# STAKEHOLDERS' PERCEPTIONS ON THE INFLUENCE OF ENVIRONMENTAL POLICY ADOPTED ON ECONOMIC PERFORMANCE OF SMALL AND MEDIUM SIZED MANUFACTURING ENTERPRISES IN NAKURU COUNTY, KENYA

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**A Thesis Submitted to the Graduate School in Partial Fulfilment of the Requirements for the Degree of Master of Research and Public Policy of Egerton University**

**EGERTON UNIVERSITY**
**FEBRUARY, 2025**

## 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.

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**Recommendation**

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## DEDICATION

This thesis is dedicated to those whose unwavering support and encouragement have illuminated my path throughout this academic journey. To my loving family, whose sacrifices and belief in me have been my constant motivation.

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## ABSTRACT

The adoption of environmental policies by large manufacturing firms has been shown to enhance their economic performance. Small and medium-sized enterprises (SMEs) are now also adopting these policies to reduce their economic footprint. However, there is limited documentation on how these policies affect their economic performance. This study aimed to assess stakeholders' perceptions of the influence of environmental policy adopted on the economic performance of manufacturing SMEs in Nakuru County. Ecological modernization theory guided this study. The study employed an explanatory sequential mixed-method research design. The target population comprised proprietors of 400 registered manufacturing micro and SMEs in Nakuru County, while the accessible population included proprietors of 94 SMEs with 10–99 employees and at least five years of operation. The sample size was 76 SMEs proprietors, and stratified random sampling was used to select participants for the survey. Simple random and purposive sampling were used to select SME proprietors and environmental officers, respectively, for the qualitative component. Data collection tools included SMEs proprietor's questionnaire, SMEs proprietors' interview guide, and county environmental officer interview guide and were validated by five policy experts at Egerton University. The questionnaire was piloted, and its reliability was estimated using Cronbach's Alpha, with a coefficient of 0.870 obtained. Descriptive and inferential statistics were used to analyze quantitative data using SPSS version 26. Qualitative data was analyzed using content analysis using MaxQDA. Hypotheses were tested at a 0.05 level of significance. The study found that majority of respondents adopted environmental management practices (EMPs) to appeal to new customers, enhance their firms' image and reduce production costs. Additionally, to a larger extent SMEs adopted regular and routine maintenance of equipment, selling waste to other organizations and use of energy-efficient bulbs. The study also established that stakeholders perceive that energy efficiency practices adopted had a significant influence on the economic performance of manufacturing SMEs. However, stakeholders perceived waste management practices adopted had no significant influence on economic performance of manufacturing SMEs. Overall, it was found that stakeholders perceived that EMPs have a significant influence on the economic performance of manufacturing SMEs. The study concluded that environmental policies have an influence on the economic performance of manufacturing SMEs in Nakuru County from a stakeholder perspective. In this study, it is recommended that the government should raise awareness among SMEs about the importance of adopting EMPs in their operations.

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## LIST OF ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| **DAAD** | German Academic Exchange Programme |
| **EMA** | Environmental Management Accounting |
| **EMCA** | Environmental Management Coordination Act |
| **EMPs** | Environmental Management Practices |
| **ERC** | Energy Regulation Commission |
| **EP** | Environmental Policy |
| **EU** | European Union |
| **FP** | Financial Performance |
| **GDP** | Gross Domestic Product |
| **KAM** | Kenya Association of Manufacturers |
| **KII** | Key Informant Interviews |
| **NEMA** | National Environmental Management Authority |
| **ROA** | Return on Assets |
| **ROE** | Return on Equity |
| **SMEs** | Small and Medium Sized Enterprises |
| **USA** | United States of America |

# CHAPTER ONE
# INTRODUCTION

## 1.1 Background to the Study

Environment refers to all external factors that influence the life of an organism (Prasad et al., 2015). The external factors comprise of both biotic and abiotic factors. Biotic refers to living part of the environment while abiotic refers to the physico-chemical units such as soil, water, air, and rocks among others. The interaction between the two factors is considered crucial as it maintains a stable ecosystem, ensures the survival and existence of biodiversity, and is essential for the sustenance of life. They also provide important ecological goods and services to human beings. For instance, forests provide recharge to rivers that provide water for domestic, agricultural, and wildlife use. They also maintain the hydrological cycle, which regulates atmospheric temperatures and moderates climatic condition (European Commission & Directorate-General Communication, 2014) .

Over the years, the environment has become vulnerable due to the impact of industrial development and population increase. Natural resources like water, forests and air have been polluted and degraded caused by human related activities such as settlements, industrialization, and agriculture. This has led to global concerns about environmental issues, emphasizing the need to integrate environmental management with development and to link environmental, social, and economic aspects (Prasad et al., 2015). The aim is to achieve sustainable development by meeting human development goals while simultaneously sustaining the ability of ecosystems to provide the natural capital and ecosystem services upon which society and the economy depend (Strange & Bayley, 2008).

Environmental management refers to the process concerned with the interaction between humans and the environment. It seeks to identify what is environmentally desirable, the physical, economic, social, and technological constraints to achieving it, and the most feasible option (Kotze & Nel, 2009). This implies the adoption of environmental management practices such as carbon emission reduction, waste management, efficient water usage and efficient energy use into the manufacturing process. Environmental management practices (EMPs) are techniques, guidelines and method aimed at monitoring and controlling the effect of manufacturing firms' actions on the natural environment (Montabon et al., 2007). These EMPs are mostly enshrined or translated by firms' internal environmental policies.

An environmental policy is a statement by a firm of its intentions and principles regarding its overall environmental performance. It provides a framework for action and for setting its environmental objectives and targets (Iqbal et al., 2022; Ramus & Montiel, 2005).

These policies always are developed based on existing international, national and county level environmental regulations. They also emphasize environmentally sustainable business development and openly espouse proactive EMPs that are beyond regulatory compliance (Iqbal et al., 2022; Ramus & Montiel, 2005). The environmental policy outlines actions to be undertaken by organizations and firms to remedy their environmental pollution through waste management, carbon emission reduction, efficient energy use and efficient water usage.

This study only focused on waste management and efficient energy use practices. Waste management involves taking all practical steps to ensure that waste is managed in a manner that protects human health and the environment against the adverse effects that may result from the waste (Ahinful & Tauringana, 2019). Energy Efficiency practices are actions that reduce the need for energy by decreasing energy losses in the supply chain (Ackah & Kizys, 2018). The two indicators, namely, waste management and energy efficiency were chosen since manufacturing firms sector is responsible for approximately 60-70% of pollution related to manufacturing, and 70% of industrial waste production (Mitchell et al., 2010).

Environmental management has taken a strategic position in business since manufacturing and service firms among others are striving to survive in a highly regulated market as well as to improve their economic performance particularly in contemporary times (Afagachie, 2013). Manufacturing firms have adopted an environmental policy to stay compliant and reduce their environmental impact. However, there are divergent opinions around the world regarding this aspect. Some scholars such as Friedman (1970) have perceived the environmental policy as a burden while scholars such as Ambec and Lanoie (2008) and Porter and Linde (1995) regard this policy as an opportunity for firms. Additionally, some researchers have indicated that there is a positive link between environmental management practice and overall economic performance of a firm (Aggarwal, 2013).

Economic performance is termed as the degree to which the firms achieve profit-oriented outcomes (Afagachie, 2013). It can also be described as an indicator of a firm's financial health over a given period of time (Vijfvinkel et al., 2011). This is because it enables the firm’s decision makers to gauge its’ current performance and return on investment. Different measures have been used to evaluate economic performance and this is because firms have different primary financial goals (Jayeola, 2015). Some firms measure economic performance using, profitability, sales growth, market share growth, number of employees among others (Vijfvinkel et al., 2011)

Profitability is a measure of the extent to which a business generates financial gains from the factors of production, which are labor, management, capital and resources among

others. Sales growth relates to improvement in overall returns in the organization and its ability to equilibrate with the surrounding environment (Addo, 2017). Growth in the market share reflects how marketing expenditure contributes to stakeholders' value. It is a measure of marketing productivity; market share is also linked with the overall firm's profitability (Khantimirov, 2017). To fully measure economic performance, it is important to incorporate the non-financial measures such as number of employees (Osiako, 2017). This measures the firm's performance through the number of full-time and part-time members. In this study, profitability, sales growth, market share and number of employees were chosen as indicators of economic performance. Other measures were not included to maintain a focused approach on key, quantifiable factors that are commonly used in assessing SME performance.

Economic performance of firms is considered to be affected by myriad of factors such as ownership type, size of the firm, age and type of industry (Ahinful & Tauringana, 2019). The size of firms mostly affects their competitive advantage as well as how they operate. For instance, According to Addo (2017), large firms are able to acquire better resources, hence enjoy economies of scale. Besides, the age of firms is often related to their experience consequently influencing economic performance of such firms. Therefore, this study controlled these factors by focusing only on SMEs that have 10-99 employees. The SMEs year of operation was controlled by focusing on SMEs who have been in operation for 5 years and above.

