

**ENVIRONMENTAL MANAGEMENT SYSTEMS AND PERFORMANCE OF
MANUFACTURING FIRMS IN KENYA**

KASUKI MARGARET MBINYA

D53/OL/25145/2012

**A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS IN
PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF
THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION OF
KENYATTA UNIVERSITY**

OCTOBER, 2017

DECLARATION

I, declare that this research project is my original work and has not been presented for a degree award in any other university.

Signature _____ **Date** _____

Kasuki Margaret Mbinya

I confirm that the work reported in this research project was done by the candidate under my supervision as the appointed University Supervisor

Signature _____ **Date** _____

Dr. Jane Wanjira (Ph.D)

Department of Business Administration

School of Business

Kenyatta University

DEDICATION

I dedicate this project to my family members who have been my key asset in emotional support. I honestly appreciate their support and prayers that led to the completion of this project within the specified timeframe.

ACKNOWLEDGEMENT

First and foremost, my sincere thanks go to God for enabling me go this far, unto him be glory forever. My special thanks also goes to my supervisor Dr. Jane Wanjira for the guidance, and every contribution she made to help me come up with this work. I also want to thank all my classmates and other people who have helped me in all the phases of my studies.

I acknowledge with sincere gratitude the immeasurable support of my husband and child for their endless support, understanding and for providing a conducive environment. God bless you for your prayers and consistent support in all the phases of my studies.

I also wish to appreciate my beloved late father Joseph Kasuki, Mother Justina, siblings Pauline, Patrick, Victoria, John, Boniface and Jane. May God bless all who contributed to the success of this research project.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF TABLES	ix
LIST OF FIGURES	x
ABBREVIATIONS AND ACRONYMS	xi
OPERATIONAL DEFINITIONS OF TERMS	xii
ABSTRACT	xiii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.1.1 Manufacturing Sector in Kenya.....	5
1.2 Statement of the Problem	6
1.3 Objectives of the Study	8
1.3.1 General Objective	8
1.3.2 Specific Objective.....	8
1.4 Research Questions	8
1.5 Significance of the Study.....	9
1.6 Scope of the Study	10
1.7 Limitations of the Study	10
CHAPTER TWO: LITERATURE REVIEW	11
2.1 Introduction.....	11

2.2 Theoretical Literature Review	11
2.2.1 Ecological Modernization Theory	11
2.2.2 Stakeholder Theory.....	12
2.2.3 Total Quality Management Theory	13
2.3 Empirical Review.....	14
2.3.1 Green Manufacturing Systems and Environmental Performance	14
2.3.2 Pollution Prevention Systems Environmental Performance	17
2.3.3 Management Systems and Environmental Performance	18
2.3.4 Pollution Control Systems and Environmental Performance.....	21
2.4 Summary of Literature Review.....	23
CHAPTER THREE: RESEARCH METHODOLOGY.....	29
3.1 Introduction.....	29
3.2 Research Design.....	29
3.3 Target Population.....	29
3.4 Sample Procedure and Sample Size.....	30
3.5 Data Collection Instrument.....	31
3.5.1 Validity of the Research Instrument	32
3.5.2 Reliability of the Research Instrument	32
3.6 Data Collection Procedures	33
3.7 Data Analysis and Presentation	34
3.8 Ethical Consideration.....	35

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION.....	36
4.1 Introduction.....	36
4.2 Response Rate.....	36
4.3 Demographic Characteristics.....	36
4.3.1 Period of Operation.....	36
4.3.2 Number of Staff.....	37
4.4 Registration with NEMA.....	38
4.4.1 Existence of Environmental Management Department.....	38
4.4.2 Existence of Environmental Management Policy.....	39
4.5 Descriptive Statistics.....	40
4.5.1 Green Manufacturing Practices.....	40
4.5.2 Pollution Prevention Practices.....	42
4.5.3 Management System Practices.....	44
4.5.4 Pollution Control Practices.....	46
4.5.5 Environmental Performance.....	48
4.6 Inferential Statistics.....	49
4.7 Correlations Analysis.....	49
CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS ...	56
5.1 Introduction.....	56
5.2 Summary.....	56
5.3 Conclusion.....	57

5.4 Recommendations for Policy and Practice	59
5.5 Suggestions for Further Research	60
REFERENCES	61
APPENDICES	72
Appendix i: Introductory Letter.....	72
Appendix ii: Questionnaire	73
Appendix iii: List of Manufacturing Firms in Nairobi	78
Appendix iv: Approval of Research Project Proposal	80
Appendix v: Research Authorization Letter from Kenyatta University	81
Appendix vi: Research Authorization Letter from NACOSTI.....	82
Appendix vii: Examination Report	83

LIST OF TABLES

Table 2.1: Summary of Research Gaps.....	24
Table 3.1: Target Population	30
Table 3.2: Sample Design	31
Table 3.3: Reliability Results	33
Table 4.1: Period of Operation	37
Table 4.2: Number of Staff.....	37
Table 4.3: Registration with NEMA	38
Table 4.4: Existence of Environmental Management Department.....	39
Table 4.5: Existence of Environmental Management Policy	39
Table 4.6: Green Manufacturing Practices.....	40
Table 4.7: Pollution Prevention Practices	42
Table 4.8: Management System Practices.....	44
Table 4.9: Pollution Control Practices	46
Table 4.10: Environmental Performance	48
Table 4.11: Correlations Analysis	50
Table 4.12: Model Summary	51
Table 4.13: ANOVA Test	52
Table 4.14: Regression Coefficient	52
Table 4.15: Performance Measurement Outputs	54

LIST OF FIGURES

Figure 2.1: Conceptual Framework	28
--	----

ABBREVIATIONS AND ACRONYMS

AGOA	African Growth and Opportunity Act
BVK	Bureau Veritas of Kenya
GSM	Green Supply Management
EBITD	Earnings before Interest, Taxes, Depreciation and Amortization
EMS	Environmental Management Systems
EPIs	Environmental performance indicators
EPZ	Export Processing Zones
GDP	Gross domestic product
GoK	Government of Kenya
ISO	International Standard Organization
KEBS	Kenya Bureau of Standards
KNBS	Kenya National Bureau of Statistics
MSEs	Micro and Small Enterprises
NACOSTI	National Commission for Science Technology and Innovation
SEZs	Special Economic Zones
SPSS	Statistical Package for Social Science
UN	United Nations
UNDP	United Nations Development Programme
USA	United States of America
WHO	World Health Organization

OPERATIONAL DEFINITIONS OF TERMS

- Certification:** The confirmation of adherence to laid down environmental management strategies of a firm.
- Effect:** The end result on firm performance resulting from certain practices or procedures applied on it.
- Environmental Management System:**
Part of the overall management system of a firm that includes EMS awareness, EMS certification and environmental audits.
- Firm:** A business organization such as a corporation, limited liability company or partnership.
- Manufacturing:** This is the production of merchandise for use or sale using labor and machines, tools, chemical and biological processing, or formulation.
- Performance:** The end result of practices of a firm.
- Relationship:** Is the state of interaction between two or among variables.
- ISO 14001:** The organizational structure, responsibilities, practices, procedures, processes and resources for implementing and maintaining environmental management.
- ISO 14000:** Is a family of standards intended to support environmental protection and prevent pollution in balance with socioeconomic needs.

ABSTRACT

Environmental degradation brings about challenges to human health, animals and plants through pollution of air, water and soil. To mitigate this pollution standard guidelines on management of the environment has been developed. Firms/organizations/institutions that are not ISO 14001 compliant are expected to employ this standard in their operations to stop or reduce polluting the environment. The general objective of this study was to investigate the environmental management systems and environmental performance of manufacturing firms in Nairobi City County, Kenya. The specific objectives of the study were to: determine the effect of Green Manufacturing Systems, Pollution Prevention Systems, Management Systems and Pollution Control Systems on performance of manufacturing firms in Nairobi City County, Kenya. This study would be of great help to ISO certification agencies, manufacturing firms, investors, future researchers, the general public and the Kenyan government. The study was done on manufacturing companies across the board that are most commonly known in the Kenyan manufacturing sector. Theories that were adopted to inform this study included; Ecological Modernization Theory, Stakeholder Theory and Total Quality Management Theory. The study adopted a longitudinal research design that was descriptive in nature to establish the effect of environmental management systems on performance of manufacturing firms in Nairobi City County, Kenya for the period 2011-2015. The study analysed the pre and post-performance of manufacturing firms to determine the problem under investigation. Target population of this study was 44 manufacturing firms which were operating in Nairobi City County, Kenya and Unit of observation were employees of manufacturing firms operating in Nairobi County, Kenya. Out of the 44 manufacturing companies a target population of 176 employees was used. Stratified sampling technique was used to select a sample size of 88 respondents who were employees of the manufacturing firms in Nairobi County, Kenya. Stratified sampling was appropriate since it provided equal opportunities for each respondent during data collection process. Structured questionnaires with open and closed ended questions were used as instruments of data collection. The respondents were; Directors, Production Managers, Occupational and Safety Managers and Quality Assurance Managers. Validity of the instrument was tested using industry experts and University supervisors, while reliability was tested using Cronbach Alpha formula. Quantitative data collected was analysed using Statistical Package for Social Sciences, (SPSS version 21) where multiple regression method was adopted to determine the statistical relationship between variables. Means, percentages and standard deviation were used during data analysis and the information was presented in form of tables. Further, qualitative data was analyzed using content analysis method where key themes of written and spoken word were reviewed and conclusions were made. The study established that there was a positive statistical correlation between green manufacturing systems, pollution prevention systems, management systems and pollution control systems and environmental performance of manufacturing firms in Nairobi City County, Kenya. The study concluded that environmental management systems have become drivers of competitive organizations in the changing business environment. Unless manufacturers were willing to comply with environmental regulations spelt out in ISO 14001 standards, environmental performance would be an uphill task. The study recommends that manufacturing companies should ensure that employees are trained on ISO 14001 regulations, appropriate technology is adopted and industry partnership is based on best environmental practices rather than on the sole revenues gain objective.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

There has been increasing environmental concern from the government and the general public in the recent past and even today (Sarkis, Torre & Diaz, 2010). Much of this concern has been on the impact of corporate activities on the natural environment. This is due to the negative impacts some of these activities have on the environment such as global warming and scarcity of some critical resources. This has led to environmental management becoming a critical business consideration for any company that aims to survive from many regulations and tough business requirements (Mohamed, 2011).

Many business firms worldwide have adopted formal environmental management systems (EMSs) as procedures for systematically identifying environmental aspects and impacts of their operations, setting explicit goals for compliance, performance, and continuous improvement, and managing for them throughout these operations. This procedure has been standardized and promoted by the International Organization for Standardization (ISO: 14001). KAM (2012) asserts that environmental management system helps organizations identify, manage, monitor and control their environmental issues in a holistic manner.

Chang, Kenzhekhanuly and Park (2013) suggest that ISO 14001 is suitable for organizations of all types and sizes, be they private, not-for-profit or governmental. It requires that an organization considers all environmental issues relevant to its operations, such as air pollution, water and sewage issues, waste management, soil contamination, climate change mitigation and adaptation, and resource use and efficiency (Baines, Brown, Benedettini & Ball, 2012).

Hasan (2013) argues that organizations and people must adopt environmentally responsible production and consumption in order to recover environmental quality, reduce poverty and bring about economic growth, with resultant improvements in healthy working conditions, and sustainability. Every organization including tea processing firms must put measures in place to ensure all dimensions of its operations are environmentally friendly (Okemba & Namusonge, 2014).

Like all ISO management system standards, ISO 14001 includes the need for continual improvement of an organization's systems and approach to environmental concerns (Murphy, 2012). The standard has recently been revised, with key improvements such as the increased prominence of environmental management within the organization's strategic planning processes, greater input from leadership and a stronger commitment to proactive initiatives that boost environmental performance (Mwaura, Letting, Ithinji & Orwa, 2015).

Jaju (2011) argues that every organization must make better use of natural resources for sustainable growth. Every organization must incorporate environmentally friendly practices in all its activities. Just like other business activities, Supply Chain activities are no exception. Since the early 1990's, manufacturers have been forced to address Environmental Management in their supply chains. Being environmentally conscious in supply chain operations is not only associated with reduced negative impacts on the environment but also improvement in overall company performance.

While many organizations have in the past have concentrated on reverse logistics, there is need to adopt green supply chain management (GSCM) practices that looks at the entire

supply chain (KIPPRA, 2013). Environmental Management Systems are a collection of management processes that enable facilities to continually reduce their impact to the natural environment (KNBS, 2015). Most EMSs involve implementing a written environmental policy, environmental performance indicators/goals, environmental training program in place for employees, and internal environmental audits.

EMSs have the potential to encourage facilities to adopt more sophisticated environmental strategies that build on their basic pollution prevention principles. EMS can improve a business internal operations, achieve greater efficiencies, and create opportunities to reduce their environmental impacts by way of pollution prevention (Momanyi, 2013). Mohamed (2011) argue that there are many reasons why an organization should take a strategic approach to improving its environmental performance.

Pietro *et al.* (2013) avers that ISO 14001 helps organizations to demonstrate compliance with current and future statutory and regulatory requirements, increase leadership involvement and engagement of stakeholders, improve company reputation and the confidence of stakeholders, achieve strategic business aims by incorporating environmental issues into business management, provide a competitive and financial advantage through improved efficiencies and reduced costs and encourage better environmental performance of suppliers by integrating them into the organization's business systems (Moutray, 2015).

ISO 14001:2015 sets out the criteria for an environmental management system and can be certified to (Mpathia, Mukulu, & Keriko, 2012). It maps out a framework that a company

or organization can follow to set up an effective environmental management system. It can be used by any organization regardless of its activity or sector. Using ISO 14001:2015 can provide assurance to company management and employees as well as external stakeholders that environmental impact is being measured and improved. ISO 14001 provides a framework for environmental management best practice to aid organisations to prevent pollution, minimise environmental footprint, conform to environmental legislation and develop their business in a sustainable manner (Mwaura, Letting, Ithinji & Orwa, 2015).

Odeh and Smallhood (2012) ascertains that applicable to all sectors of industry, ISO 14001 helps organisations review their practices to mitigate against environmental risk and ensure sustainability (Nee, & Wahid, 2010). Benefits of ISO 14001 certification to competitive firms range from: quantifying, monitoring & controlling impact of operations on the environment; ensuring legislative awareness & compliance; improving environmental performance of supply chain; identifying cost savings with greater emphasis on resource, waste & energy management; involving people in minimising negative impacts; protecting the company, assets, shareholders & directors; improving corporate image and credibility among stake holders, regulators, customers, prospective clients and the public (Otieno, 2011).

ISO 14001 defines environmental performance as measurable results of the environmental management systems relating to the management of the environmental aspects performed by the organization based on its environmental policies and objectives (UNDP, 2015). It is focused on reduced levels of environmental pollutants. Environmental performance of an organization may be achieved through reduction of air

emission, reduction of waste water, reduction of solid wastes, decrease of consumption for hazardous materials, decrease of frequency for environmental accidents. Environmental performance may be enhanced through among other factors assigning environmental responsibility to general managers, and they provide environmental training to non-environmental workers as well as environmental specialists (Hasan, 2013).

