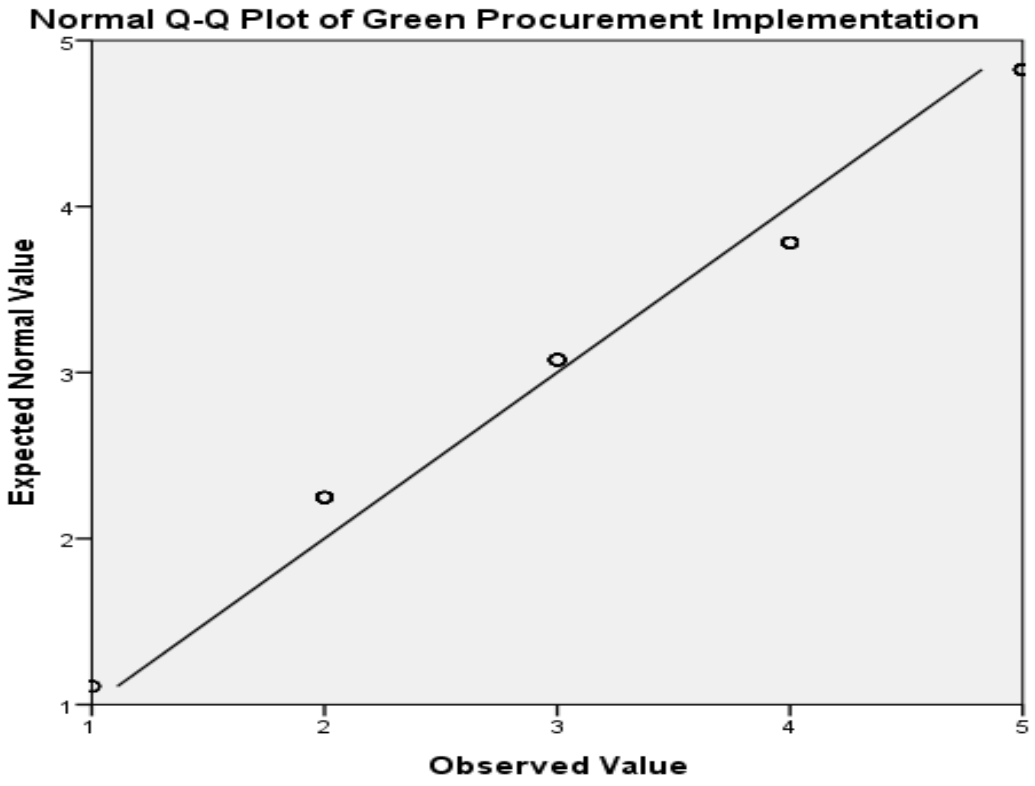

Figure 4.1: Normal Q-Q Plot

4.7 Influence of Procurement Policy on the Implementation of Green Procurement.

The bivariate linear regression analysis was conducted for procurement policy and implementation of green procurement. Table 4.12 to 4.14 presents the results obtained.

Table 4.12: Procurement Policies Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.651[a]	.424	.417	.97302

a. Predictors: (Constant), Procurement Policies

The information presented in Table 4.12 shows R value of 0.651. This indicates that there is a fairly strong positive relationship between procurement policies and implementation of green Procurement in manufacturing Firms in Nyeri County. The R squared value of 0.424 implies that procurement policies predicts 42.4% of the variability in the implementation of green procurement. The rest of the variability can be explained by factors beyond the procurement policy.

Table 4.13: Procurement Policies Model ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	59.272	1	59.272	62.606	.000[b]
	Residual	80.475	85	.947		
	Total	139.747	86			

a. Dependent Variable: Green Procurement Implementation

b. Predictors: (Constant), Procurement Policies

The output on Table 4.13 indicates that the *p*-value is small (*p*=0.000) implying that the relationship between the procurement policies and the implementation of green procurement is statistically significant and the model can be used to predict the dependent variable.

Table 4.14: Procurement Policies Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.433	.282		5.084	.000
	Procurement Policies	.622	.079	.651	7.912	.000

a. Dependent Variable: Green Procurement Implementation

The beta value of 0.622 indicated that the procurement policies are a predictor of the implementation of green procurement. The significant values (p=0.000) under sig. column indicated that the influence of procurement policies on implementation of green procurement was statistical significant. From Table 4.14, the bivariate linear regression model equation fitted using unstandardized coefficients is; $Y= 1.433 + 0.622X_1 + e$ where 1.433 is the constant and X_1 is Procurement Policies index. The study finding implies that an increase of one unit of X_1 increases Y by 0.622.

4.8 Influence of Eco Supplier Selection on the Implementation of Green Procurement.

The bivariate linear regression analysis was conducted for Eco supplier selection and implementation of green procurement. Table 4.15 to 4.17 presents the results obtained.

Table 4.15: Eco Supplier Selection Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.714[a]	.509	.503	.89823

a. Predictors: (Constant), Eco Supplier Selection

The information presented in Table 4.15 shows R value of 0.714. This indicates that there is a strong positive relationship between Eco supplier selection and implementation of green procurement in manufacturing Firms in Nyeri County. The R squared value of 0.509 implies that Eco supplier selection predicts 50.9% of the variability in the implementation of green procurement. The rest of the variability can be explained by factors beyond the Eco supplier selection.

Table 4.16: Eco Supplier Selection Model ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	71.168	1	71.168	88.210	.000[b]
	Residual	68.579	85	.807		
	Total	139.747	86			

a. Dependent Variable: Green Procurement Implementation

b. Predictors: (Constant), EcoSupplier Selection

The output on Table 4.16 indicates that the *p*-value is small (*p*=0.000) implying that the relationship between the Eco supplier selection and the implementation of green procurement is statistically significant and the model can be used to predict the dependent variable.

