FACTORS INFLUENCING THE IMPLEMENTATION OF ENVIRONMENTAL MANAGEMENT PRACTICES IN SMALL AND MEDIUM SIZED MANUFACTURING ENTREPRISES IN NAKURU TOWN, KENYA

A Thesis Submitted to the Graduate School in Partial Fulfillment of the Requirements for the Master of Science Degree in Environmental Science of Egerton University

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DECLARATION AND RECOMMENDATION

Declaration

This thesis is my original work and has not been presented in this university or any other for the award of a degree.

Signature _____ Date _____

Walela Hillary Barasa

NM12/51501/14

Recommendation

This thesis has been submitted with our approval as University Supervisors.

Signature _____ Date _____

Dr. Millicent Mokua

Department of Environmental Science

Egerton University

Signature _____ Date _____

Dr. Moses Otiali Esilaba

Department of Environmental Science

Egerton University

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DEDICATION

This thesis is dedicated to my Son Raymond Walela (The Late), my parents Mr. and Mrs. Jeremiah Wakape, my Brothers and Sister and my dear friend Mr. Samuel Biketi.

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ABSTRACT

Small and Medium-sized Enterprises (SMEs) play crucial role in economic growth for many nations globally. Whereas growth of SMEs contributes to economic growth and development of a society they can also cause a significant environmental degradation. Despite continued emphasis on environmental management in Kenya, there is limited study that has focused on the environmental management strategies undertaken by manufacturing SMEs in Nakuru Town. The aim of this study was to assess the factors influencing the implementation of environmental management practices in small and medium sized manufacturing enterprises in Nakuru Town. The study employed cross sectional research design where data was collected through structured questionnaire, face to face interviews and observations. The respondents were owners of the industry, technical managers or administrative staff. Simple random sampling procedure was used to select 32 manufacturing SMEs in Nakuru County. Data was analyzed using descriptive statistics and results presented as frequency tables and bar graphs. Logistic regression model was used to determine factors influencing the adoption of environmental management practices. The findings indicate that the owners/managers of SMEs in Nakuru Town had limited awareness with regard to environmental impacts surrounding their business. The SME owners/managers had a positive attitude towards environmental management. But it was established that the adoption of environmental practices among the selected small and medium manufacturing enterprises was still very low or non-existent. On the factors influencing the adoption of environmental practices, the size of the firm, level of awareness and financial resources had significant influence on the decision to undertake environmental management practices. New efforts are therefore required to engage the SMEs sector in addressing environmental issues by building capacity such as raising awareness and offering incentives on programs that supports sustainable practices.

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LIST OF ABBREVIATIONS AND ACRONYMS

CEC	Commission for Environmental Cooperation
EA	Environmental Auditing
EC	European Commission
EIA	Environmental Impact Assessment
EMCA	Environmental Management and Coordination Act
EU	European Union
EMP	Environmental Management Practices
EMS	Environmental Management System
GDP	Gross Domestic Product
GoK	Government of Kenya
IFC	International Finance Corporation
IICA	Indian Institute of Corporate Affairs
KEBS	Kenya National Bureau of Statistics
NEAP	National Environment Action Plan Framework
NEMA	National Environment Management Authority
OECD	Organization for Economic Cooperation and Development
PEG	Partnership for Environment and Growth
SME	Small and Medium Enterprise
UK	United Kingdom
UNDP	United Nation Development Programme
UNEP	United Nation Environment Programme
UNIDO	United Nation Industrial Development Organization

CHAPTER ONE

INTRODUCTION

1.1.Background Information

The Small and Medium sized Enterprises (SMEs) are identified as one of the leading groups of economic activities globally (Robu, 2013). The importance of SME sector is well recognized worldwide due to its significant contribution towards economic growth through employment creation and provision of essential goods and services (Organization for Economic Cooperation and Development, 2004). While it is widely accepted that SMEs play a significant role in the economic development globally, they also collectively exert considerable pressure on the environment. Much of the prior studies have focused majorly on the environmental impacts of the large industries (Gunningham, 2009). Therefore, majority of the initiatives devised to incorporate environmental issues into business processes were predominately aimed at large industrial establishments. It is until recently that the focus has shifted to all business establishments including small and medium-sized enterprises.

Studies show that small and medium- sized enterprises are the dominant forms of business in almost all countries in the world (OECD, 2017). They provide the main source of employment and are the major contributors to the gross domestic product of any country regardless of degree of development and standards of living. According to the International Finance Corporation (2013), SMEs represent more than 90% of global businesses accounting to about 50% of Gross Domestic Product (GDP) of all countries and for 60% of their employment. Formal SMEs contribute up to 40% of national income (GDP) in emerging economies (OECD, 2017). These numbers are significantly higher when informal SMEs are included.

Generally, individual SME may not have a significant environmental impact compared to large corporations, but collectively a large number of SMEs can exert considerable pressure on the environment (Gadenne *et al*., 2009; Sa´nchez-Medina *et al*., 2014). Small and medium sized enterprise accounts for 40% of industrial productions and are responsible for an estimated 70% of the total industrial pollution load globally (OECD, 2018). Small and Medium Enterprises are responsible for 64% of pollution in Europe and contribute approximately 60-70% of the total industrial waste in the European Union (Miller, 2011). This has resulted in an

increasing recognition of SMEs' social and environmental impact. There is a growing trend in the sustainability movement that increasingly focuses on SMEs, and not just on large enterprises.

The impact of some of these SMEs is largely acknowledged as they consume energy and natural resources, and generate waste and pollution. Climate change, environmental pollution, water quality issues and waste generation and disposal are among the leading challenges resulting from such development (OECD, 2007) Moreover as technology improves more hazardous forms of wastes are generated. Ensuring compliance of small and medium-sized enterprises with environmental regulations is a substantial policy challenge for environmental authorities worldwide. In particular, their size and number limit the effectiveness of conventional regulatory and compliance assurance approaches developed for large enterprises (OECD,2018).

Kenya is an emerging economy that is averagely industrialized (UNIDO, 2013). The country has fairly developed large to small scale industries with the SMEs playing a key role in economic development and job creation. According to UNIDO (2013), SMEs in Kenya contribute-approximately 18 % to the Country's GDP and 80% of the employment. The SMEs can be categorized into micro-enterprise, small enterprise or medium enterprise. A micro-enterprise is a business organization having not more than 10 employees while small enterprise has a minimum of 11 employees and maximum of 50 employees (Gok, 2012). On the other hand, medium enterprise has between 50 and 250 employees.

Small and Medium Enterprises in Kenya are characterized by; the ease of entry and exit; the small-scale nature of activities; self-employment; family owned and the little amount of capital and equipment (Waweru, 2007). SMEs are found in the largest and most dynamic sectors in the Kenyan economy, ranging from those that are pollution-intensive and resource-intensive, such as manufacturing and natural resource extraction, to those that are more environmentally benign, such as retail (Mikwa, 2018). The SMEs range from those unregistered, locally known as Jua Kali enterprises (local name for informal sector), to those registered small-scale businesses, such as supermarkets, wholesale shops and factories.

In Nakuru County, general trade, wholesale, retail stores, service and manufacturing industries make up majority of the businesses. Most of these businesses are located within the

major towns namely, Nakuru, Naivasha, Njoro, Subukia, Gilgil, and Molo. Nakuru Town being the County headquarters and the fourth largest town in Kenya hosts majority of these enterprises. The wide ranges of industries in Nakuru County includes textile, rubber factories, and wood processors, food and beverage industry, chemical production, automobile servicing industries (County Government of Nakuru, 2013). Whereas vast majority of the industries are located within the outskirts of major towns, quite a number are scattered within the entire County. Each of these sectors contributes differently to environmental degradation.

Micro and small enterprises are usually faced with a myriad of difficulties in dealing with environmental issues. According to Kenya Economic Outlook (2016), SMEs are hindered by size related constraints such as inadequate capital, limited market access, poor infrastructure, inadequate knowledge and skills and rapid changes in technology. Corruption also presents another bottleneck to sustainability. In comparison with the larger enterprises, empirical research shows that most of these SMEs are lagging behind when it comes to addressing environmental concerns (Lawrence *et al.,* 2006). It has also been argued that the very concept of sustainable business practice for small firms is elusive (Lawrence *et al.,* 2006) and that SMEs are less likely to be proactive when it comes to environmental protection (OECD, 2007).

There is a growing importance for small and medium- sized enterprises in all sectors to implement sustainability standards in their daily operations. The purpose is to run the sector responsibly, not only to society but also to the environment. An environmental management program is based on practical steps to reduce the impact of human activities on the environment such as minimizing waste, conserving water and energy (UNEP, 2003). This entails environmental sound practices that are geared towards addressing environmental issues resulting from the operations of an enterprise. It is from this point of view that this study was conducted and the focus was to explore the factors that influence environment management practices adopted by small and medium-sized manufacturing SMEs in Nakuru Municipality.

1.2.Statement of the Problem

There has been an increase in the number of industries both large and small scale in Kenya. In particular, Nakuru County has been a recipient of such development initiatives. The industrial activities imply a greater potential for increased resource use and waste generation resulting to greater environmental impacts. As the Country makes significant strides in industrial development, concerns about environmental degradation and sustainable

development continue to attract attention. Natural resource depletion and pollution continues to be among the most significant environmental issues resulting from rapid industrialization and urbanization. Proper management of the environment among industries, both small and large, is a key part of sustainable development. Environmental management represents a significant challenge for small and medium enterprises. While there is a significant amount of research that focused on environmental performance of large enterprises, it is notable that little research has concentrated on SMEs and particularly, in Nakuru County. Similarly, government policies on environmental management often focus predominantly on larger firms; yet, SMEs constitute majority of Kenyan industries. Despite huge emphasis in environmental management in Kenya since 2000s, the environmental practices employed by SMEs to reduce their environmental impact are unknown. This study therefore aimed at obtaining baseline information on the factors that influence the adoption of environmental management practices among the manufacturing SMEs and the specific actions undertaken to reduce the impacts of their activities on the environment in Nakuru Town.

1.3. Objectives

1.3.1. Broad Objective

The broad objective was to assess factors influencing the implementation of environmental management practices in small and medium-sized manufacturing enterprises in Nakuru Town.

1.3.2. Specific Objectives:

i) To determine the level of environmental awareness of the owners/managers of manufacturing small and medium-sized manufacturing industries in Nakuru Town
ii) To assess the environmental attitude of the owners/managers of manufacturing small and medium-sized manufacturing industries in Nakuru Town
iii) To identify the factors that significantly influence the adoption of environmental management practices among Small and medium manufacturing industries in Nakuru Town.

1.4. Research Questions

This study was guided by the following research questions;

i) What is the level of environmental awareness of the owners/managers of manufacturing small and medium-sized manufacturing industries in Nakuru Town?
ii) What is the attitude of owners/managers of manufacturing small and medium manufacturing industries in Nakuru Town on environment issues?

iii) What are the environmental management practices adopted by small and medium sized manufacturing industries in Nakuru Town?
iv) What are the factors that significantly influence the adoption of environmental management practices among Small and medium manufacturing industries in Nakuru Town?

1.5. Justification

The importance of managing the impact of human activity on the natural environment has gained increasing levels of support, highlighted by the rising quantities of legislation, both nationally and internationally. It is recognized that the environment has become an important factor in the decision-making process of companies around the world. This is because environmental issues are becoming more complex and interconnected. Environmental management has primarily been practiced in large companies and therefore predominantly understood from a large business perspective. However, SMEs have an important role to play in this context as they make up a significant proportion of these industries. This is because while the environmental impact of each SME may seem insignificant, their cumulative effect cannot be ignored.

Small Medium Enterprises have been described as one of the fastest growing sectors of the economy not only in Nakuru County and Kenya but the whole of Eastern Africa. Such immense surge in SMEs in the county indicates potentially significant environmental impacts. As the region strives to accelerate the pace of development in line with vision 2030, environmental concerns are becoming more evident. Beyond achieving environmental compliance, incorporating sustainable practices among SMEs in all sectors is key to fulfilling the requirements of Agenda 21 of the 1992 Earth Summit and the Sustainable Development Goals (SDGs). With changing global economic landscape and a shift towards environmental sustainability, there is potentially an opportunity to engage SMEs to develop, incorporate and integrate environmental considerations in their planning and processes. Furthermore, competitive advantage will be achieved by integrating environmental considerations into business strategy and daily operations, which may lead to new environmentally friendly products and service. This information is crucial for decision making by policy makers and environmental managers on the importance of environmental management with regard to small and medium enterprises.

1.6. Scope of the Study and Limitation

Based on Nakuru County administrative structure, the study was conducted in Nakuru East and Nakuru West Sub-Counties in Nakuru County which forms the Nakuru Town. The focus was on small and medium manufacturing enterprises with less than 250 employees within the area of study. The study was conducted in 2017 and was limited to the objectives highlighted in the study. The researcher encountered resistance and reluctance by the owners/managers/ employees of the selected industries to share key information. However, the researcher assured the respondents that the information given was confidential and was to be used only for academic purposes. The researcher also faced financial limitations as the research had relatively high cost implications and had to stick to the budget schedule for the study.

1.7. Assumptions

The study was based on the perceptions of the respondents (owner/managers) to the survey statements and as such it was self-assessment. It was therefore assumed that the information provided by the respondents was factual, honest and free of bias. It was also assumed that the owners/managers had at least college level education.

1.8. Definition of Terms

Environmental Attitude - In this study attitude refers to as affective, behavioral and cognitive disposition, feeling, position, (positive or negative) of people about the environment and the general environmental issues.

Environmental Awareness - Having or showing realization, perception, or knowledge about the environment and related issues**.**

Environmental Impacts -Any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products, or services.

Environmental Legislation-a collection of laws and regulations aimed at controlling the impact of human activities on the environment.