1.1.1 Manufacturing Sector in Kenya

Since achieving independence in 1963 Kenya's economy has remained largely agriculture based, so industrialisation remains a key factor in Kenya's development plans. In 2011 the industrial sector in Kenya contributed 16% of the country's GDP; the contribution of GDP from industry has remained fairly consistent throughout the 2000s. Kenya's industrial production growth rate for 2011 was recorded as 3.1% (AKM, 2011). Manufacturing contributes 11% of Kenya's GDP per capita, and makes up the largest section of the country's industrial production.

Kenya is rated 129 out of 185 countries by the World Bank for ease of doing business, a ranking based on how conducive the regulatory environment is to the opening and operation of a local firm. In 2011 the manufacturing sector in Kenya employed 254,000 people equivalent to 13% of total employment, and contributed US\$285,698 towards the country's GDP, making manufacturing an important part of the Kenyan economy. Added to this, the informal side of the manufacturing industry currently employs a further 1.4 million workers.

Industrial products include food, plastic goods, furniture, batteries, textiles, clothing, soap, cigarettes, flour, fuels, steel, cement among others. In 2010 Kenya exported the equivalent of US\$4,723,558,847; major contributors were vegetable products 50%; food beverages and tobacco 9% and chemicals 8.5% (United Nations Commodity Trade Statistics Database 2010). In 2011 locally manufactured goods comprised 25% of Kenya's exports. Imports continually outweighed exports by over 50% from 2005-2010, suggesting that the Kenyan manufacturing sector is highly import dependant. Kenya's 2010 imports measured US\$9,376,736,812 in 2010; the major import related industries are minerals 12.5%; and vehicles and transport 15.3% (KNBS, 2015). The high reliance on imports throughout Eastern Africa suggests that Kenya's regional competitiveness could be improved by gradually replacing their external suppliers.

In the 2012-2013 World Economic Forum Global Competitiveness Report Kenya was ranked 68 out of 144 countries in the report. For production process sophistication Kenya was given a score of 3.6 out of 7.0, where 7.0 is the most desirable. Kenya ranked higher than many other countries in the East African region, with Uganda receiving a rating of 122 and scoring 2.8. The overall performance of the manufacturing sector has been affected by low capital injection and high costs of doing business brought about by underdeveloped physical infrastructure, limited access to finance, and underdeveloped institutional frameworks and skills; resulting in limited FDI and increased external investment (Mars Group Kenya, manufacturing and industry sector report 2011).

1.2 Statement of the Problem

Environmental Management Systems provides a framework for environmental management best practice to aid organizations to prevent pollution, minimize

environmental footprint, conform to environmental legislation and develop their business in a sustainable manner (KAM, 2012). Application of EMS in the manufacturing sector has contributed to improved environmental performance of firms locally and internationally. Despite the challenge of implementing EMS by many firms around the world, a survey conducted by ISO (2013) revealed that firms are likely to achieve increased productivity based on compliance to ISO 14001 standards.

In the Kenyan context, a number of studies have been conducted. For instance, Otieno (2011) studies on green supply chain management practices in the food manufacturing industry in Kenya and revealed that green supply chain management practices adoption was at a low stage. Mohamed (2012) studied on green supply chain management and performance of manufacturing in Mombasa and noted that green supply chain management has a positive impact on manufacturing firms' performance. Ong'ong'o (2012) studied on factors affecting adoption of green technology by firms in Kenya and established that regulatory policy is the major factor affecting adoption of green technology. However, the studies focused on green supply chain but not environmental management systems.

However, from the findings of the previous studies, it is revealed that little has been done by previous researchers to address the problem under investigation. Most of the studies were conducted in different countries like Malaysia and United States. Some adopted different research methodologies like cross-sectional and causal research designs and data analysis methods which cannot be relied in this study. Therefore, it is on this background this study sought to investigate environmental management systems and performance of manufacturing firms in Nairobi City County, Kenya.

1.3 Objectives of the Study

1.3.1 General Objective

The study sought to establish the influence of environmental management systems and performance of manufacturing firms in Kenya.

1.3.2 Specific Objective

The specific research objectives of this study were:

- i. To establish the influence of Green Manufacturing Systems on performance of manufacturing firms in Nairobi City County, Kenya.
- ii. To determine the influence of Pollution Prevention Systems on performance of manufacturing firms in Nairobi City County, Kenya.
- iii. To evaluate the effect of Management Systems on performance of manufacturing firms in Nairobi City County, Kenya.
- iv. To assess that effect of Pollution Control Systems on performance of manufacturing firms in Nairobi City County, Kenya.

1.4 Research Questions

The research questions of this study were:

- i. How does Green Manufacturing Systems influence performance of manufacturing firms in Nairobi City County, Kenya?
- ii. What is the effect of Pollution Prevention Systems on performance of manufacturing firms in Nairobi City County, Kenya?
- iii. What is the effect of Management Systems on performance of manufacturing firms in Nairobi City County, Kenya?
- iv. How does Pollution Control Systems influence performance of manufacturing

firms in Nairobi City County, Kenya?

1.5 Significance of the Study

This study would be of great help to a number of stakeholders that include; ISO Agencies, manufacturing companies, The Kenyan Government, investors and researchers and scholars.

Manufacturing of Manufacturing firms would use the findings of this study to formulate policies that would encourage production of environmental friendly products thus promote corporate social responsibility culture.

The Government National and County Government will find this study beneficial since it would endorse the already existing policies through National Environmental Management Authority and Department of Environment in various Counties would operate and develop environmental management frameworks thus sustainable performance of firms in the manufacturing sector in Kenya.

Management of regulatory bodies such as ISO would use information of this study to review the already existing environmental management systems and develop systems that would address the changing needs of business. The findings of the study would assist ISO certification agencies to know the effects of EMSs on performance of manufacturing firms.

Investors interested in the manufacturing sector in Kenya would use this information to make investment decisions enshrined with EMS. Finally, researchers and scholars in the field of strategic management would use this information to develop new theories and formulate hypotheses for future studies.

1.6 Scope of the Study

The study focused on manufacturing firms in Nairobi County, Kenya to establish environmental management systems on performance of manufacturing firms in Nairobi County, Kenya for the period 2011-2015. The independent variables of the study were; Green Manufacturing Systems, Pollution Prevention Systems, Management Systems and Pollution Control Systems while the dependent variable of the study was environmental performance of manufacturing firms in Nairobi County, Kenya. The study was conducted within a period of three months.

1.7 Limitations of the Study

This study focused on all the manufacturing firms in Nairobi County. The challenges that were encountered originated from the method that was used to collect data, which was the questionnaire. These challenges included failure to return questionnaires by employees. To overcome/reduce the impact of these challenges, the researcher used drop and later pick method. In addition, the firms were located at different places within the capital of Nairobi. Moreover, another challenge was of gathering information from small sized organizations as they had no clear systems and structures. To overcome this problem, the researcher studied firms across the board so that those posing this challenge were represented by those without this problem but of the same nature. Another key limitation was that some firms did not understand what EMS was all about. However, this challenge was overcome by explaining to respondents its meaning and implication to their firms.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This chapter outlines; the introduction, theoretical literature review, empirical literature review, critique of literature, summary of literature and knowledge gaps and conceptual framework.

2.2 Theoretical Literature Review

Theories that were adopted to inform this study were; Ecological Modernization Theory, Stakeholder Theory and Total Quality Management Theory as discussed:

2.2.1 Ecological Modernization Theory

Ecological Modernization Theory was established in 1980's by a group of scholars such as Huber, Janickie and Simonis. The theory argues that the economy benefits from moves towards environmentalism (Watson *et al*, 2004). It is based on the assumption that organizations are environmental dependent but not vice versa. Organizations that observe and comply with environmental regulations are likely to perform well and vice versa. Ecological modernization relates to environmental preadaptation of economic growth and industrial development.

On the basis of enlightened self-interest, economy and ecology can be favourably combined (UNDP, 2015).The fundamental philosophy of the theory emphasizes on resource efficiency as well as product and process innovations such as environmental management and sustainable supply chain management, clean technologies, benign substitution of hazardous substances, and product design for environment (Santos & Brito, 2012).

Radical innovations in these fields can not only reduce quantities of resource turnover and emissions, but also change the quality or structure of the industrial metabolism. In the co-evolution of humans and nature, and in order to upgrade the environment's carrying capacity, ecological modernization gives humans an active role to play, which may entail conflicts with nature conservation (Toke, Gupta & Dandekar, 2012). Therefore, this theory was underpinned on Green Manufacturing Systems and pollution prevention systems variable of this study.

2.2.2 Stakeholder Theory

The Theory was established by Freeman in (1983) and later was reviewed by other proponents such as Mile (Samantha, 2012). Florida and Davison (2001) argue that stakeholder approach to corporate environmental management to include any individual or group who can affect the firm's performance or who is affected by the achievement of the organizations' objectives. The stakeholder theory is grouped into two: strategic stakeholder who emphasizes the active management of stakeholder interests and moral stakeholder interested in balancing stakeholder interests Corporations should not focus narrowly their strategic management decisions on creating shareholder value; rather broaden their objectives to tackle the expectations and interest of a wide variety of salient stakeholders (Freeman & Phillips, 2002).

Chang, Kenzhekhanuly and Park (2013) argue that poor environmental performance leads to poor company's relationship with its stakeholders. This will affect the firm's reputation and shareholders will suffer financial losses on their investments if a firm's is found liable to environmental damage. Consequently shareholders and financial institutions perceive companies with a poor environmental record as riskier to invest in and may demand a

higher risk premium. Also companies with a poor reputation of environmental management will find it harder to attract and retain highly qualified employees who may have a strong proactive environmental management.

Chang, Kenzhekhanuly and Park (2013) suggest that a firm with a reactive environmental strategy may face big loss of competitive advantage if proactive environmental management becomes a common practice among its competitors. The threats posed by various stakeholders in response to the poor environmental management may thus induce firms to improve their corporate environmental practice. The assumption of this theory is that organizations interact with people within the system and those outside the system and they have to be represented in the corporate decision making process. Therefore, manufacturing firms should embrace ISO 14001 practices for them to be judged by stakeholders as socially responsible (Murphy, 2012). Therefore, this theory was underpinned on pollution control systems variable of this study.

2.2.3 Total Quality Management Theory

The theory was established by Deming and Juran (1931). They propose that quality is perceived from different perspectives by different customers. TQM theory is applied by competitive organizations in managing service quality in the dynamic business environment. The theory holds that environmental performance is enhanced by designing products and services to meet or exceed customer expectation by empowering workers to find and eliminate all factors that undermine product or service. TQM promotes organizational effectiveness through; promoting stakeholder satisfaction, pursuing continuous improvement; and fostering proactive leadership (Murphy, 2012).

Boer and Zandberg (2012) argue that organizational managers should engage their staff in identifying the organization's internal and external stakeholders and by determining the criteria that each uses to judge the organization to be successful. This process suggests that the effective competitive organization is one that satisfies the expectations of its customers and stakeholders without environmental pollution. Quality is a complex phenomenon based on perception by individuals with different perspectives on products companies produce and their impact to the environment. Consequently, quality encapsulates time and other contextual dimensions that add to the complexity of what is essentially a subjective evaluation of the quality of good and/or service by the consumer (Lalinsky, 2012).

Delmas and Toffel (2008) assert that Environmental Management System strategies for managing quality therefore need to consider this inherent complexity, and build complexity into its models. Any single paradigm provides a too narrow view to capture complexity, and the multi-faceted nature of reality. Due to factors such as intangibility and reliability, managing quality in service settings is much more challenging than managing quality in product markets. The complexity of managing quality in this type of service is further increased if there is continuous change in the external environment due to intense competition and changing customer needs. Therefore, this theory was underpinned on management systems variable of this study.

2.3 Empirical Review

2.3.1 Green Manufacturing Systems and Environmental Performance

Lalinsky (2012) posits that green manufacturing systems are production equipment, methods and procedures, product designs and product delivery mechanism that conserves energy and natural resources, minimize environmental load of human activities, and

protect the natural environment. They include both hardware such as pollution control equipment, ecological measurement instrumentation, and cleaner production technologies. They also include operating methods such as waste management practices and conservation-oriented work arrangements used to conserve and enhance nature (Okemba & Namusonge, 2014).

The classification of green manufacturing practices is a necessary first step in the process of discussing them. Esty and Winston (2009) proposed classifying green manufacturing practices into five themes based on their general management orientation: design for disassembly, manufacturing for the environment, total quality environmental management, industrial ecosystems, and technology assessment. However, these themes are difficult to measure over time, cannot be easily overlaid onto existing manufacturing strategy research, and include aspects of both strategy development and implementation. Most studies support a more straightforward typology for characterizing green manufacturing practices as belonging to three general categories: pollution prevention management systems and pollution control (Sarkis, Torre & Diaz, 2010).

According to Kenya National Bureau of Statistics survey (2015), manufacturing sector in Kenya has been facing a challenge of manufacturing while polluting the environment. As a result most of the firms have been prosecuted for the period 2011 to 2015. The number of environmental crimes reported increased from 66 in 2013 to 268 in 2014. This may be attributed to increased awareness by the public on their rights to a cleaner environment. There is continued outcry from environmentalists and other key stakeholders ranging from customers and the general public concerning violation of environmental regulation manufacturing firms in Kenya (UNDP, 2015).

Momanyi (2013) studied on adoption of green manufacturing practices by food processing firms in Mombasa County, Kenya and indicated that green manufacturing practices adoption was at implementation stage as most food processing had considered adoption. The study also established that the major perceived benefits of adopting green manufacturing are; reduction of waste water, reduction of frequency of environmental accidents and reduction in scrap rate.

Pietro, Brodin, Isaksson and Sweeney (2012) demonstrated how environmental issues can successfully be integrated into financial analysis. They explained a newly developed methodology derived from fundamental principles of financial analysis and demonstrated the approach by applying it empirically to companies in the USA pulp and paper industry. The results showed clearly that companies within this industry face environmental risks that vary widely in magnitude from firm to firm. These risks are not evident in companies' financial statements, nor are they likely to be incorporated in current market valuations. Nevertheless, it was noted that their study was confined to companies in the USA pulp and paper industry.

Nee and Wahid (2010) on the relationship of EMS and performance of Small and Medium Enterprises (SMEs) in Malaysia established that EMS implementation has a positive and significant relationship with SMEs' performance. However, the study was carried out in Malaysia and focused on different variables like regulations and ISO systems but not variables of this study. Watson, Klingenberg, Polito and Geurts (2004) studied on the impact of environmental management system implementation on financial performance in the United States and revealed that implementation of ISO 14001 standards was a practice of competitive firms in the modern business environments.