Table 4.17: Eco Supplier Selection Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.650	.319		2.037	.045
	EcoSupplier Selection	.748	.080	.714	9.392	.000

a. Dependent Variable: Green Procurement Implementation

The beta value of 0.748 indicated that the Eco supplier selection is a predictor of the implementation of green procurement. The significant values (*p*=0.000) under sig. column indicated that the influence of Eco supplier selection on implementation of green procurement was statistical significant. From Table 4.17, the bivariate linear regression model equation fitted using unstandardized coefficients is; $Y= 0.650 + 0.748X_1 + e$ where 0.650 is the constant and X_2 is Eco Supplier selection index. The study finding implies that an increase of one unit of X_2 increases Y by 0.748. The indication was that Eco Supplier selection is one of major factor that affects implementation of green procurement in the manufacturing Firms. According to Armstrong (2008), Supplier selection consists of measuring the performance of a group of suppliers to select the best option improving the effectiveness of the whole supply system. Armstrong noted that supplier Selection is not an easy task, since various potential suppliers may have similar performance characteristics for different attributes. Garran (2011), noted that implementation of green procurement in the manufacturing companies requires specialized skills.

4.9 Influence of Information Communication Technology on the Implementation of Green Procurement.

The bivariate linear regression analysis was conducted for information Communication technology and implementation of green procurement. Table 4.18 to 4.20 presents the results obtained.

Table 4.18: Information Communication Technology Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.699[a]	.488	.482	.91742

a. Predictors: (Constant), Information Communication Technology

The information presented in Table 4.18 shows R value of 0.699. This indicates that there is a fairly strong positive relationship between information communication technology and implementation of green Procurement in manufacturing Firms in Nyeri County. The R squared value of 0.488 implies that information communication technology predicts 48.8% of the variability in the implementation of green procurement. The rest of the variability can be explained by factors beyond the information communication technology.

Table 4.19: Information Communication Technology Model ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	68.206	1	68.206	81.037	.000[b]
	Residual	71.541	85	.842		
	Total	139.747	86			

a. Dependent Variable: Green Procurement Implementation

b. Predictors: (Constant), Information Communication Technology

The output on Table 4.19 indicates that the *p*-value is small (p=0.000) implying that the relationship between the information communication technology and the implementation of green procurement is statistically significant and the model can be used to predict the dependent variable.

Table 4.20: Information Communication Technology Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.231	.271		4.538	.000
Information Communication Technology	.673	.075	.699	9.002	.000

a. Dependent Variable: Green Procurement Implementation

The beta value of 0.673 indicated that information communication technology is a predictor of the implementation of green procurement. The significant values (p=0.000) under sig. column indicated that the influence of information communication technology on implementation of green procurement was statistical significant. From Table 4.20, the bivariate linear regression model equation fitted using unstandardized coefficients is; $Y= 1.231 + 0.673X_4 + e$ where 1.231 is the constant and X_4 is information communication technologies index. The study finding implies that an increase of one unit of X_4 increases Y by 0.673. The finding of this study that information communication technologies had a major effect on implementation of green procurement supports Mambo, Ombui & Kagiri (2013), who noted that technology have been consistently identified as an important factor for successful green procurement adoption. According to Burton-Jones & Hubona (2006), organizations adopt new technologies to improve the efficiency and effectiveness of various work processes, unfortunately, many technology-based products and services never reach their full potential, and some are simply rejected. mabona (2016), noted that lack of supportive information Communication technology infrastructure and absence of ICT skills amongst procurement staff greatly affect the implementation of effective green procurement.

4.10 Influence of Financial Resources on the Implementation of Green Procurement

The bivariate linear regression analysis was conducted for financial resources and implementation of green procurement. Table 4.21 to 4.23 presents the results obtained.

Table 4.21: Financial Resources Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.742[a]	.551	.546	.85916

a. Predictors: (Constant), Financial Resources

The information presented in Table 4.21 shows R value of 0.742. This indicates that there is a fairly strong positive relationship between financial resources and implementation of green Procurement in manufacturing Firms in Nyeri County. The R squared value of 0.551 implies that financial resources predict 55.1% of the variability in the implementation of green procurement. The rest of the variability can be explained by factors beyond the financial resources.

Table 4.22: Financial Resources Model ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	77.004	1	77.004	104.319	.000[b]
	Residual	62.743	85	.738		
	Total	139.747	86			

a. Dependent Variable: Green Procurement Implementation

b. Predictors: (Constant), Financial Resources

The output on Table 4.22 indicates that the *p*-value is small (p=0.000) implying that the relationship between the financial resources and the implementation of green procurement is statistically significant and the model can be used to predict the dependent variable.

Table 4.23: Financial Resources Model Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.582	.301		1.937	.056
	Financial Resources	.773	.076	.742	10.214	.000

a. Dependent Variable: Green Procurement Implementation

The beta value of 0.773 indicated that financial resources are a predictor of the implementation of green procurement. The significant values (p=0.000) under sig. column indicated that the influence of financial resources on implementation of green procurement was statistical significant. From Table 4.23, the bivariate linear regression model equation fitted using unstandardized coefficients is; $Y= 0.582 + 0.773X_3 + e$ where 0.582 is the constant and X_3 is financial resources index. The study finding implies that an increase of one unit of X_1 increases Y by 0.773. The finding of the study that financial resources is a major factor that affect implementation of green procurement support earlier findings by Archer & Yuan (2010), who found out that financial resources is a key factor that influence green procurement implementation. Archer & Yuan noted that financial resources for green procurement can ensure implementation success. Therefore, if the green procurement does not have the full support of the top management team in terms of financial allocation, there is every reason for it to fail. It is important to make sure that the top management has given full support for the adoption of green procurement.

4.11 Overall Regression Model

The researcher conducted multiple linear regression analysis to establish the relationship between the independent and dependent variables of the study. The scores to be regressed were determined by computing the average. Multiple linear regression analysis was then used to test whether there existed interdependency between independent variables (procurement policies, eco supplier selection, information communication technology and financial resources) and dependent variable (implementation of Green procurement). Table 4.24 to 4.26 presents the results of the multiple regression analysis carried out.