Environmental Management Practices-procedures, processes and actions that control the interaction and impact of human activities on the environment

Environmental Management Systems – (EMS) is a set of processes and practices that enable an organization to reduce its environmental impacts and increase its operating efficiency

Resource Efficiency –process optimization to limit consumption of energy, water and materials and output of waste products

Small and Medium Enterprise- For the purpose of this study, Small and Medium Enterprise are defined as a business or company or industry that employ no more than 250 employees

CHAPTER TWO

LITERATURE REVIEW

2.1. Definition of SMEs

The definition of Small and Medium-sized Enterprises (SMEs) varies from one country to another and is usually based on the number of employees, turnover and capital investment of the individual SMEs (Robu, 2013). The Organization for Economic Co-operation and Development (OECD) defines small and medium-sized enterprises as non-subsidiary, independent firms which employ fewer than a given number of employees (OECD, 2005). The European Commission defines SMEs as the "category of micro, small and medium-sized enterprises which employ less than 250 persons and which have a turnover not exceeding € 50 million" (European Commission, 2012). This is further categorized into micro enterprises (with less than 10 employees), small enterprises (with 10-49 employees) and medium sized enterprises (with 50-249 employees). In the United Kingdom the limit is set at 250 employees with the turnover not exceeding £ 12.5 million. In Canada, the United States and Mexico, the definitions of SMEs vary by sector and are based on the number of employees not exceeding 500 (European Commission, 2012).

In Kenya, the classification of enterprises is primarily by the number of employees engaged by firms and their turnover. The Micro and Small Enterprises (MSE) Act 2012 defines: Micro enterprises as any firm, trade, service, industry or a business activity, formal or informal that has an annual turnover that does not exceed Kenya Shillings 500,000 and employing 1- 9 people. The total assets and financial investment or the registered capital of the enterprise does not exceed KES. 10 million in the manufacturing sector and does not exceed KES. 5 million the service and farming sector. Small enterprises are those firms, trade, service, industry or business activities that post an annual turnover of between KES.500, 000 and KES.5 million and have an employee list of 10 to 50. In the manufacturing sector, investment in plant and machinery should be between KES. 10 million and KES. 50 million and registered capital of the enterprise between KES. 5 million and KES. 25 million in the service and farming sector (GoK, 2012).

2.2. The Role of SMEs in the Economy

Studies show that small and medium- sized enterprises are the dominant forms of business in almost all countries in the world. The SMEs are the biggest contributors to the gross domestic product of any country regardless of degree of development and standards of living. According to the International Finance Corporation (2013), SMEs represent more than 90% of global businesses and account, on average, for about 50% of Gross Domestic Product (GDP) of all countries and for 60% of their employment. Formal SMEs contribute up to 40% of national income (GDP) in emerging economies (OECD, 2017). These numbers are significantly higher when informal SMEs are included.

The small and medium-sized enterprises in the European Union generated about 67% of all employment (Wymenga *et al*., 2011). In countries like Japan and China 60% of GDP comes from SMEs, in United States of America that percentage goes up to 65% while in the European Union (EU), SMEs generate 52% of GDP (Robu, 2013). The small and medium-sized enterprises in the European Union generated about 67% of all employment (Wymenga *et al.,* 2011). In the Netherlands, SMEs account 98.8% of all private sector companies, contribute 31.6% to Gross Domestic Product, and employ 55% of total workforce (Indarti & Langenberg, 2004). The contribution of SMEs in output in Japan is 65 % and Germany 48% while in USA its 45%. SMEs in the US generate more than half of the nation's gross domestic product (Indarti & Langenberg, 2004).

In South Africa, SMEs make up 91% of all businesses, providing about 60% of employment and contributing about 34% of the country's GDP (Banking Association of South Africa, 2014). Small and medium-sized enterprises are also the prominent form of business in Ghana accounting to about 90% of all businesses providing about 60% of employment and contributing about 34% of the GDP (Abor & Quartey, 2010). In Kenya, just like many other countries globally, the SMEs sector plays a key role in economic growth through creating employment, wealth creation and income opportunity. SMEs in Kenya contribute approximately 18 % to the Country's GDP and 80% of the employment (UNIDO, 2013). The SMEs operate in all sectors of the Kenyan economy, that is, manufacturing, trade and service sectors in a wide spectrum of industry disciplines. The SMEs range from those unregistered, locally known as Jua Kali enterprises (informal sector), to those registered small-scale businesses, such as supermarkets, wholesale shops and factories (Waweru, 2007).

2.3. Small and Medium-sized Enterprises and Environment

Small and medium-sized enterprises constitute the backbone of every economy and account for about 90% of businesses and more than half of employment worldwide (IFC, 2013). As the economic significance of SMEs continues to grow, so do their environmental impacts. Small and medium-sized enterprises are particularly strong in sectors characterized by high intensity of resource use and by polluting emissions (UNEP, 2004). Today, SMEs are increasingly being faced with pressure to measure and manage their impact on the environment (European Union, 2018; IFC, 2013). It has been viewed that environmental management has primarily been practiced in large companies and therefore environmental management is predominantly understood from a large business perspective (Lawrence *et al*., 2006: Studer *et al.*, 2005).

Small and medium-sized enterprises have a substantial environmental impact, the nature and scale of which has been considerably documented in literature. Blackman (2006) suggested that small businesses are more pollution-intensive than big businesses. Generally, individual SME may not have a significant environmental impact compared to large corporations, but collectively a large number of SMEs can exert considerable pressure on the environment (Gadenne *et al.,* 2009; Sa´nchez-Medina *et al.,* 2014). In the European Union, small and medium-sized enterprises are responsible for 64% of pollution in Europe and contribute approximately 60-70% of the total industrial waste in the European Union (Miller, 2011).

According to the OECD (2018), around 70% of the total industrial pollution in OECD countries alone. A study by Redmond *et al.* (2008a) on the impact of small business on the environment highlighted that SMEs have considerable negative impact on the environment in terms of waste generation, energy and water consumption. These SMEs produce a substantial volume of waste and consume energy and water resources. It also highlighted that they do not use best practice for waste disposal and that the environmental management of water resources was found to be the least well-established priority of small businesses.

According to OECD (2018), sectors that have been identified to have significant environmental impact include foundry, leather tanning, textiles, dyes and chemicals, electroplating, ceramics, glass and glassware, small cement plants and pulp and paper. It is noted that the pollution per unit of production is generally higher in SMEs than that of the corresponding large units. This is partly due to the use of obsolete technologies and poor

management practices, and partly because most of these units do not come under the ambit of regulatory authorities (Indian Institute of Corporate Affairs, 2013) It is also observed that large industries comply with environmental regulations as they have the financial capacity to install pollution control technologies, while smaller companies tend to struggle more to achieve conformance with the law (OECD, 2015).

2.4. Environmental Management in Kenya

Proper management of the environment among industries, either small or large, is a key part of sustainable development. As documented in literature, SMEs often face unique environmental challenges that are related to their size and their place in the SMEs (Mikwa, (2018). All businesses irrespective of its nature can have significant impacts on the environment such as resource consumption and environmental pollution (Julien, 2006; McLaughlin, 2013; Ramli *et al.,* 2013) There has been increasing concern from the government and the general public over the environmental impacts of SMEs in Kenya. Many industries in Kenya still encounter problems when it comes to managing the impacts of their operations in the environment (Mikwa, 2018).

Today Kenya has made tremendous strides in addressing these concerns through its commitment to a resource-efficient development pathway. This is evidenced by the wide range of policy, institutional and legislative frameworks to address the environmental issues from industrial and economic development programs (Failler *et al.,* 2016; Kaimuri & Kosimbei, 2017). The enactment of the Environmental Management and Coordination Act of 1999 (EMCA) laid the foundation of environmental management in Kenya. The Environmental Management and Coordination Act of 1999 provided an appropriate legal and institutional framework for the management of the environment (Barczewski, 2013). In addition, environmental considerations of development are contained within the social and economic pillars such as vision 2030 as well as international development treaties like Agenda 21 and the sustainable development goals (Kaimuri & Kosimbei, 2017).

Environmental Management and Coordination Act of 1999 (now amended to 2015) provided for the establishment of the National Environment Management Authority (NEMA). The National Environment Management Authority is the principle agent tasked with enforcing EMCA's provisions as well as the subsidiary legislation in the Country (GoK, 2015) Most of the provisions contained in EMCA, as well as the subsidiary legislation, are intended to provide

regulations for the usage and type of allowable activity in the different ecosystems and habitats of Kenya (Barczewski, 2013). However, enforcement of environmental laws remains a great challenge especially in developing nations (UNEP,2017). This is due to factors such as lack of institutional capacity, lack of competence of relevant enforcement personnel, and lack of information and national guidance on enforcement Sustainability standards may lag if there is no regulatory enforcement within a sector (Draper & Ngarachu, (2017).

2.5. Environmental Awareness of SMEs Managers

From a perspective of environmental sustainability, it is essential for SMEs managers to understand the pertinent environmental issues surrounding their businesses (Willianson *et al.,* 2006). This plays a crucial role in adopting sustainable environmental practices. The more knowledge one has on environmental sustainability, the greater the sustainable attitude towards the environment (Heiskanen *et al.,* 2014). Environmental awareness is aligned with the individual's convictions regarding environmental causes, their positioning through actions and attitudes, and the way in which they demonstrate this behavior in favor of the environment, by participating actively in environmental issues (Mei *et al.,* 2016).

Many questions have been raised on the awareness of SMEs on their obligation to safeguard and promote environmental sustainability. Existing data show that a large proportion of SMEs tends to underestimate their environmental impacts (Walker *et al.,* 2007; Wilson *et al.,* 2012). While some enterprise believe that their operation has minimal impact on the environment (Redmond *et al*., 2008a), others believe that they have a cooperate responsibility to safeguard the environment (Parker *et al.,* 2011). A study conducted in the UK demonstrated that only 7% of SMEs believed that their activities were harmful to the environment (Wilson *et al.,* 2012). A similar study in Australia found that while 61% of the SMEs acknowledged that their business had an impact on the environment, only 26% had taken steps to protect the environment (Walker *et al.,* 2007).

Mputhia *et al.* (2009) sought to establish awareness as a determinant of compliance with environmental regulations on manufacturing SMEs in Nairobi, Kenya. The study sampled 36 where it was revealed that environmental awareness was quite high. The measure of awareness was based on of the Environmental Management and Coordination Act and Environmental Impact Assessment (EIA) and Environmental Audit. A correlation between environmental awareness and environmental compliance revealed a positive correlation. The study also

established NEMA as the major source of environment information (56%) followed by the media. According to the study 88.2% of manufacturing SMEs had high awareness level when it comes to environmental impact assessment (EIA) and environmental audit.

Research has shown that environmental practices depend on general environmental awareness and that lack of awareness may hinder the implementation of environmental practices (Gadenne *et al*., 2009; Williamson *et al*., 2006)). For example, those who are aware of environment issue and are concerned about the impact of their business on the environment will be more likely to act to reduce the impact of their business activity. This view is also reinforced by (Greenwood *et al.*, 2012) who stated that the behavior of managers plays a crucial role in a company's sustainability. If SMEs managers lack of environmental concern, they will not be able to make a strategic evaluation on the importance of environmental improvements. It is therefore crucial for managers to understand the environmental issues surrounding their business.

Many small and medium firms do not have information about modern managerial and technical solutions that could help them improve environmental performance (OECD, 2015). They suffer from an overall lack of managerial and technical skills and human resources to perform certain tasks, especially if these tasks are believed to be outside of the SMEs core business. It has been established also that many SMEs do not know about legislation relevant to their business and in particular, the understanding of which legislation to implement and to what level (OECD, 2012). A study by Revell *et al*. (2010) also cited lack of information as a major constraint in environmental management among SMEs. This view is backed by another study by Johnson (2012) which revealed a low awareness level among SMEs. The study concluded that high awareness level positively correlated to high level of sustainability practices and vice versa.

Responding to environmental issues requires subtle understanding of the environmental issues related to the industry and the underpinning legislation. However, a number of studies pointed out that most SMEs have limited knowledge on how to respond to environmental issues (OECD, 2012; Seroka- Stolka & Jelonek, 2013). For example, most SMEs are generally much less likely to embark on environmental improvement programs than large firms. This includes adopting a written environmental policy, to utilize a formal environmental management standard, or to undertake environmental audits. According to Williams and Schaefer (2013),

many SMEs assume that their impact on the environment is minimal and therefore do not realize the extent to which environmental legislation affect them. As a result, many SME businesses are reactive rather than proactive when dealing with the environmental issues.

2.6. Environmental Attitudes of SMEs Owners/Managers

There is consensus in literature that industries, irrespective of their size, industries can no longer fail to respond to the needs of the communities in which they do business (Panwar *et al.,* 2016). However, as highlighted in most studies, SMEs have specific barriers that prevent them from engaging in environmental practices, such as limited resources, culture and policy (Bergmiller & McCright, 2009; Francisco *et al.,* 2016; Omar *et al.,* 2009). In addition to this, implementation of environmental practices such as pollution abatement programs, involvement in voluntary environmental initiatives, reduction of waste and emissions are also driven by human behavior (Panwar *et al.,* 2016; Williams & Schaefer, 2013). Previous studies suggest that human behaviors are the major underlying cause of climate change and environmental issues (Steg & Vlek, 2009). However, few studies have addressed the issue of SMEs pro-environmental behaviours (Francisco *et al*., 2016).