Formulation of policies by an organization that promote social corporate relationships contribute significantly to environmental performance of firms. However, the study was carried out in the United States and focused on different variables such management, systems and policies but not variables of this study.

2.3.2 Pollution Prevention Systems Environmental Performance

Ferron, Funchal, Nossa and Teixeira (2012) revealed that companies that invest in pollution prevention systems are more likely to perform well compared to firms that react to environmental pollution. It was established that pollution prevention had a direct positive impact on return on investments. Mohamed (2011) revealed that pollution prevention systems are likely to reduce or eliminate pollutants by using cleaner alternatives than those currently in place Pollution prevention practices can be further characterized as product or process adaptation, although the two are related. Product adaptation encompasses all investments that significantly modify an existing product's design to reduce any negative impact on the environment during any stage of the product's manufacture, use, disposal, or reuse. Process adaptation refers to fundamental changes to the manufacturing process that reduce any negative impact on the environment during material acquisition, production, or delivery (Otieno, 2011).

Sarkis, Zhu and Lai (2011) established that some management systems, such as improved housekeeping practices, might be considered to be pollution prevention or to be part of implementing a product or process adaptation. The emphasis here is the physical product and/or process change. This narrow definition reflects the structural/infrastructural distinction made in manufacturing strategy research, which has earned broad theoretical and managerial acceptance in operations management. Delmas and Toffel (2008) revealed

that some organizations have found a match between environmental considerations and profitability. Further, they argue that green supply management helps reduce the ecological impacts of industrial activities thereby enhancing environmental performance.

Hasan (2013) indicated that there is a positive relationship between GSCM practices and environmental performances in all the three cases they studied. In these studies, they found out that market actor-oriented models are more sustainable for enhancing GSCM practices than regulation-oriented models as they are based on mutual communications and cooperation among the core stakeholders. They suggested provision of more technical supports and application of market mechanisms other than the mandatory regulations in achieving GSCM.

Odeh and Smallhood (2012) further indicated that production of environmentally friendly products through joint research and making it a requirement for suppliers to satisfy higher environmental standards as strategies for improving the involvement of external green supply chain management practices. It was noted that in all cases, companies entirely focus on the internally proactive environmental management activities because the external part is not implementable. Due to limited scope of their studies, they suggested further studies on interactions between GSCM practices and financial performance, business process and client services and dissemination of successful GSCM practices.

2.3.3 Management Systems and Environmental Performance

Okemba and Namusonge (2014) established that green manufacturing is passively correlated with organizational performance. Efforts to formalize procedures for evaluating environmental impacts during capital decision budgeting, to increase outside

stakeholder involvement in managing operations, to increase employee training for spill prevention and waste reduction, to establish an environmental department, and to develop new procedures for cross-functional coordination. Monitoring, internal and external reporting, and related compliance systems are also examples of management systems practices

Santos and Brito (2008) suggest that management systems practices also include: use of environmental systems as the primary management approach for addressing environmental aspects of internal operations and activities, environmental aspects, establishment of environmental objectives and targets and implementation, collection, analysis, and reporting of information to measure performance in the implementation.

Mwaura, Letting, Ithinji and Orwa (2015) points out that the importance of measurement and use of environmental performance indicators (EPIs) within Canadian manufacturing firms. They investigated two research questions including the extent to which firm characteristics are associated with the importance of measurement of various categories of EPIs and extent to which firm characteristics are associated with global and specific uses of EPIs. More specifically, their work examined four uses of EPIs (that is, to monitor compliance, to motivate continuous improvement, to support decision making, and to provide data for external reporting) as well as four characteristics of firms, namely environmental strategy, International Organization for Standardization (ISO) 14001 compliance, size, and ownership (Okello & Were, 2014).

Mputhia, Mukulu and Keriko, (2012) established that an environmental database of products, asking for product testing report and top management support; GSCM practices

can be attributed to environmental performance. In a study conducted by Moutray (2015) on implementation of green supply chain management practices in the electrical and electronic industry and their relation to organizational performances, it was evident that green procurement and green manufacturing can generate favourable environmental performance.

Ferron et al, (2012) analyzed the relationship between the profitability of firms and obtaining certification of an environmental management system according to the NBR ISO 14001:2004 standard in Brazil. They analyzed this question by the difference in differences (DID) statistical model, to capture the effect of obtaining certification by comparing treated firms (that is, those with EMS) with untreated companies (control). They performed difference-in-difference fixed effect design comparing the financial performance of companies with and without certification of their EMS. The results indicated that firms with certified EMS according to the NBR ISO 14001:2004 standard tended to be more profitable, on average, than firms without certification.

Ferron et al, (2012) further used EBITDA and a Net Income as their measures of profitability which showed 11% and 24.6% higher, respectively, for firms with EMS certification than those without. This shows that firms that implement EMS certification tend to increase their economic-financial results. Ferron et al, (2012) limited their study only to Brazilian companies had difficulty of obtaining financial data on unlisted companies. Thus, companies stratified according to various aspects, such as sectors were not studied, which will be among the areas of focus in this study.

2.3.4 Pollution Control Systems and Environmental Performance

Momanyi (2013) indicated that pollution control systems were drivers of organization efficiency and effectiveness. However, in contrast to prevention practices, pollution control practices treat or dispose of pollutants or harmful by-products at the end of a manufacturing process, either immediately or later, to accomplish this, a plant must add operations or equipment to the end of an existing manufacturing process, thereby leaving the original product and process virtually unaltered (Chang, Kenzhekhanuly & Park, 2013).

Pollution control practices can be further characterized as either remediation or end-of-pipe controls. Remediation refers to cleaning up environmental damage caused by crises or past practices, and it is often driven by regulation or by improvement in scientific understanding of environmental damage. End-of-pipe controls refer to using equipment that is added as a final process step to capture pollutants and wastes prior to their discharge (KAM, 2012).

Nee and Wahid (2010) examined the relationship of ISO 14001 EMS implementation to Malaysian SMEs performances. Based upon 61 responses structured questionnaire survey, findings of their study confirmed that ISO 14001 EMS implementation has a positive and significant relationship with SMEs' performance. Their finding was consistent with the environmental management literature mostly published in the developed countries. These findings were distinctively important although they were solely based to the Malaysia context. Their study was important as the empirical results provided an indicator to encourage other SMEs which have no EMS in place to consider joining the bandwagon. Since the ISO 14001 standard is still on a voluntary basis in

Malaysia, their study being able to give empirical evidence on SMEs performance it appeared to be critical at this juncture noting the fact that SMEs contributes to the largest business establishments in Malaysia.

The findings of Nee and Wahid (2010) suggested that the importance of measurement of EPIs is associated with firms having a more active environmental strategy, ISO 14001 compliant firms, larger firms and public firms. It also suggested that the global use of EPIs is associated with a more active environmental strategy, ISO 14001 compliance, larger firms and public firms. It also found out that the specific uses of EPIs are associated with different firm characteristics, that is, monitoring compliance is associated with ISO-compliant firms, motivating continuous improvement is associated with an active environmental strategy and larger firms, decision making is associated with an active environmental strategy, and external reporting is associated with public firms. However, the study did not examine the effects of EMS on firm environmental performance which will be done in this study (Ninlawan, Seksan, Tossapol & Pilada, 2010).

Pietro, Brodin, Isaksson & Sweeney (2012) found out that Environmental Management Systems (EMS) seek to make companies simultaneously more competitive and environmentally responsible. They explained that improved environmental performance can be sought from the adaptation of techniques that emphasize reduction of waste and process/product redesign in the quest of reducing environmental impact. On the other hand, they noted that EMS lacks a framework to quantify improvements and much of the evidence of EMS's impact on financial performance is anecdotal. This lack of theoretical development has served to diminish corporate support, thus reducing the likelihood of

EMS implementation due to a perceived cost disadvantage.

2.4 Summary of Literature Review

From the findings of previous empirical studies, it is noted that most of the studies such as (Sarkis, Torre & Diaz, 2010); (Sarkis, Zhu & Lai, 2011); (Okemba & Namusonge, 2014). Murphy (2012); (Mwaura, Letting, Ithinji, Orwa, 2015); Momanyi, (2013) and Ong'ong'o, (2012) among others were different variable to particular variables such as green products, financial performance, ISO systems, regulations and technology but failed to address issues oin the manufacturing sector in Kenya. Furthermore, it is noted that most of the studies were conducted in different countries like China, Hong Kong, South Korea, Uganda, Tanzania, Philippines and failed to focus Kenya as a country. Furthermore, it was observed that studies conducted have scantily dealt with the influence of the EMS implementation on the performance of firms and more specifically the manufacturing firm sector in Kenya.

In addition, some studies have used different methodologies to obtain and analyze data hence no clear indication that if the questionnaire method that was used for this study was to produce the same results. Above all, in most of these studies the researchers were too general about the sector and as a result, the findings would not serve as a sufficient indicator for different sectors. Thus, this study focused on specific and different variables such as Green Manufacturing Systems, Pollution Prevention Systems, Management System sand Pollution Control Systems and sector, which is manufacturing sector in a developing country, which is Kenya and more specifically in Nairobi City County.

Table 2.1: Summary of Research Gaps

Author	Study	Findings	Gaps	Focus of the current Study
(Okello & Were, 2014).	Influence of supply chain management practices on performance of the Nairobi Securities Exchange's listed, food manufacturing companies in Nairobi	The study established that there was a positive correlation between supply chain management practices and performance of manufacturing firms	The study was limited to different variables such as supply chain management practices	To establish the influence of Green Manufacturing Systems on environmental performance of manufacturing firms in Nairobi County, Kenya.
(Okemba & Namusonge, 2014).	Green supply chain management practices as determinants of supply chain performance in kunya's manufacturing firms	The study revealed that green supply chain practices were embraced on a small extent by manufacturing firms in Kenya	The study focused on firms in the beverage sector in Kenya	To evaluate the effect of Management Systems on environmental performance of manufacturing firms in Nairobi County, Kenya.
(Hasan, 2013).	Sustainable Supply Chain Management Practices and Operational Performance.	The study found out that firms in developed countries were embracing sustainable supply chain practices compared to firms in developing countries	The study was conducted in United States of America	To determine the influence of Pollution Prevention Systems on environmental performance of manufacturing firms in Nairobi County, Kenya.
Ninlawan, Seksan Tossapol & Pilada (2010)	The Implementation of Green Supply Chain Management Practices in	The study revealed that implementation of green supply chain management practices had a significant effect on	The study was conducted in Hong Kong	To evaluate the effect of Management Systems on environmental performance of

	Electronics Industry	performance of firms		manufacturing firms in Nairobi County, Kenya.
Sarkis, Gonzalez-Torre, & Adenso-Diaz, (2010).	Stakeholder pressure and the adoption of environmental practices: The mediating effect of training.	The study revealed that stakeholders like customers, suppliers and manufacturers has a significant role in environment performance in multiple sectors	The study focused on different variables such as stakeholder pressure on firm performance	To assess that effect Pollution Control Systems on environmental performance of manufacturing firms in Nairobi County, Kenya.
Momanyi, (2013)	Adoption of green manufacturing practices by food processing firms in Mombasa County, Kenya	It was established that there was a statistical relationship between green manufacturing and performance of food processing firms	The study focused on green manufacturing but not EMS on environmental performance	To establish the influence of Green Manufacturing systems on environmental performance of manufacturing firms in Nairobi County, Kenya
Ong'ong'o, (2012)	Factors Affecting Adoption of Green Technology by Firms in Kenya	It was indicated that technology was the only driver of green production process	The study focused on technology but not EMS	To establish the influence of Green Manufacturing systems on environmental performance of manufacturing firms in Nairobi County, Kenya
Ferron <i>et al</i> , (2012)	Relationship between the profitability of firms and obtaining certification of an environmental management	Firms with certified EMS according to the NBR ISO 14001:2004 standard tended to be more profitable, on average, than firms without certification.	Companies stratified according to various aspects, such as sectors were not studied, study based solely on Brazil	To establish the influence of Pollution Prevention systems on environmental performance of manufacturing firms in Nairobi County,

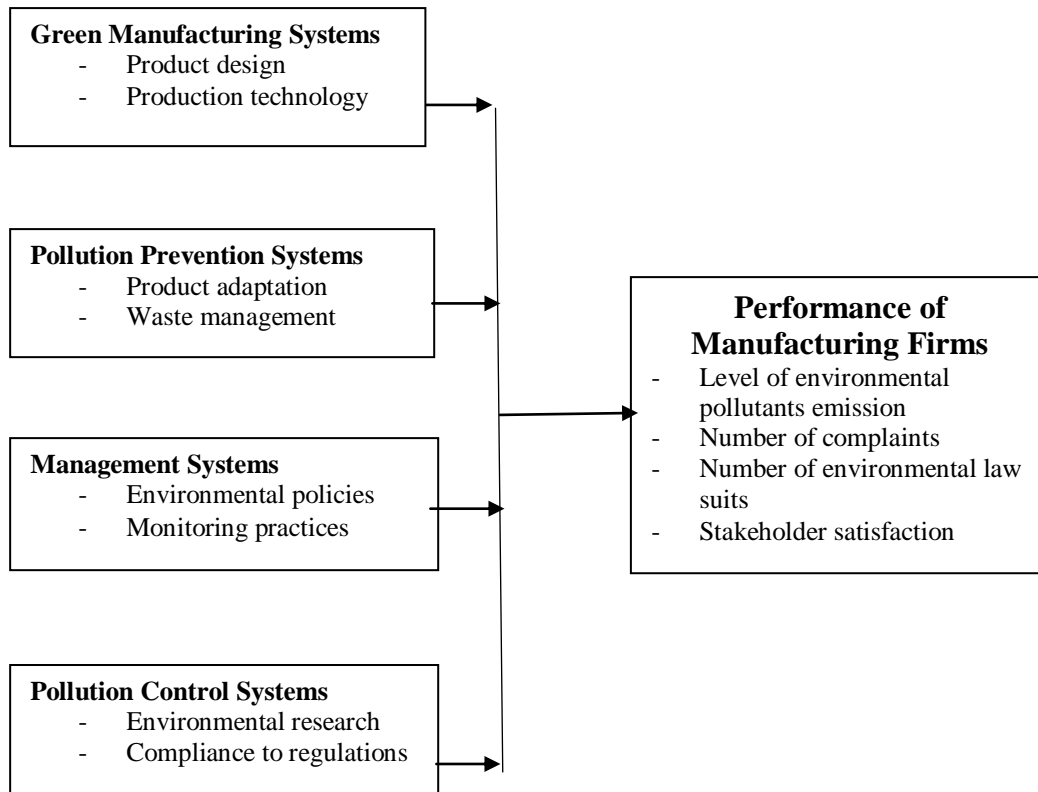
	system in Brazil.			Kenya
Otieno, (2011)	Green Supply Chain Management Practices in the Food Manufacturing Industry in Kenya	The study established that green manufacturing practices were not common in Kenya due to lack of implementation of EMS among firms	The study focused on green supply chain but not EMS	To establish the influence of Management Systems on environmental performance of manufacturing firms in Nairobi County, Kenya
Nee and Wahid (2010)	Relationship between ISO14001 EMS implementation and SMEs performance in Malaysia	SMEs without ISO 14001 implementation were performing poorly	Study solely based on Malysian context	To establish the influence of Pollution Control Systems on environmental performance of manufacturing firms in Nairobi County, Kenya
Henri and Journeault (2006)	Associations among firm characteristics and the importance of measurement and use of environmental performance indicators (EPIs) within Canadian manufacturing firms	Importance of measurement of EPIs and their global use is associated with firms having a more active environmental strategy, ISO 14001 compliant firms, larger firms and public firms. Also specific uses of EPIs are associated with different firm characteristics.	Effects of environmental plan on environmental performance of manufacturing firms were not examined.	To establish the influence of Pollution Control Systems on environmental performance of manufacturing firms in Nairobi County, Kenya
Watson <i>et al</i> , (2004)	examining the impact of environmental management system	Implementation of an EMS strategy does not negatively impact a firm's financial	Firms' performance was not measured from non-financial	To establish the influence of Pollution Prevention systems on environmental

	implementation on firm`s financial performance in USA	performance.	dimension.	performance of manufacturing firms in Nairobi County, Kenya
Repeto and Austin (2000)	Integrated financial analysis on environmental issues in USA Pulp and paper industry	Firms in USA pulp and paper industry were faced with environmental risks though were not evident in companies` financial statements, nor were they likely to be incorporated in current market valuations.	Only companies in the USA pulp and paper industry were studied and not in various aspects, such as sectors.	To establish the influence of Pollution Prevention systems on environmental performance of manufacturing firms in Nairobi County, Kenya

Source: Author (2017)

2.5 Conceptual Framework

From figure 2.1, it was conceptualized that Green Manufacturing Systems, Pollution Prevention Systems, Management Systems and Pollution Control Systems had a positive relationship with performance of manufacturing firms in Kenya.