Table 4.24: Implementation of Green Procurement Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.844[a]	.712	.698	.70000

a. Predictors: (Constant), Financial Resources, Procurement Policies , Information Communication Technology , EcoSupplier Selection

In a model summary, the "R" value is used to indicate the strength and direction of the relationship between the variables. The closer the value gets to 1, the stronger the relationship. In this case the results indicate R value of 0.844 which mean there is a strong positive relationship between predictor variables and implementation of green Procurement in manufacturing Firms in Nyeri County. The R squared value of 0.712 implies that financial resources, procurement policies, information communication technology, Ecosupplier selection combined predicts 71.2% of the variability in the implementation of green procurement. The rest of the variability can be explained by factors not considered in this study.

Table 4.25: Implementation of Green Procurement Model ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	99.567	4	24.892	50.800	.000[b]
	Residual	40.180	82	.490		
	Total	139.747	86			

a. Dependent Variable: Green Procurement Implementation

b. Predictors: (Constant), Financial Resources, Procurement Policies , Information Communication Technology , EcoSupplier Selection

The output on Table 4.25 indicates that the *p*-value is small (p=0.000) implying that the relationship between the predictor variables (procurement policies, eco supplier selection, information communication technology and financial resources) and the dependent variable (implementation of Green procurement) is statistically significant and the model can be used to predict the dependent variable.

Table 4.26: Implementation of Green Procurement Model Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-.674	.363		-1.858	.067
Procurement Policies	.124	.050	.163	2.476	.015
EcoSupplier Selection	.391	.070	.406	5.561	.000
Information Communication Technology	.189	.065	.196	2.929	.004
Financial Resources	.526	.075	.505	7.042	.000

a. Dependent Variable: Green Procurement Implementation

The beta values in Table 4.26 indicate the direction of the relationship. A positive or negative sign indicates the nature of the relationship. The significant values (p-value) under sig. column indicate the statistical significance of the relationship or the probability of the model giving a wrong prediction. A *p*-value of less than 0.05 is recommended as it signifies a high degree of confidence. The results of the regression equation show that if all the predictor variables were rated zero, implementation of Green procurement would be -0.674. However, all the predictors had a positive relationship with the dependent variable. A unit increase in procurement policies would lead to increased implementation of green procurement by 0.124. A unit increase in Ecosupplier selection would lead to increased implementation of green procurement by 0.391. A unit increase in information communication technology would lead to increased implementation of green procurement by 0.189 while a unit increase in financial resources would lead to increased implementation of green procurement by 0.526. In view of the results in Table 4.26, the optimal model for predicting implementation of green procurement is represented as follows;

$Y= -0.674 + 0.124X_1 + 0.391X_2 + 0.189X_3 + 0.526X_4 + e.$

where X_1 is procurement policies index

X_2 is eco supplier selection index,

X_3 is Information communication technology index

X_4 is financial resources index.

ε= Stochastic error term

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter is a synthesis of the entire report and contains the summary of the findings, conclusion arrived at and policy recommendations arising from the study. Research gaps identified during the study are also identified as basis for future studies.

5.2 Summary of Findings

This section presents a summary of the main findings of the study based on the four core objectives that the researcher sought to accomplish. Overall, the findings of the study revealed that information communication technology and financial resources had positive and significant effect on implementation of green procurement in manufacturing Firms in Nyeri County.

5.2.1 Procurement Policies

The study accentuates that at 5% level of significance the regression results indicated a positive and statistically significant relationship between procurement policies and implementation of green procurement at p value less than 0.000 when considered alone and when combined with other variables. Descriptive results established that inadequate skilled man power poses a major challenge during implementation of green procurement. In addition, the study revealed that procurement policies set aside for implementation of green procurement are not followed to the latter and there is no regular adjustment of green bid specifications to encourage use of green products and recycled paper products.

5.2.2 Eco Supplier Selection

The study accentuates that at 5% level of significance the regression results indicated a positive and statistically significant relationship between eco supplier selection and implementation of green procurement at p value greater than 0.000 when considered alone and when combined with other variables. Based on the results of the descriptive statistic, it was evident that the majority of the respondents believed that working with ISO certified suppliers makes green procurement implementation easy. In addition, most

of the respondent indicated that supplier past performance on green-procurement implementation is an important factor for its successive implementation. It was also noted that absence of competent staff with the right technical skills, experience and lack of training is a major factor to successful implementation of green procurement. The study further revealed that most company staffs do not have the technical knowledge and experience with regard to green procurement and the supplier selection team are adequately trained to support green procurement implementation.

5.2.3 Information Communication Technology

The results of the regression analysis revealed that information communication technology had positive and statistically significant effect on implementation of green procurement when considered alone and when combined with other variables at 5% level of significance. Descriptive results established that inadequate ICT infrastructure, in compatibility of various ICT system and lack of modern ERP systems has been the major factor towards adoption and implementation green procurement. In addition, incompatibility of procurement with other ICT modules has slowed green procurement adoption. The study further revealed that organizations offices do not have adequate IT Infrastructure to support successful implementation of green procurement.

5.2.4 Financial Resource

The regression analysis result established that that financial resource had positive and statistically significant effect on implementation of green procurement when considered alone and when combined with other variables at 5% level of significance. Based on the results of the descriptive statistic, majority of the respondents indicated that there is a cost management policy reviewed and implemented by top management to support green procurement implementation however inadequate financial resources and lack of support by stakeholders have been a major factor towards implementation of green procurement.

5.3 Conclusion of the Study

The study finding revealed that procurement policies had positive and statistically significant relationship between implementation of green procurement. In addition,

inadequate skilled man power poses a major challenge during implementation of green procurement and procurement policies set aside for implementation of green procurement are not followed to the latter. The study therefore conclude that there is need to institute measures to ensure that procurement policies set aside are adhered to and staff are adequately trained on all areas pertaining effective implementation of green procurement.