Environmental attitude is commonly understood as a cognitive judgement towards the value of environmental protection (Eilam & Trop, 2012). Environmental attitudes are commonly perceived as preconditions for achieving environmental behavior (Gadenne *et al*., 2009) and that environmental action is motivated by the cognitive drive towards environmental protection. The approach of SMEs to environmental management is different from that of large firms in that it is personalized and informal (Francisco *et al*., 2016). Small and medium-sized enterprises engagement with environmental practices reflects the values of their owners and the needs of their community, since their engagement results more from a genuine concern for the community and the environment than the anticipated business benefits (Panwar *et al.,* 2016).

Management has an important role in defining the environmental orientation of the firm, since their values and environmental orientation determine to a great extent the environmentally practices implemented by the firm (Cassels & Lewis, 2011). According to Williams and Schaefer (2013), entrepreneur's values and personal commitment are linked to a more general concern for the environment especially in SMEs where to a more general concern for the environment. Studies indicate that positive environmental attitude is an important factor

in the introduction of environmental initiatives in businesses (Zhengang *et al*., 2011). While some researchers have claimed a positive correlation between environmental attitude and environmental behaviours (Gadenne *et al*., 2009; Zhengang *et al*., 2011), others have concluded that high degree of environmental attitudes would not result in environmental improvement. This has been proven the study by Shivakumara and Prakash (2012) where the respondents expressed highly positive environmental attitudes but their apparently positive attitude was not reflected in environmental business practices.

A study by Gadenne *et al.* (2009) on awareness and practices in SMEs also indicated that owner/managers environmental attitudes do not necessarily translate into proactive environmental behavior or practices. According to Schaper (2002), the lack of movement towards greater adoption of environmental practices and initiatives in business is not primarily due to a lack of positive environmental attitudes in business. Zhengang *et al.* (2011) in their study on attitudes and awareness towards environmental management in Sri Lanka, concluded that "It requires obviously less effort to express positive attitudes about environmental issues".

2.7. Environmental Management Practices in SMEs

Brigitte *et al.* (2014) described environmental practices as practical operationalization of actual environmental behaviors of firms. That actual environmental behaviors concern all activities undertaken by SMEs that reduce the impact of their operations on the environment. Every activity in any enterprise from raw material inputs, production process, packaging, to waste disposal, are related to environmental issues. Environmental management practices are being employed more widely as a result of the changing business conditions that emphasize on environmental performance. Therefore, environmental management practices are a combination of organizational activities aiming at reducing resource consumption and improving waste disposal.

Over the years there has been considerable pressure from governments for small and medium-sized industries in the manufacturing sector to engage in pro-environmental issues in order to improve their environment performance (Williams & Schaefer, 2012). Recent studies have found that a greater number of small businesses now engage at least in some environmental activities (Brammer *et al*., 2011; Cassells & Lewis, 2011; Revell *et al*., 2010). These management practices range from undertaking environmental audits, pollution prevention plans, environmental training for employees, life-cycle analysis, hiring a designated

environmental manager, and environmental standards (Brammer *et al*., 2012; Julien, 2006; Lawrence *et al*., 2006). Environmental management practices are therefore aimed at improving environmental performance, including improving efficiency, shortening response time, cutting down energy consumption, reducing waste and toxic material usage (Bergmiller & McCright, 2009).

Lawrence *et al.* (2006) indicated that SMEs seem to engage in less explicit environmental and social behaviour than larger firms. This finding is supported by numerous other studies that documented SMEs to have limited ability and willingness to engage with pro-environmental issues (Hamann *et al.,* 2009; Spence, 2007). Ann *et al.* (2016) in their study on resource efficiency models among SME revealed that 80% of businesses did not embrace resource efficiency as part of business strategy, 50% of businesses did not have an individual or team responsible for environmental management. Only 40% of the businesses monitored resource use and only one (1) business had a formal environmental management system in place. A survey by Julien (2006) on comparison between SMEs and large firms revealed that only 44.4% of firms with less than 100 employees have a written environmental policy, when compared to 83.1% of firms with more than 500 employees. When it comes to environmental training programs for employees the percentage are 40% of firms less than 100 employees and 81% of large firms.

Today, more companies are appointing senior officers with sole responsibility for the environment (Julien, 2006; NetRegs, 2003; Williamson *et al*., 2006). Such firms have demonstrated better environmental performance when compared to those that lack a designated environmental officer (Battisti & Pretty, 2010). Green wood *et al*. (2012) stated that environmental manager plays a critical role in advancing environmental sustainability and social responsibility in their organizations. According to Green wood *et al*. (2012), environmental managers play a leading role in pollution prevention, sustainable resource use, climate change mitigation, and raising environmental and social responsibility awareness among those with which the organization has relationships. Butler (2009) argues that environmental managers serve a multifunctional role and continually strive for more sustainable practices. Today's environmental managers serve as internal facilitators, guiding and enabling sustainability efforts within the firm while simultaneously serving as the environmental stewards of the corporate world, managing the relationship between the firm and the environment (Greenwood *et al.,* 2012).

Generally environmental managers have clearly defined responsibilities related to environmental aspects and impacts, including the reduction of negative environmental impacts of the organization's processes, maintaining regulatory compliance, and avoiding unnecessary environmental liabilities (Butler, 2008). Their technical knowledge, problem-solving abilities, and management skills can advance environmental stewardship in the organization (Greenwood *et al.,* 2012). However, small and medium enterprises are usually unable to hire competent personnel to propagate their environmental agenda due to financial constraints unlike large firms (Williamson *et al.,* 2006). Therefore, SMEs lack competent staff to implement good environmental practices which influence the overall environmental performance.

The environmental practices associated with environmental management systems are considered important strategies in reducing the impact of industries on the natural environment (Low *et al*., 2015). An environmental management system offers the methodology a company needs to identify and implement ways in which to improve the environment both inside and outside a plant or business (Commission for Environmental Cooperation, 2005). An EMS addresses all aspects of organizations' activities, including raw materials consumption, energy, process control, waste and emissions (European Commission, 2004). A successful EMS can enhance efficiency and lower costs, reduce resource use and waste, help to ensure compliance with regulatory requirements, encourage employee involvement in environmental performance and improve relations with customers (European Commission, 2013; OECD, 2007).

Although the use of EMSs is becoming more common among larger companies, its adoption by small and medium-size enterprises is less common (Lawrence *et al*., 2006; NetRegs, 2003). Commission for Environmental Cooperation (2005) reported that most SMEs face few incentives and many difficulties in implementing environmental management systems. According to the report, most SMEs do not know what an environmental management System is and, if they do, they don't know how it could benefit their business. Additionally, many smaller businesses lack the technical expertise and resources needed to develop and implement one. Although business needs may ultimately determine whether an SME implements an EMS, government or private sector technical assistance is crucial to providing the conditions under which businesses particularly small and micro-businesses are likely to implement EMS (Seidel *et al.,* 2009).

Another important element of environmental management practice is environmental auditing. Environmental auditing is processing whereby an organizational environmental performance is tested against its environmental policies and objectives (DEAT, 2004). According to several studies, SMEs are less involved in environmental auditing (Iraldo *et al*., 2010; Wilson, 2011) and those that do undertake environmental auditing do so within the confines of a very strict regulatory set up (Mputhia *et al*., 2009). According to Wilson (2011), SMEs are not used to conducting environmental auditing and always consider environmental audit as burden.

Manufacturing small and medium-sized enterprises consume a significant portion of the energy and natural resources in any economy, either directly, as inputs in the production processes, or, indirectly in various activities that are linked to the SMEs (UNEP, 2010). Minimizing the cost for the environment through resource efficiency is a major strategy that has been formulated (Julien, 2006). According to the Commission for Environmental Cooperation (2005), many SMEs rate the success of their environmental performance by monitoring the resources used such water and energy consumption, both of which are closely related to cost savings. Organizations use self-generated records, bills or data from various utilities to measure consumption (UNEP, 2010).

The European Commission (2013) indicate that 93% of SMEs are taking at least one action to be more resource efficient, with the most common actions being to minimize waste, save energy (both 67%) and save materials (59%). At least half are also recycling by reusing material or waste within the company, or by saving water (both 51%). Efficient use of resources such as waste minimization energy and water has widely been recognized as a useful approach to mitigate pollution (European Commission, 2013). Research shows efficient use of resources lead to improved environmental performance. According to European Commission (2013), resource-efficient technologies emphasize the reduction of waste, use of renewable energy source or energy saving measures/programs to curtail consumption as well as emissions among industries. This allows industries to produce more with less resources, less emissions, and normally, less environmental impact and greater sustainability (McLaughlin, 2013; UNEP, 2003).

Achieving energy efficiency requires implementing some practices and/or taking some measures to maximize on energy available. Energy efficiency strategies include a wide range of measures such as changing to alternative sources of energy for example use of solar energy, replacing old appliances and gadgets with energy efficient ones and undertaking energy audits (Fleiter, 2012; Lo *et al.,* 2015; Viesi *et al.,* 2017). It also includes generally changing behaviours to reduce energy consumption and/or wastage through switching of electrical appliances when not in use (Gillingham *et al*., 2009; UNEP, 2010). Yacob *et al.* (2014) stated that energy management roles have widely expanded in industries to include SMES. Today, energy saving has become one of the most prominent aspects of environmental management in manufacturing SMEs and it should be implemented.

According to Yacob *et al.* (2014) energy efficiency improvement in manufacturing plants can lessen possible negative environmental impacts, and at the same time, improving the company's financial performance. Implementing energy efficiency improvements in SMEs significantly reduces greenhouse gas emissions by applying sustainable production processes that are resource and energy efficient (UNEP, 2010). Liu *et al.* (2012) conducted a survey among 125 Chinese SMEs to investigate the extent to which different energy-saving actions were implemented. Among the participating companies, the most commonly adopted energy-saving action was the daily maintenance of production equipment in order to reduce energy use, while the action adopted least often was the promotion of eco-design. This practice of internal training on energy savings had significant positive impact on the companies' practice of energy-saving actions.

Most manufacturing processes require water as part of their input depending on the manufacturing processes. Kenny *et al.* (2009) highlighted that water conservation is a major issue in industrial activities. However, many SMEs do not pay much attention to water conservation in their manufacturing processes. In addition, it is found that many SME owners/managers ignore the adoption of water minimization practices mainly due to the heavy financial commitment that may be required (Bay & Rasmussen, 2011). SMEs shun the adoption of water minimization practices, as they have little understanding or appreciation of the potential benefits of water conservation (Vives, 2010). However, what many businesses fail to realize is that in addressing water issues that are deemed financially burdensome, they stand to gain in terms of efficiency and profitability in the long run (Hokinson, 2010).

According to UNEP (2010), in the study on promoting resource efficiency in small and medium sized enterprises in Kenya revealed that companies that were conscious of resource use made significant improvement in environmental performance. In particular, a case study in Chandaria Industries revealed the company made an annual saving of US$ 633,600 on water efficiency. The measures implemented included: metering and sub metering of all points of water use/discharge and setting performance indicators and preventive routine maintenance of machinery and fixing of all leak points. Other measures included water recycling, use of poly-electrolytes for wastewater treatment and – reuse of clean water. The study concludes that SMEs appear less keen on adopting resource efficiency measures.

When it comes to matters of waste management, studies show that the subject continues to attract much attention in small and medium-sized enterprises (Demirbas, 2011). This is due to the increased demand for sustainability among all sectors of economy (Dametew, 2015). Previous studies show that many SMEs continue to struggle with issues related to waste management (Demirbas, 2011; Yacob *et al.*, 2017). The complexities and magnitude of the challenges become evident when considering the waste types to be managed that include industrial solid waste, municipal wastewater, industrial wastewater, storm water and hazardous. Most of the SMEs have traditionally managed their waste products by discharging them into the environment without any preceding treatment, resulting in an increase of pollution and negative environmental impacts (Demirbas, 2011). Waste management performance of SMEs is neither recognized nor evaluated as most of the environmental research concentrates on large firms.

Lack of adequate capacity exhibited by SMEs to manage wastes has given rise to formal and informal sector entrepreneurs and enterprises dealing in solid waste management, especially in recycling and disposal of waste (Dematew, 2015). For example, most of the industrial waste especially in urban centers are collected by private licensed companies for reuse/recycling purposes while other waste eventually ends up in the dumpsites (Kuria, 2007). According to the UNEP (2017), environmentally sound waste management must go beyond mere safe disposal. It should include minimization actions, reuse and recycling activities, proper treatment and finally safe disposal. Demirbas (2011) stated that waste minimization is one of the aspects of sustainable practices that lead to greater productivity in SMEs as well as

environmental protection. That in order to achieve sustainability, the willingness and intention of SMEs owners/managers is critical (Redmond *et al*., 2008b)

2.8. Factors Influencing the Adoption of Environmental Management Practices

There are a growing number of organizations that are seeking to reduce their environmental impacts, and mitigate their environmental harm (Gunningham, 2009). These efforts involve undertaking a wide range of initiatives such as pollution prevention, material and energy efficiency initiatives, development of clean technology and product stewardship. Literature has identified a number of drivers for pro-environmental engagement, those originating from the external and internal environments of the enterprises. These include compliance with legislation, stakeholder pressure (shareholders, customers, Non- Government Organizations etc.), economic opportunities (e.g. competitive advantage) and ethical or ecological motives which are driven by leadership and corporate values (Moorthy *et al.,* 2012; Walker *et al.,* 2008)

Consensus exists in the literature that legislation is among the most important driver towards environmental management (Gadenne *et al.,* 2009; OECD, 2018). Gadenne *et al.* (2009) stated that compliance with regulation is a means for encouraging initial pro-environmental engagement. That regulations are normally associated with fines that are too high for SMEs' financial resources. Thus, companies comply with the regulations to avoid excessive penalties. According to André and Marcelo de Oliveira (2017), the main drivers to pro environmental behaviour are compliance with legal regulations and to increase efficiency. On environmental regulation, SMEs tend to be more sensitive to comply with federal and local laws in order to avoid regulatory retaliations. On efficiency, simple practices such as recycling, resource rationalization and energy saving by SME are less demanding in terms of investments, and provide short term operational results. As engagement in these activities progresses, other initiatives take place like the acquisition of more efficient machinery and the installation of greener energy supply systems, like solar panels for example, which may have longer payback periods.