The relationship between environmental policy and economic performance has gained interest to both scholars and academicians over the years. Malesios et al. (2018), assert that actively engaging in environmental practices is no longer optional but rather a necessity involving the long-term enhancement of economic results and helping managers formulate a long-term vision for their enterprises. Environmental management practices can also provide access to new markets, especially with evolving environmentally conscious markets that increasingly desire eco-friendly products. This has led to new sales opportunities (Horváthová, 2012; Klassen McLaughlin, 2015).

Early studies such as Hart (1995), Porter and Linde (1995), and Russo and Fouts (1997), highlighted the relationship between environmental management and firm economic performance to be win-win scenario. For instance, Porter and Linde (1995) , postulates that the environmental management benefits outweigh the cost and that tighter regulations stimulate innovation. This perspective is alluded by Montabon et al. (2007), who found that there is a significant and positive relationship between environmental management practices and measures of firm performance such as return on investment (ROI) and sales growth.

Ameer and Othman (2012), studied the relationship between environmental practices and financial performance in a population of Top 100 sustainable global companies in 2008 from developed countries and emerging markets. The results of the study indicated significantly higher mean sales growth, profit before taxation, return on assets and cash flows from sustainability activities they integrated in their operation. Similarly, King and Lenox (2002) found a significant correlation between waste prevention and firms' profitability in their study "exploring the locus of profitable pollution reduction" in the USA.

The relationship between environmental policy and financial performance has been studied widely and two schools of thought seem to be identified. One is the 'cost-concerned approach' which argues that environmental activities require huge and costly investments and thus,lead to decrease in firm earnings and decline in market value. The other is the 'value-creation approach', which argues that environmental initiatives taken by firms provide them with an increased competitive advantage, which contributes to their higher profitability (Hassel et al., 2005). However, there is limited documentation on such relationship in Kenya, and hence this study sought to fill this gap.

On the cost-concerned approach, traditionalist conservationist argues that adoption and implementation of environmental policies put extra pressure on the already scarce resources of the firm hence induces additional cost (Afagachie, 2013). The negative argument has also been explained by Ambec et al. (2013) that even though environmental management offers environmental health benefits to the society, it also forces businesses to allocate resources such as capital and labour which is unproductive from business perspective. Wagner (2005), studied the relationship between environmental performance and financial performance of European paper manufacturing industry in UK, Germany, Netherlands, and Italy. The results established that there is a predominantly negative relationship between environmental and economic performance.

In Africa, the relationship between environmental management and financial performance has been studied widely but the scope is only limited to big sized firms. Famiyeh et al. (2018), studied environmental management practices, operational competitiveness, and environmental performance in developing counties. The study results indicated that EMPs adopted by firms have a significant positive implication on firms' competitive operational performance. Similar finding were found by Nyirenda et al. (2013) in the study of the impact of environmental management practices on firm financial performance: a case study of selected South African mining companies listed under the Socially Responsible Index (SRI) of the

Johannesburg Stock Exchange (JSE). The findings highlighted positive relationship between environmental management Practices and firms' financial performance.

Ntalamia (2017) examined the factors influencing adoption of Environmental Management Accounting (EMA) practices among manufacturing firms in Nairobi, Kenya. Through the regression analysis, the results showed that financial status and adoption of EMA are positively and significantly related. The study recommended adopting EMA practices among companies since such a practice would result into increased financial performance as well as company reputation. Otundo (2019), studied effects of green production practices on financial performance of manufacturing firms in Kenya. The finding showed that the firms that had adopted green manufacturing concepts had their financial performance components improved particularly in earnings before interest and tax, return on sales, return on investment, sales growth, profitability, and finally return on equity.

Small and medium sized enterprises refers to those firms that employ 10 - 99 workers with annual turnovers between KES 500,000 to KES 8 million (Indrawati, 2018). SMEs are the heartbeat of each economy all over the world. Internationally, SMEs are considered critical in achieving the Sustainable Development Goals (SDGs) such as SDG 1, SDG8 and SDG 9. SDG 1 states that "end poverty in all its forms everywhere". SDG 8 states that "promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all" while SDG 9 states that "build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation" (Nulkar, 2019; Timoti, 2018). Therefore, in this regard, governments have been supporting the growth of SMEs.

In Kenya, SMEs are considered to play a huge role in attaining the vision 2030 goal of transforming Kenya into a newly industrializing, high middle-income country (International Trade Centre [ITC], 2019). Similarly, SMEs are considered as the 'bedrock' for manufacturing and have been identified as central enablers towards realizing the 'Big Four Agenda' transformational agenda under the manufacturing pillar (ITC, 2019). This is in recognition that the vast majority of businesses in Kenya are SMEs, which are estimated at 98% of the business in the country. Besides, they contribute largely to the Gross Domestic Product (GDP) in Kenya and they also employ more than 80% of the working Kenyan population (Wairimu, 2015). This indicates that SMEs play a central role in Kenya's economic and growth strategies. Despite their importance, SMEs significantly impact the environment, contributing to 60-70% of manufacturing pollution and 70% of industrial waste (Mitchell et al., 2010). They also consume over 13% of global final energy demand and generate around 40% of business sector GHG emissions (International Energy Agency, 2015). Therefore, given the urgency and scale of

emissions reductions needed, companies, including SMEs, need to urgently act to reduce energy-related carbon emissions both in their direct operations and in their supply chains.

In Nakuru County, SMEs form a huge percentage of business. This is indicated by its high number of single permits issued as well as its contribution of approximately 6.5% to the national GDP in 2018 (Kenya National Bureau of Statistics [KNBS], 2019b). Despite, the County's positive contribution to the Kenyan economy, it is no longer the cleanest county in East Africa, as it was perceived before, this is attributed to the industrial expansion and urbanization (Odada et al., n.d.). Additionally, Lake Nakuru and Naivasha, are protected wetland and UNESCO World Heritage Sites and they may soon begin to perish or animals migrate because of increasing levels of pollution from untreated sewage and industrial waste (Wakibia, 2021). The diminishing numbers of flamingos in Lake Nakuru explain this problem. Nakuru community also is shown to rely on biomass fuels to a significantly greater degree than Nairobi, hence high levels of air pollution (Kuria, 2011).

Decisions on what environmental actions to prioritize and how to implement them often involve a multitude of stakeholders, each with their own interests, concerns, and expertise (Saleem et al., 2020). Stakeholder can be defined as individuals, groups and organizations that have an interest in the processes and outcomes of the firm and upon whom the firm depends for the achievement of its goals (Moneva & Hernández-Pajares, 2018). This could include owners, employees, managers, shareholders, financiers, customers and suppliers among others. Delmas and Toffel (2004) and Hörisch et al. (2014), in their studies indicated that SMEs proprietors such as owners and managers steers and orchestrates environmental management policies, infusing them with their values, personal attributes, and relational skills in engaging with stakeholders. They also alluded that managers employ significant influence in shaping the company's values, policies, and day-to-day practices, including those related to adoption of environmental practices.

Ruf et al. (2001) and Schaltegger et al. (2019), reiterated that the personal values of owner-managers and their close relationships with other stakeholders, driven by extrinsic motivations, can yield benefits and competitive advantages. Despite the growing importance of environmental and social issues, research into how SMEs engage with these concerns has been relatively scarce. Even fewer studies have focused on environmentally proactive SMEs. Hence, understanding the perspectives of managers in such firms is crucial. Additionally, there is limited documentation on such influence among SMEs which contribute significantly to Gross Domestic Product (GDP) in Nakuru County. Additionally, fewer studies have focused on the influence between environmental policy and economic performance among SMEs from

stakeholders' perspective. Therefore, the purpose of this study was to assess stakeholders' perceptions on the influence between environmental policy adopted and economic performance of manufacturing SMEs in Nakuru County, Kenya.

## 1.2 Statement of the Problem

Environmental management has taken a strategic position in business operations where manufacturing firms are trying to mitigate adverse effects resulting from their business operations. This has been through the adoption of environmental policies that often highlight practices that firms use to reduce pollution and energy consumption among others. While the adoption of these policies has been traditionally more common among large companies, SMEs have also assumed the same trend especially in contemporary times. This is attributed to adequate support from the government compounded by the advent of environmental social governance among investors. Comparative studies have shown that several large-sized manufacturing firms have leveraged the adoption of environmental management practices to improve their business performance. Additionally, stakeholders, such as owner/managers, are the key players in business since they are the ones who determine, in a personal way, the values, policies, and daily practices in the business, including the environmental practices that should be adopted. Hence, the need to investigate the perceptions of this stakeholders. Furthermore, Nakuru contributes positively due to its strong presence in Kenya's economic landscape. However, due to rapid industrial expansion and urbanization, the county is considered one of the most polluted cities in Kenya. Hence, it is worth investigating the role, approaches, and extent to which SMEs contribute to addressing environmental challenges and reducing environmental degradation in the county. Nevertheless, literature on the influence of environmental policy adopted on economic performance among SMEs, as well as stakeholders' perspectives on this influence, remains scarce. Therefore, the study sought to assess stakeholders' perceptions on the influence of environmental policy adopted on economic performance of manufacturing SMEs in Nakuru County.