Eco supplier selection was found to have positive and statistically significant relationship effect on implementation of green procurement. In addition, working with ISO certified suppliers makes green procurement implementation easy and supplier past performance on green procurement implementation was found to be an important factor for successive implementation green procurement. The study therefore conclude that it is necessary to prioritize who are ISO certified in green supply chain since they can enhance effective implementation of green procurement.

Information communication technology had positive and statistically significant effect on implementation of green procurement. However the study established inadequate ICT infrastructure, in compatibility of various ICT system and lack of modern ERP systems has been the major factor towards adoption and implementation green procurement in manufacturing Firms in Nyeri County. The study therefore concludes that manufacturing Firms should embark on investing on ICT infrastructure and redesign procurement system that is compatibility of various existing ICT system. In addition, the hardware component to be acquired should have the capacity to support the software and emerging technologies.

Financial resource had positive and statistically significant effect on implementation of green procurement. In addition, the study revealed that inadequate financial resources and lack of support by stakeholders have been a major factor towards implementation of green procurement. Based on the finding the study concludes that top management to should support green procurement implementation by setting aside adequate financial resources for its effective implementation.

5.4 Recommendations of the Study

This study established that most manufacturing companies in Nyeri County were not effectively implementing green procurement inadequate skilled man power. This study therefore recommends that Nyeri manufacturing companies should develop a staff training policy geared towards training key personnel on implementation of green procurement practices. In addition, all key staff needs to be involved in the procurement function and continuously upgrade their skills in order to be able to appreciate the latest innovations in green product design, to enable them design sustainable tenders documents.

The study established that working with ISO certified suppliers makes green procurement implementation easy. This study therefore recommends prioritizing eco compliant and screening of suppliers for environmental performance in the procurement processes. The study further established ICT highly influence implementation of green procurement. The study therefore recommends full automated procurement process with the aim of enhancing efficiency and effectiveness.

The study established financial resources highly influence implementation of green procurement. This study therefore recommends that companies establishment strategies of setting aside finances through budgetary allocation to focus on effective implementation of green procurement. In addition, management should avail necessary monetary support to the implementation of green procurement practice i.e. reduction of wastage, increase efficacy, increase revenue, growing global requirement among other gains.

5.4 Suggestions for Future Research

The study recommends future researcher to focus on the benefit of implementation of green procurement of manufacturing companies. This study focused on the effect of green procurement in manufacturing Firms in Nyeri County, a study of manufacturing Companies on other counties need to be undertaken to establish whether the findings can

be generalized. The study also suggests that future researcher can focus on challenges of implementing green procurement by manufacturing companies.

REFERENCES

Ambrose (2013).*Introduction to Research Methodology* (2nd Ed.). New Delhi: New Age International limited

Adam Saffer, Paul Temple, and ThibautMuzart (2009), *Extracting Value for Enterprises*: Enterprise Development in the Mining Industry in Sub-Saharan Africa, Business Growth Initiative and UNIDO, Africa.

Agawal, R., Ailamaki, A., Bernstein, P. A., Brewer, E. A., Carey, M. J., Chaudhuri, S., ... & Gehrke, J. (2009). The Claremont report on database research. *Communications of the ACM*, *52*(6), 56-65

Alchian, A.A., and H. Demsets, (2006), *Production, Information Costs, and Economic Organization*, American Economics Review 62 (5), 777-795.

Asanuma, Williamson, North, Buvik&Gronhaug., (2010), *Manufacturer-Supplier Relationships In Japan And The Concept Of Relation-Specific Skill*, Journal of the Japanese and International Economics Vol. 3, pp 1-30.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120

Barney, J. (2011). Firm resources and sustained competitive advantage. *Journal of Management* Vol *102*, 289-301.

Barney, J.B., (2011), *Firm Resources and Sustained Competitive Advantage*, Journal of Management Vol. 17, pp: 99-120.

Berger, P. L., & Luckmann, T. (2007). *The social construction of reality [1966]*. na.

Belkebir, K., & Saillard, M. (2005). Testing inversion algorithms against experimental data: inhomogeneous targets. *Inverse Problems*, *21*(6), S1.

Benton W (2004), *Supplier Evaluations: Communications Strategies To Improve Supplier Performance.*,Journal of Operations Management, Vol. 22. pp39 to 62

Benton, W.C. (2007). *Power influences in the supply chain.* Journal of Operations Management.

Blumberg, B., Cooper, D. R., & Schindler, P. (2011). Business Research Models.

Brammer, S., & Walker, H. (2011). Sustainable procurement in the public sector: an international comparative study. *International Journal of Operations & Production Management*, *31*(4), 452-476.

Brigham, M., & Introna, L. D. (2007). Invoking politics and ethics in the design of information technology: undesigning the design. *Ethics and Information*

Technology, *9*(1), 1-10.Browner, W. S., Newman, T. B., & Hulley, S. B. (2007). Estimating sample size and power: applications and examples. *Designing clinical research*, *3*, 367.

Brooks, W. (1998).*Supply chain management practices and organization performance.* Journal of Supply Chain Management.

Burgess, C. (2006). *Continuing professional development: Introduction to research statistics.* Journal of Social Science.

Burns, J.S. (2007). Chaos theory and leadership studies .*Journal of Business & Industrial Marketing*,

Chai-Arayalert, S., & Nakata, K. (2011, August). The evolution of green ICT practice: UK higher education institutions case study. In *Proceedings of the 2011 IEEE/ACM International Conference on Green Computing and Communications* (pp. 220-225). IEEE Computer Society.

Chang, S. (2008).An Investigation of Stock Depletion Cost and Its Effect on Inventory.*Journal of Supply Chain Management.*

Charles, N. (2008). Centralised and decentralized procurement functions. *Journal of supply chain Management*.

Chien, M. K., & Shih, L. H. (2007). An empirical study of the implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances. *International Journal of Environmental Science and Technology:(IJEST)*, *4*(3), 383.

Chkanikova, O., & Lehner, M. (2015). Private eco-brands and green market development: towards new forms of sustainability governance in the food retailing. *Journal of Cleaner Production*, *107*, 74-84.