Study by Jiahan (2017) revealed that the dominant driver to sustainability was to safeguard the public reputation or image of a company and customers. Li *et al*. (2013) suggested that enterprise conducting their business more responsibly and ethically can increase their value by managing public reputation and image. Investigations on consumer behavior also revealed that nearly 90% of customers would stop buying a product if they learned any illegal or immoral practice on the part of the manufacturer. Customers are more willing to buy a product with social and

environmental benefits, even at higher prices (Ramli *et al.,* 2013). Customers are now more aware of environmental issues and transmit to businesses their expectation that if they do not engage in environmental activities, they will be penalized.

Kim and Ham (2010) stated that pro-environmental behaviours can be fostered by consumers exhibiting greater willingness to pay for products or services produced in an environmentally conscious way. This often makes entrepreneurs engage in sustainable behaviors beyond complying with government regulations. The implication being that SMEs recognize their consumers' preferences and therefore will uphold sustainability practices as they understand the value of doing so, both from a financial viewpoint but also societal. This is attributed to the rising consumer awareness on the quality of products. There is a discourse in literature on whether customer satisfaction improved with environmental practices. While some studies established a link existed between customer satisfaction and improved environmental performance (Jiahan, 2017; Li *et al.,* 2013; Ramli *et al.,* 2013) others showed skepticism towards making environmental improvements and did not view them as an opportunity for a competitive advantage (Revell *et al.,* (2009).

The small and medium- sized enterprise' approach towards sustainability is often heavily influenced by the characteristics of the owner-manager given the size and nature of SMEs (Seidel *et al*., 2009). Comparing this with the relatively low uptake of environmental management within SMEs suggests that, while leadership is an important success criterion for environmental initiatives (Gadenne & McKeiver, 2005), other factors present greater influence. The more ethical motivational factor is social responsibility which is described as companies pursuing environmental management because it is the right thing to do (Bansal & Roth, 2000). For this to be successful, employee support is considered pivotal to driving pro-environmental behavior within the workplace (Henriques & Sadorsky, 2007). For example, employees can be motivated by better working conditions resulting from implementation of better environmental practices (Brigitte *et al*., 2014).

Empirical evidence indicates small and medium enterprises are typically less engaged with environmental issues than their larger counterparts (Battisti & Perry, 2011; Brammer *et al.,* 2012; Revell *et al.,* 2010). This has been attributed to common barriers that face any business organization but are more inherent in SMEs. According to Allison and John (2010) the main barriers preventing SMEs from engaging in good environmental practices are associated costs,

lack of awareness of business benefits, and resources (time, money, knowledge). These are the characteristics of SMEs in general, resource availability (including financial, human and time), and the manager's knowledge, interest and motivation relating to good environmental management (Moorthy *et al.,* 2012).

Studies note that SMEs are less likely to implement environmental management practices because they are largely occupied with the day-to-day concerns of keeping their businesses viable and retaining existing customers (Drake *et al.,* 2004). When compared with larger businesses, SMEs generally do not have dominant market positions; they have less well-defined management structures (Labonne, 2006). They also generate less environmental data they have less environmental expertise and fewer financial and technical resources available to pursue environmental management and they tend to have less interaction with regulatory agencies (Moorthy *et al.,* 2012; Revell & Blackburn, 2004).

It has been stated that many SMEs are unaware of environmental regulations that affect them and fail to comply with them (Allison & John, 2010). Unlike larger businesses, anything more than compliance for SMEs can be unrealistic due to their lack of resources and ability to react rapidly and flexibly to pressures (Drake *et al*., 2004). According to Revell and Blackburn (2004), the owner/managers of SMEs have a poor understanding of the knowledge and skills required for environmental management. On the other hand, SMEs that understand the importance of sustainable practices may lack the necessary financial resources to adopt them and therefore are hesitant to pursue environmental initiatives often due to the associated costs (Cronstam & Grönberg, 2017).

Evidence has shown that small and medium sized enterprises have difficulty in adopting environmental practices due to lack of internal expertise, knowledge and staff resource to investigate and implement environmental practices. SMEs often cannot afford to employ a full-time member of staff to focus on improving the materials, energy and water efficiency of their businesses (Ann *et al*., 2016; Julien, 2006). According to Draper and Ngarachu (2017), some voluntary environmental initiatives might be very expensive for SMEs. For example, the cost of certification has long been considered a major challenge in the implementation of sustainability standards.

Besides the financial difficulties, many SMEs are not fully aware of how to respond to environmental issues. A number of research studies found a lack of information as a common barrier to implementing environmental practices within SMEs. For instance, in one study of 220 SMEs, about one-third of respondents cited lack of information on what to do as a barrier to environmental reform, and about 57% wanted more information about how their business could help the environment (Revell *et al.*, 2009). Revell and Blackburn (2007) also highlighted lack of understanding or expertise about laws, environmental management, and best practices the common barrier towards environmental sustainability. According to Revell and Blackburn (2007) some SMEs could not interpret regulations or did not understand how regulations might impact their business.

2.9. Theoretical Framework

The theoretical framework for this study is based on the model developed by Delmas and Toffel (2003). The model argues that environmental management practices depend on both firm specific internal factors and the institutional pressure that are exerted on them by external pressure. This model combines two theories: the economic model and the institutional model. The economic approach describes firm's adoption behavior as driven by performance outcomes. The institutional framework emphasizes the importance of regulatory, normative and cognitive factors that affect firm's decision to adopt a specific practice. Delmas and Toffel (2003) suggested that when firms are subjected to the same level of institutional pressure, they perceive this pressure differently according to their organizational structure, strategic proportion and financial and environmental performance. See figure 2.1.

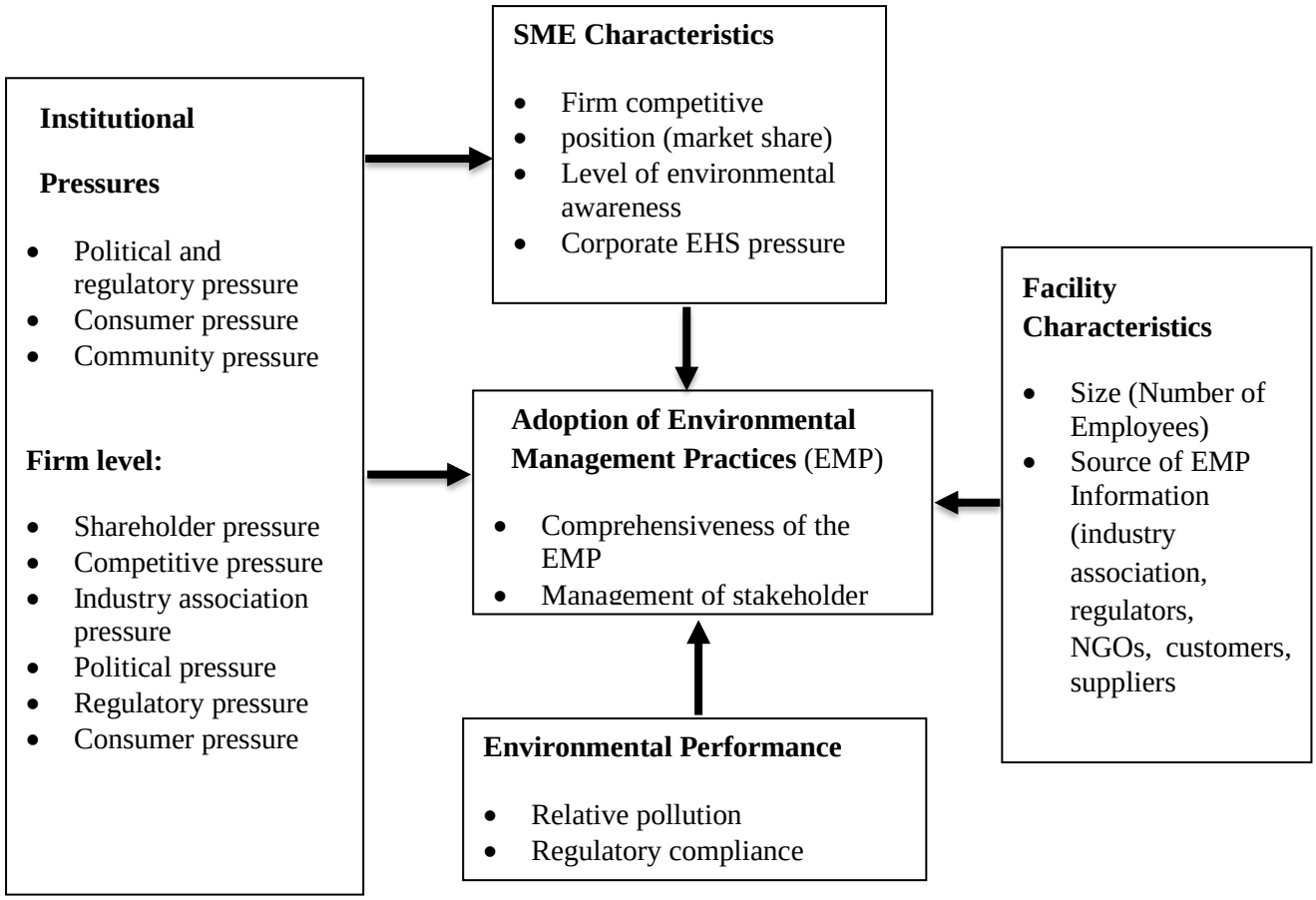

Figure 2.1: A Theoretical Model of institutional pressures and firm's environmental management practices.

2.10. Conceptual Framework

The conceptual framework for the study was derived from theoretical framework. Figure 2.2 shows the relationship between the dependent and independent variables. The independent variables include environmental awareness, environmental attitude, and factors influencing the adoption of environmental practices while the dependent variable is the environmental management practices. Environmental Awareness was assessed based on the general knowledge about the Environmental Management and Coordination amendment of 2015 (EMCA). Other aspect also included the National Environmental Management Authority (NEMA), Environmental Impact Assessment and Audit requirements as well Environmental Management System (EMS).

Environmental management practices include specific actions undertaken by the SMEs in order to mitigate the environmental impacts of their activities. These included actions such as having a responsible Environmental Officer, conduction environmental compliance audits, implementing EMS and certification (ISO 14001:2015). Other practices included resource minimization measure such as waste management, energy conservation, water conservation, rainwater harvesting, and presence of renewable energy. Factors influencing the adoption of environmental management practices in the study included age and size of the firms, awareness, attitude, regulatory pressure, and financial resources.

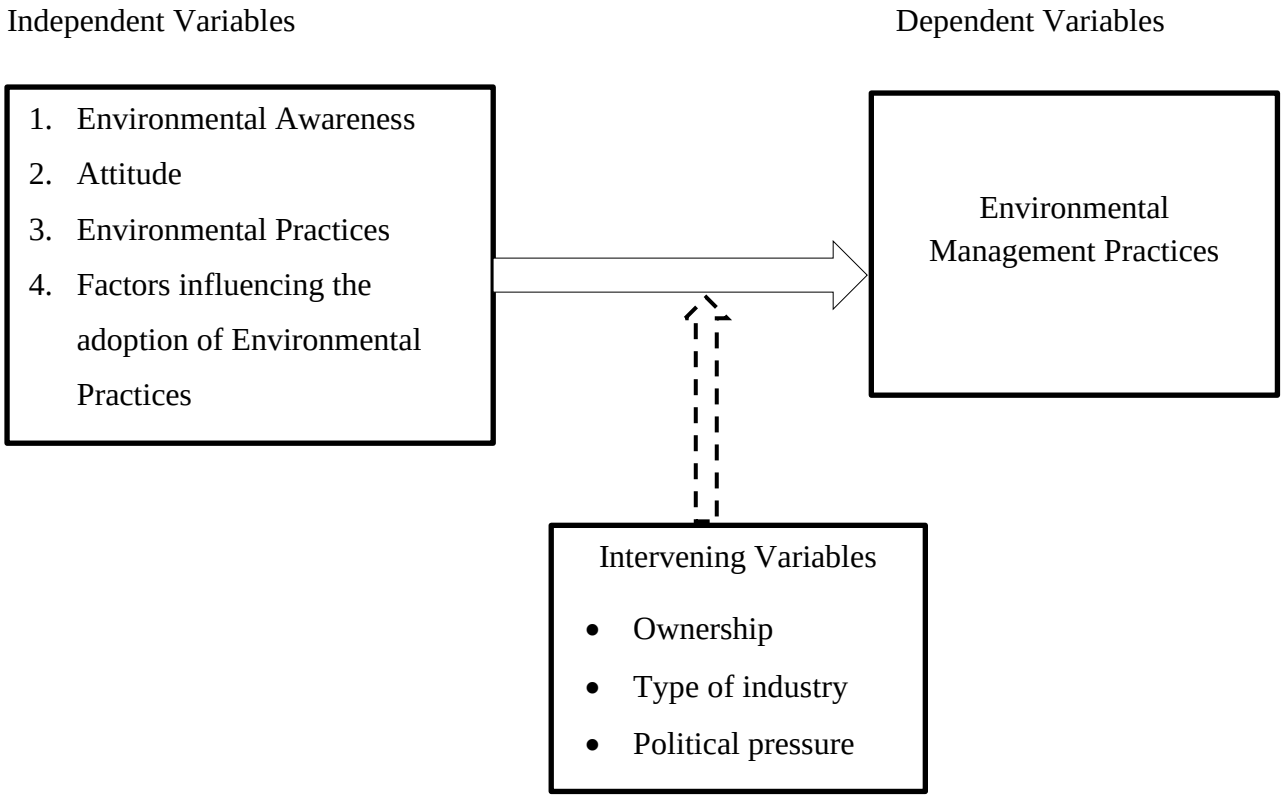

Figure 2.2. Conceptual framework.