## 1.3 Purpose of the Study

The purpose of the study was to assess stakeholders' perceptions on the influence of environmental policy adopted on the economic performance of manufacturing small and medium sized enterprises in Nakuru County.

## 1.4 Objectives of the Study

This study was guided by the following specific objectives:

i. To examine the stakeholders' perceptions on the nature of environmental management practices adopted among manufacturing SMEs in Nakuru County.
ii. To examine stakeholders' perceptions on the extent of environmental management practices adopted among manufacturing SMEs in Nakuru County.
iii. To determine the stakeholders' perceptions on the influence of waste management practices adopted on economic performance of manufacturing SMEs in Nakuru County.
iv. To determine the stakeholders' perceptions on the influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County.
v. To determine stakeholders' perceptions on the influence of environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County.

**1.5 Research Questions**

i. How do stakeholders perceive the nature of environmental management practices adopted by manufacturing SMEs in Nakuru County?
ii. How do the stakeholders perceive the extent of environmental management practices adopted among manufacturing SMEs in Nakuru County?

**1.6 Research Hypotheses**

The following are the null hypotheses that were tested.

**Ho1:** There is no statistically significant influence of the waste management practices adopted on economic performance of manufacturing SME in Nakuru County as perceived by stakeholders.

**Ho2:** There is no statistically significant influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders.

**Ho3:** There is no statistically significant management practices adopted on economic performances of manufacturing SMEs in Nakuru County as perceived by stakeholders.

**1.7 Significance of the study**

The findings of the study are likely to be beneficial to several stakeholders such as government, SMEs, researchers and academicians. First, the study would provide insights to SME owners on how they may improve their firms' returns by adopting environmental management practices. The findings of the study may also form a basis for business motivation

to adopt green strategies in their daily operations. Secondly, the study would inform policy maker both at national and county governments on how to enhance environmental sustainability while enhancing the SMEs performance in Kenya. This would be achieved through the provision of insights to measures to avoid the challenges that SMEs face as result of the adoption of environmental policy. In addition, the findings would be utilized as evidence for the inform development of environmental management policies at both county and national level. More so, this study extends the existing literature on environmental policy adoption and how it correlates with economic performance, especially among SMEs.

### 1.8 Scope of the study

The study focused on SMEs in the manufacturing sector located in Nakuru County. The focus was on the enterprises that have been in operation for at least five years because older SMEs have knowledge and experience in their operating environment. The study respondents included the SMEs proprietors, and Nakuru County environmental officers. The study also focused specifically on selected environmental policy indicators, which include waste management practices and energy efficiency practice. Moreover, the study focused on the economic performance of SMEs. Attributes such as profits, sales growth, market share and number of employees, which are of key interest among firms, were used as proxies for economic performance.

### 1.9 Limitation of the study

The following are limitations of this study:

i. The study only focused on a few indicators of environmental policy and economic performance while there are many variables for economic performance and environmental policy variables.
ii. The study also limited its scope to the manufacturing sector hence hampering generalization of the findings across other sectors.

### 1.10 Assumptions of the Study

The following assumptions were made in this study:

i. This study assumed that stakeholders' respondents would be ready and willing to participate in the study.
ii. The study assumed that the stakeholders' perceptions accurately reflect the reality of the influence of environmental policies adopted on economic performance. Stakeholders are presumed to have sufficient knowledge and experience to provide valid insights.

## 1.11 Operational Definition of Key Terms

In this section, the researcher highlights both constitutive and operational definitions of the technical terms that were used in the study.

**Adopted:** refers to accepting, implementing, or putting into practice a policy, idea, or strategy (Oxford English Dictionary, 2010). Adopted in this study referred to the implementation of environmental policies among manufacturing small and medium-sized enterprises.

**Economic Performance:** refers to the measure of a company's financial and operational outcomes over a specific period, typically evaluated using indicators such as profitability, revenue growth, return on investment (ROI), efficiency, and market share (Afagachie, 2013). In this study, economic performance referred to the degree to which manufacturing SMEs achieve profit-oriented outcomes, specifically net profit margins, annual sales growth, market share growth, and number of employees.

**Energy efficiency:** refers to using less energy to produce same amount of service or useful output (Munene et al., 2019). In this study, energy efficiency referred to all energy-saving efforts, which included timely maintenance of equipment, the use of energy-efficient bulbs and equipment, the use of clean energy, the presence of an energy officer, and educating and training staff in energy efficiency.

**Environmental Management:** refers to the management of all components of the environment both biotic and abiotic factors (Brammer et al., 2012). In this study, environmental management referred to planning and controlling all manufacturing activities by SMEs to reduce their environmental footprint gearing towards the enhancement of environmental quality.

**Environmental Management Practices**: refers to programs to improve environmental performance of processes and products in the forms of eco-design (design for environment), recycling, waste management and life-cycle analysis (Yang et al., 2011). In this study, environmental management practices referred to actions or programs undertaken by manufacturing firms to address environmental pollution, specifically in the areas of waste management and efficient energy use.

**Environmental Policy:** is a statement by which an organization states its intentions and principles in relation to its overall environmental performance (Purvis et al., 2019). In this study, environmental policy referred to a statement highlighting the environmental management practices of manufacturing SMEs, intended to improve their environmental performance, such as waste management and energy efficiency practices.

**Extent:** It refers to the particular degree to which something is believed to be the case (Maříková et al., 2014). In this study, the extent referred to refers to the degree to which SMEs proprietors implement and integrate environmental management strategies into their operations.

**Manufacturing:** it refers processing or changing the basic ingredient or characteristics of a good or product (Yang et al., 2011). In this study, manufacturing referred to the process of transforming basic ingredients into products, particularly in the pharmaceuticals and medical equipment, textiles and apparel, energy, electrical and electronics, chemical and allied products, and building and construction.

**Nature:** It refers to the underlying characteristics and principles that guide these practices toward sustainable interactions with the environment (Maříková et al., 2014)**.** In this study, nature referred to the objectives of the SMEs to manage and address their environmental footprints, such as profitability, efficient production, and company visibility, among other aspects, that are adopted by SMEs.

**Perception:** It refers to how individuals, communities, organizations, and policymakers view, understand, and prioritize environmental issues and the practices used to address them, as well as the impacts these perceptions have on decision-making and behavior (Mcdonald, 2012). In this study, perception referred to the views and understanding of SME proprietors regarding decision-making and behavior on environmental issues, and how these decisions and behaviors influence their economic performance.

**Small and Medium Sized Enterprises**; Are those firms, business activities, or industry with a capital investment of not more than Kshs 30 million and less than Kshs 10 million with employees with not less than 10 and not more than 100 employees (Wairimu, 2015). In this study, SMEs referred to firms with 10 to 100 employees, a capital investment of no more than Kshs 30 million, and less than Kshs 10 million, and have been in operation for 5 years or more.

**SMEs Proprietors**: Are individuals or groups who own, manage, and operate small to medium-sized businesses (Akbar et al., 2017). In this study SMEs Proprietors referred to SMEs owners/ managers who manage and operate the manufacturing SMEs.

**Stakeholders:** A stakeholder refers to any individual or group that maintains a stake in an organization in the way that a shareholder possesses shares (McGrath & Whitty, 2017). In this study, stakeholders referred to SMEs proprietors including SMEs owners and managers who often have an interest in, is affected by, or can influence environmental management practices, decisions, and outcomes.

**Waste management:** refers to activities and actions required to manage waste from inception to its final disposal, that is collection, transportation, treatment and disposal of waste together with regulation of the waste management process (Amasuomo & Baird, 2016). In this study, waste management referred to the activities and actions required to manage solid, liquid, and gas waste from inception to final disposal, including waste recycling and reusing, waste separation, staff training and education on waste management, and eco-friendly packaging and purchasing.

# CHAPTER TWO
# LITERATURE REVIEW

## 2.1 Introduction

This section reviewed literature related to the study, which includes environmental regulations and policies in Kenya, adoption of environmental policy, economic performance, manufacturing small and medium sized enterprises. This section also included a discussion on the influence of environmental policy on SMEs' economic performance as well as the theory that guided the study.

## 2.2 Environmental Legislations and Policies

There are diverse regulations and policies for environmental management and governance both international and national. Globally, Agenda 2030 of sustainable development agreement and Agenda 2030 for Sustainable Development, with its 17 Sustainable Development Goals (SDGs), provides a comprehensive framework that supports Small and Medium Enterprises (SMEs) in adopting environmental management practices while contributing to environmental protection. Specifically, SDG 12, which focuses on sustainable consumption and production, encourages SMEs to integrate resource-efficient and environmentally friendly practices into their operations. By promoting cleaner production technologies, waste reduction, and responsible resource use, SMEs can reduce their environmental footprint and enhance sustainability (Rodríguez-Espíndola et al., 2022). Additionally, SDG 8 emphasizes fostering economic growth through decent work, which includes the development of green jobs in SMEs, enabling them to thrive while contributing to environmental protection. By aligning their practices with the broader goals of SDG 13 (climate action) and SDG 15 (life on land), SMEs can play a key role in mitigating environmental challenges and driving sustainable development (Chigbu & Nekhwevha, 2023).