Chong. H. Y. (2011). What is the "right" inventory management approach for a purchaseditem.*International Journal of Operations & Production Management*.

Chopra, P. (2005). Purchasing and supplies chain Management.(4th Ed).*New Jersy: Kogan Page Publishers*.

Christian, S. (2011). The purchasing chessboard: 64 methods to reduce cost and increase benefits. *International Journal of Operations Management.*

Christianne D, (2008). New developments in employee training. work study. *International Journal of Management*,

Cohen, L., Manion, L., & Morrison, K.R.B. (2007) *Research methods in Education (6th Edition). Routledge.*

Cohen, A., & Nachmias, R. (2006). A quantitative cost effectiveness model for Web-supported academic instruction. *The Internet and Higher Education*, *9*(2), 81-90.

Cooper, J., & Schindler, M. (2008). Perfect Sample Size in Research. *New Jersey*.

Compton, D. (2007). *Purchasing and supplies chain Management. (3rd Edition).Newyork: Pearson Publishers*

Conner, K. R. (2006).*A historical comparison of the resource-based theory and five schools control models. Unpublished D.B.A. Dissertation, Washington University, St. Louis.*

Cooke W. (2000).structural and market predictors of corporate labor relations strategies. *Journal of logistics Management*..

Cooper, M.C. (2008), Supply chain postponement and speculation strategies.*Journal of Operations Management.*

Cooper, D.R., & Schindler, P.S. (2006) *Business Research Method*, (9th Edition) Boston: McGraw-Hill Irwin.

Corsten, P. (2009). Public procurement practices in developing countries. *Journal of supply chain Management*.

Cox, A. (2007), Implementing 1992 public procurement policy. *Journal of Logistics Management.*

Crossman, A. (2013). A common statistical technique used in sociological. Offshore Outsourcing of Professional Services: A Transaction Cost Economics Perspective.*Journal of Operations Management.*

Daniel, B. (2010). *Cooperative sourcing, simulation studies and empirical data on outsourcing. Journal of Operation Management*.

Dempsey, B. (2003). Research Methods.(4th Edi) New Jersey: Pearson Publishers.

Drew S., Joe, B &Hanna,R.(2006) Enhancing supply chain solutions. *Journal of supply chain Management.*

Drost, E. A. (2011). Validity and reliability in social science research. *Education Research and perspectives*, *38*(1), 105.

Edward,W.(2010). *EOQ* application.International. *Journal of Operations & Production effective Procurement*.

Elia, *et el,*. (2012). Strategic planning optimization for natural gas to liquid transportation fuel (GTL) systems. *Computers & Chemical Engineering*, *72*, 109-125.

Eisenhardt, K.M. (1989), Agency theory: *an assessment and review, Academy of Management.*

Ekanayake, S. (2004), Agency theory, national culture and management control systems, *Journal of Management*.

Elliot, R. (2007). What is the right inventory management approach for a purchased item?*", Journal of purchasing Management*.

Eyraud, L., Wane, A. A., Zhang, C., & Clements, B. (2011). Who's going green and why? Trends and determinants of green investment.

Field A (2005). *Discovering statistics using SPSS. (2nd Ed). New Delhi: Sage Publications*

Field, A. (2000). *Discovering Statistics using SPSS for Windows.(2nd Edition). London. Thousand Oaks*

Field, A. (2006*). Reliability Analysis. Introduction to descriptive statistic (2nd Edition). London. Thousand Oaks*

Findlay, C. (2009), *The case for procurement outsourcing. Journal of Procurement.*

Fisher, M. (2007).*Retail store execution: an empirical study. Journal of supply chain Management.*

Gelderman et al, 2006). A conceptual model of the influences on sustainable public procurement.*Journal of supply chain Management.*

George,K.(2010). *Procurement of technical works.Journal of Procurement.*

Gerd, K. (2009).Public procurement challenges in Uk. *Journal of supply chain Management.*

Ghasemi, A&Zahedias,S.(2012).Normality test for statistical analysis.*New Jersey: Pearson Publishers*

Golder, A. (2007), Outsource recruitment to slash unnecessary costs. *Journal of supply chain Management.*

Grant, R.M. (2007). Prospering in dynamically-competitive environments.*Journal of supply chain Management*.

Green, P.E., Krieger, A.M. (1991), *"Product design strategies for target-market. Journal of supply chain Management.*

Green,P&Tull,C (2009). *Research Methods.(3rd Edition).Newyork: Pearson Publishers.*

Grindle,M.&Thomas,T. (2000). *Managing supplier relationships.Journal of Business Logistics.*

Guadagnoli E and Velicer W. (1988).*Relation of sample size to the stability of component patterns.Psychological Bulletin*.

Günther, E. (2007), *The hurdle analysis: a self-evaluation tool for municipalities Global Supply Chain Journal*.

Habing, B. (2003). Exploratory factor analysis.Journal of Social Sciences.

Hall, J. (2009).Environmental supply chain dynamics, *Journal of Cleaner Production*.

Hall, J. (2009). *Environmental supply chain dynamics.Journal of Production and operation management.*

Handfield, R.B. (2009).*Purchasing and supply chain management (2nd Ed). New Jersey: Pearson Publishers*

Handfield, R., Walton, S. V., Sroufe, R., & Melnyk, S. A. (2002). Applying environmental criteria to supplier assessment: A study in the application of the Analytical Hierarchy Process. *European journal of operational research*, *141*(1), 70-87.

Heikkila, J. (2002).From supply to demand chain management. *Journal of supply Chain Management.*

Hunja, R. (2009).Obstacles to public procurement reform in developing Countries. *Journal of supply chain Management.*

Hu, A. H., & Hsu, C. W. (2010). Critical factors for implementing green supply chain management practice: an empirical study of electrical and electronics industries in Taiwan. *Management research review*, *33*(6), 586-608.

Igarashi, M., de Boer, L., & Fet, A. M. (2013). What is required for greener supplier selection? A literature review and conceptual model development. *Journal of Purchasing and Supply Management*, *19*(4), 247-263.