CHAPTER THREE

METHODOLOGY

3.1. The Study Area

3.1.1. Location

The study was carried out in Nakuru Town (Nakuru West and Nakuru East Sub-counties) in Nakuru County. The region lies between 0°16'0"S, 36°2'0"E and 0°20'0"S, 36°8'0"E (Figure 3.1). Before the advent of devolution, the town was referred administratively as Nakuru Municipality. However, with devolution, Nakuru Town was divided into Nakuru Town West Sub-County and Nakuru Town East Sub-County.

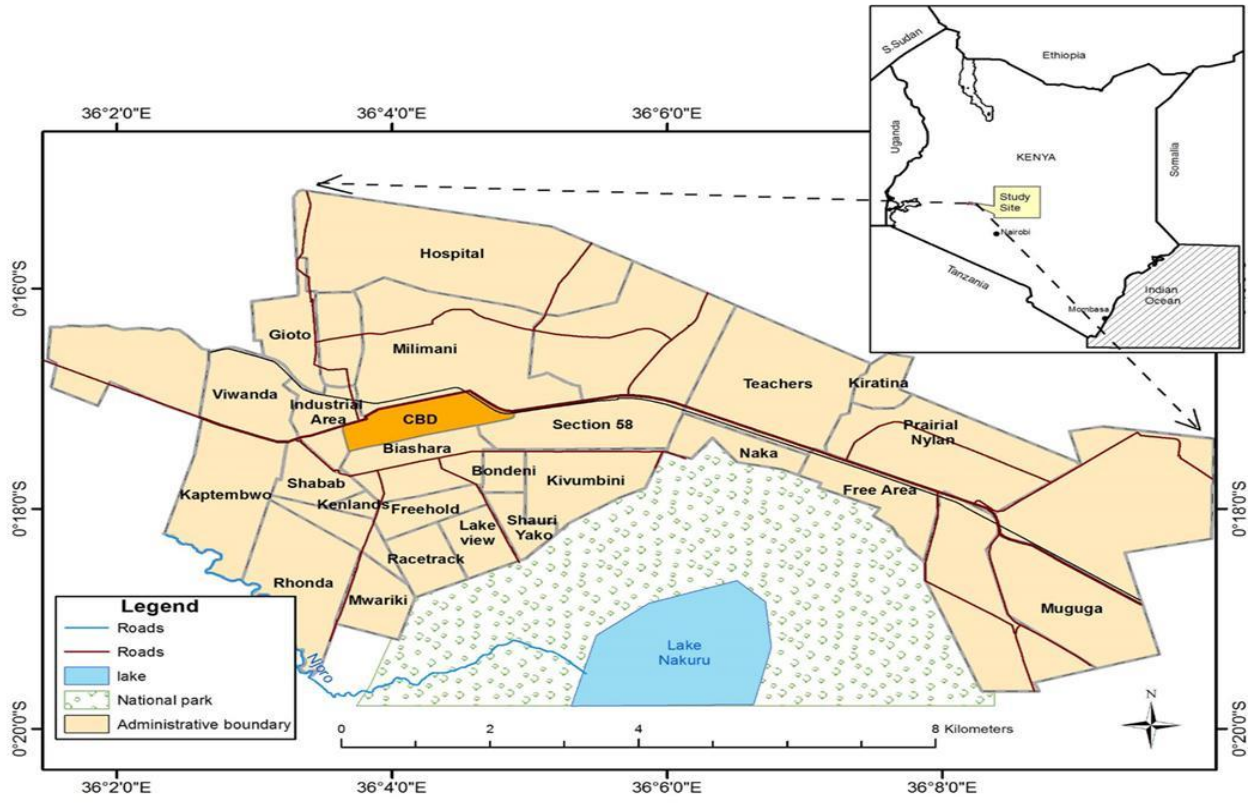

Figure 3.1: Map of the Study Area (Source: Google Maps, 2016).

3.1.2. Climate

Nakuru is characterized by an annual rainfall between 700mm-1200mm and experience a bimodal pattern with long rains in April –June and short rains from July- August. The region is generally warm with minimal variation in temperatures between 9ºC and 26ºC throughout the year.

3.1.3. Socio-Economic Activities

The major economic sectors in the region are agriculture, tourism, commerce, industry and tertiary services. Agriculture is the backbone of the economy of Nakuru County with most commercial farms located in the outskirts of the towns. The main crops grown in the county include coffee, wheat, maize beans and barley. The crops provide primary raw materials for the manufacturing industries found in Nakuru. The County is also endowed with sizeable manufacturing industries and currently boasts of numerous industrial establishments including grain milling and storage, food processing industries, agro- chemical production, soaps, and textile industries. Other forms of business in the town include general trade, wholesale; retail stores finance institutions and service industries.

3.1.4. Population

Nakuru town has a population of over 307,990 people according to the 2009 population census (KEBS, 2009). For administrative purposes, the town is divided into Nakuru Town West and Nakuru Town East Sub-Counties. According to County Government of Nakuru (2013), there were 104 registered manufacturing industries in Nakuru Town at the time to the study.

3.2. The Study Design

3.2.1. Research Design

The survey was conducted in March 2017 and covered manufacturing and processing industries with less than 250 employees within Nakuru Town. The respondents were either owners of the industry, managers, or administrative staff. The research design was qualitative as well as quantitative research design. The following methods were used to collect data;
Administration of structured questionnaire that capture relevant information related to attitude, awareness and practices. A likert scale questionnaire was used to measure attitude while awareness was measured by closed ended question with ‘yes’ or ‘no’ answers. Opened and closed ended questionnaire captured the relevant information on environmental practices. Face to face interviews with the owner/managers to capture more information on awareness and practices. Observations which focused on line of production, types of wastes produced, raw materials. presence of rainwater harvesting and storage systems. Other aspects of observation included water and electricity conservation measures in place waste management aspects such types of waste generated, availability of waste bins, color coding of waste bins etc.

3.2.2. Sampling Technique

The sample size of our study population was calculated using the formula by Cochran (1963). According to County Government of Nakuru (2013), there were 104 registered manufacturing industries in Nakuru Town at the time to the study. With a target population of 104 SMEs, the projected sample size for the study was;

$$n = \frac{N}{1 + N(Ne)^2}$$

Where n = Sample size

N= Population size

e = Margin of error =0.1

$$n = \frac{104}{1 + 104(0.1)^2} = 50.98 \cong 51$$

Simple random sampling was used to select SMEs to participate in the research whereby 61 sets of questionnaires were administered with 32 responding to the questionnaire. Gadenne *et al*. (2009) acknowledged that low rates of participation in research by SME owner/managers are common. According to Mugenda and Mugenda (2003), a sample of 10-30% is good enough if well-chosen and the elements in the sample are more than 30. Therefore, in this study the 32 SMEs that responded was deemed adequate enough to represent the entire population.

3.2.3 Operationalization of Variables

Environmental Awareness was measured by knowledge on existence of EMCA 1999 i.e. by indicating 'Yes' or 'No'. The scores were assigned to each response (Yes=1; No=0) which were used to generate an index for analysis. Environmental attitude was measured by use of a likert scale chart. The respondents were given statements covering environmental concerns where five responses were provided under each statement: strongly agree, agree, neutral, disagree and strongly disagree. The score on each alternative response was assigned a weightage ranging from 1-5, that is strongly disagree=1, disagree=2, undecided=3, agree=4, and strongly agree=5.The attitude score was the sum total of item scored on all the statements with the higher score indicating the more favorable attitude towards the environment and vice versa. Environmental practices measured by indicators such as the presence of an environmental officer, carrying out environmental audit, waste management activities, actions

to save water and energy, presence of environmental policy and ISO 14001: 2015 certification. The scores were assigned to the responses used to generate an index for analysis.

Factors influencing the adoption of environmental management practices – use of dummy variables representing environmental management practices. The dummy variables were either dichotomous assuming values one (1) or zero (0) or continuous. The study was interested in linking the decision to undertake environmental practices with some specified characteristics or variables include (a) age of the industry (b) Size of the firm, (c) awareness (d) regulation (e) financial resources. For example, the decision either to implemented to adopt environmental management (1) or not, either complies with the regulations (1) or does not (0); and either undertakes environmental audits (1) or does not (0).

3.2.4. Validity and Reliability of Research Instruments

To establish the validity of the research, instrument the researcher sought opinions of experts in the field of study. A pretest was conducted on eight SMEs in Njoro Sub-County to establish the reliability of the questionnaires. This helped in highlighting the questions that would not be clearly understood or that could lead to confusion when responding.

3.3. Data Analysis

Data entry and analysis carried out using statistical software package for social science SPSS version 22.0 and excel spreadsheet. Descriptive statistics analysis was used to show the frequency distribution. Logistic regression model was used to assess the influence of independent variables on the adoption of environmental management practices (dependent variable). See table 3.1

Table 3.1: Summary of Methods of Data Analysis

Variables	Values	Analysis tool
Environmental Awareness	(Yes=1, No=0)	Descriptive Statistics- Frequency tables and bar charts,
Environmental Attitude	Likert scale Strongly agree= 5, Agree=4, Neutral=3, Disagree=2, Strongly disagree=1	Descriptive Statistics; Frequency tables, bar charts and arithmetic means
Environmental Management Practices	Environmental Officer Environmental Audit EMS Resource minimization	Descriptive Statistics; Frequency tables and bar charts
Factors Influencing the Adoption of Environmental Management Practices	Age Size of the firm Awareness Regulation Financial resources	Logistic Regression

CHAPTER FOUR

RESULTS AND DISCUSSION

4.1. Background Information on Selected SMEs

Table 4.1 shows demographic features of the selected small and medium-sized manufacturing industries. 32 industries surveyed, 18.8% were classified as micro (less than 10 employees), 50% as small with 11-50 employees whereas 31.2% as medium sized enterprises with 51-250 employees. The results imply that majority of the enterprises in Nakuru Town are small-sized. Based on the number of years the firms have been in operation, 28.1 % were less than 5 years old, 37.5% were between 5-10 years old, and 34.4% were more than 10 years.

Table 4.1 Demographic features of the selected manufacturing SMEs

Size of the Firms	**No. of Employees**	**Frequency**	**Percentage**
	1-10 (Micro)	6	18.8%
	11-50 (Small)	16	50%
	51-250 (Medium)	10	31.2%
	Total	32	100
Age of SMEs Based on Years of Operation	**Age of the Firm**	**Frequency**	**Percentage**
	0-5 years	9	28.1%
	6-10 years	12	37.5%
	Above 10 years	11	34.4%
	Total	**32**	**100**
Types of Manufacturing Industries	**Type of Industry**	**Frequency**	**Percentage**
	Food and Beverage	2	6.3%
	Animal Feeds	10	31.2%
	Chemical	7	21.8%
	Plastic	4	12.5%
	Paper Pulp and wood	5	15.6%
	Building Material	2	6.3%
	Textile	2	6.3%
	Total	**32**	**100**

4.2. Environmental Awareness

The results (Figure 4.1) indicate that 40.6% of the respondents were familiar with the Environment Management and Coordination Act, while about 62.5% indicated that they were aware of the NEMA. Only about 43.8% were familiar with the requirements of the Environmental Impact Assessment and Audit regulations. As expected, a paltry 34.4 % said they were familiar with the environmental management systems, in this case the ISO14001; 2015 standards.

The study found that the owners of SMEs in Nakuru Town have limited awareness on environmental issues regarding their business. A number of the SMEs owners/managers were unaware of the requirements of principle environmental laws (EMCA) and the body mandated to enforce the regulation (NEMA). As expected, awareness to ISO 14001:2015 (EMS) was very low among the owners/managers of the selected SMEs. The low awareness on EMS may be attributed to the fact that EMS is new approach in environmental management and many managers/owners have not been trained on its implementation (Ouko, 2012). The low environmental awareness is reflected in actual environmental practices with majority of SMEs having not adopted management practices designed to improve their environmental performance. Gadenne *et al.* (2009) indicated that lack of general environmental awareness may hinder the implementation of environmental practices. For example, those who are aware of environment issue and are concerned about the impact of their business on the environment will be more likely to act to reduce the impact of their business activity.

A similar study by Mputhia *et al*. (2009) on the manufacturing SMEs in Nairobi-Kenya revealed different results where high level of environmental awareness was established. The measure of awareness was based on of the Environmental Management and Coordination Act, Environmental Impact Assessment (EIA) and Environmental Audit. A correlation between environmental awareness and environmental compliance revealed a positive correlation. This suggests that increasing SMEs environmental awareness will lead to better environmental performance. According to Gadenne *et al.* (2009), lack of general environmental awareness may hinder the implementation of environmental practices. For example, those who are aware of environment issue and are concerned about the impact of their business on the environment will be more likely to act to reduce the impact of their business activity.