Independent Variables

Dependent Variable

Figure 2.1: Conceptual Framework

Source: Author (2017)

As illustrated in figure 2.1, it was established that green manufacturing, pollution prevention, management systems and pollution control systems had a significant statistical effect on performance of manufacturing firms in Kenya which were expressed in form of stakeholder satisfaction, minimal complaints, reduced environmental pollution and compliance to environmental laws

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter focuses on the methodological procedures that were employed in the study. These include; research design, target population, sample procedure and sampling size, data collection instruments, validity and reliability of the instrument and data analysis techniques.

3.2 Research Design

The study adopted a longitudinal research design that was descriptive in nature to establish the effect of environmental management systems on performance of manufacturing firms in Nairobi County, Kenya. Cooper and Schindler (2006) acknowledge the importance of descriptive design especially when the intent is gaining broader understanding of the context of the research and processes being enacted. The study analysed the pre and post-environmental performance of manufacturing firms for the period of 2011-2015 to determine the problem under investigation.

According to Kothari (2006), in a longitudinal study, researchers conduct several observations of the same subjects over a period of time, sometimes lasting many years. The benefit of a longitudinal study is that it enables researchers to detect developments or changes in the characteristics of the target population at both the group and the individual level (Cooper & Schindler, 2006).

3.3 Target Population

Target population of this study comprised of 176 employees selected from 44 manufacturing firms operating in Nairobi City County, Kenya. The population of the

study refers to a complete set of individuals, cases or objects with some common observable characteristics (Mugenda and Mugenda, 2003). Additionally, Kombo and Tromp (2006) state that a population involves a group of individuals' objects or items from which samples are taken for measurement. The population therefore can be seen as the large group for which a researcher can draw a representative sample for the case of collecting information relevant to the study being conducted. The respondents of the study comprised of; Directors, Production Managers, Occupational and Safety Managers and Quality Assurance Managers

Table 3.1: Target Population

Position	Population Size	Percentage
Directors	14	8.0
Production Managers	41	23.2
Occupational and Safety Managers	60	34.0
Quality Assurance Managers	61	35.1
Total	176	100

Source: (Author, 2017)

3.4 Sample Procedure and Sample Size

Out of the Total population of 176 employees, 50% of the total population were selected from manufacturing firms operating in Nairobi City County and ISO 14001 Certified, half of the total population (88) employees were selected using stratified sampling techniques. Stratified sampling technique was adopted in this study because it provides the opportunity select respondents with adequate information systematically.

The unit of analysis was manufacturing firms in Nairobi City County while unit of observation was employees of the selected manufacturing firms. Fifty percent of the total population was appropriate for this study because Kothari (2004) proposes that more than 50% of the target population is appropriate to make conclusions of scientific studies. The representative sample of this study was 88 respondents who comprised of Directors, Production Managers, Occupational and Safety Managers and Quality Assurance Managers of manufacturing firms in operating in Nairobi City County and ISO 14001 Certified.

Table 3.2: Sample Design

Position	Target Population	Sampling Rate	Sample Size (50%)
Directors	14	0.5	07
Production Managers	41	0.5	21
Occupational and Safety Managers	60	0.5	30
Quality Assurance Managers	61	0.5	30
Total	176		88

Source: (Author, 2017)

3.5 Data Collection Instrument

Primary data was collected from respondents by the use of structured questionnaires that comprised of open and closed ended questions. Gall and Borg (2006) suggest that questionnaires are preferred in scientific studies due to their ability to capture respondent opinions in a structured manner and in written form for future reference. They also enabled the respondents to answer questions freely and frankly even on sensitive issues

because they were not required to reveal their identity, this increased the likelihood of getting accurate information. Questionnaires also offered uniformity in answering questions allowing a great degree of comparison because the items were framed in the same format.

3.5.1 Validity of the Research Instrument

The validity of the instrument was determined through seeking opinions of experts in the field of study especially the researcher's supervisor and industry experts working in manufacturing firms. Validity entails the appropriateness, meaningfulness and usefulness of inferences a researcher makes based on the data collected (Saunders, Lewis & Thornhill, 2009). An appropriate inference was one that is relevant to the purpose of the study while a meaningful inference was one which says something about the meaning of the information obtained through the use of the instruments. Content, criterion, and construct related validity was measured using the research instrument. The theories of the study were used to test the validity of the research instruments and modifications were made where it was necessary.

3.5.2 Reliability of the Research Instrument

Reliability involves the extent to which a measuring device is consistent in measuring whatever it measures (Saunders, Lewis & Thornhill, 2009). It involves a measure of the degree to which a research instrument yields consistent research or data after repeated trials. Reliability of the instruments is influenced by random error which is a deviation from a true measurement due to factors that have not effectively been addressed by the researcher. Cooper and Schindler (2006) suggest that the reliability of each construct will be examined to ensure the items collectively measured their intended constructs consistently as recommended. Internal consistency reliability was examined by use of

Cronbach's Alpha coefficient. In addition, the Cronbach Alpha coefficient has the advantage of producing a reliability estimate with only one administration. The accepted threshold of the reliability coefficient of this study was 0.7.

Table 3.3: Reliability Results

Variables	No. of Items	Cronbach Alpha	Comments
Green Manufacturing Systems	8	0.842	Reliable
Pollution Prevention Systems	8	0.724	Reliable
Management Systems	8	0.718	Reliable
Pollution Control Systems	8	0.721	Reliable
Environmental performance of manufacturing firms in Nairobi City County, Kenya.	8	0.795	Reliable

Source: Research data (2017)

As shown in Table 3.3, all the four variables were reliable since reliability coefficients were more than 0.7 threshold stipulated by Zikmund (2000).

3.6 Data Collection Procedures

The researcher sought permission from relevant authorizes before questionnaire administration. The researcher sought permission from National Commission for Science, Technology and Innovation (NACOSTI). Also permission was sought from the management of manufacturing firms and Kenyatta University. Questionnaires were administered to respondents by the researcher during working hours.

Drop and pick later method was applied where respondents did not have time to respond immediately. The questionnaires were administered through face-to-face method of collecting data. The questionnaire was designed based on the objectives and arguments of the theories discussed in the literature review. Concepts of the theories were based on the questions of the study to establish the effect of environmental management systems on the environmental performance of manufacturing firms in Nairobi County, Kenya.

3.7 Data Analysis and Presentation

To analyze the data, Statistical Package for Social Sciences, (SPSS version 21) software was used. The data collected was edited, coded and classified on the basis of similarity and then tabulated. Sekaran (2011) asserts that the core function of the coding process was to create codes and scales from the responses, which was then summarized and analyzed in various ways. To permit quantitative analysis, data was converted into numerical codes representing attributes or measurement of variables.

Multiple regression method was adopted to determine the statistical relationship between variables. Further, descriptive statistics such as mean, standard deviation, frequency distributions, percentages and tables were used to summarize and relate variables which were attained from the administered questionnaires. Correlation and regression analysis were conducted to establish the effect of each independent variable on the dependent. The analyzed data was presented in form of Tables. Specifically the regression model was of the form: $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$

Where;

Y= Environmental Performance of Manufacturing Firms in Kenya

β_0 = Y intercept

β_1 to β_3 = regression coefficients

X_1 = Green Manufacturing Systems

X_2 = Pollution Prevention Systems

X_3 = Management Systems

X_4 = Pollution Control Systems

ε = Error term

3.8 Ethical Consideration

The researcher sought permission from National Commission for Science, Technology and Innovation (NACOSTI). Further, permission from the management of manufacturing firms and Kenyatta University to collect data was sought before data collection. Responsibility to the respondents included voluntary participation and informed consent prior to participation. To ensure the participants were not prejudiced, simple language and statements were used to describe the aim of the research and its procedures. Responsibility to the profession included accuracy in analysis, presentation and reporting of the study findings. Confidentiality and anonymity of the respondents was guaranteed. As noted by Kothari (2004) it is appropriate to seek permission from relevant stakeholder before data collection in any scientific research. For objectivity purposes of scientific research, stakeholders should be informed and the objective of the research explained to enhance willingness and high response rates from the respondents.

CHAPTER FOUR: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

This chapter discusses the findings of the study on the basis of the objectives by descriptive statistics. Further, the chapter discuss inferential statistics such are regression and correlation analysis conducted and finally a summary of qualitative data analysis. In addition, this chapter provides discussions of the findings of this study in relation to existing literature.

4.2 Response Rate

The study targeted a total of 88 employees in 44 manufacturing firms operating in Nairobi City County, Kenya. Out of the 88 questionnaires administered to employees of the 44 manufacturing firms in Nairobi City County, Kenya, only 81 questionnaires were returned duly filled by employees of manufacturing firms in Nairobi City County, Kenya. This contributed to 92% response rate from employees of manufacturing firms in Nairobi City County, Kenya. This response rate was adequate for data analysis and conforms to Cooper and Schindler (2006) whom stipulates that a response rate of more than 50% is justifiable to make accurate decisions concerning the problem under investigation in any scientific studies.

4.3 Demographic Characteristics

4.3.1 Period of Operation

The respondents of the study were asked to indicate the period which their companies operated in Kenya and the following were the findings as shown in Table 4.1:

Table 4.1: Period of Operation

Years	Frequency	Percentage
Less than 5yrs	10	12
5-10 years	41	51
10-20 years	16	20
Over 20 years	14	17
Total	81	100

Source: Research data (2017)

As illustrated in Table 4.1, majority (51%) of the respondents indicated their manufacturing companies had operated for a period of between 5-10 years, 20% of them indicated that their manufacturing companies had operated for a period between 10-20 years while 17% indicated that their companies had operated for a period more than 20 years and 12% indicated that their companies had operated for a period less than 5 years. This implied that majority of the companies had operated for quite some time to determine the effect of environmental management systems on their environmental performance.

4.3.2 Number of Staff

The respondents of the study were asked to indicate the number of employees engaged by manufacturing companies in Kenya and the following were the findings as shown in Table 4.2:

Table 4.2: Number of Staff

Employees	Frequency	Percentage
Less than 25 employees	21	26
25-100	43	53
300-1000	17	21
Over 1000	0	00
Total	81	100

Source: Research data (2017)

As illustrated in Table 4.2, majority (53%) of the respondents indicated that their companies comprised of 25-100 employees also 26% indicated that their companies comprised of less than 25 employees and 21% comprised of 300-1000 employees. This implies that most of the companies had expanded their operation and increased the number of workers thus their impact on environmental management systems was a mandatory practice on their environmental performance.

4.4 Registration with NEMA

The respondents of the study were asked to indicate whether their companies were registered with NEMA and the following were the findings as shown in Table 4.3:

Table 4.3: Registration with NEMA

Item	Frequency	Percentage
Yes	73	90
No	08	10
Total	81	100

Source: Research data (2017)

As illustrated in Table 4.3, it was revealed that 90% of the manufacturing companies had registered with NEMA and 10% were not. This implied that most of the manufacturing companies found it necessary to register despite compliance requirements by the authority. It emerged that despite registration a few companies were compliant with NEMA regulation.

4.4.1 Existence of Environmental Management Department

The respondents of the study were asked to indicate whether their firms had environmental management department and the following were the findings as shown in

Table 4.4:

Table 4.4: Existence of Environmental Management Department

Item	Frequency	Percentage
Yes	20	25
No	61	75
Total	81	100

Source: Research data (2017)

As illustrated in Table 4.4, it was revealed that 75% of the manufacturing companies had no Environmental Management Department while 25% of the companies had Environmental Management Department. This implied that most of the manufacturing companies did not prioritize environmental issues despite the NEMA regulations. This findings correspond with Mputhia, Mukulu and Keriko (2012) who revealed that environmental management authorities should formulate policies and ensure implementation takes place through stakeholder engagement.

4.4.2 Existence of Environmental Management Policy

The respondents of the study were asked to indicate whether their companies had environmental management policy and the following were the findings as shown in Table 4.5:

Table 4.5: Existence of Environmental Management Policy

Item	Frequency	Percentage
Yes	73	90
No	08	10
Total	81	100

Source: Research data (2017)

As illustrated in Table 4.5, it was revealed that 90% of the manufacturing companies had environmental management policy that regulated their practices while 10% did not have environmental management policy. This implied that most of the manufacturing companies had environmental management policy despite the implementation challenges. These findings concurs with UNDP (2015) that established that top leadership should institutionalize new policies and develop mechanisms of overcoming change resistance among workers.

4.5 Descriptive Statistics

4.5.1 Green Manufacturing Practices

The study sought to establish the effect of green manufacturing practices on environmental performance in the sampled manufacturing companies. The findings are presented in Table 4.6:

Table 4.6: Green Manufacturing Practices

Items	Mean	SD
Recycling of production materials	3.78	.884
Proactive measures in waste reduction	3.61	.664
Treatment of wastes or emission reduction	3.58	.587
Usage of recyclable materials in packaging products	3.47	.673
Energy conservation by use of modern equipment in production	3.33	.596
Production of eco-friendly products	2.10	.498
Leadership support on environmental regulations	2.10	.491
Employee awareness on ISO 14001 practices	2.03	.411

Source: Research Data (2017)

As illustrated in Table 4.6, it was revealed that majority of the respondents agreed that green manufacturing practices had a significant positive effect on environmental performance the low extent of implementation. For instance, majority of the respondents indicated that; recycling of production materials influenced environmental performance of their companies with a mean of 3.78, proactive measures in waste reduction with a mean of 3.61, treatment of wastes or emission reduction with a mean of 3.58, usage of recyclable materials in packaging products with a mean of 3.47, energy conservation by use of modern equipment in production with a mean of 3.33, production of eco-friendly products with a mean of 2.10, leadership support on environmental regulations with a mean of 2.10 and finally employee awareness on ISO 14001 practices with a mean of 2.03.