In Africa, Agenda 2063, the African Union's strategic framework for the continent's development, emphasizes sustainable economic growth, environmental protection, and the promotion of inclusive development. It recognizes the crucial role of Small and Medium Enterprises (SMEs) in achieving these goals by fostering sustainable industrialization, job creation, and innovation(African Union, 2020). Specifically, Agenda 2063 encourages SMEs to adopt green technologies, sustainable production practices, and environmentally friendly innovations that contribute to climate resilience and biodiversity conservation. Through initiatives like the African Green Growth Strategy and the promotion of circular economies, SMEs are incentivized to reduce their environmental footprint while enhancing their

competitiveness. By aligning with environmental management goals outlined in Agenda 2063, SMEs can contribute to Africa's long-term sustainability, achieving both economic and environmental benefits(African Union, 2020).

Nationally, environmental regulation instruments include; The Constitution of Kenya, 2010, Environmental Management and Co-ordination (Amendment) Act, 2015, Waste Management Regulation, 2006, Energy Act, 2006 among others. The Constitution of Kenya recognizes the importance of environmental management through various provisions. These provisions are included in Chapter Four under the rights and fundamental freedoms, Chapter Five under environmental and natural resources, Chapter Ten under judicial authority and the legal system, and in the Fourth and Fifth Schedules.

The Constitution of Kenya emphasizes environmental protection for present and future generations through Articles 69 and 70. Article 69 mandates the state to ensure sustainable exploitation, utilization, management, and conservation of natural resources, equitable benefit sharing, and public participation in environmental management. It also requires environmental impact assessments, audits, and the elimination of harmful activities. Article 70 empowers citizens to seek redress for environmental rights infringements and defines the role of courts in protecting the environment, including preventing harmful acts, compelling public officers to act, and providing compensation to victims of environmental rights violations.

The Environmental Management and Coordination Act (EMCA), 1999, serves as Kenya's primary environmental management and conservation legislation. It entitles every person to a clean and healthy environment and mandates safeguarding and enhancing the environment. The Act establishes the legal framework for environmental management, including institutional and structural frameworks, and provides standards for air, water, land, pollution control, waste discharge, and toxic substances. EMCA mandates Environmental Impact Assessments (EIA) before project commencement, as specified in Part VI, Section 58(1) and the Second Schedule. Part VIII sets environmental quality standards for businesses. The National Environment Management Authority (NEMA), established under Part II, Section 7, enforces these standards, supervises environmental matters, and develops regulations and guidelines in consultation with lead agencies.

The National Environment Management Authority ensures compliance with environmental standards through enforcement, penalties, and regulation of potentially harmful activities. Part XIII of EMCA outlines environmental offenses and penalties. NEMA enforces waste disposal standards, identifies and manages hazardous materials, and issues guidelines for waste management. It ensures no waste disposal causes pollution and requires licenses for

waste transportation and disposal. NEMA also formulates regulations, sets standards, issues licenses, and conducts monitoring and inspections to ensure environmental quality and assess the impacts of industrial activities.

Another regulation is the Waste Management Regulations of 2006, which was developed under EMCA 1999. It provides guidelines, procedures, and standards for environmental governance to ensure compliance. It also covers licensing, monitoring, and enforcement of waste disposal. This regulation mandates that businesses and organizations dispose of waste in designated receptacles, segregate waste, and ensures waste is transferred to licensed transporters and disposal facilities. The regulations also support cleaner production technologies to minimize waste and maximize raw material use, including improving production processes and incorporating environmental concerns. Additionally, it highlights that the industrial sector must install pollution control technology for waste pretreatment and cannot generate hazardous waste without a valid EIA license.

The Energy Act, 2006 (Cap. 541) mandates the Energy Regulatory Commission (ERC) to regulate the importation, exportation, generation, transmission, storage, distribution, and use of energy resources, including petroleum products, natural gas, electricity, and renewable energy. The ERC prepares and updates national energy plans and collects energy data for decision-making. To achieve its objectives, the Energy (Energy Management) Regulations, 2012 require consumers using over 180,000 kWh annually to conduct energy audits every three years with ERC-licensed auditors, promoting energy conservation and cost reduction without compromising productivity.

**2.3 Environmental Policy Adoption**

Environmental policy refers to a document which clearly sets out the overall aims and intentions of a firm/company with respect to the environment (Purvis et al., 2019). It signals a commitment to environmental management and prepares a way for further environmental management activities. It also highlights the nature, size, and environmental impacts of its activities, products, or services, including a commitment to continuous improvement, pollution prevention, and alignment with environmental goals. In general, environmental policy emphasizes the environmental management practices (EMPs) that organizations adopt to prevent pollution and environmental degradation.

Environmental Management Practices (EMPs) are defined as techniques, guidelines, and methods aimed at monitoring and controlling the impact of a firm's actions on the natural environment (Montabon et al., 2007). These actions include waste management, carbon emission reduction, efficient energy use, and efficient water usage to address environmental

pollution. This study defines EMPs as any actions, decisions, efforts, or practices taken by manufacturing SMEs to reduce environmental pollution caused by their operations. The study focused on waste management and energy efficiency practices as indicators of environmental policy, given that the SME sector is responsible for an estimated 60-70% of pollution related to manufacturing and 70% of industrial waste production (Mitchell et al., n.d.).

The nature and extent of the adoption of environmental policy may vary among firms and they are influenced by different factors. However, the effects of the environmental management practices may not vary since the practices minimizes organizations/ firm's ecological footprint at the same time reducing the cost of environmental compliance, attracting green customers which eventually improves the business performance (Porter & Linde, 1995). There is, therefore, the need to shed some light on the nature and extent of environmental management practices among firms specifically on energy efficiency and waste management.

Over the years, interest in improving energy efficiency has been increasing at corporate, local, national and international levels around the world. This is seen as a means of addressing concerns about environmental impact resulting from the use of energy and concerns about energy security (Ahinful & Tauringana, 2019). Improving business energy efficiency is seen to be beneficial to business performance for instance, according to Ates and Durakbasa (2012), industries who adopt energy management practices may save up to 40% of their total energy consumption. In this regard, businesses have therefore, started takin the initiatives of adoption of practices aimed at reducing the energy consumption and the negative impact on the environment. Galvez-Martos et al. (2013), examined the important energy-related needs in retailers' stores in Europe. The study findings indicated that most retailers majorly were integrating energy minimization and saving measures as standard practice systematically across stores. These retailers also integrate a comprehensive monitoring system in the energy management of every store or building belonging to the company, enabling the rapid identification of energy saving opportunities.

Ates and Durakbasa (2012), carried out a multiple case study of the Turkish iron, steel, cement, paper, ceramics and textile industries. The findings indicated that only 22% of the sampled companies practiced energy management in Turkey. The findings also highlighted that lack of synergy between the stakeholders, the extent and scope of energy manager courses, and inadequate awareness of and lack of financial support for energy management activities were the main barriers of implementation of the practices. Ackah and Kizys (2018), analyzed the energy efficiency practices of SMEs in rural Ghana. These results showed that the reduction in energy consumption among SMEs could be attributed mostly to national blackout and not

efficiency. Besides, energy-efficient practices are observed to be nearly non-existent within rural SMEs. Gaps in this study was that it used a small sample size (15 respondents) hence; this limits the empirical generalizability of the findings to SMEs in general.

Waste management is also one of the most important aspects in the manufacturing sector and this is because the sector produces a lot of waste with estimates 70% of waste is produced every day. The waste generated are perceived to have negative effects on the environment on the environment and natural resources. Therefore, this cannot be ignored thus sustainable waste management strategies need to be developed. Shah (2014), determined the industrial solid waste management in Hattar industrial estate Pakistan. The study results showed the practices being adopted by the industries in the study sample included recycling or reusing of waste. They also highlighted that the recycling and reusing of were economically helping the locals of the universe of study but at the cost of enormous pollution problems.

Abu et al. (2015), conducted a qualitative study on the Best Malaysian SMEs Practices in Solid Waste Management in Malaysia. In the research, only two manufacturing companies were interviewed. The results indicated that there are two types of best waste practices implemented by SMEs, which are monitoring waste expenditures and waste auditing. In the study, the researcher acknowledged gaps included, limited geographical coverage and small sample size; this limits the empirical generalizability of the findings to SMEs in general.

### 2.3.1 Barriers to Adoption of Environmental Policy

Improved understanding of the barriers to the adoption of environmental management practices within SMEs is critical to extending the concept within the manufacturing sector. Without such advances, the economic viability and social acceptability of SMEs may be jeopardized in the long term (Vernon et al., 2003). Research has highlighted various factors that limit the effective implementation of environmental improvement activities by small and medium firms. For instance, financial limitations, lack of knowledge of environmental regulation among SMEs proprietors among others.