Jae Mather, 2010. (2010). Forest transition in South Korea: reality, path and drivers. *Land Use Policy*, *29*(1), 198-207.

Joppe,G. (2000).Testing reliability and validity of research instruments.*Journal of American Academy of Business Cambridge*.

Kanire, G. (2012). Social science research methodology: Concepts, methods and computer applications

Kasi, P. (2009) Research: *What, Why and How? A Treatise from Researchers to Researchers (1st Edition). Bloomington*.

Katz, H. C. (2003). The decentralization of collective bargaining. *Journal of supply chain Management.*

Ketchen, D.J. (2007*).* Bridging organization theory and supply Chain. *Journal of supply chain Management.*

Khalili-Damghani, K., & Tavana, M. (2014). A comprehensive framework for sustainable project portfolio selection based on structural equation modeling. *Project Management Journal*, *45*(2), 83-97.

Kim, J., & Mueller, C. (1978) Introduction to factor analysis. *Journal of Social Sciences.*

Kinyanjui, M. J. W. (2013). The role of supply chain tools and techniques.*Journal of supply chain Management*.

King, M. T., Grover, D. L., Kushler, C. A., & Stafford-Fraser, J. Q. (2010). *U.S. Patent No. 7,818,215*. Washington, DC: U.S. Patent and Trademark Office

Koehler, S. & Wilding, R. (1998).Chaos, complexity and supply- chains, Logistics. *Journal of Supply Chain Management*.

Kochan, T. A.(2006). The transformation of american industrial relations.*Journal of supply chain Management*.

Kombo, D. K., & Tromp, D. L. (2006). A (2006). *Proposal and thesis writing: An introduction*.

Kootsra (2013) Exploratory factor analysis: theory and application. *Procurement Journal.*

Kothari, C.R. (2003). *Research methodology: methods & techniques. (2nd Ed). Nairobi: New Age International Publishers.*

Kothari, C. R. (2004). *Research methodology: Methods and techniques*. New Age International.

Kothari, C.R. (2006). Research methodology*: methods & techniques. (1st Ed). Nairobi: New Age International Publishers*

Krishnaswamy, K. N., Sivakumar, A. I., & Mathirajan, M. (2006). *Management research methodology: Integration of principles, methods and techniques*. Pearson Education India

Kull, T. J., & Talluri, S. (2008). A supply risk reduction model using integrated multicriteria decision making. *IEEE Transactions on Engineering Management*, *55*(3), 409-419.

Laforet, S. (2010). *Managing brands: A contemporary perspective*. McGraw-Hill Higher Education

Lin, C., Huang, Y. A., & Stockdale, R. (2011). Developing a B2B web site effectiveness model for SMEs. *Internet Research*, *21*(3), 304-325.

Lysons, K .(2007). *Purchasing and supplies chain Management. (5TH Ed). New Jersy: Pearson publishers.*

Macmillan, M. (2009).Purchasing management. (2nd Ed). London: Oxford Press.

Margetta, J. (2008). *The power of virtual integration.*

Matunga, D. A.,Nyanamba, S. O.&Okibo,W (2013). *The Effect of E- Procurement Practices on efficient procurement in public hospitals.*

Mburu, D. M., & Mwangangi, P. (2014). Issues affecting implementation of procurement policies in government institutions in Kenya: Case of Ministry of East African, Affairs Commerce and Tourism. *International Journal of Social Sciences and Entrepreneurship*.

McCrudden, C. (2008). Using public procurement to achieve social outcomes.*Journal of supply chain Management.*

Mertens, D. M. (2010). Transformative mixed methods research. *Qualitative inquiry*, *16*(6), 469-474.

Michuki, G. N. (2011). University Industry Collaboration and Innovativeness of Firms: Evidence from Kenya Innovation Survey. *International Journal for Innovation Education and Research*, *5*(3), 1-10.

Miller, D., & Friesen, P. H. (1982). The longitudinal analysis of organizations: A methodological perspective. *Management science*, *28*(9), 1013-1034.

Michelsen, O., & de Boer, L. (2009). Green procurement in Norway; a survey of practices at the municipal and county level. *Journal of Environmental Management*, *91*(1), 160-167.

Mohamed, M. S. E., Mohamed, W. S. A. E., Ding, J., & Buchmann, J. (2008, October). MXL2: Solving polynomial equations over GF (2) using an improved mutant strategy. In *International Workshop on Post-Quantum Cryptography* (pp. 203-215). Springer, Berlin, Heidelberg

Morris, M. (2001).*Descriptive research methods.(2ndEd). London. Wadsworth Publishing.*

Mugenda and Mugenda (2003).Research methodology (2nd Ed). Research Methods*; Quantitative and Qualitative Approaches. Nairobi Acts Press.*

Mugenda and Mugenda (2008).*Research methodology.(2nd Ed). Research Methods; Quantitative and Qualitative Approaches. Nairobi Acts Press.*

Muindi, A. (2014). *Factors influencing efficient public procurement in the free*

primary education. Journal of supply chain Management.

Murphy, C. (2007), *Imagining what's possible, Information. Journal of procurement Management.*

Muturi, P. (2015). A Review of Nyeri County-Kenya Strategic Plan 2013-2017. *Int. J. Economics Commerce Manag*, *3*(5), 1365.

Nasiche, F., & Ngugi, G. K. (2014). Determinants of adoption of green procurement in the public sector: A case study of Kenya Pipeline Company. *International Journal of Social Sciences and Entrepreneurship*, *1*(11), 351-372.

Nawrocka, D. (2008). Environmental supply chain management, ISO 14001 and RoHS. How are small companies in the electronics sector managing?. *Corporate Social Responsibility and Environmental Management*, *15*(6), 349-360.

Newing, R. (2011). Environment: long-term impact of green issues played down. *Financial Times*, *18*.