These findings implies that manufacturing companies in Kenya does not have appropriate technologies to recycle production materials, reactive measures were put in place rather than proactive measures in waste reduction, treatment of wastes of emissions was a challenge, usage of recyclable packaging materials was not a common practice, energy conservation by use of modern equipment was not a routine practice, production of eco-friendly products was also a challenge due to lack of appropriate technologies, leadership support was not a common practice and awareness of employees on ISO 14001 practice was not a common practice.

These findings corresponds with UNDP, (2015); Otieno, (2011); and Ong'ong'o, (2012) who revealed that manufacturing practices in competitive organizations was enhanced by leadership support, employee awareness of ISO 14001 standards, adoption of appropriate technology and production of eco-friendly products. It also emerged that investment in

research was one of the practices that enhanced green manufacturing practices. Production of green products contributed to improved environmental conservation activities and sustainability of business activities.

4.5.2 Pollution Prevention Practices

The study sought to establish the effect of pollution prevention practices on environmental performance in the sampled manufacturing companies. The findings are presented in Table 4.7.

Table 4.7: Pollution Prevention Practices

Items	Mean	SD
Reduction in air pollution	3.13	.665
Reduction of waste water	3.13	.654
Reduction of solid waste	3.18	.623
Reduction of frequency of environmental accidents	3.21	.584
Environmental certification	3.11	.453
Continuous improvement	3.21	.486
Decrease in the cost of energy consumption	3.41	.781
Decrease in fine for environmental accidents	3.41	.744

Source: Research data (2017)

As illustrated in Table 4.7, the findings indicate that the majority of the respondents that pollution prevention practices by manufacturing were adopted on a small extent. For instance, it was indicated that reduction in air pollution with a mean 3.13, waste water with a mean of 3.13, waste solid with a mean of 3.18, frequency of environmental accidents with a mean of 3.21, environmental certification with a mean of 3.11,

continuous improvement with a mean of 3.2, energy consumption with a mean of 3.41 and environmental accident fines with a mean of 3.41.

The findings implied that majority of the manufacturing firms put little effort with regard to measures of minimizing environmental pollution. This was as a result of the inability of the firms to control their practices from air, water and solid pollution. Majority of the manufacturing firms recorded high level of accidents annually among its workers due to lack of environmental safety measures and awareness. However, it emerged that some firms were operating despite environmental certification and majority of the workers were not given environmental training to improve their production processes to minimize pollution activities.

In addition it emerged that most of the manufacturing firms experienced high cost of energy consumption. Majority of the firms were using high voltage equipment without energy conservation regulation tools. Most of the manufacturing firms were sued in court to pay heavy fines on environmental accidents by workers and members of the public. It emerged that some firms did not take accident insurance covers against their workers and third parties.

These findings corresponds with Anaman and Osei-Amponsah (2009); Blacksmith Institute and Green Cross report (2012); Delmas and Toffel (2008) who established that firms were to be accredited with ISO 140001 standards for being able to train workers on safety measures, insure workers and third parties, create maximum awareness on environmental pollution through corporate social responsibility initiatives. Further they revealed that competitive manufacturing firms should produce green products that have

no negative effects to environment. Conservation of natural resources like air, water and animals should be the drive.

4.5.3 Management System Practices

The study sought to establish the effect of management system practices on environmental performance in the sampled manufacturing companies. The findings are presented in Table 4.8:

Table 4.8: Management System Practices

Items	Mean	SD
Compliance to governments environmental regulations	3.18	.544
Leadership participation in environmental forums	3.11	.487
Formulation of green marketing policies	2.80	.421
Desire to improve product quality	2.80	.374
Public sensitization on environmental conservation	2.11	.343
Compliance to procurement and disposal Act	1.15	.203
Technology integration in Production	2.02	.185
Employee training on health and safety measures at the workplace	1.06	.156

Source: Research data (2017)

As illustrated in Table 4.8, it was revealed that majority of the manufacturing firms operating in Kenya adopted management system practices that were inefficient and ineffective. For instance, it was indicated compliance to government environmental regulations was on a small extent with a mean of 3.18, leadership participation in environmental forums with a mean of 3.11, formulation of green marketing policies with a mean of 2.80, desire to improve product quality with a mean of 2.80, public

sensitization on environmental conservation with a mean of 2.11, compliance to procurement and disposal Act with a mean of 1.15, technology integration in production 2.02 and employee training on health and safety measures at the workplace with a mean of 1.06.

The findings implied that despite NEMA regulation and registration of manufacturing firms, many were non-compliant to set regulations and standards. It emerged that leaders of most of the manufacturing firms did not attend environmental awareness forums organized by local and international authorities like NEMA, and United Nations Development Programme. Most of the managers were not conversant with production of green products, sensitizing employees and the general public about environmental conservation was a rare practice.

It also emerged that most of the firms did not comply with Procurement and Disposal Act as they disposed waste electrical and electronics without observing laid down procedures. It further emerged that most workers were involved in accidents due to lack of information and awareness on personal health and safety. It was noted that most of the manufacturing firms did not have Occupational Safety Workers to sensitize workers on safety regulation while at work.

These findings correspond with (Ninlawan, Seksan, Tossapol & Pilada, 2010); (Chang, Kenzhekhanuly & Park, 2013); (Okello & Were, 2014); (Okemba & Namusonge, 2014) & Murphy (2012) whom also revealed that majority of the manufacturing companies were ranked poorly on environmental performance due to non-compliance to set regulations by environmental authorities, lack of awareness among leaders and employees

on environmental conservation, lack of appropriate technology of production and recycling waste products and lack of employee training on personal health and safety at the workplace. They further noted that environmental performance among manufacturing firms contributed to minimal costs of operation, enhanced stakeholder satisfaction and global reputation of firms.

4.5.4 Pollution Control Practices

The study sought to establish the effect of pollution control practices on environmental performance in the sampled manufacturing companies. The findings are presented in Table 4.9.

Table 4.9: Pollution Control Practices

Items	N	Mean	S.D
Treatment of waste products before disposal	81	4.26	.884
Compliance to ISO 14001 practices	81	4.21	.664
Conducting environmental research	81	3.23	.587
Partnerships with ISO 14001 certified firms	81	3.11	.673
Investment in modern production equipment	81	3.04	.596
Employee awareness on ISO 14001 Standards	81	2.59	.498
Stakeholder engagement before production	81	2.41	.345
Compliance to Kenya Bureau of Standards	81	2.22	.354

Source: Research data (2017)

As illustrated in Table 4.9, it was revealed that majority of the manufacturing firms operating in Kenya adopted pollution control practices on small extent. For instance, it was indicated that most of the manufacturing companies did not treat waste products before disposal with a mean of 4.26, compliance to ISO 14001 practices with a mean of

4.21, conducted environmental research with a mean of 3.23, partnered with ISO 14001 certified firms with a mean of 3.11, invested in modern production equipment with a mean of 3.04, created employees awareness on ISO 14001 Standards with a mean of 2.59, engaged stakeholder before production with a mean of 2.41, complied to Kenya Bureau of Standards with a mean of 2.22.

These findings implied that most of the manufacturing companies operating in Kenya were not sensitive on pollution control practices since they disposed waste products before treatment and this resulted to pollution of the air and water. Non-treatment of waste products also exposed members of the public to contaminated water leading to health complications. It emerged that environmental research among manufacturing firms was not a common practice since it was associated with costs. Partnership with ISO compliant firms and stakeholder involvement before production of goods and services were rare practices. It was noted that most manufacturing firms did not comply with Kenya Bureau of Standards regulations like packaging of products with environmental friendly materials.

These findings correspond with Gallopoulos (2006) who established that pollution control was the only drive to environmental performance among competitive firms in changing business environment. Proactive measures like employee awareness on ISO 14001 standards, partnership, investments in modern technology and stakeholder involvement before production of goods were best practices to sustain environmental conservation practices.

4.5.5 Environmental Performance

The study sought to establish the effect of environmental performance indicators in the sampled manufacturing companies. The findings are presented in Table 4.10:

Table 4.10: Environmental Performance

Items	Mean	S.D
Minimal level of environmental pollutants emission	3.26	.384
Minimal number of complaints	3.21	.364
Minimal number of environmental law suits	3.23	.487
Stakeholder satisfaction	3.11	.373
Firm participation in social corporate responsibility	3.04	.496

Source: Research data (2017)

As illustrated in Table 4.10, it was revealed by majority of respondents that environmental performance was measured by a number of indicators. For instance, minimal level of environmental pollutants emission 3.26, minimal number of complaints 3.21, minimal number of environmental law suits 3.23, stakeholder satisfaction 3.11 and firm participation in social corporate responsibility with a mean of 3.04.

This is supported by Mohamed (2011) who revealed that environmental performance was the standard measure of global competitive firms in the changing business environment. They also noted that stakeholder involvement was the only way manufacturing firms will use to compete in the 21st Century. Firms should cooperate in environmental issues rather than compete for short term gains that ruin environmental resources.

4.6 Inferential Statistics

Multiple regression analysis was carried out to test the statistical effect of the independent variables (Green Manufacturing Systems, Pollution Prevention Systems, Management Systems and Pollution Control Systems) on the dependent variable (environmental performance of manufacturing firms in Nairobi City County, Kenya) the study applied the statistical package for social sciences (SPSS version 21) to code, enter and compute the measurements of the multiple regressions for the study. Coefficient of determination explains the extent to which changes in the dependent variable can be explained by the change in the independent variables or the percentage of variation in the dependent variable (environmental performance of manufacturing firms in Nairobi City County, Kenya) that is explained by all the four independent variables (Green Manufacturing Systems, Pollution Prevention Systems, Management Systems, Pollution Control Systems).

4.7 Correlations Analysis

Pearson's Product Moment Correlation analysis was also used to assess the relationship between the variables while multiple regressions was used to determine the predictive power of the environmental management systems on the environmental performance of manufacturing firms in Nairobi County, Kenya as shown in Table 4.11.

Table 4.11: Correlations Analysis

		Environmental performance of manufacturing firms in Nairobi County, Kenya.	Green Manufacturing Systems	Pollution Prevention Systems	Management Systems	Pollution Control Systems
Environmental performance of manufacturing firms in Nairobi County, Kenya.	Pearson Correlation	1				
	Sig. (2-tailed)					
Green Manufacturing Systems	Pearson Correlation	.710	1			
	Sig. (2-tailed)	.0012				
Pollution Prevention Systems	Pearson Correlation	.693	.027	1		
	Sig. (2-tailed)	.0017	.799			
Management Systems	Pearson Correlation	.579	.560	.762	1	
	Sig. (2-tailed)	.0023	.000	.530	.	
Pollution Control Systems	Pearson Correlation	.556	.540	.742	.723	1
	Sig. (2-tailed)	.0021	.000	.540	.	

Source: Research data (2017)

As illustrated in Table 4.11, the four independent variables were correlated with the dependent variable using Pearson Correlation Analysis at 95% confidence interval and 5% significance level. After correlation, it was established that there was a positive correlation between Green Manufacturing Systems, Pollution Prevention Systems, Management Systems, and Pollution Control Systems on performance of manufacturing firms in Nairobi City County, Kenya.

For instance, as illustrated in Table 4.11, there is a positive relationship between environmental performance of manufacturing firms in Nairobi County, Kenya, and Green Manufacturing Systems, Pollution Prevention Systems, Management Systems, Pollution Control Systems of magnitude 0.710, 0.693, 0.579 and 0.556 respectively. Green Manufacturing Systems having the highest value and Pollution Control Systems having

the lowest correlation value. These findings concurs with Dobers, Strannegård & Wolff (2001); Erla (1965); Esty & Winston (2009) who established that social responsibility of manufacturing firms was measured based environmental performance.

This notwithstanding, all the factors had a significant p-value ($p < 0.05$) at 95% confidence level. The significance values for the relationship between Green Manufacturing Systems, Pollution Prevention Systems, Management Systems and Pollution Control Systems were 0.0012, 0.0017, 0.0023 and 0.0021 respectively. This implies that Green Manufacturing Systems was the most significant factor, followed by Pollution Prevention Systems then by Management Systems and Pollution Control Systems being the least significant.

4.9 Model Summary

Table 4.12: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.923	0.852	0.789	0.6273

Source: Research data (2017)

As illustrated in Table 4.12, it was established that the four independent factors that were studied explain only 78.9% of environmental management systems and environmental performance of manufacturing firms in Nairobi City County, Kenya, as represented by the R^2 . This therefore means that other factors not studied in this research contribute 21.1% of environmental management systems and environmental performance of manufacturing firms in Nairobi City County, Kenya. Therefore, further research should be conducted to

investigate the other factors (21.1%) that influence performance of manufacturing firms in Kenya.

Table 4.13: ANOVA Test

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	0.003	12	.001	3.867	_.015 ^b
Residual					
Total	0.068	173	.021		
	0.071	185			

Source: Research data (2017)

From the ANOVA statistics in Table 4.13, the processed data, which is the population parameters, had a significance level of 0.015 which shows that the data is ideal for making a conclusion on the population's parameter as the value of significance (p-value) is less than 5%. The calculated was greater than the critical value ($2.262 < 3.869$) an indication that the four variables were significantly influenced by performance of manufacturing firms in Nairobi City County, Kenya. The significance value was less than 0.05, an indication that the model was statistically significant and fit for forecasting purposes.

Table 4.14: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.139	1.2235		1.515	0.0133
	Green Manufacturing Systems	0.887	0.1032	0.152	4.223	0.0122
	Pollution Prevention Systems	0.752	0.3425	0.154	3.424	0.0112
	Management Systems	0.645	0.2178	0.116	3.236	0.0111
	Pollution Control Systems	0.612	0.2012	0.113	3.111	0.0001

Source: Research data (2017)

From the finding in Table 4.14, the established regression equation was: Performance of Manufacturing Firms in Kenya = 1.139+ 0.887 Green Manufacturing Systems + 0.752 Pollution Prevention Systems + 0.645 Management Systems + 0.612 Pollution Control Systems.

From the above regression model, holding Green Manufacturing Systems, Pollution Prevention Systems, Management Systems, Pollution Control Systems to a constant zero performance of manufacturing firms in Nairobi County, Kenya would be at 0.139. It was established that a unit increase in Green Manufacturing Systems would cause an increase in performance of manufacturing firms in Nairobi city County by a factor of 0.887, while a unit increase in Pollution Prevention Systems would cause an increase in performance of manufacturing firms in Nairobi County by a factor of 0.752, a unit increase in Management Systems would cause an increase in performance of manufacturing firms in Nairobi city County by a factor of 0.645 and a unit increase in Pollution Control Systems would cause an increase in performance of manufacturing firms in Nairobi City County by a factor of 0.612.