According to Cassells and Lewis (2009), information deficits and limited managerial capability among the SME owner-managers and also inadequacy of firms' absorptive capacity are significant barriers for SMEs with regard to adoption of environmental practices. This is also alluded by Vernon et al. (2003), where in their study the results indicated that SME owner-managers find it difficult to get information in relation to environmental issues, and that in their struggle to do so often negates any willingness they might have to engage with either the issues broadly, or implementing initiatives specifically.

Jamaludin and Yusof (2016), studied the barriers of adopting environmental management practices in the Micro and Small Island Chalets (MSIC) operations. The results identified lack of trained staffs in green practice management as the highest barrier. This was associated to the fact that MSEs always have a limited number of staff, a hence it's quite impossible to have a dedicated environmental officer. The moderate barriers identified were the lack of green knowledge, small financial capacity, lack of government support and enforcement and lack of support from the owner was also identified since most of the owner/manager were very supportive of the idea of implementing environmental practices, but they are not fully ready to adopt in their operation.

Walker et al. (2008) conducted a literature review on the small and medium enterprises and the environment: barriers, drivers, innovation and best practice. The finding forms the literature reviewed indicated that from the perspective of the owner-manager of an SME, there were three main barriers preventing them from engaging in good environmental practices. These included the characteristics of SMEs in general resource availability i.e., financial, human and time, and their personal interest, motivation and knowledge of environmental management.

**2.4 Measuring Economic Performance among Manufacturing SMEs**

Economic performance is used interchangeably with financial performance and it refers to the degree to which an organization achieves profit oriented outcomes (Yang et al., 2011). It can also be described as an indicator of a firm's financial health over a given period of time (Vijfvinkel et al., 2011). This is because it enables the firm's decision makers to gauge the current firm's performance and return on investment. The firm's economic performance is considered a crucial kind of information to the firm's stakeholders, for instance the owner, the employees and investors. Good economic performance is considered to result to ripple effect which leads to satisfaction of firm's stakeholders and overall firms growth (Osiako, 2017).

To evaluate the economic performance different measures are used and this is because firms have different primary financial goals (Jayeola, 2015). Some firms measures economic performance using, profitability, sales growth, market share growth, liquidity and solvency among others (Vijfvinkel et al., 2011). Financial measure of firm's performance is widely used and according to Hopwood (1972), financial measures can lead to favorable subordinates' behaviors because of the objectivity and the reduced uncertainty of such measures. Kotane and Kuzmina-Merlino (2017), reiterated that the widespread use of financial performance measures in a number of reasons. First financial performance measures, such as profit, are coherent with

the organization's long-term objectives, which are usually purely financial. Secondly, well-chosen financial performance measures provide a comprehensive view of an organization's performance.

In 1996, Kaplan and Norton introduced a balanced scorecard, which is a set of measures that give firms stakeholders fast but comprehensive view of the business. The balanced scorecard combines both financial measures and non-financial measures. The non-financial measures are meant to complement the financial measures with operational measures on customer satisfaction, internal processes, and the organization's innovation and improvement activities (Kotane & Kuzmina-Merlino, 2017; Osiako, 2017). Taking into consideration the aim of the study, the financial and non - financial indicators used among SMEs were also analyzed. Studies have indicated that SMEs use different financial measures which include; rate of return on assets (ROA), the rate of return on equity (ROE), operating profit margin, and net SME income, sales revenues among other. Sousa et al. (2006), studied the performance measures in English small and medium enterprises and their main purpose was to determine the performance measures degree of implementation in small and medium enterprises (SMEs) in England. The findings indicated a great use of financial measures such as financial return and working capital among UK manufacturing firms. The gap identified is, the study focused on all sectors but did not specifically focus on the financial measures used specifically for the manufacturing sector.

Ahmad et al. (2015), investigated the performance measurement among 160 SMEs in Malaysia and the findings indicated that both financial and non-financial measures were used. Ahmad et al. (2015), further found that the most popular financial measures used by the SMEs were sales growth (76%), operating income (75%), cash flow measure (74%), and return on investment (73%). The gap identified is the study focused on different contextual environments hence they cannot be generalized with this study. Besides, the study addressed different variables like the performance measurement system and commitment of SMEs proprietors different from the variables of this study.

Maduekwe and Kamala (2016), also investigated on the performance measurement by small and medium enterprises in Cape Metropolis, South Africa where the purpose of the study was to identify performance measures are use among SMEs. The findings of the study revealed that most of the sampled SMEs measure their performance using both financial and non-financial performance measures, even though financial performance measures were used more frequently than the non-financial ones. The financial performance measures included sales

growth, cash flows, operating income and net profit margin while the most popular non-financial measures are customer focused.

In a study also conducted in Kenya, Wadongo et al.(2010), investigated the key performance measures utilized by six five-star hotels. The researchers reported that most hotel managers highly monitored financial performance using measures such as total revenue, food and beverage sales, and total operating cost. The research focused on the food industry, and it did not highlight the performance measures specifically used in manufacturing SMEs. In this study, financial performance was measured by the development of revenues and profits, which specifically include sales growth, net profits, and market share. This is because these measures are often used as a primary goal for multiple firms, either big sized or SMEs.

Revenue development can be seen as a growth indicator of the firm and also as a competitive strategy for consecutive firms (Vijfvinkel et al., 2011). It is argued that the primary goal of many enterprises is some growth-related factors such as sales revenue, unit sales or market share. Similarly, many firms are maximizing their profit making, hence the development of profits is a suitable indicator for financial performance as well. Focusing on the relationship between economic performance and environmental management practices a different relationship has been proposed between firm economic performance and environmental management practices (Porter & Linde, 1995). For instance, a firm, by being environmentally friendly, differentiates its products and thus increases its revenue. Similarly, a firm can save costs on resources, regulatory costs, capital and labor and therewith increase its profits.

**2.5 Manufacturing Small and Medium Sized Enterprises**

Small and Medium-sized Enterprises (SMEs) have been the subject of increasing attention by policymakers in national governments and international institutions in both developed and developing countries. SMEs account for a huge share of the enterprises in most economies, and employ significant numbers of people for in most cases are considered to the engine of new growth and innovation (Tewari et al., 2013).

Definition of SMEs varies from country to country, and often even within countries. The SME definition in most countries is typically based on a number of variables such as number of employees, Assets / Turnover / Capital investment, Industry , ownership among others (Afande, 2015; Mwihaki, 2015). Therefore, an enterprise can be determined whether it is a micro, small or medium-sized enterprise by comparing its data with the characteristics, but it does not mean they change status if they exceed one of these parameters (European Commission, 2005). Table 1 indicates SMEs definition across diverse countries

**Table 1**

*SME definition criteria across diverse countries*

| Country | Definition Criteria | Small Enterprise | Medium Enterprise | Source |
|---|---|---|---|---|
| European Union | Number of employees, annual turnover or balance sheet | < 50 employees, turnover or balance sheet ≤ EUR 10 million | < 250 employees, turnover ≤ EUR 50 million, or balance sheet ≤ EUR 43 million | Prenaj and Ismajli (2018); Ayyagari et al. (2007); Berisha and Pula (2015); Prenaj and Ismajli (2018); Mwihaki (2015); Tewari et al. (2013) |
| United States | Ownership structure, number of employees, earnings, industry | Manufacturing: ≤ 500 employees, no turnover limit; Commerce: ≤ 100 employees | No standard model, varies by criteria | Mwihaki (2015); Sceulovs and Sarkane (2012) |
| China | Number of employees, annual revenue | Not specified | Manufacturing: < 1000 employees or < 400 million RMB in annual revenue | Mwihaki (2015); Prange and Zhao, (2018) ; Muriithi, (2017) |
| India | Investment in plant and machinery (manufacturing) | Investment: > INR 25 lakhs ≤ 5 crores rupees | Investment: > INR 5 crores ≤ 10 crores rupees | Berisha and Pula, (2015) |
| Ghana | Number of employees, annual turnover, assets | 5-50 employees, turnover: $6,000 - $30,000, assets < $30,000 | 50-100 employees | Douglas et al. (2017). |
| Kenya | Number of employees, | 10-50 employees, turnover: KES | 50-99 employees, turnover: KES 5 | Republic of Kenya [MSMEs] |

| | | | | |
|---|---|---|---|---|
| | annual turnover, capital formation | 500,000 - 5 million, capital: KES 5 - 50 million (manufacturing), KES 5 - 20 million (services) | million - 800 million | (2012); Indrawati (2018); Ong'olo and Awino, (2013); Wairimu, (2015) |

Small and medium-sized enterprises are the heart of the Kenyan economy. They represent about 98% of all businesses, and more than 80% of Kenya's working population rely on them for income. SMEs contributed an estimated 34% of the country's gross domestic product (GDP) in 2016. Though mostly informal, SMEs are engines of employment creation, generating 80% of new jobs annually (ITC, 2019). Small and medium sized enterprise are considered as the instruments for attaining the goals of Kenya vision 2030. For instance, the goal of transforming Kenya into newly industrializing high middle-income country. Similarly, the SMEs are considered as bedrock for manufacturing and have been identified as the central enablers towards realizing the big four agenda and the economic pillar of vision 2030.