Similar studies in other regions show that the environmental awareness level of SMEs owners/managers is usually low (Ahmad, 2016; Seroka- Stolka & Jelonek 2013; Zhengang *et al*., 2011). Carlson (2004) argues that conflicting research results as well as an exceptionally large number of influencing variables have led to the assumption that researchers do not always share the same concept of environmental awareness. These variations occur due to the differences in measurement scales which cover different environmental issues affecting the organizations

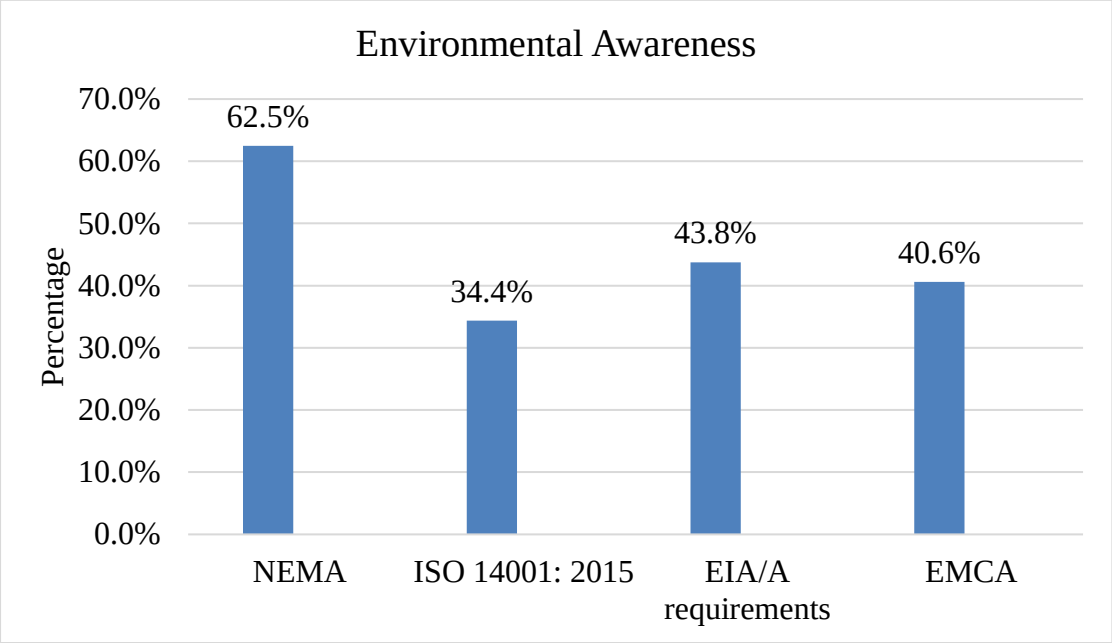

Figure 4.1: The Level of Environmental Awareness of Owners/managers of SMEs

4.3. Environmental Attitude

The attitude of SME owner/managers to interactions between the firm and the environment was measured using a 5-point Likert scale. The results (Table 4.2) indicate that the owner/managers had a highly positive attitude with a mean of the responses on attitude questions as 4.07 which is a high score on attitude. The positive attitude towards the environmental issues surrounding a business is a key ingredient in achieving sustainability. The positive environmental attitudes among the SMEs can be perceived as a good sign which suggests that most of the SMEs may be concerned about the environment.The findings are consistent with other studies on environmental attitude of SMEs managers/owners (Ahmad, 2016; Zhengang *et al*., 2011). Some researchers have claimed a positive correlation between

environmental attitude and environmental behaviours (Gadenne *et al.,* 2009). This study however suggests that SMEs having positive environmental attitude does not translate to SMEs adopting environmental practices (Figure 4.3). This finding is consistent with the observation by Zhengang *et al*. (2011) that having a positive environmental attitudes among SMEs manager/owners may not neccesarily mean that they are taking actions to protect the environment. It requires obviously less effort to express positive attitudes about environmental issues. With increasing demand for sustainability in recent years, every business organization, regardless of their size, activity or scope, must meet the challenge of complying with the requirements of the natural environment in which they operate.

Table 4.2: Attitude of Owner/Managers

Attitude of Owners/Managers	N	Means
All businesses have negative impacts on the environment	32	3.25
All businesses have a responsibility to protect the environment.	32	4.59
Good environmental management is an essential part of business management	32	4.22
Saving water/energy is critical in environmental protection	32	4.13
Every business has a responsibility to minimize the waste they produce	32	4.16
Mean		4.07

4.4. Environmental Practices

Figure 4.3 shows the results of environmental practices which were assessed based on specific actions undertaken by SMEs with an aim of protecting the environment, reducing environmental impact resulting from the operations of the firm and efficient use of natural resources. The study reveals that only a few of the selected industries (25%) have a designated staff in charge of the environment. This implies that most SMEs failed to recognize the role played by environmental officers in tackling pertinent environmental issues. The lack of a responsible person in charge of environment can be attributed to financial constraints as most SMEs cannot necessarily afford to hire a designated environmental officer. Previous studies on the appointment of environmental officer revealed consistent results (Lawrence *et al*., 2006; NetRegs, 2003; Studer *et al*., 2005). Williamson *et al*. (2006) further suggested that in SMEs, the role of environmental officer/manager is usually carried out by the owner or staff members

such as the human resource managers. That quite often they do not possess necessary skills to implement good environmental practices and therefore spend less time on green issues such as recycling, waste management, alternative energy and resource minimization.

Environmental audits are usually regulatory requirements for all industries and even though there is a great effort on SMEs to comply with these requirements, apparently not all SMEs in the region are undertaking environmental audits as required. The results reveal that only about 34% of the selected SMEs undertook environmental audits within the last three years. This is a matter of concern for all stakeholders and raises questions as to whether the firms are doing enough to ensure compliance with the requirement of the EIA/EA regulation of 2006. This may also reflect lack of information or resources on the part of manufacturing SMEs to engage in environmental audits. A similar research by Mputhia *et al*. (2012) on manufacturing SMEs in Nairobi, revealed a high number (83.3%) of SMEs undertook environmental. This was attributed to high awareness levels in the area of study coupled with stringency in enforcing EIA/EA regulation in the region. This suggests that increasing environmental awareness of SMEs would result to them engaging more on environmental audit.

Resource use efficiency practices cuts across all the industries irrespective of the size with significant proportion of enterprise engaging in practices that are focused on reducing waste, water and energy related costs. More than half of the selected firms (63%) put mechanisms to minimize waste generated through reducing, reusing and recycling of waste, and reducing on resource utilities such as water and energy. Clearly the SMEs in Nakuru Town appear to be more focused on conserving and efficient use of resources such water (63%) and energy (56%). The results suggest that such efforts are primarily aimed at reducing operational costs rather than achieve environmental sustainability. A study by Schmidt *et al*. (2018) revealed that 81.25% of the selected SMEs were concerned with caring for and protecting the environment, for which 53.84% carry out specific initiatives to reduce energy consumption, 61.54% to reduce materials, and 46.15% to reduce water consumption.

On water conservation, the significant result is largely consistent with those reported by Yacob *et al.* (2017). Most manufacturing SMEs implement numerous ways to reduce water consumption ranging from simple housekeeping measures such as machine maintenance, no-cost and low-cost methods such as adjusting flow rates or recycling water, as well as more complex solutions such as the installation of infrared active faucets and water treatment plant

(Côté *et al*., 2006). These findings substantiate the findings of UNEP (2010) in which SMEs believe that reducing the amount of water used on site will generally reduce the overall cost of operation.

However, adoption of water conservation measures is not 100% in the selected manufacturing SMEs. For instance, only 63% of the SMEs had undertaken measures to reduce on water consumption with about 37% not doing the same (figure 4.4). The results further indicate that about 34% of the selected SMEs have not adopted measures to harvest rainwater. This is an area of resource efficiency in which almost all SMEs can perform better. This may reflect lack of information on such technology on the part of SMEs management or lack of resources to undertake such initiative (OECD, 2018). According to Bay and Rasmussen (2011), many SME owners/managers ignore the adoption of water minimization practices mainly due to the heavy financial commitment that may be required. Hoskinson (2010) recommends that increasing awareness towards resource efficiency practices by SME's owners/managers would lead to not only improved environmental performance, but also great savings in terms of cost.

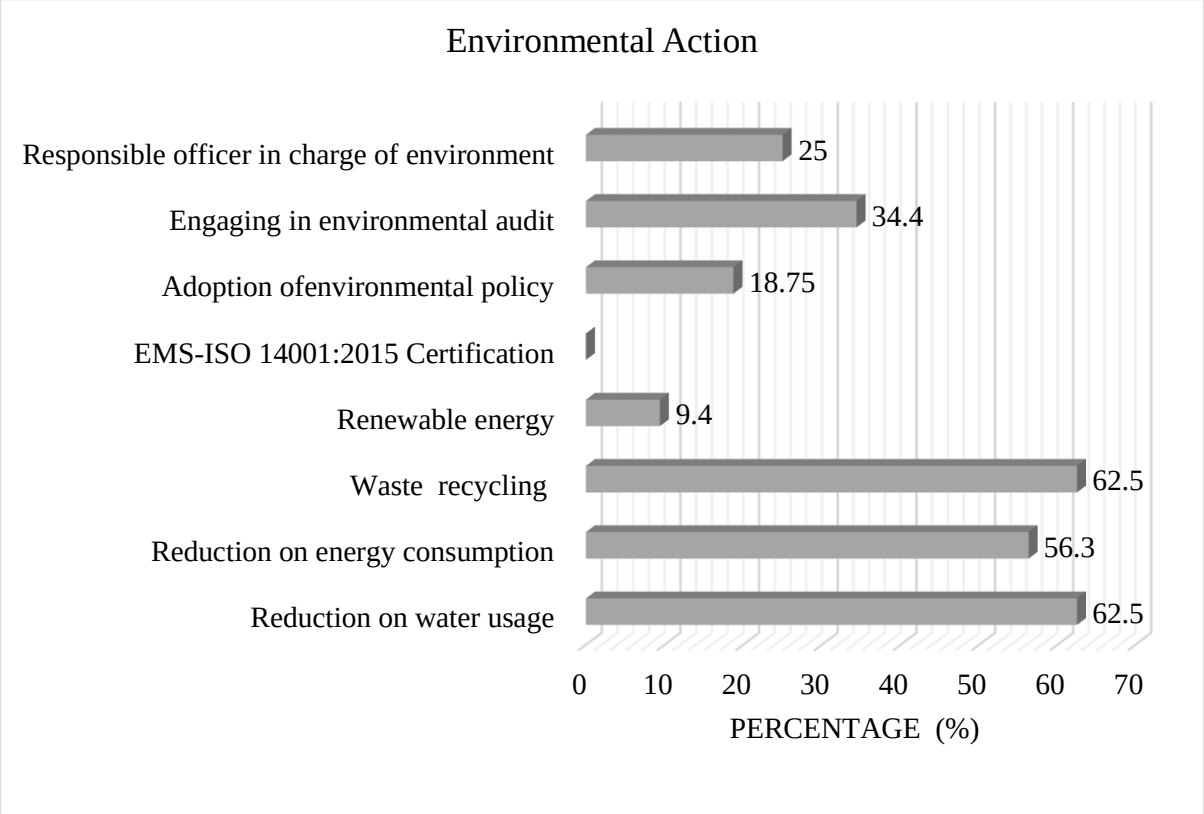

Figure 4.3: Summary of Environmental Practices

Figure 4.4 below shows that there is a low response towards the adoption of a formal environmental policy as about 19% of the small and medium enterprises have adopted a formal environmental policy. NetRegs (2003) pointed that having an environmental policy in place is a key indicator of a business's attitude towards environmental improvements. However, this result suggests a lack of awareness on the management of SMEs and other stakeholders on environmental policy framework. The results also point out at a low response in the implementation of environmental management systems as none of the sampled SMEs had achieved ISO 14001: 2015 certification at the time of the study. Quite interesting is the fact that only about 6% were implementing the ISO 14001:2015 while about 66% indicated that they had plans to incorporate an EMS in their business in future. However, about 28% intimated that they have no plans to implement an EMS in future (Figure 4.4), a clear indication that the SMEs in Nakuru have failed to appreciate the benefits of an EMS. This can be attributed to various factors such as high costs involved and lack information (Allison & John, 2010; Gadenne & McKeiver, 2005; Julien, 2006). Other studies have also shown consistent results on the EMS implementation among SMEs (Hillary, 2004; Lawrence *et al.*, 2006; Studer *et al*., 2005) The low implementation and subsequent ISO 14001:2015 certification is a major issue of concern for all stakeholders given the vast benefits of the ISO standard.

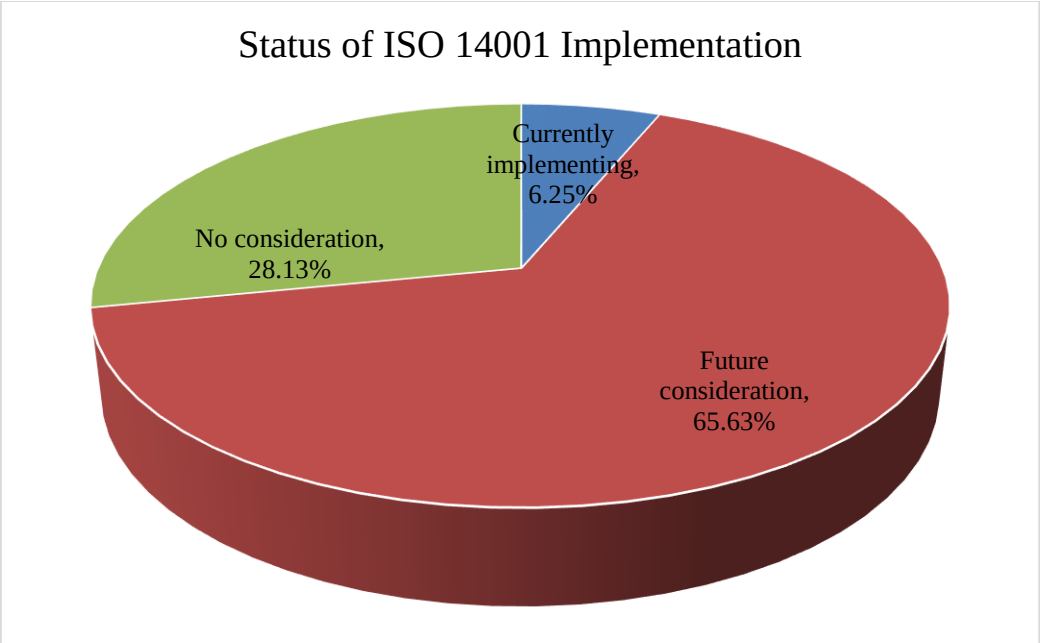

Figure 4.4: Status of ISO 14001:2015 Implementation

The relationship between of relative sizes of the industries and implementation of environmental practices (Figure 4.5.) indicates that micro-sized industries are least likely to engage in environmentally friendly practices as compared to the larger enterprises. This means that a large proportion of the industries that are undertaking much of the environmental practices are either small or medium sized. The differences between the micro, small and medium firms was also documented by NetRegs (2003). The study observed that only 20% of micro firms had an environmental policy as compared to 34% of small and 54% medium firms respectively. Only 40% of the micro enterprise had a responsible person in charge of the environment as compared to small enterprise (65%) and medium enterprise (61%). This may be a reflection of the fact that SMEs are less concerned by environmental issues than bigger firms.