Therefore, it can be concluded that at 5% level of significance and 95% level of confidence, all the significance values were found to be less than 0.05, an indication that all the values were statistically significant to make the study conclusion. Therefore these findings corresponds with Momanyi, (2013), Ong'ong'o, (2012), Ferron *et al*, (2012), Otieno, (2011) & Nee and Wahid (2010) who revealed that adoption of environmental management systems have a direct effect on the performance of manufacturing companies in both developed and developing countries.

Table 4.15: Performance Measurement Outputs

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.119	1.2225		1.415	0.0123
	Level of environmental pollutants emission	0.737	0.1132	0.132	3.113	0.0112
	Number of complaints	0.622	0.3325	0.134	2.224	0.0122
	Number of environmental law suits	0.575	0.3278	0.196	2.136	0.0131
	Stakeholder satisfaction	0.548	0.221	0.189	2.123	0.000
	Firm participation in social corporate responsibility	0.512	0.211	0.123	2.143	0.000

Source: Research data (2017)

As illustrated in Table 4.15, the study sought to establish the effect of environmental management systems on the environmental performance of manufacturing firms in Nairobi County, Kenya, using level of environmental pollutants emission, number of complaints, number of environmental law suits, stakeholder satisfaction and firm participation in social corporate responsibility as indicators of performance measurement.

After correlation analysis, it was established that performance of manufacturing firms in Nairobi City County, Kenya, was determined by level of environmental pollutants emission, number of complaints, number of environmental law suits, stakeholder satisfaction and firm participation in social corporate responsibility and had significant values being less than 0.05 and indication that all the values were statistically significant to conclude that manufacturing firms determined their performance using level of environmental pollutants emission, number of complaints, number of environmental law

suits, stakeholder satisfaction and firm participation in social corporate responsibility (Otieno, 2011).

Further, after conducting quantitative data analysis, qualitative data was analyzed using content analysis on the four variables of the study that included green manufacturing systems, pollution prevention systems, management systems and pollution control systems, it was established that most of the manufacturing firms in Kenya did not embrace green manufacturing systems due to costs associates and lack of awareness of with regard to green manufacturing practices.

Further, it was noted that pollution prevention systems were adopted on a small extent because most of the manufacturing firms violated environmental regulation. In addition, it was noted that management of manufacturing firms were not compliant with ISO regulation and the vision of many firms were inconsistent with environmental changes. Finally, it was observed that most of the firms developed pollution control systems but to a larger extent were challenged to implement pollution policies.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents summaries of the study findings as per the study objectives, conclusions based on those findings and recommendations which are based on both the study findings and other relevant literature considered necessary and vital to be used in future to improve the study situation.

5.2 Summary

The study sought to establish the influence of environmental management systems on the environmental performance of manufacturing firms in Nairobi City County, Kenya. The study established that most of the manufacturing companies in Kenya did not have appropriate technologies to recycle production materials. Firms were reactive to environmental concerns rather than proactive. It emerged that firms incurred high costs in consumption of energy. Firms did not produce eco-friendly products due to technological challenges and employee awareness on ISO 14001 series was not practiced.

The study established that most of the manufacturing firms put little effort with regard to measures of minimizing environmental pollution. This was as a result of the inability of the firms to control their practices from air, water and solid pollution. It emerged that many firms recorded high number of accidents annually among its workers due to lack of environmental safety measures and awareness. It was evident that manufacturing firms incurred high cost in legal issues associated with court suits from various stakeholders like workers and consumer protection institutions.

It was revealed that most of the manufacturing firms violated NEMA regulation. It emerged that leaders of most of the manufacturing firms did not attend environmental awareness forums organized by local and international authorities like NEMA, and United Nations Development Programme. Most of the managers were not conversant with production of green products, sensitizing employees and the general public about environmental conservation was a rare practice. It was noted that many firms did not comply with Procurement and Disposal Act as they disposed waste electrical and electronics without observing laid down procedures.

It was also established that most of the manufacturing companies operating in Kenya were not sensitive on pollution control practices since they disposed waste products before treatment and this resulted to environmental pollution. It was noted that most firms released raw waste products to rivers and dumping sites with little concern of its impact on the surrounding communities. Most of the firms were packaging products with non-biodegradable materials despite the set regulation of NEMA and Kenya Bureau of Standards regulations. Lack of appropriate production technology and industry partnership in waste management techniques was an uphill task.

5.3 Conclusion

From the findings of the study, it can be concluded that manufacturing companies operating in Kenya should adopt green manufacturing systems, pollution prevention systems, management systems and pollution control systems to enhance their performance.

For green manufacturing systems to be efficient and effective, management should embrace ISO 1400 practices that emphasize on production of green products. Employees should be trained on the benefits of green manufacturing models. Pollution prevention systems should be effective, all stakeholders should be sensitized on the benefits of environmental conservation. Firms should focus on the society rather than producing products that are harmful to consumers.

Policies formulated by the management should foster employee empowerment and societal philosophy. Initiatives of conserving natural resources should be implemented collaboratively. Pollution control systems should focus on improving the already models of recycling waste products using modern technologies and techniques like reverse distribution.

By extension, Sarkis, Torre & Diaz, 2010); (Sarkis, Zhu & Lai, 2011); (Otieno, 2011); Mohamed (2011); (KAM, 2012) & (Baines, Brown, Benedettini & Ball, 2012) concur that EMS should be an integral part of any organization regardless of its size. Further, Commission for Environmental Cooperation (2000) ascertains that environmental policies formulated by firms should reflect the long term vision of an organization.

Therefore, for manufacturing companies to gain competitive edge, it is mandatory to create maximum environmental awareness among their workers, create industry partnerships with ISO 14001 certified firms, invest in environmental research, adopt appropriate technology in production and waste management, train employees on ISO14001 standards and encourage leaders to support corporate social responsibility activities.

5.4 Recommendations for Policy and Practice

The study established that majority of the manufacturing firms did not embrace green manufacturing practices on a larger extent. The study recommends that manufacturing and processing should develop environmental management policies that should be well communicated and shared across the organizations. Specifically, this study recommends that management of manufacturing firms should establish electronic waste management systems that invest in modern production technological equipment, focus on production of green products, train workers on ISO 14001 standards in order to promote environmental performance.

The study established that most of the manufacturing firms did not have pollution prevention mechanisms. Therefore, this study recommends that top leadership of manufacturing firms should steer initiatives intended to enhance environmental performance like compliance to NEMA and Kenya Bureau of Standards regulation. Stringent measures should be put in place by NEMA and Kenya Bureau of Standards to ensure that formulated policies are not violated by industry players. Firms compliant to regulations should be accredited and certified. It is also recommended that multi-sectoral synergies should be encouraged by environmental authorities to enhance environmental performance.

It was established that management systems adopted by manufacturing firms in Kenya were ineffective and inefficient. Therefore this study recommends that top leadership of manufacturing companies should weigh-in and ensure appropriate management regulations are adhered to. Adherence to Procurement and Disposal Act, integration of technology in production process, formulation of green marketing policies and employee

training on ISO 14001 series should be emphasized.

Finally, it was established that most of the manufacturing firms did not fully adopt pollution control measures as stipulated by NEMA. Therefore, the study recommends that heavy penalties should be imposed on firms that do not treat the waste before disposal. Firms that do not comply with ISO 14001 standards should not be allowed to produce and sell their products in Kenya. Stakeholder involvements and employee training on ISO 14001 standards should be the culture of the manufacturing firms.

5.5 Suggestions for Further Research

Future studies should explore the reasons behind the influence of environmental management systems on the environmental performance of manufacturing firms in Nairobi City County, Kenya by focusing on different variables like e-commerce, continuous improvement and business process re-engineering. Researchers should go ahead and establish the reasons behind the failure of environmental performance. Future studies should seek to minimize the challenges experienced by manufacturing firms when trying to adopt environmental management systems.

REFERENCES

- Anaman, A. K. & Osei-Amponsah, C. (2009). Determinants of the Output of the Manufacturing Industry in Ghana from 1974 – 2006. *The Ghana policy journal*, 3, 69-86.
- Anastasi, S. & Urbina, S. (1997). *Psychological Testing*. 7th edition. India: Pearson publications.
- Al-Odeh, M & Smallhood, J. (2012). Sustainable Supply Chain Management: Literature Review, Trends, and Framework. *International Journal of Computational Engineering & Management*. 15(1) 85-90.
- Baines, T., Brown, S., Benedettini, O., & Ball, P. (2012). Examining green production and its role within the competitive strategy of manufacturers. *Journal of Industrial Engineering and Management*, 5 (1), 53-87.
- Barney, J. B. (1991). Firm Resources and Sustained Competitive Advantage. *Journal of Management*, 17 (1), 99-120.
- Barney, J. B. (2001). Is the Resource-Based “view” a Useful Perspective for Strategic Management Research? Yes. *Academy of Management Review*, 26 (1), 41-56.
- Barney, J. B. (2002). *Gaining and Sustaining Competitive Advantage*. 2nd edition. Upper Saddle River, NJ: Prentice Hall.
- Barney, J. B., Wright, M. & Ketchen, J. D. J. (2001). The Resource-Based View of the firm: Ten years after 1991. *Journal of Management*, 27 (6), 625–641.
- Black, K. (2010). *Business Statistics: Contemporary Decision Making*; 6th edition, John Wiley & Son
- Blacksmith Institute and Green Cross report. (2012). *The World’s worst pollution problems: Assessing Health Risks at Hazardous Waste Site*. New York.

- Chang, B. Y., Kenzhekhanuly, Y. & Park, B. (2013). A Study on Determinants of Green Supply Chain Management. *International Journal of Control and Automation* 6, (3), 199-208
- Creswell, J.W. (1998) Qualitative Inquiry and research design: *Choosing among five traditions*. London: Sage
- Claire, S., Wrightsman, L. S. & Cook, S. W. (1962). *Research Methods in Social Sciences*.
- Cooper, D. R. & Schindler, P. S. (2001). *Business Research Methods*. 7th edition. Boston: Mcgraw – Hill.
- Cooper, D.R. & Schindler, P. S (2006) Business Research Methods. New Delhi, Tata McGraw-Hill
- Commission for Environmental Cooperation (2000). Green Environmental Practices. Free Press
- Collis, J. & Hussey, R. (2014). *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*. 4th edition, Palgrave Macmillan.
- Cyert, M. R. & March, G. J. (1963). *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.
- Deming and Juran (1931). *Principles of Quality Management Practices*. Free Press
- De Boer, E. A., & Zandberg, T. (2012). Decision-making by Organizational Routines: The Influence of Agency and Personality Traits on Deviating from Formal Organizational Routines. *Journal of Quality Assurance in Hospitality & Tourism*, 13 (4), 316-325.
- Delmas, M. A., & Toffel, M. W. (2008). Organizational responses to environmental demands: Opening the black box. *Strategic Management Journal*, 29 (10), 1027-1055.

- DiMaggio, P. (1998). The New Institutionalisms: Avenues of Collaboration. *Journal of Institutional and Theoretical Economics (JITE)*, 154 (4).
- Dobers, P., Strannegård, L., & Wolff, R. (2001). Knowledge interests in corporate environmental management. *Business Strategy and the Environment*, 10 (6), 335-343.
- Deming, W. E. (1993). *The New Economics for Industry, Government, and Education*. Boston, Ma: MIT Press. 132.
- Economic Recovery Strategy for Employment and Wealth Creation Report. (2005). *Government of Kenya*.
- Erla, B. S. (1965). *Financial Benefit of Implementing Environmental Management System ISO 14001 in Icelandic Companies*.
- Esty, D. C., & Porter, M. E. (1998). Industrial ecology and competitiveness. *Journal of Industrial Ecology*, 2 (1), 35-43.
- Esty, D., & Winston, A. (2009). *Green to gold: How smart companies use environmental Strategy to Innovate, Create Value, and Build Competitive Advantage*. John Wiley & Sons.
- Florida, R., & Davison, D. (2001). *Gaining from green management*. *California Management Review*, 43 (3), 63-84.
- Federal Facilities Council Report. (1999). Environmental Management Systems and ISO 14001. *National Research Council*, (138), SBN: 0-309-59316-6.
- Ferron, T. R., Funchal, B., Nossa, V. & Teixeira, C. J. A. (2012, May). Is ISO 14001 certification effective? An experimental analysis of firm profitability. *Brazilian Administration Review*.

- Field, A. P. (2009). *Discovering statistics using SPSS*, 2nd edition. London: Sage.
- Freeman, R. E., & Phillips, R. A. (2002). Stakeholder theory: A libertarian defense. *Business Ethics Quarterly*, 331-349.
- Frooman, J. (1999). Stakeholder influence strategies. *Academy of management review*, 24 (2), 191-205. *Journal of International Management*, 14 (4), 364-376.
- Gallopoulos, N. E. (2006). Industrial ecology: an overview. *Progress in Industrial Ecology, an International Journal*, 3 (1), 10-27.
- Gall, M. D., Gall, J. P., & Borg, W. R. (2006). *Educational Research: An Introduction* (8th Ed.). New York: Longman.
- GoK. (2030). Kenyan Vision 2030. *Government of Kenya*.
- Grant, R. M. (1991). The Resource-Based Theory of Competitive Advantage: Implications for Strategy Formulation. *California Management Review*, 33(3), 114–135.
- Hasan, M. (2013). Sustainable Supply Chain Management Practices and Operational Performance. *American Journal of Industrial and Business Management*, (3), 42-48.
- Helfat, E. C. & Peteraf, A. M. (2003, September). *The Dynamic Resource-Based View: Capability Lifecycles*. Article first published online: 12.
- Henri, F. J. & Journeault, M. (2006). Environmental Performance Indicators: An empirical study of Canadian manufacturing firms. *Journal of Environmental Management*, 87 (2008), 165–17.

- IIED. (2007). Profiles of Tools and Tactics for Environmental Mainstreaming. Environmental Management Systems (EMS). *International Institute for Environment and Development*, (5).
- Investopedia. (2016). Macroeconomic factor. Retrieved April 13, 2016, from <http://www.investopedia.com/terms/m/macroeconomic-factor.asp>.
- IPCC. (2007). Annual Report. *Intergovernmental Panel on Climate Change*. Fourth Assessment Report.
- Jaju, B. S. (2011). *Implementation of ISO 14000 in Luggage Manufacturing Industry: A Case Study*. INTECH Open Access Publisher.
- Janeiro, R. (2012). Toward a Subjective Measurement Model for Firm Performance. *Special Issue*, 6 (9), 95-117.
- Kairu, N. C. (2014). Factors Influencing Implementation of Environmental Management System ISO 14001 Certification at Allpack Industries Limited. *School of business of University of Nairobi*.
- Kenya Association of Manufacturers. (2012). *Manufacturing in Kenya: Food Processing Sector, 2012*. Kenya Association of Manufacturers.
- Kenya Bureau of Standards (2013). *Food Processing Firms in Mombasa County*. Kenya.
- Kashani, S. E. (2007). *Clarifying evolutionary theory of economic change 1*. U.K.
- Kenneth, B. A. & Odum, H. W. (2010, Sept). A general panel model with random and fixed effects: a structural equations approach. *Institute for research in social science, Dept. of Sociology and statistics, University of North Carolina, Chapel Hill*, 89 (1), 1-34.