In Kenya, there are about 1.3 million micro and small enterprises in Kenya employing about 2.4 million people. About two-thirds of all SMEs are in the rural areas. About 17% are found in Nairobi and Nakuru. The main activities of the SMES are involved in include General Trade, wholesale and Retail, Manufacturing, Education, Agriculture, Hospitality, Building and Construction, Clearing and Forwarding among others. Therefore, this study focused on SMEs operating within Nakuru County in the manufacturing sector.

## 2.6 The Relationship between Environmental Policy Adoption and Economic Performance

The initial literature in the relationship between Environmental policy (EP) and economic performance was, marked by Win-Win argument by Porter (1991). This study challenged the conservative wisdom that government environmental standards which are perceived to be tighter are detrimental to firm competitiveness. Through the anecdotal evidence, porter argues that environmental management benefits are greater than the costs and government environmental standards will then result to innovations (Afagachie, 2013; Montabon et al., 2007). This line of reasoning was further continued by Porter and Linde (1995) and their assertion is focused on innovation offsets. They argue that environmental regulation leads to innovation and the benefits of innovation may offset the cost of complying.

In the study, they defined innovation in two ways; first as the approaches that minimizes the pollution costs accrued when pollution and second approaches of improving the productivity of resources (Afagachie, 2013; Montabon et al., 2007).

The need to understand more about the link between environmental management and financial performance has led to large number of empirical studies on their relation in the past decades. The empirical investigations supported the positive relationship between the two variables. Other researchers studied the relationship between financial performance and corporate performance and more recently on corporate sustainability and financial performance (Qian, 2012). Milosevic et al. (2018), investigated how environmental award announcements affect the stock market returns of the firm. They used historical analysis to show the relationship, and the findings indicate a positive relationship, which supports Porter's argument. They argue that environmental performance through market gains and cost savings affects financial performance. The findings indicate that the average market valuation of the firm increases following the winning of environmental award, hence a positive relation.

Hart et al. (2000), linked environmental management through investigating the emissions reduction and the firm's performance. They posited that going green pays especially in the future. However, the finding indicated that it takes longer for emissions reduction and to impact on ROE merits that is the efforts to reduce emissions through pollution prevention appear to drop to the bottom line within one to two years after initiation. The results also highlighted that operating performance (ROS, ROA) significantly benefited in the following year, whereas it takes about two years before financial performance (ROE) is affected. This delay is attributed to the following reason; First, the impact of emission reduction on the financial performance work through the effects on operational performance with capital structure as compounding factor which results to delay (Hart et al., 2000). The study focused on Pollution control and only on financial indicators of economic performance excluding non-financial indicators, hence the gaps that this study seeks to fill.

Earnhart and Lizal (2010), explored the effect of corporate environmental performance and financial outcome. The study assessed whether good environmental performance affects profits, and in which direction the profit is affected. The study analyzed the links from environmental performance to revenues, costs, and profits using an unbalanced panel of Czech firms from the years 1996 to 1998. The finding indicated a positive relationship between environmental performances. Better environmental performance improves profitability by driving down costs more than it drives down revenues. The environmental performance, especially lowering emissions charge rates, increases profitability of the firms. The study

focused mainly on a big sized company's environmental performance and how it affects financial outcome. The gap identified is the study focused only on profitability as an indicator of economic performance while there are other indicators such as sales growth, market share and number of employees. Hence, the present study sought to fill this gap.

Nyirenda et al. (2013), examined the impact of environmental management practices on the financial performance of a South African mining firm. They investigated whether such practices have a close relationship with the mining firm's financial performance (return on equity). They used multiple regression statistics, the return on equity of Green-Steel is regressed on three environmental management practices of Green Steel (carbon reduction, energy efficiency, and water usage). The result showed there is no significant relationship between the variables, and this lends credence to information gathered from Green-Steel environmental reports that Green-Steel's environmental management practices are driven mostly by a desire to abide by regulations and by a moral obligation to use environmental management practices to mitigate climate change impact.

Ahinful and Tauringana (2019), investigated the impact of environmental management practices (EMPs) (energy efficiency, water, waste, material, pollution and biodiversity management) on financial performance (FP) of Ghanaian small and medium-sized enterprises. The study surveyed 238 SMEs from two industrial sectors. The findings indicate that there is a positive and significant relationship between EMPs and SMEs' financial performance. The study only focused on profitability as measure of SMEs financial performance but not in other measures of financial performance, hence this study sought to fill this gap by focusing on other financial performance indicators. Mohamed (2012), conducted a study on green supply chain management and performance of manufacturing in Mombasa. The study finding indicated that green supply chain management has a positive impact on manufacturing firms' performance. A research gap exists in the limited exploration of environmental management practices (EMPs), as previous studies have primarily focused on green products as an aspect of EMPs. This study addresses the gap by examining other critical aspects, such as waste management and energy efficiency, and their relationship to the financial performance of SMEs.

Kamande and Lokina (2013), examined the linkage between the profitability of firms measured by return on assets (ROA) and environmental performance measured by eco-efficiency and the impact of a good environmental management system (EMS) on profitability and eco-efficiency of Kenyan Manufacturing Firms. The results indicate that there is a potential gain in the profitability of the firm by improving eco-efficiency in resource use. Furthermore, proactive firms are found to perform better than reactive firms in terms of profitability and eco-

efficiency but firms that combine both proactive and reactive EMS perform even better, which shows the benefit of adopting commitment-based approaches alongside the compliance-based approaches to environmental management.

Other studies have showed negative and no relationship between environmental management and firm's financial performance. Neeveditah et al. (2017), examined the relationship between environmental management practices adopted by 42 listed companies on the Stock exchange of Mauritius and their impact on their financial performance. Through regression analysis, the finding revealed that there was an insignificant relationship between environmental management practices and financial performance except for energy efficiency, which generated a significant relationship. The gap identified is that the study focuses on stock exchange markets as much as it operationalized the environmental management practices.

**2.7 Theoretical Framework**

The study was guided by the Ecological modernization theory (Win-Win principle). The concept of ecological modernization was developed in the 1980s by Joseph Huber and Martin Jänicke (Gibbs, 1998; Gouldson & Murphy, 1997). The concept of ecological modernization implies that it is possible, through the development of new and integrated technologies, to reduce the consumption of raw materials, as well as the emissions of various pollutants, while at the same time creating innovative and competitive products (Gouldson & Murphy, 1997). Ecological modernization identifies a positive-sum game between economy and ecology that is, improving the environmental bottom line, improves the economic bottom line (Mol & Spaargaren, 2000). The original ecological modernization discourse emphasizes more on efficient production, less waste, lower costs from anticipating and preventing pollution rather than cleaning up later and profits to be made in selling green goods and technologies (Schlosberg & Rinfret, 2008).

In general, ecological modernization theory describes a "win-win" scenario whereby technological development and innovation can help industries and countries to achieve both economic and environmental benefits. Hence, the justification for choosing the theory for this study. Ecological modernization theory supports the idea that companies can invest in process/product innovation to decrease environmental degradation and thus help with economic gains (Chen, 2015), hence the justification for choosing the theory for this study. Therefore, the ecological modernization theory guided this study to explain the relationship between the environmental policy adopted and SMEs financial/Economic performance.