Neto, J. Q. F., Bloemhof-Ruwaard, J. M., van Nunen, J. A. E. E., van Heck, E., Krikke, H., le Blanc, I., ... & Fleuren, H. (2008). *Special Section on Sustainable Supply Chain*. R. Piplani, N. Pujawan, & S. Ray (Eds.). Elsevier

Nderitu, K. M., & Ngugi, K. (2014). Effects of green procurement practices on an organization performance in manufacturing industry: case study of East African Breweries Limited. *European Journal of Business Management*, *2*(1), 341-352.

Ng'ang'a, S. I., Kosgei, Z. K., & Gathuthi, E. W. (2008). Management Research Methods. A Learner's Guide

Ngugi,K & Mugo,H (2010*). Internal factors affecting procurement process of supplies in the government ministries. Journal of supply chain Management.*

Nunnally, J. C. (1978). *Psychometric theory. (2nd ed.). New York: McGraw-Hill.*

O'Loan, N. (2004). *An analysis of the works and supplies directives of the european communities, Public Procurement Law Review.*

OECD (2002).Public procurement practices in developing countries. *Journal of supply chain Management.*

Oburu, C. K. (2010). *A study of the factors contributing towards adoption of green marketing practices in Kenya: a survey of the mobile phone service providers in Kenya* (Doctoral dissertation, University of Nairobi, Kenya).

Odhiambo, 2008). *Green procurement and the socio-economic development of small and medium enterprises in Nigeria. International Journal of Human Resource & Procurement (IJHRP), 1*(4), 17-34.

Ogola,D. (2009). Public procurement *practices. Journal of Purchasing.Journal of supply chain Management.*

Oliver, J. D. (2005). Vibrio vulnificus. In *Oceans and health: pathogens in the marine environment* (pp. 253-276). Springer, Boston, MA.

Ombuki, K., Arasa, R., Ngugi, P. &Muhwezi, M. (2014).Determinants of Procurement regulatory compliance by Kenya public universities.*Journal of supply chain Management.*

Onyinkwa,J. (2013). Factors influencing compliance to procurement regulations in public sector. *Supply chainJournal*.

Orodho, C.R. (2009). Elements of Education and Social Science Research Methods.(2nd Edition). New Delhi:*Kanezja Publishers*

Orodho, A. J. (2003). Essentials of educational and social science research methods: Qualitative and quantitative approaches

Orodho, A. J. (2009). Techniques of Data Analysis Using Statistical Package for Social Sciences (SPSS) Computer Package. *Maseno, Kenya: Kanezja Publishers*.

Palmujoki, A., Parikka-Alhola, K., & Ekroos, A. (2010). Green public procurement: analysis on the use of environmental criteria in contracts. *Review of European, Comparative & International Environmental Law*, *19*(2), 250-262.

Patricia, Dale,P. &Michael,W. (2012). *Procurement methods.Journal of Purchasing.*

Philipson, G. (2010). A Comprehensive and Practical Green ICT Framework. *Handbook of Research on Green ICT: Technology, Business and Social Perspectives: Technology, Business and Social Perspectives*, *1*, 131.

Ramasesh, R.V. (2007). *Procurement under uncertain lead times,a dual-sourcing technique. Procurement Journal.*

Richardson, H.L. &Sowinski, L.L. (2007).*High-tech cost cutting strategies in electronics manufacture ring firms. Supply chain Management Journal.*

Riggs,P. &Sharon,H. (2008). *Strategic sourcing. Journal of Business& Industrial Marketing, right strategy, Journal of Business Logistics*.

Rumsey,D.(2012*). Research methods.(2nd Ed).* New Jersey: *Pearson Publishers*.

Rungtusanatham, M., Rabinovich, E., Ashenbaum, B., Wallin, C. (2007).*Vendor managed inventory. supply chain Management.*

Sarkis, J., Zhu, Q., & Lai, K. H. (2011). An organizational theoretic review of green supply chain management literature. *International Journal of Production Economics, 130*(1), 1-15.

Saunders, M., Lewis, P., Thornhill, A., & Wilson, J. (2009). Business research methods. *Financial Times, Prentice Hall: London*.

Sekaran, U., & Bougie, R. (2006). Research method for business. *Salemba Empat, Jakarta*.

Sanjeeve, A.S (2007) *critical factors that influence e- procurement adoption success in the public sector, Journal of Public Procurement,*

2006. SenjaSvahn, Mika Westerlund, (2009). *Purchasing strategies in supply relationships.supply chain Management.*

Shalle, N.I, Guyo, W. &Amuhaya, I. M. (2014).*Role of inventory optimization.Journal of supply chain Management.*

Saunders, M. (2007) *Research methods for business students, (4th Edition). London: Financial Times Prentice Hall.*

Sekaran, U.,&Bougie, R. (2010) *Research Methods for Business: A Skill Building Approach, (5th Edition).* Hoboken, N.J./Chichester: John Wiley and Sons.

Simpson, M. (2007), *Benchmarking and the organization the performance* .

Slaybaugh (2008).*Quantitative model. Journal of Business Logistics.*

Song, H., Yu, K., & Zhang, S. (2017). Green procurement, stakeholder satisfaction and operational performance. *The International Journal of Logistics Management, 28*(4), 1054-1077.

Stevens, J.P. (1992). *Applied multivariate statistics for the social sciences.(2nd Ed).*Hillsdale, NJ: Erlbaum.

Talluri, S. (2008). E-logistics and the natural environment. *Supply Chain Management: An International Journal*, *9*(4), 303-312.

Testa, F., Iraldo, F., Vaccari, A., & Ferrari, E. (2015). Why Eco-labels can be Effective Marketing Tools: Evidence from a Study on Italian Consumers. *Business Strategy and the Environment*, *24*(4), 252-265.

Teutemann, M. (2007), *The completion of the internal market: an application of public choice the application of chaos theory, supply chain management: An International Journal of Supply Chain*.

Varnäs, A., Faith-Ell, C., & Balfors, B. (2009). Linking environmental impact assessment, environmental management systems and green procurement in construction projects: lessons from the City Tunnel Project in Malmö, Sweden. *Impact Assessment and Project Appraisal*, *27*(1), 69-76

Velnampy (2010).*Evaluation of factors influencing effective procurement Management.Journal of Management*.