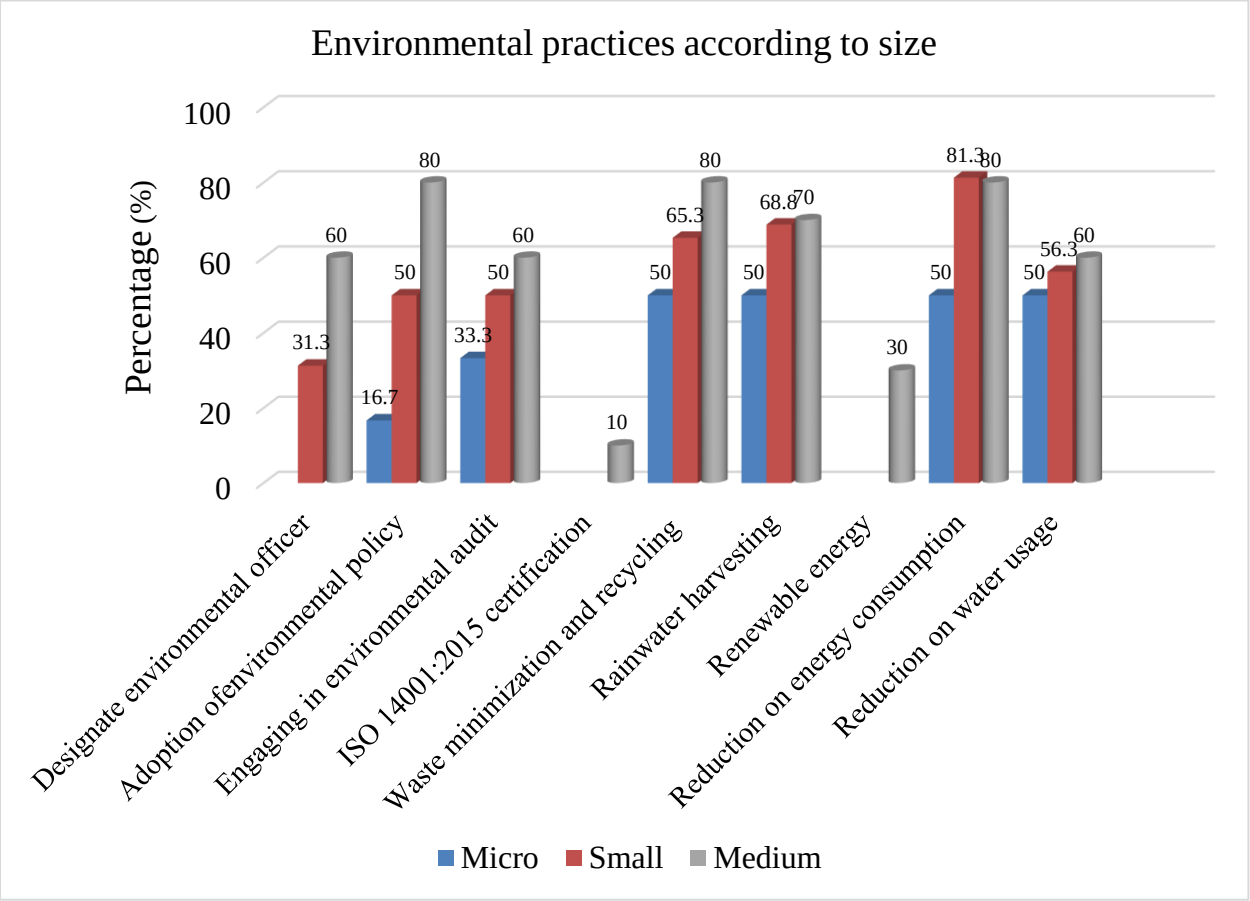

Figure 4.5. Environmental Management Practices According to Size

4.5. Factors Influencing the Adoption of Environmental Management Practices

A logit regression analysis was performed to identify the major factors that have greater influence on the adoption of environmental management practices among the selected SMEs. The logistic regression model predicts the values of a dichotomous variable Y which takes only

two values, 0 or 1, depending on a set of explanatory variables, which can be quantitative or categorical variables. The study was interested in linking for example, the decision to undertake environmental practices with some specified characteristics or variables include (a) age of the industry (b) Size of the firm, (c) awareness (d) regulation (e) financial resources. The logit model was used to identify the factors which have more influence in the implementation of environmental practices. These characteristics/variables were taken to be the covariates and were defined as follows;

Age	Number of years since inception
Size of the firm	Number of employees
Awareness-	Knowledge on environmental issues (EMCA, NEMA, EMS, EIA/EA)
Regulation	Regulatory pressure
Financial resources	Availability of funds/cost benefits

It was anticipated that age of the firms and regulatory pressure would have a significant influence on the adoption of environmental. It was also necessary to know whether or not the age of a firm as well as the size had influence on the overall environmental behavior of the selected SMEs. It was anticipated that the age and size of the firm should have a strong influence on pro-environmental behaviour of the selected SMEs. The influence of age depends on when (year) the firm was started while size depends on the number of employees working in the firm. It was also anticipated that increased level of environmental awareness would increase the probability of undertaking environmentally friendly practices. Other factors such as regulatory pressure and resource availability (finances) also play a role in firms' decision to adopt environmental practices.

Therefore, the firm either complies with the regulations (1) or does not (0); and either adapts to the environmental practices (1) or does not (0). The variable awareness was treated as a dummy, which assumed two values; knowledge about the regulation and standards required for environmental audit and awareness about the requirements by EMCA; which takes on the value of one (1) for high awareness level and zero (0) for low. Age and size were taken as continuous variable, while environmental practices were treated as dummy variables to include the cost reduction practices/values, for example water and energy savings activities.

The effect of any independent variable on the dependent variable was expressed as an odds ratio, which is a percentage increase or decrease in the odds of occurrence. The estimated coefficients are measures of the change in the odds ratio. A positive coefficient increases the probability of an event occurring while a negative coefficient decreases the predicted probability. The regression model was applied as follows;

Table 4.3 Logit Regression Variables

Decision Variable	Values	Predictor variables
a) To conduct an environmental audit	(1) for yes, (0) for otherwise	Regressed with the variables of age, size, awareness, finances and regulatory pressure
b) To implement an EMS	(1) for yes, (0) for otherwise	Regressed with the variables of age, size, awareness, finances and regulatory pressure
c) To undertake resource conservation measure	(1) for yes, (0) for otherwise	Regressed with the variables of age, size, awareness, finances and regulatory pressure

The decision to conduct environmental audit was regressed with the variables of age, size, awareness, finances and regulatory pressure and the results presented in the table 4.4.

Table 4.4: Decision to Conduct Environmental Audit

Predictor Variables	**Coefficient**	**Exp. (B)**
Age	-0.002	0.998
	0.159	
Size	-1.631	1.017
	*0.075***	
Awareness	0.708	2.030
	*0.069***	
Finances	0.580	1.786
	*0.075***	
Regulatory pressure	0.413	0.234
	0.239	
Constant	-1.586	
	0.210	

2 log likelihood	59.120
% Correct prediction	65.6
N	32

*significant at p<0.05, **significant at p<0.10

Table 4.4 show that there is a significant relationship between awareness level, size of the firm and finances and a firm's decision to adopt environmental practices (conduct environmental audit). The positive coefficient of the level of awareness indicates that the SMEs owners/managers with higher level of environmental awareness are more likely to conduct environmental audit. The descriptive analysis on awareness indicated that the level of environmental awareness among SMEs owner/mangers was relatively low. The results of Logistic analysis indicate that increase in the level of awareness among owners/managers increases the likelihood of the owners/managers conducting compliance audits. Environmental awareness comes with the knowledge about the regulation and standards required for environmental audit (conformity and compliance), awareness about the requirements by EMCA and particularly NEMA. Therefore, increase in the level of environmental awareness increases the likelihood of undertaking environmental audits, or undertaking conformity and compliance measures.

The size of the firm variable was found to be statistically significant. It was anticipated that increase in size increase the likelihood of undertaking environmental audits and this finding confirms this assertion. This implies that firms that are smaller (micro) in size are less likely to conduct environmental audits compared to those that are larger in this case small and medium category. The low response in adopting an environmental practice such environmental audit, is reflected more in micro and small-sized industries than the medium sized industries. Comparative studies between the subset of the samples SMEs i.e. micro, small and medium sized enterprise showed increase on adoption of environmental practices with increase in size. In other words, firms that are big in terms of size, are more likely to adopt environmental practices when compared to the micro-sized industries. This is because the bigger the size of the firm means the more the employees, the more the production-waste and therefore the need for environmental practices. It could also be that bigger firms face more pressure from the public/regulatory authorities to address environmental concerns or that the need for environmental management is less important in SMEs.

A similar study by Julien (2006) highlighted similar results. The practices reviewed in the study ranged from a written environmental policy, to environmental training programs in place for employees, to carrying out external/internal environmental audits. For each practice under consideration, smaller firms were less likely to have implemented the practice than larger firms. Older firms tend to have acquired more competences, knowledge, and resources to support an environmental strategy (Lawrence *et al.,* 2006). As small and medium- sized enterprise seek to become more environmentally sustainable, they encounter a variety of barriers, many of are not common with large firms (Battisti & Perry, 2011; Brammer *et al.,* 2012; Revell *et al.,* 2010)

Table 4.5. Decision to Implement Environmental Management Systems

Predictor Variables	**Coefficient**	**Exp. (B)**
Age	-0.011	1.011
	0.988	
Size	-1.631	0.196
	*0. 082***	
Awareness	1.105	3.019
	*0.040**	
Finances	0.338	1.403
	*0.017**	
Regulatory pressure	0.346	1.511
	0.671	
Constant	3.368	3.368
	0.406	
2 log likelihood	37.321	
% Correct prediction	71.9	
N	32	

*significant at p<0.05, **significant at p<0.10

On the decision to implement environmental management system, table 4.5. shows that awareness level, size of the firm and finances are statistically significant. Environmental awareness comes with knowledge about the importance of environmental conservation, knowledge about the regulation and standards required for environmental management. Therefore, SMEs owners/managers with higher level of environmental awareness are more

likely to adopt environmentally friendly practices. Firm size had positive effect on the adoption of environmental management system. That is to say that increase in size increase the likelihood of undertaking environmentally friendly measures. According to Lawrence *et al.* (2006), the adoption of EMS by small and medium-size enterprises is less common when compared to large enterprises. This may be because many smaller businesses lack the technical expertise and resources needed to develop and implement environmental management systems (Commission for Environmental Cooperation, 2005). It could also be that SMEs are less aware of the potential benefits associated with EMS relative to other firms.

The study also highlights that finances play a critical role in the adoption of environmental practices. The implementation of environmental practices for example such as implementing EMS are has cost implications on the business. The descriptive statistics on the implementation of EMS indicated a very low response towards the practice. This implies that the low adoption of practices related to EMS can be attributed to size related constraints such as financial factors. This is supported by a number of studies that pointed out financial constraints as the main limitation for SMEs to implement voluntary initiatives such as EMS (Commission for Environmental Cooperation, 2005; Fabio *et al.*, 2010; Julien, 2006). Larger firms enjoy greater access to financial and human resources therefore, tend to have acquired more competences, knowledge, and resources to support environmental strategies (Revell *et al.*, 2009).

On the decision to undertake environmental conservation, table 4.6 shows that size of the firm and financial resources were significant determinants of the need to undertake resource conservation measures. This implies that the smaller, the firm the less likely to undertaking resource conservation measures. In other words, bigger firms are more likely to put measures that reduce on water consumption, reduce on energy consumption and minimize production of wastes. This could be because bigger firms consume more resources (energy, water, raw materials) have more employees, and produce more waste and therefore the need for environmental practices. Smaller firms lack resources to employ resource-efficient technologies that promote waste reduction, use of renewable energy source or energy saving programs to curtail consumption as well as emissions among industries (UNEP, 2003).

The influence of finances can be viewed in two perspective, that is, as a driver or a barrier to undertaking environmental practices. Firms make funds available by undertaking some cost saving measures, for example savings on water, energy and also recycling. Such actions have great bearing on the overall financial performance of the firm. From the descriptive statistics, more than half of the selected firms had put mechanisms to reduce waste, water and electricity. These efforts provide opportunities to reduce operational costs which eventually provide long-term cost savings. According to Evangelia *et al.* (2019), simple practices such as recycling, resource rationalization and energy saving by SME are less demanding in terms of investments, and provide short term operational results. These results could also imply that the associated cost related to certain environmental initiatives may scare away the owner/managers of SMEs. Cassels and Lewis (2011) suggested that the owner/managers of the small industries view the environment as a cost burden and a threat to their competitiveness, and therefore are more reluctant to incur costs related to environmental management.