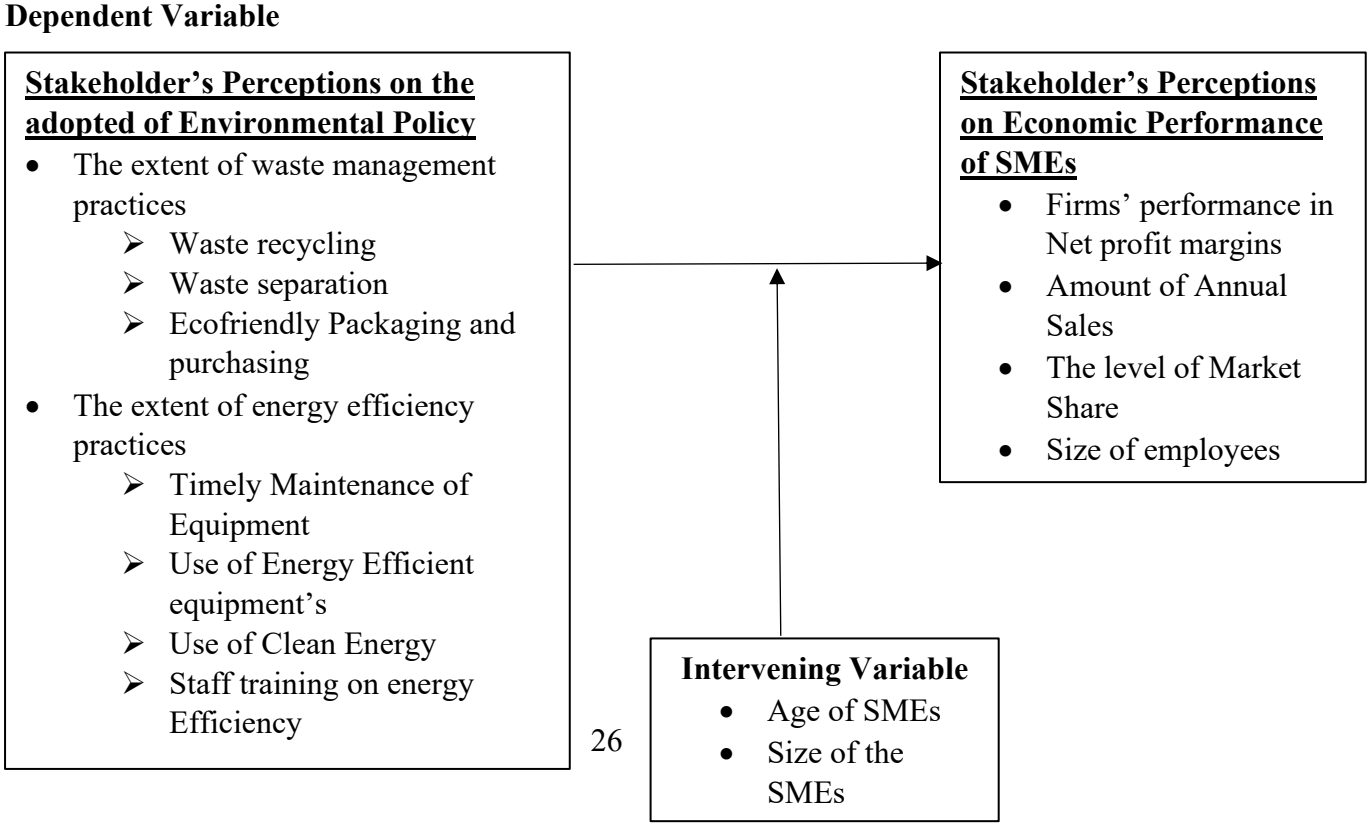
Additionally, despite the effectiveness of the theory in this study, its application could have limitation as it struggles with the difficulty of accurately assessing the global or systemic environmental impacts of specific industrial or economic changes (Milchakova & Reshetnikov, 2024). It typically focuses on technological advancements and market-based solutions that reduce resource intensity in industries, but it may overlook how these improvements can lead to hidden environmental costs elsewhere, such as in supply chains or through consumption patterns in different regions (York & Rosa, 2003). Therefore, this research adopted a multi-level approach that considers not only the technological aspects of environmental management practices but also the non-technical aspects, such as social, organizational, and policy factors. Additionally, it explored both economic and non-economic aspects when evaluating the performance of SMEs. This approach allows for a comprehensive understanding of how environmental management practices impact SMEs.

### 2.8 Conceptual Framework

This section illustrates the relationship between the independent, dependent and intervening variables of the study. Figure 1 highlights the relationship study variables that is Stakeholder's Perceptions on the adopted of Environmental Policy and Stakeholder's Perceptions on Economic Performance of SMEs.

**Figure 1**

*Conceptual Framework on the stakeholder's perceptions on the influence of Environmental Policy Adopted on Economic Performance of manufacturing SMEs*



The conceptual framework above shows the interaction between the independent variable and the dependent variable. The dependent variables indicators include the stakeholder's perceptions on firm's performance in Net profit margins, amount of annual sales, and the level of market share and size of employees that depend on various independent variables indicators, which include waste management practices and energy usages practices. In this study the intervening variables include age of the firm and size of the SMEs. The size of SMEs was controlled by focusing only SMEs that have 10-99 employees. The SMEs year of operation was controlled by focusing on SMEs who have been in operation for 5 years and above.

# CHAPTER THREE
# RESEARCH METHODOLOGY

## 3.1 Introduction

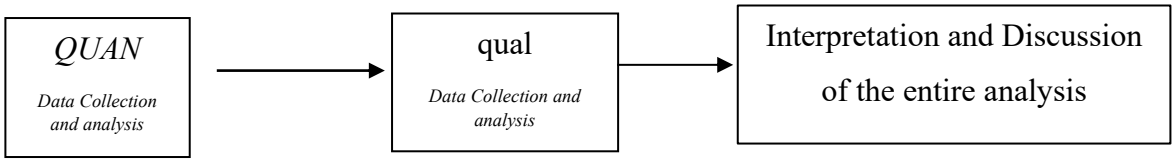
This chapter presents research design and procedures that were used to carry out the study. The chapter highlights the research design, the location of the study and the population that was studied. It also presents the sampling procedures and sampling size, data collection procedures and instrument, ethical consideration and data analysis.

## 3.2 Research Design

The study employed explanatory sequential mixed method research design (figure 2). The design incorporated quantitative (cross sectional survey) and qualitative research designs. The design was chosen because it provides a better understanding of the research problem by enabling data triangulation, allowing qualitative data to complement and explain trends in the quantitative data (Creswell & Creswell, 2018; Doyle et al., 2009). Additionally, the approach allowed cross-validation of results where the qualitative data allows researchers to explore people's views in greater depth (Molina-Azorin, 2016; Monday, 2020).

**Figure 2**

*Visual representation of the explanatory sequential mixed method research design.*




Source: Creswell and Creswell(2018)

This study started with the collection and analysis of quantitative data, which guided the development of the qualitative phase of the study. The weight was given to the quantitative data, and the mixing of the data occurred during the interpretation. This means that the quantitative and qualitative data was analyzed and presented separately in a results section and then merged the two sets of results together during the interpretation or discussion phase.

## 3.3 Location of the study

The study was conducted in Nakuru County (Appendix V). The County lies within the Great Rift Valley. The county covers an area of 7,495.1 Km² and is located between Longitude 35 º 28` and 35º 36` East and Latitude 0 º 13 and 1º 10` south. The county had a population of 2,162,202 in 2019, making it one of the five most populous counties in the country (Kenya National Bureau of Statistics [KNBS], 2019a). The county was among those with the highest number of single permits issued (KNBS, 2019b). This is an indication that the county has a

large number of small and medium-sized enterprises. Nakuru county also contributed 6.5% to the country's GDP (KNBS, 2019b) is which also an indication of a large number of SMEs.

### 3.4 Population of the Study

The target population is constituted of manufacturing SMEs proprietors, environmental officers in Nakuru County. The manufacturing SMEs were chosen because studies indicate that they collectively have negative effects on the environment as a result of their operational and business activities in comparison to larger enterprises. According to the Ministry of Industry, Trade, and Cooperation (2019), there were 400 registered manufacturing micro and SMEs in Nakuru County. The accessible population included SMEs proprietors of 94 manufacturing SMEs with 10-99 employees and those in operation for five years or more, as detailed in Appendix IV. This selection is in line with the Micro and Small Enterprise Act (2012), which defines small enterprises as employing 10-49 people, while medium enterprises, although not covered under the act, are reported to have 50-99 employees (Wairimu, 2015). Furthermore, SMEs that have been in operation for at least five years are more likely to possess well-established business processes, a loyal customer base, and reliable financial records (Redmond et al., 2008). This stability enables observed changes in economic performance to be more reliably attributed to the adoption of environmental management practices, rather than other factors linked to the volatility of newer businesses (Channarika & Serey, 2024). Furthermore, the accessible population also included six County Environmental Officer.

### 3.5 Sampling Procedure and Sample Size

Sampling is the process of selecting a subset of individuals from within a population to estimate the characteristics of whole population (Bellhouse, 2014). The sample size of the study was computed using the Taro Yamane /Micheal Slovin formula. The formula is considered a useful sampling formula for finite population (Yamane, 1967). Hence, it's appropriate for this study. The Taro Yamane formula is presented below.

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

Where;

n is the desired sample size

N is the target population size

E is the margin error which is often set at 5% level.

The sample size of this study was computed as follows;

$$n = \frac{94}{1 + 94\ (0.05)^2}$$

$$n = \frac{94}{1.2325}$$

$$n = 76$$

Therefore, the sample size for this study was 76 SMEs Proprietors

A proportionate stratified random sampling technique was used in the selection of the sample that took part in the study. The technique was utilized to improve the representativeness of the sample and also to reduces selection bias (Mathers et al., 2009). The SMEs were stratified based on the manufacturing sectors and the proportion of each sector was randomly selected from each stratum as shown in Table 2. The SME proprietor from each company in the sample responded to the questionnaire.

**Table 2**

*Sample Size based on SME manufacturing category*

| **Manufacturing Sector** | **Accessible Population** | **Sample Size** |
|---|---|---|
| Textile and Apparels | 3 | 2 |
| Paper and Board | 2 | 2 |
| Energy, Electrical and Electronics | 5 | 4 |
| Chemical and Allied | 6 | 5 |
| Building and Construction | 13 | 11 |
| Fresh Farm Produce | 2 | 2 |
| Food and Beverage | 21 | 17 |
| Metal and Allied | 22 | 18 |
| Plastic and Rubber | 2 | 2 |
| Carpentry | 11 | 9 |
| Leather | 3 | 2 |
| Animal Feeds | 4 | 3 |
| **Total** | **94** | **76** |

The SME proprietors were chosen for interviews through a simple random sampling method. This selection was made based on the analysis of survey data, specifically targeting those who reported having adopted environmental policy within their operations. Each identified SME/Owner manager questionnaire was given a unique number, and 30 respondents were selected using a table of random numbers. According to Thomson (2011), it is recommended to plan for 30 interviews to fully develop patterns, concepts, categories, properties, and dimensions of the given phenomena in research. Moreover, the sampling

technique was chosen because it improves the representativeness of the sample, and it reduces selection bias.