Wanderi, (2007). *The Role of Tour-Guides in the Conservation of Cultural Landscapes in Kieni East Division, Nyeri North District* (Doctoral dissertation, University of Nairobi, Kenya).

Wang,J.C(2012). *ICT in supply chain.Journal of operation management.*

Wanjiru, D. K. (2014).*Effects of records management on the efficiency of the Procurement.supply chain Management*.

Wanyama, J (2010). *The effectiveness of the procurement regulations in Kenya.supply chain Management.*

Wheatley, M.J. (2009) *Leadership and the New Science.(2nd Ed).* New Jersy: Pearson Publishers

Wong, M. H., Leung, A. O. W., Chan, J. K. Y., & Choi, M. P. K. (2005). A review on the usage of POP pesticides in China, with emphasis on DDT loadings in human milk. *Chemosphere*, *60*(6), 740-752.

Xingxing, Z. (2012). An agency theory perspective on supply chain quality management. *Journal of Supply Chain Management*.

Yano, C.A., Dobson, G. (1998).Designing product lines for diverse customer Markets.*Journal of Operational Managemment.*

Zander, U. (2007).*Knowledge of the firm, combinative capabilities.(2nd Ed).* London: Kogan Page Publishers

Zinbarg,M. (2005), *Research methods.(1st Edition).New Jersey*: Pearson Publishers.New Jersey..

APPENDICES

Appendix 1: Introduction Letter

To Whom It May Concern

Dear Sir/Madam,

RE: COLLLECTION OF DATA

I am a master's student in the Department of Procurement and logistics, Dedan Kimathi university of Technology. As part of the requirement for the award of the degree, I am expected to undertake a research study .I'm therefore, seeking your assistance to fill the questionnaires attached. The attached questionnaire will take about twenty minutes to complete. Kindly answer all the questions. The research results will be used for academic purposes only and will be treated with utmost confidentiality. Only summary results will be made public. No one, except the institution will have access to these records

Yours sincerely,

Martin Njoroge

SECTION A: GENERAL INFORMATION

General information

This questionnaire is meant to test the factors that influence the factors affecting effective green procurement implementation in Kenya. Specifically it will involve aspects of procurement policies, eco supplier selection, information communication technology and financial resources

Respondent particulars

What is your qualification?

Master ( )

Degree ( )

Diploma ( )

Others ( )

How long have you worked in the in the company (tick as appropriate)

a. Less than 1 year ☐
b. Between 1-5 years ☐
c. Between 5-10 years ☐
d. Over 10 years ☐

Section B: Procurement Policies

This section has statements regarding the procurement policies that your Organization has adopted. Kindly respond with the response that matches your opinion. Please tick as appropriate in the boxes using a tick (√) or cross mark (x).

QUESTION	Strongly Agree	Agree	Disagree	Strongly Disagree
There is a current statement or policy that commits the company for sustainability and/or reducing environmental impact procurement decision taking				
Procurement policies set aside for implementation of green procurement are not followed to the latter to enhance successful implementation green procurement				
Inadequate skilled man power poses a major challenge during implementation of green procurement				
There is no Regular adjustment of green bid specifications to encourage use of green products and recycled paper products				
Inadequate participation in an indoor quality review have affected green procurement implementation				

SECTION C: Eco Supplier Selection

What reason best explains why you trade with eco suppliers? Please tick as appropriate

Reason	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
Working with ISO certified suppliers makes green procurement implementation easy					
Supplier past performance on green-procurement implementation is an important factor for its successive implementation.					
Absence of competent staff with the right technical skills, experience and lack of training is a major Factor to successful implementation of Green procurement					
Supplier selection team are adequately trained to support green procurement implementation					

Section D: Financial Resources

NOTE: From this section**,** kindly use the scale given below to indicate your level of agreement with the following statements 5- Strongly Agree, 4-Agree, 3- Neutral 2-Disagree; 1- Strongly Disagree by placing a tick (√) in the appropriate box

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Adequate financial resources are available to support adoption and implementation of green procurement.					
There is a cost management policy reviewed and implemented by top management to support green procurement implementation					
The company remain committed to supplier development through financial support					
Commitment to change from paperwork to electronic procurement have the support of top management					
The major Stakeholders (Leaders, suppliers, employees, service providers) in the company supported implementation of Green procurement					

SECTION E: Information Communication Technology

From this section**,** kindly use the scale given below to indicate your level of agreement with the following statements 5- Strongly Agree, 4-Agree, 3- Neutral 2-Disagree; 1- Strongly Disagree by placing a tick (√) in the appropriate box

Statement	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Inadequate ICT infrastructure, in compatibility of various ICT system and lack of modern ERP systems has been the major factor towards adoption and implementation green - procurement					
Incompatibility of procurement with other ICT modules has slowed green procurement adoption					
The current ICT infrastructure is well managed to support electronic data interchange which enhance implementation of green procurement					
There adequate IT Infrastructure to support e sourcing which in the long run reduces paper work					

SECTION F: Green Procurement Implementation

Average rate of improvement	2013	2014	2015	2016
Indicate in percentage (%) how much the company has saved through use of green raw materials in the indicated years				
Percentage (%) of waste management improvement				
Percentage (%) of lead time improvement in the indicated years?				
Percentage (%) of quality improvement in the indicated years				

Appendix II: Study Schedule

Activity	**April-2017**	**Sep-2017**	**Nov 2017**	**Feb 2018**	**March 2018**
Proposal writing					
Construction instrument					
Pilot study					
Main study					
Data editing and analysis					
Report writing					
Publishing report					

Appendix iii: Budget

Activity	**Cost (Ksh)**
Research of proposal and Printing	14,000
Photocopy	4,000
Data collection and analysis	38,000
Internet	2,000
Binding	3,000
Travelling expenses	10,000
Miscellaneous	3,000
Publishing	17,000
Total	**91,000**