Table 4.6 Decision to Undertake Resource Conservation

Predictor Variables	**Coefficient**	**Exp. (B)**
Age	-0.301	1.351
	0.011	
Size	-0.010	1.010
	*0.094***	
Awareness	0.721	0.486
	0.139	
Finances	1.814	6.132
	*0.071***	
Regulatory pressure	0.650	1.916
	0.301	
Constant	-0.996	1.525
	0.124	
2 log likelihood	35.549	
% Correct prediction	75%	
N	32	

*significant at p<0.05, **significant at p<0.10

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

The study explored the factors influencing the implementation of environmental management practices in small and medium-sized manufacturing entreprises in Nakuru Town. The study concludes that the general knowledge regarding the aspects of environmental management such as EMCA, NEMA, EIA/EA was low. In terms of the environmental attitude, there is a positive attitude towards managing the environmental issues sorrounding their business. The adoption of environmental management practices is still very low or non-existent. However, there is a significant proportion of enterprise engaging in resource conservation practices such as water and energy conservation as well as waste minimization and recycling aimed at reducing operational costs and eventually improving environmental performance.

On the factors that influence the implementation of environmental management practices, it was established that firms' size, awareness and financial resources had significant influence the decisions to undertake environmental management practices. On the other hand, firm's age and regulatory pressure were not statistically significant factors for the implementation of environmental management practices.

5.2. Recommendations

i) There is need to raise awareness of owners/managers and employees by providing adequate information and advice on environmental issues that are specific to small and medium sized enterprises.
ii) County and National Governments should also to support small and medium enterprises in integrating environmental issues into their business through programs that supports sustainable practices such as environmental management systems.

5.3. Further Research Suggestions

This study found out that age of the firm and regulatory pressure did not have significant influence on the adoption and implementation of environmental management practices. Therefore, there is need to conduct further research on how regulation pressure, age of the firm as well as firm's location affect the adoption of environmentally conservation practices.

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APPENDICES

Appendix 1: Questionnaire

My name is Hillary Barasa, M.Sc. student from Egerton University conducting research Titled: *Assessment of Environmental Management Practices among Small and Medium Industries in Nakuru County*. You have been identified as a useful informant to assist in achieving the objectives of this research. Your participation is voluntary and you are assured that the information you provide will be treated with confidentiality and used for the sole purpose of research.

Thank you in advance for accepting to contribute to this noble activity.

By filling in your/company's detail below, you give consent to be interviewed on behalf of the company.

INDUSTRY BACKGROUND		
Line of Production……	Number of Employee (s) ……..……	Year of commencement ..……

A. ATTITUDE		
1. All businesses have negative impacts on the environment *(Tick where appropriate)*	a. Strongly agree	
	b. Agree	
	c. Undecided	
	d. Disagree	
	e. Strongly disagree	
2. All businesses have a responsibility to protect the environment.	a. Strongly agree	
	b. Agree	
	c. Undecided	
	d. Disagree	
	e. Strongly disagree	
3. Good environmental management is an essential part of business management	a. Strongly agree	
	b. Agree	
	c. Undecided	
	d. Disagree	
	e. Strongly disagree	
4. Every business have a responsibility to minimize the waste they produce	a. Strongly agree	
	b. Agree	
	c. Undecided	
	d. Disagree	
	e. Strongly disagree	
5. Saving water/energy is critical in environmental protection	a. Strongly agree	
	b. Agree	
	c. Undecided	
	d. Disagree	
	e. Strongly disagree	

B. AWARENESS		
	YES	**NO**
6. Are you aware of the Environmental Management and Coordination Act?		
7. Are you aware of the Environmental Impact Assessment (EIA) and Environmental Audit requirements?		
8. Are you aware of the National Environment Management Authority?		
9. Are you aware of the Environmental Management Systems (International Standards on the environment- ISO 1400)?		

10. What would you say is the most significant environmental impact (s) associated with the operations of your company?

Environmental Impacts	
a. Solid waste	[ ]
b. Water pollution- wastewater discharge	[ ]
c. Air pollution	[ ]
d. Hazardous waste	[ ]
e. Noise pollution	[ ]

C. PRACTICES

	Yes	**No**
11. Does the company have a responsible officer in charge of the environment?		
12. Does your company have an environmental management policy?		
13. Does the company have an environmental management plan?		
14. Does the company generate any form of hazardous wastes? If yes, what are the major types of hazardous wastes? ***list here***		

15. What is the status of EMS (ISO 14001) certification at your facility?		
	a. Already certified	
	b. Currently implementing	
	c. Planning to implement	
	d. Future consideration	
	e. Not being considered	

16. When was the last time you conducted environmental audit

Less than 1 year	Two Years ago	More than three years	Not sure

17. How do you dispose the solid wastes that are generated from the activities of the company (*Tick where appropriate)*

a. Municipal disposal	[ ]
b. Composting	[ ]
c. Open pit dumping	[ ]
d. Incineration	[ ]
e. Landfill disposal	[ ]
f. Contracting licensed waste handlers	[ ]
g. Others	[ ]

18. Please indicate which among the following actions you have undertaken with regards to solid waste management

a. Waste Segregation (Clearly marked Waste bins)	[ ]
b. Waste reuse and recycling	[ ]
c. Assessment and characterization of all wastes	[ ]

19. What are the main sources of water?

a. Municipal/ Public Supply	[ ]
b. Borehole	[ ]
c. Rainwater	[ ]
d. Buying from water venders	[ ]
e. Others *(Specify)*	

20. What conservation measures have you put in place to conserve water?

Water flow restrictor	[ ]
Water efficient taps	[ ]
Water recycling and reuse	[ ]
Others	[ ]
None	[ ]

21. Has the company embraced rainwater harvesting? (in large amounts)

Yes [ ] No [ ]

22. Does the company generate waste water from the operations of the company? (liquid waste)

Yes [ ] No [ ]

23. Does the company conduct regular water quality monitoring of the waste water that is discharged from the operations of the company?

Yes [ ] No [ ]

24. What is the source (s) of energy?

a	Hydroelectric power	[ ]
b	Solar power	[ ]
c	Wind power	[ ]
d	Coal	[ ]
e	Diesel	[ ]
f	Biomass	[ ]
g	Others	[ ]

25. What measures have you put in place to conserve energy?

a. Conducting regular energy audit	[ ]

	b. Energy saving bulbs	[ ]	
	c. Switching off light (Reminders)	[ ]	
	d. Using energy efficiency machines	[ ]	
	e. Others (specify)	[ ]	
	f. None	[ ]	

D. Drivers and Barriers

26. What would you say is your main motivation to adopt environmental management practices?

a. Improve regulation compliance	[ ]
b. Improve corporate image	[ ]
c. Economic benefit (cut costs)	[ ]
d. Create good relation with customers	[ ]
e. General concern for environment	[ ]
f. Others (Specify)	[ ]

27. What may be hindering you to undertake environmental management practices?

a. Lack of finances	[ ]
b. Lack of information	[ ]
c. Lack of trained staff and expertise/ Lack of environmental skills	[ ]
d. Increase workload	[ ]
e. Others (Specify)	[ ]

28. How do you rate your performance regarding environmental management in your company?

Excellent	[ ]
Good	[ ]
Satisfactory	[ ]
Not doing well	[ ]

29. What are some of the best environmental management practices that your firm has embraced?

……

……

Appendix 2: Data Analysis Summary

1. Environmental Awareness

Environmental Awareness	N	Yes		Mean	SD
		F	%		
Environmental Management Systems (ISO 14001)	32	11	34.4	1.22	0.42
The Environmental Impact Assessment and Audit requirements	32	14	43.8.	1.31	0.471
Environmental Management and Coordination Act	32	13	40.6	1.13	0.336
The National Environment Management Authority	32	20	62.5	1.47	0.567

2. Analysis of Environmental Attitude

	N	Mean	SD	S. Agree	Agree	Neutral	Disagree	S. Disagree
All businesses have negative impacts on the environment	32	3.25	1.4534	19	34	3	25	19
All businesses have a responsibility to protect the environment.	32	4.5938	0.9108	75	19	-	3	3
Good environmental management is an essential part of business management	32	4.2188	1.0075	50	34	3	13	-
Every business has a responsibility to minimize the waste they produce	32	4.16	1.157	47	34	3	13	3
Saving water/energy is critical in environmental protection	32	4.1312	1.1773	44	37	-	16	3

3. Environmental Practices

Environmental Action	N	Frequency (Yes)	Percentage (%)	Mean	SD
Undertake measures to Save energy	32	18	56.3	1.25	0.44
Use renewable energy	32	3	9.4	1.91	0.296
Have introduced measures to conserve water	32	20	62.5	1.44	0.504
Undertake waste reuse and recycling	32	20	62.5	1.56	0.504
Have achieved ISO 14001 certification	32	-	-	-	-
Have an environmental policy	32	6	18.75	1.44	0.504
Undertake environmental Audit	32	11	34.4	1.34	0.483
Responsible officer in charge of the environment	32	8	25	1.66	0.483

4. Logit Model Analysis

i. Conducting Environmental Audit

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	59.120[a]	.134	.216

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Age	-.002	.134	.949	1	.159	.998
	Size	-1.631	.023	.512	1	.075	1.017
	Awareness	0.708	1.778	.175	1	.069	2.030
	Regulation	- 0.413	1.674	.150	1	.239	.234
	Finances	0.580	76.614	.000	1	.025	1.786
	Constant	-1.586	12.379	.517	1	.210	.000

a. Variable(s) entered on step 1: Age, Size, Regulation, Finances, Awareness.

ii. Decision to Implement Environmental Management Systems

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	37.321[a]	.214	.357

a. Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Age	.011	.035	.094	1	.760	1.011	.988	1.083
	Size	-1.631	.937	3.032	1	.082	.196	.031	1.227
	Regulation	.346	1.030	.401	1	.671	1.511	.069	3.920
	Finances	.338	1.190	.081	1	.176	1.403	.136	14.458
	Awareness	1.105	1.314	.707	1	.040	3.019	.230	39.677
	Constant	1.214	1.914	.403	1	.406	3.368		

a. Variable(s) entered on step 1: Age, Size, Regulation, Finances, Awareness.

iii. Decision to Undertake Resource Conservation

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	35.549[a]	.529	.707

a. Estimation terminated at iteration number 7 because parameter estimates changed by less than .001.

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Awareness	0.721	1.492	.206	1	.139	.486	.027	9.460
	Age	.301	.119	6.410	1	.011	1.351	1.070	1.704
	Size	-.010	.013	2.576	1	.109	1.010	.995	1.047
	Regulation	.650	1.205	.532	1	.301	1.916	.039	4.402
	Finances	1.814	1.413	1.789	1	.071	6.132	.009	2.410
	Constant	-.996	2.026	2.369	1	.124	1.525		

a. Variable(s) entered on step 1: Awareness, Age, Size, Regulation, Finances.

Appendix 3: Research Authorization

THIS IS TO CERTIFY THAT:
MR. HILLARY WALELA BARASA
of EGERTON UNIVERSITY, 0-20115
Egerton,has been permitted to conduct
research in *Nakuru County*

on the topic: *ASSESSMENT OF ENVIRONMENTAL MANAGEMENT AND COMPLIANCE PRACTICES AMONG SMALL AND MEDIUM-SIZED INDUSTRIES IN NAKURU COUNTY, KENYA*

for the period ending:
16th February,2018

.....
Applicant's Signature

Permit No : NACOSTI/P/17/62780/14391
Date Of Issue : 17th February,2017
Fee Recieved :Ksh 1000

.....
Director General
National Commission for Science, Technology & Innovation

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, Utalii House
Uhuru Highway
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. NACOSTI/P/17/62780/14391

Date: 17th February, 2017

Hillary Walela Barasa
Egerton University
P.O. Box 536-20115
EGERTON.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Assessment of environmental management and compliance practices among Small and Medium-Sized Industries in Nakuru County, Kenya,"*** I am pleased to inform you that you have been authorized to undertake research in **Nakuru County** for the period ending **16th February, 2018.**

You are advised to report to **the County Commissioner and the County Director of Education, Nakuru 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
Nakuru County.

The County Director of Education
Nakuru County.

Received 2/3/2017.

COUNTY DIRECTOR OF EDUCATION
NAKURU COUNTY

Appendix 4: Journal Publication

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Environmental management practices among small and medium manufacturing enterprises in Nakuru town, Kenya

Walela H Barasa[1], Dr. Mokua Millicent[2], Dr. Moses Otiali Esilaba[3], Moses Chege[4]

[1-3] Department of Environmental Science, Egerton University, Kenya

[4] Department of Environmental studies, Laikipia University, Kenya

Abstract

This paper discusses the findings of a study on environmental management strategies among small and medium manufacturing enterprises (SMEs) in Nakuru Town, Kenya. This paper discussed one of the objectives of identifying the specific actions taken by SMEs to reduce the environmental impacts originating from their activities. Stratified and simple random sampling procedures were used to select the thirty-two (32) manufacturing SMEs in Nakuru Municipality. It was observed that the implementation of the environmental management strategies among small and medium-sized manufacturing enterprises in Nakuru was minimal. Environmental practices such as engaging in environmental audits, developing an environmental policy, having designated environmental officer and implementation of EMS are still very low or non-existent. However, resource conservation efforts take priority with most SMEs making efforts to reduce operational costs through energy and water conservation. It is concluded that SMEs are less concerned with environmental issues and that the lack of financial and technical capacity limit enterprises' ability to engage in sound environmental management practices. There is need therefore, for SMEs to address the limiting factors such as capacity building so as to support sustainable environmental practices.

Keywords: small and medium manufacturing enterprises, environmental awareness, environmental attitude, environmental management practices, environmental sustainability, and resource use efficiency