- Kinnear, P., & Gray, D. (2002). *SPSS for windows made simple*. Psychology Press, Sussex.
- KIPPRA. (2013). Kenya economic report. *Kenya Institute for Public Policy and Analysis*. Nairobi.
- KNBS. (2015). Economic Survey. *Kenya National Bureau of Statistics*. Nairobi
- Krishnaswami, O. R. (2003). *Methodology of Research in Social Science*. Mumbai: Himalaya publishing House.
- Kombo, D.K & Tromp,D.L (2006) *Proposal and thesis writing* . Mukuyu, Kenya Don Bosco Printing press.
- Kothari, C. R. (2004). *Research Methodology; Methods and Techniques*. New Delhi: New Age International (P) Ltd. Publishers.
- Kombo, D. K. & Tromp, D. L. (2006). *Proposal and Thesis Writing: An Introduction*. Nairobi: Paulines Publications Africa.
- Lalinsky, T. (2012). *Firm Competitiveness Determinants: Results of a Panel Data Analysis*. Slovakia: National Bank of Slovakia.
- Mars Group Kenya, manufacturing and industry sector report (2011)
- Mahoney, J.T. & Pandian, J. R. (1992). The Resource-Based View within the Conversation of Strategic Management. *Strategic Management Journal*, 15(5), 363–380.
- Mertler, C.A. & Vannatta, R. A. (2010). *Advanced and Multivariate Statistical Methods, 4th Ed*. Los Angeles.
- Miles, Samantha (2012). Stakeholders: essentially contested or just confused. *Journal of Business Ethics*. 108 (3): 285–298.

- Mohamed, G.H. (2012). Green supply chain management and performance of manufacturing in Mombasa. MBA Thesis. Kenyatta University
- Momanyi, B. N. (2013). *Adoption of green manufacturing practices by food processing firms in Mombasa County, Kenya*. Published MBA Thesis University of Nairobi
- MOPHS & MEMR. (2009). *Report on Kenya country situation analysis and needs assessment for the preparation of national plans of joint action for implementation of the Libreville Declaration on health and environment in Africa*. Ministry of Public Health and Sanitation, Department of Environmental Health and Sanitation (MOPHS) and Ministry of Environment and Mineral Resources (MEMR). Nairobi.
- Mohamed, K. (2011). Green Supply Chain Management of Manufacturing Firms in Mombasa (Unpublished MBA project). University of Nairobi, Nairobi, Kenya.
- Moutray, C. (2015, April). Global Manufacturing Economic Update. *A Publication of the National Association of Manufacturers*.
- Mohamed, K. (2011). *Green Supply Chain Management of Manufacturing Firms in Mombasa*. MBA project. University of Nairobi, Nairobi, Kenya.
- Mpathia, J. G., Mukulu, E. & Keriko, J. (2012, June). Awareness as a Determinant of Compliance with Environmental Regulations by Micro and Small Enterprises in the Manufacturing Sector in Nairobi, Kenya. *International Journal of Applied Science and Technology*, 2 (6).
- Mugenda, O. & Mugenda, A. (2003). *Research methods; Quantitative and qualitative approaches*. Nairobi: Acts Press.

- Mugenda, O. & Mugenda, A. (2003). *Research methods; Quantitative and qualitative approaches*. Nairobi: Acts Press.
- Mulusa, T. (1998). Evaluating: Education and Community Development Programme. Nairobi: *Deutsche Stifling for International Entwicling*.
- Murphy, E. (2012). Key Success Factors for Achieving Green Supply Chain Performance; A study of UK *ISO 14001 Certified Manufacturers*. (PhD thesis, *The University of Hull*)
- Mwaura, A., Letting, N., Ithinji, G. & Orwa H. B. (2015). Reverse Logistics Practices and Their Effect on Competitiveness of Food Manufacturing Firms in Kenya. *International Journal of Economics, Finance and Management Sciences*. Vol. 3, (6), pp. 678-684.
- National Geographic News. (2007). China Pollution. From <http://news.nationalgeographic.com/news/2007/07/070709-china-pollution.html>.
- Nee, Y. G. & Wahid N. A. (2010, June). The Effect of ISO 14001 Environmental Management System Implementation on SMEs Performance: An Empirical Study in Malaysia. *Journal of Sustainable Development*, 3(2).
- Nelson, R. R. & Winter, S. G. (1982). *An evolutionary theory of economic change*.
- Ninlawan, C., Seksan P., Tossapol K., & Pilada W. (2010). The Implementation of Green Supply Chain Management Practices in Electronics Industry. *Proceedings of the International Multi Conference of Engineers and Computer Scientists, 17-19 March 2010 Hong Kong*.
- Novikov, A.M. & Novikov, D.A. (2013). *Research Methodology: From Philosophy of Science to Research Design*. CRC Press

- Ong'ong'o, J. O. (2012). *Factors Affecting Adoption of Green Technology by Firms in Kenya* (Unpublished MBA project). University of Nairobi, Nairobi, Kenya.
- Otieno, K. O. (2011). *Green Supply Chain Management Practices in the Food Manufacturing Industry in Kenya* (Unpublished MBA project). University of Nairobi, Nairobi, Kenya.
- Orodho, A. (2005). *Techniques of Writing Research Proposals, and Reports in Education and Social Services*. Nairobi: Kanezja Enterprises.
- Okello, J. O. & Were, S. (2014). Influence of supply chain management practices on performance of the Nairobi Securities Exchange's listed, food manufacturing companies in Nairobi. *International Journal of Social Sciences and Entrepreneurship*, 1 (11), 107-128.
- Okemba, P.O & Namusonge, S. G. (2014). Green supply chain management practices as determinants of supply chain performance in Kenya's manufacturing firms: A case study of Nairobi-based firms in the food and beverage sector. *The strategic Journal of Business and Change Management*, 2 (22), 423-431.
- Ong'ong'o, J. O. (2012). *Factors Affecting Adoption of Green Technology by Firms in Kenya*. MBA project. University of Nairobi, Nairobi, Kenya.
- Otieno, K. O. (2011). *Green Supply Chain Management Practices in the Food Manufacturing Industry in Kenya* (Unpublished MBA project). University of Nairobi, Nairobi, Kenya.
- Phelan, C. & Wren, J. (2005-06). Exploring Reliability in Academic Assessment. Graduate Assistants, *UNI Office of Academic Assessment*.
- Pinsonneaut, A. & Kraemer, K. L. (1993). Survey Research Methodology in Management Information systems. *Journal of Management Information System*, 10 (2), 75-96. An Assessment.

- Pietro, E., Huge-Brodin, M., Isaksson, K. & Sweeney, E. (2012). Purchasing Green Transport and Logistics Services: Implications for Small Business. *National Institute for Transport and Logistics*
- Popper, K. (1979). *Objective Knowledge: An Evolution Approach*. London, Oxford University Press.
- Repetto, R. & Austin, D. (2000). Pure Profit: The Financial Implications of Environmental Performance. Washington, D.C.: *World Resources Institute*.
- Sarkis, J., Gonzalez-Torre, P., & Adenso-Diaz, B. (2010). Stakeholder pressure and the adoption of environmental practices: The mediating effect of training. *Journal of Operations Management*, 28 (2), 163-176.
- 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. (2009). *Research Methods for Business Students*, 5th Ed. New Jersey: Prentice Hall.
- Santos, B. J. & Brito, L. A. L. (2012, May). Toward a Subjective Measurement Model. *Special Issue*, 6(9), 95-117.
- Santos, J. A. C. & Haubrich, J. G. (1999). Banking and Commerce: a liquidity Approach. *Working papers 78 Bank for International settlements*.
- Sekaran, U. (2011), *Research Methods for Business: A Skill Building Approach*, Southern Illinois University New York.
- Toke, L.K., Gupta, R.C. and Dandekar, M. (2012). An empirical study of green supply chain management in Indian perspective. *International Journal of Applied Sciences and Engineering Research* 1(2)372-383
- UNDP (2015). Sustainable Environmental Practices of Firms. Frees Press

- Verma, G. K. & Mallick, K. (1999). *Researching education: Perspectives and techniques*. Philadelphia: Open University Press.
- Watson, K., Klingenberg, B., Polito, T. & Geurts, G. T. (2004). Impact of environmental management system implementation on financial performance: A comparison of two corporate strategies. *Management of Environmental Quality: An International Journal*, 15(6), 622-628. Emerald Group Publishing Limited.
- Wilson, J. (2010). *Essentials of Business Research: A Guide to Doing Your Research Project*. Sage Publications
- Wu, J., Dunn, S. & Forman, H. (2012). A Study on Green Supply Chain Management Practices among Large Global Corporations. *Journal of Supply Chain and Operations Management* 10(1)182-194
- Zutshi, A., & Sohal, A. S. (2004). Adoption and maintenance of environmental management systems: critical success factors. *Management of Environmental Quality: An International Journal*, 15 (4), 399-419.

APPENDICES

Appendix i: Introductory Letter

Margaret Mbinya Kasuki,

Department of Business Administration,

School Of Business, Kenyatta University,

P.O. Box 43844-00100, Nairobi-Kenya.

Email: margaretkasuki@yahoo.com

TO WHOM IT MAY CONCERN

Dear Respondent,

REF: MBA RESEARCH PROJECT

I am a student pursuing a Masters Degree in Business Administration of Kenyatta University. As a requirement of the program, am required to carry out a research study on: “*Environmental Management Systems on Performance of Manufacturing Firms in, Kenya.*”

The findings of this study will enhance competitiveness of your Manufacturing firms in the changing business environment by providing the necessary information of implementing EMS to enhance environmental performance. Information given will be treated with utmost good faith and confidentiality. The final Report will be submitted to your organization for policy making.

Yours sincerely

Sign _____

Appendix ii: Questionnaire

PART A: DEMOGRAPHICS

Please answer the following questions by indicating [X] where appropriate:

1. How long your firm has been operating?

- a) Less than 5yrs []
- b) 5-10 years []
- c) 10-20 years []
- d) Greater than 20 years []

2. What is the size of the staff of your company?

- a) Less than 25 []
- b) 25-100 []
- c) 300-1000 []
- d) Greater than 1000 []

3. Is your company registered with any environmental management body?

- a) Yes []
- b) No []

4. Does your firm have environmental management department?

- a) Yes []
- b) No []

5. Does your firm have an environmental management policy?

a) Yes []

b) No []

PART B: ENVIRONMENTAL MANAGEMENT SYSTEMS

Please indicate by ticking the extent to which your organization has implemented listed green manufacturing practices using the following scale: 1- Not at all , 2- Strongly disagree, 3-Disagree , 4- agree, 5- strongly agree.

6. Indicate the extent to which the following practices influence environmental performance of your firm?

	Green Manufacturing Practices					
1.	Recycling of production materials					
2.	Proactive measures in waste reduction					
3.	Treatment of wastes or emission reduction					
4.	Usage of recyclable materials in packaging products					
5.	Energy conservation by use of modern equipment in production					
6.	Production of eco-friendly products					
7.	Leadership support on environmental regulations					
8.	Employee awareness on ISO 14001 practices					

7. How else does Green Manufacturing Practices influence environmental performance of your firm?

8. Indicate the extent to which the following practices influence environmental performance of your firm?

	Pollution Prevention Practices					
1.	Reduction in air pollution					
2.	Reduction of waste water					
3.	Reduction of solid waste					
4.	Reduction of frequency of environmental accidents					
5.	Environmental certification					
6.	Continuous improvement					
7.	Decrease in the cost of energy consumption					
8.	Decrease in fine for environmental accidents					

9. How else does Pollution Prevention Practices influence environmental performance of your firm?

10. Indicate the extent to which the following practices influence environmental performance of your firm?

	Management System Practices					
1.	Compliance to governments environmental regulations					
2.	Leadership participation in environmental forums					
3.	Formulation of green marketing policies					
4.	Desire to improve product quality					
5.	Public sensitization on environmental conservation					
6.	Compliance to procurement and disposal Act					
7.	Technology integration in Production					
8.	Employee training on health and safety measures at the workplace					

11. How else does Management System Practices influence environmental performance of your firm?

12. Indicate the extent to which the following practices influence environmental performance of your firm?

	Pollution Control Practices					
1.	Treatment of waste products before disposal					
2.	Compliance to ISO 14001 practices					
3.	Conducting environmental research					
4.	Partnerships with ISO 14001 certified firms					
5.	Investment in modern production equipment					
6.	Employee awareness on ISO 14001 Standards					
7.	Stakeholder engagement before production					
8.	Compliance to Kenya Bureau of Standards					

13. Indicate the extent to which the following indicators influence environmental performance of your firm?

	Environmental Performance					
	Minimal level of environmental pollutants emission					
	Minimal number of complaints					
	Minimal number of environmental law suits					
	Stakeholder satisfaction					
	Firm participation in social corporate responsibility					

14. How else does Pollution Control Practices influence environmental performance of your firm?

15. What are the environmental performance measures used by your manufacturing firms?

Appendix iii: List of Manufacturing Firms in Nairobi

1. BIDCO OIL REFINERIES LIANTO DIVISION
2. BIDCO OIL REFINERIES LTD
3. CENTRAL GLASS INDUSTRIES LTD
4. COCA-COLA JUICES LIMITED
5. EAST AFRICAN BREWERIES LIMITED
6. EAST AFRICAN MALTINGS LTD
7. HASS PETROLEUM (K) LTD
8. JOMO KENYA UNIVERSITY OF AGRICULTURE AND
TECHNOLOGY (JKUAT)
9. KENYA FORESTRY RESEARCH INSTITUE
10. LAKE VICTORIA NORTH WATER SERVICES BOARD
11. MUHORONI SUGAR COMPANY
12. SOUTH NYANZA SUGAR COMPANY LTD
13. THE NAIROBI HOSPITAL
14. UNITED NATIONS OFFICE AT NAIROBI PUBLISHING SERVICES
DIVISION
15. VERMONT FLOWERS (EPZ) LTD
16. MABATI ROLLING MILLS (ATHI RIVER)
17. MABATI ROLLING MILLS (MARIAKANI)
18. COMPLAST INDUSTRIES LIMITED
19. KENGEN LIMITED
20. ALLPACK
21. TWIGA STATIONERY
22. LEOCHEM
23. RIFT VALLEY BOTTLERS
24. MT.KENYA BOTTLERS

25. KISII BOTTLERS
26. NYANZA BOTTLING
27. COASTAL BOTTLERS
28. SPINNERS AND SPINNERS
29. CORRUGATED SHEETS
30. WARTSILA EAST AFRICA LIMITED
31. WARIDI CREATIONS
32. EAST AFRICAN PACKAGING INDUSTRIES LIMITED(EAPI)
33. TOTAL KENYA
34. DIVERSY EASTERN AND CENTRAL AFRICA
35. KALU WORKS LIMITED-ALUMINIUM DIVISION
36. KENYA PETROLEUM REFINERY
37. ATHI RIVER MINING
38. TRANSEAST LIMITED
39. KIPEVU-MOMBASA
40. IKUMBI TEA
41. SADOLIN PAINTS
42. HENKEL
43. FRIGOKEN
44. EQUATOR BOTTLERS

Source: Kenya Bureau of Standards, database (2016)

Appendix iv: Approval of Research Project Proposal



KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 810901 Ext. 4150

Internal Memo

FROM: Dean, Graduate School

DATE: 24th November, 2016

TO: Kasuki Margaret Mbinya
C/o Business Administration Dept.

REF: D53/OL/25145/2012

SUBJECT: APPROVAL OF RESEARCH PROJECT PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 2nd November, 2016 entitled "Environmental Management Systems On The Environmental Performance Of Manufacturing Firms in Nairobi City County, Kenya".

You may now proceed with your Data Collection, Subject to Clearance with Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you.


ANNBELL MWANIKI
FOR: DEAN, GRADUATE SCHOOL

c.c. Chairman, Business Administration Department.

Supervisors:

1. Dr. Jane Wanjira
C/o Department of Business Administration
Kenyatta University

AM/awn

Appendix v: Research Authorization Letter from Kenyatta University



**KENYATTA UNIVERSITY
GRADUATE SCHOOL**

E-mail: dean-graduate@ku.ac.ke

Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 8710901 Ext. 57530

Our Ref: D53/OL/25145/2012

DATE: 24th November, 2016

Director General,
National Commission for Science, Technology
and Innovation
P.O. Box 30623-00100
NAIROBI

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR KASUKI MARGARET MBINYA – REG. NO. D53/OL/25145/2012

I write to introduce Ms. Margaret Mbinya who is a Postgraduate Student of this University. She is registered for M.B.A degree programme in the **Department of Business Administration**.

Ms. Mbinya intends to conduct research for a M.B.A Project Proposal entitled, **“Environmental Management Systems On The Environmental Performance of Manufacturing Firms in Nairobi City County, Kenya”**.

Any assistance given will be highly appreciated.

Yours faithfully,


MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

AM/awn

Appendix vi: Research Authorization Letter from NACOSTI



**NATIONAL COMMISSION FOR SCIENCE,
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,
2241349,3310571,2219420
Fax: +254-20-318245,318249
Email: dg@nacosti.go.ke
Website: www.nacosti.go.ke
when replying please quote

9th Floor, Uthili House
Uburu Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref. No

Date:

NACOSTI/P/17/99448/15132

18th January, 2017

Margaret Mbinya Kasuki
Kenyatta University
P.O. Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *“Environmental management systems on the environmental performance of manufacturing firms in Nairobi City County, Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Nairobi County** for the period ending **17th January, 2018**.

You are advised to report **the County Commissioner and the County Director of Education, Nairobi County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

DR. STEPHEN K. KIBIRU, PhD.
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Nairobi County.

The County Director of Education
Nairobi County.

COUNTY COMMISSIONER
NAIROBI COUNTY
P.O. Box 43844-00100
NAIROBI



National Commission for Science, Technology and Innovation (ISO 9001:2008 Certified)
P.O. Box 74529, NAIROBI

Appendix vii: Examination Report

D53/04/25145/12

DEAN GRADUATE SCHOOL

RE: INTERNAL EXAMINATION FOR MARGARET MBINYA KASUKI'S MBA PROJECT

This is in reference to your letter of 3/5/2017 on the above subject. This is to indicate the following on its evaluation.

A. PRELIMINARIES

- Improve Table of Contents to incorporate title and avoid sub-sections.
- Improve Acronyms section and either have abbreviations or acronyms only.
- Abstract contains most relevant issues but incorporate a clear target population and justify the sampling design and include limitation of the overall study.
- Revisit title to incorporate one Environmental Systems and Performance of Manufacturing Firms in Kenya.

B. CHAPTER ONE – INTRODUCTION

- Proof read this chapter to avoid typographic errors:
- Incorporate an introduction of this chapter before 1.1
- Your 1.13 or performance of manufacturing firms in your background to the study because it is the issue at stake or the actual problem. Reorganize this section and bring out additional citations to justify the gap.
- The problem statement is too long. Make it short or no more than one page and be focused.
- Need to omit 1.8 once you introduce this chapter.

C. CHAPTER TWO – LITERATURE REVIEW

- Avoid use of citations which are more than 10 years old
- Format pg 15 and improve on the syntheses of each theory to help bring the linkages and generate the gap.
- The empirical review section is well done but you need additional citations in each of those variables.
- The section of critique of literature should stand alone and should target any other factor that may lead or influence a firm's environmental performance that was not captured by your model.
- Have therefore a section of summary and gaps to be filled by the study with a small introduction and backed by table 2.1

D. CHAPTER THREE – RESEARCH METHODOLOGY

- Longitudinal research design fall in the category of descriptive research design. Link the study to this and justify its use.
- Table 3.1 seems to be oversimplified. Introduce a percentage of each category in relation the complete target population of 176.
- Source all tables in this chapter.
- Separate validity and reliability sections of the chapter and discuss them independently.

E. CHAPTER FOUR– DATA ANALYSIS AND PRESENTATION OF RESULTS

- The chapter contents appears okay but you need to improve tenses in this chapter and general grammar e.g. pg 43 second paragraph
- Some of your paragraphs are too long for instance pg 45 you can get an extra paragraph from your first paragraph. This applies to pg 47, 49, etc.
- You have introduced a section where you have analysed your data using hypothesis testing. If you want to keep this section, change your 1.4 i.e. research questions to research hypotheses so that you do not analyse the same results twice.
- On examining your 3.8 section that of data analysis and presentation you had indicated that you made use of regression model and not hypotheses testing. Do not mis-match this section with the approach you used in Chapter Four.

F. CHAPTER FIVE – SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

- Improve title as suggested.
- Your conclusions section should be made in plural and you need to conclude on how each independent variable on how each affects the dependent variable.
- Your recommendation section should also target each variable i.e. Green Manufacturing, Pollution Prevention, Management and Pollution Control Systems.
- Avoid sweeping conclusion and recommendation.
- I have not seen your own individual contribution to knowledge in this area. This should be incorporated.
- Paginate all your appendices.

G. CONCLUSIONS

This is to indicate that the project is adequate in form and content and reflects an adequate understanding of the subject content and should be awarded the degree.

Yours faithfully,

19.6.2017

REF: INTERNAL EXAMINATION REPORT OF MBA PROJECT

TOPIC : ENVIRONMENTAL MANAGEMENT SYSTEMS AND ENVIRONMENTAL PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI CITY COUNTY, KENYA
CANDIDATE NAME: MARGARET MBINYA KASUKI
REG. NO. : D53/OL/25145/2012

After examining the above MBA project, I hereby make the following observations on the basis of each section and chapter.

PRELIMINARY SECTION

- The purpose should be amended to read " A RESEARCH PROJECT SUBMITTED TO THE SCHOOL OF BUSINESS IN PARTIAL FULFIMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF BUSINESS ADMINISTRATION OF KENYATTA UNIVERSITY"
- The candidate should amend the declaration page to make it consistent with university format and capture important information such as department, school and university
- The table of contents should be edited so as to include the missing information such as Table of Contents, List of Figures, and Research Permit.
- The contents of the List of Tables and List of Figures should not be presented in bold letters
- The heading "Abbreviation Acronyms" should be amended to read "Abbreviations and Acronyms". Furthermore, the candidate has not captured all the abbreviations presented in the report eg KIPPRA on page 2, GSM on page 19, BOVESPA on page 21, IPCC on page 22, NACOSTI on page 31 etc
- The abstract should be edited for grammatical errors and to provide clarity on time scope for the longitudinal study, unit of observation, type of stratified sampling technique, type of questionnaire, type of data, data collection procedure, test of validity and reliability, descriptive and inferential statistics unit of analysis, analysis and presentation of qualitative data, findings and recommendations

CHAPTER 1 – INTRODUCTION

- In sub-section 1.1.1, the candidate should introduce and provide a conceptual discussion of the four independent variables ie Green manufacturing systems, pollution prevention systems, management systems and pollution control systems. In addition, the candidate should ensure that any substantive sub-section has at least three paragraphs
- The sub-sections on "ISO 14001 Series and Firm Environmental Performance" should be expunged and thus sub-heading 1.1.2 should read "Manufacturing Sector in Kenya"
- The candidate should clearly reveal the research problem regarding environment performance in manufacturing firms in Nairobi City County. Moreover, research gaps emanating from critical review of empirical literature in chapter two have not be revealed in the statement of the problem
- The general objective is not consistent with the research topic
- The sub-section on "Significance of the Study" should logically present the key beneficiaries of the findings of the study in form of paragraphs eg management of manufacturing firms in Nairobi City County, management of manufacturing firms in other counties, management of regulatory agencies, and scholars.

- There is a need to refine the contents of the scope in line with the choice of research design for the study
- The candidate should include the preliminary and appendices sections in the organization of the study
- Generally, in-text citation for the entire report should be consistent with APA format eg (Anastasi and Urbina, 1997) on page 1 etc

CHAPTER TWO: LITERATURE REVIEW

- The introduction to chapter two should be amended to highlight the contents of the chapter.
- Sub-section 2.2 should read “ Theoretical Literature Review
- Sub-sections 2.2.1 should be enhanced to have at least three paragraphs. For each theory discussed in sub-section 2.2, the candidate should provide information on the proponent/s, propositions and the research variable/s underpinned by the theory
- 2.3 should read “Empirical Literature Review” and should not focus on conceptual discussion of the constructs. The candidate should clearly present the findings and the research gap/s with respect to each of the empirical study reviewed in this sub-section
- Sub-section 2.4 should read “Summary of Literature Review and Research Gaps” and the source of Table 2.1 should be acknowledged.
- The figure on conceptual framework should be preceded by a brief introduction and followed by a concise interpretation/explanation of its contents.

CHAPTER THREE: RESEARCH METHODOLOGY

- In 3.2, the candidate should scale down the level of conceptual discussion but rather focus on providing a suitable justification for the choice of research design. There is no clarity on the role of the descriptive research study captured in the last paragraph on page 28
- 3.3 should be edited for grammatical errors and the source of information in Table 3.1 should be acknowledged
- 3.4 should read “Sampling Procedure and Sample Size”. The candidate should specify the type of stratified technique used and provide a justification for the choice of unit of observation. The source of information in Table 3.2 should be indicated and additional columns should be included on sampling factor and sample size.
- Generally, the source of information in the tables and figures presented in the report should be acknowledged and each table and figure should be preceded by a brief introduction and followed by an interpretation/explanation of its contents.
- Sub-heading 3.5 should read “Data Collection Instrument” and should clearly indicate the type of questionnaire, form and content of the questionnaire. In addition, test of validity and reliability should be included in this sub-section as follows:
 - 3.5 Data Collection Instrument
 - 3.5.1 Test of Validity – be clear on how you tested face, content and construct validity
 - 3.5.2 Test of Reliability- present the results of the test of reliability and provide appropriate interpretation/explanation of these results
- 3.6 should read “Data Collection Procedure” and should provide information relating to the research permit, management’s consent, respondent’s consent, delivery of the research instrument, any measure taken to enhance response rate, and collection of the research instrument.
- In sub-section “3.9 Data Analysis and Presentation”, the candidate has not adequately discussed the empirical model, analysis and presentation of quantitative data on the basis of descriptive and

inferential statistics, and qualitative data from open-ended questions. The contents of this sub-section should also be edited for grammatical errors. The candidate should be clear on the choice of the empirical model ie linear regression or logistic regression. Diagnostic tests should logically precede test of hypotheses.

CHAPTER FOUR: DATA ANALYSIS, INTERPRETATION AND INTERPRETATION

- The chapter heading should be amended to read "RESEARCH FINDINGS AND DISCUSSION"
- The introduction to chapter four should be refined to highlight the contents of chapter four
- The content of 4.2 pilot study should be refined and taken to the sub-section on data collection instrument in chapter three. The numbering of other sub-sections should be amended accordingly
- The results of analysis of response rate should be presented using a pie chart to make it intelligible. Part of the content of 4.3 should be taken to the introduction part of chapter four
- Sub-section 4.5 should be edited to read "Descriptive Statistics." The tables for descriptive statistics should be edited to include aggregate scores for mean and standard deviation, and the symbol for sample size (n) should be used in place of N. The results of descriptive statistics should have been compared with the descriptive statistics of reviewed studies
- 4.6 should be edited to read "Inferential Statistics." The results of regression analysis should have been preceded by a discussion of the results of diagnostic tests. The results presented in Table 4.14 are not consistent with the test of homoscedasticity. It may not have been necessary to include diagnostic tests given that there were no hypotheses to be tested.
- The recommendation deriving from the coefficient of determination presented in Table 4.18 should be taken to chapter five
- The empirical model on page 59 should be edited for consistency as follows;
$$\text{ENVIRONMENTAL PERFORMANCE} = 1.139 + 0.887 \text{ GREEN MANUFACTURING SYSTEMS} + 0.752 \text{ POLLUTION PREVENTION SYSTEMS} + 0.645 \text{ MANAGEMENT SYSTEMS} + 0.612 \text{ POLLUTION CONTROL SYSTEMS}$$
- The candidate did not have any hypotheses as insinuated in sub-section 4.10 on "Hypotheses Testing." It's not clear which empirical model between linear regression and logistic regression formed the basis for inferential statistics
- The candidate should present a discussion on analysis and presentation of qualitative data from the open-ended questions featured in the questionnaire

CHAPTER 5: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

- Sub-section 5.2 should read "Summary." The content of sub-section 5.2 should be organized on the basis of specific objectives as guided by inferential statistics and presented in paragraph form without sub-headings 5.2.1, 5.2.2, etc
- The conclusion should be logically organized on the basis of the specific objectives of the study and in line with the summary. The candidate should avoid replicating chapter four as is evident in the last paragraph on page 71
- 5.4 should read "Recommendations for Policy and Practice." These recommendations should be more specific and guided by the conclusions made regarding the different specific objectives.
- Sub-section 5.5 should have included a recommendation deriving from the coefficient of determination reported in chapter four.

REFERENCES

- The candidate should consistently adhere to APA style of referencing
- Some of the sources presented in the list of references have not been included in the in-text citation eg Sekaran, U. (2011) on page 82

APPENDICES

- The heading of page 69 should read " APPENDICES"
- Letter of introduction should be amended in line with the topic of research
- Pagination for appendices should be in roman numbers