The Environmental officers in Nakuru County were also sampled purposively to participate in the study.

### 3.6 Instrumentation

The study utilized three instruments to collect data: the SMEs proprietor's questionnaire, the SMEs proprietors interview guide, and the County environmental officer interview guide, all developed by the researcher. The three tools were used because the study integrates both quantitative and qualitative approaches.

#### 3.6.1 SMEs Proprietors Questionnaire

The study primarily used one set of semi-structured questionnaires, which was self-administered to collect data from the SMEs proprietors. The questionnaire was appropriate for this study as it standardizes responses, ensuring consistency, reliability, and minimizing interviewer bias, which is crucial for structured data collection (Mathers et al., 2009). The questionnaire consisted of five sections and included both open-ended and closed-ended questions. Section A was used to collect demographic information of the respondents, Section B focused on SME characteristics, Section C gathered data on environmental management practices, Section D collected data on the SMEs' economic performance, and Section E addressed barriers to the adoption of environmental policies. Section A had 3 closed-ended and 1 open-ended item, Section B had 3 open-ended and 5 closed-ended items, and Section C had 2 open-ended and 2 closed-ended items. The closed-ended questions used a scale of 1-5, where 5 indicated "excellent," 4 indicated "good," 3 indicated "slightly poor", 2 indicated "poor," and 1 indicated "very poor." Section D had 5 closed-ended items on a Likert scale of 1 to 5, where 5 indicated "Strongly Agree," 4 indicated "Agree," 3 indicated "Slightly Disagree," 2 indicated "Disagree," and 1 indicated "Strongly Disagree". The open ended items were used to stimulate the respondents to cover the required areas of interest in depth while having the freedom of speech (R. B. Burns & Burns, 2008). The suitability of the semi-structured questionnaire in the study was based on its ability to collect both qualitative and quantitative data.

#### 3.6.2 SMEs Proprietors Interview Guide

Semi-structured interview is a qualitative data collection tool in which the researcher asks informants a series of predetermined but open-ended questions (Given,2008). The semi structured interviews schedule was appropriate for the study because it allows interviewers to freely introduce new questions or discard existing ones hence allowing new ideas to emerge

from the discussion (Ragab & Arisha, 2018). The interview guide was used to collect qualitative data from SMEs proprietors that provided additional explanation for the study's quantitative results. The guide entailed both structured and unstructured question components. It allowed a more detailed investigation on the following: the nature and extent of environmental policy adoption among manufacturing SMEs; the relationship between environmental management practices and economic performance of their companies; and the barriers for adopting the environmental policy in their companies.

### 3.6.3 County Environmental Officer Interview Guide

Interviews are purposive discussions between two or more people in which one party is the researcher and others are informants with critical information on the research phenomena (Ragab & Arisha, 2018). County Environmental Officer unstructured interview guide was used to collect qualitative data, which was used to support the study findings. The interview guide collected more data on the extent, nature and the barriers to the environmental policy adoption among the SMEs in Nakuru County. The interview guide was used to collect data from the environmental officer in the County. Interviews were appropriate for the study because it enabled the researcher to gain a rich picture of what is happening in a setting by talking at length and in detail to participants involved. The interview was also important for the study because it provided the researcher with specific information in relation to research phenomena.

### 3.6.3 Validity

Validity is the accuracy of the research instrument to measure what it claims to measure (Heale & Twycross, 2015). Validity is considered to increase transparency, reduce opportunities for research bias, ensure that the data are sound and replicable, and guarantee that the results are accurate (Mohajan, 2017; Mohamad et al., 2015). Content validity of the questionnaire, and interview guides were determined by submitting the tools for review and approval by the five policy and environmental sustainability experts in the Department of Curriculum Instruction and Education Management (CIEM). The suggestions provided were used to improve the instrument's accuracy.

### 3.6.4 Reliability

Reliability refers to the consistency of instruments in measuring the concepts being studied with accuracy and without random errors (Millsap & Maydeu-Olivares, 2009). The SME proprietors' questionnaire was piloted using 10% of the study's sample size. Piloting was conducted in Nairobi County, which was selected because both Nairobi and Nakuru Counties are among the largest cities in Kenya with the highest concentration of SMEs. As a result,

SMEs in these two counties are likely to share similar characteristics. Piloting helped the researcher to check the questionnaire's appropriateness based on aspects such language used and type of questions. After piloting, the data thereof was analyzed using Statistical Package for Social Sciences (SPSS) version 24x to estimate the reliability coefficient. The reliability of the questionnaire was estimated using Cronbach alpha coefficient. This method is used to test the internal consistency reliability of summated measurement scale (Lovelace & Brickman, 2013). Hence, it's appropriate for the study because the questionnaire consisted of multiple Likert scales of 5 points.

Cronbach alpha is an estimate of a scale's internal consistency by quantifying the homogeneity of the items that make up a summated scale. The homogeneity of items in a summated scale is characterized by positive correlations among the items, with a coefficient of 0.7 and above considered acceptable for surveys (Salkind, 2010). The questionnaire was administered to 11 manufacturing SMEs in Nairobi County. A coefficient of 0.870 was obtained which indicated that the research instrument was reliable.

### 3.7 Data Collection Procedure

Before data collection, a research permit was obtained from the National Commission for Science, Technology and Innovation (NACOSTI), after obtaining approval for data collection and introductory letter from the Egerton University Graduate School and Ethics committee. After obtaining the research permit, the researcher visited the County Commissioner's and the Deputy Commissioner offices to inform them of the intention to collect data. The researcher proceeded to identify the area chiefs who were requested to help in identifying the location of the manufacturing SMEs that might provide relevant information to the topic of the study. First, a face-to-face administering of questionnaires was conducted in each sampled SME with SME owner/manager being the respondent. This was done during the month of March 2023. After the collection and analysis of quantitative data, semi structured interviews were conducted among the SMEs proprietors during the month of May 2023. The researcher also visited the National Environmental Management Authority (NEMA) Nakuru County and requested an interview session with their departmental head.

### 3.8 Data Analysis

Data analysis commenced following the conclusion of data collection. Both quantitative and qualitative data were entered and cleaned into SPSS version 26 and MaxQDA 20 software's respectively. Outliers were removed from the dataset and the analysis was conducted on data drawn from 76 SME owners/managers. Quantitative data from the survey

was analyzed by employing descriptive statistics of frequencies, percentages and mean scores by use of SPSS software. The influence of environmental policy adoption on economic performance manufacturing SMEs was tested using linear regression. Hypotheses were tested at $\alpha = 0.05$ level of significance. The data gathered from the interview was analyzed through content analysis using MaxQDA software. Table 3 presents the summary of data analysis techniques.

**Table 3**

*Summary of data analysis*

| | **Research Objective** | **Independent Variable** | **Dependent Variable** | **Statistical test** |
|---|---|---|---|---|
| i. | To examine the stakeholders' perception on the nature of environmental management practices adopted among manufacturing SMEs in Nakuru County | | | Percentages, and content analysis |
| ii. | To examine stakeholders' perception on the extent of environmental management practices adopted among manufacturing SMEs in Nakuru County | | | Mean, Standard Deviation and content analysis |
| iii. | To determine the stakeholders' perception on the influence of the waste management practices adopted on economic performance of manufacturing SMEs in Nakuru County. | Stakeholders' perception on the influence of Waste management Practices | Economic performance of manufacturing SME in Nakuru County | Linear Regression and content analysis |

| | | | | |
|---|---|---|---|---|
| iv. | To determine the stakeholders' perception on the influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County | Stakeholders' perception on the influence of Energy efficiency Practices | Economic performance of manufacturing SMEs in Nakuru County | Linear Regression and content analysis |
| v. | To determine stakeholders' perception on the influence of environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County | Stakeholder perception on the influence of extent environmental management practices adoption | Economic performance of manufacturing SMEs in Nakuru County | Linear Regression and content analysis |

### 3.9 Ethical Consideration

Data collection exercise was preceded by the approval from the Egerton University Graduate School and Ethics committee that facilitated acquisition of research permit from NACOSTI. During data collection, the researcher solicited informed consent from the participants. This was captured at the introductory part of the SMEs proprietor's questionnaire. The confidentiality of participant information was strictly maintained, ensuring it was used solely for academic purposes. The researcher upheld integrity and respect throughout data collection, honoring participants' time, decisions, religion, gender, culture, and other differences.

# CHAPTER FOUR
# RESULTS AND DISCUSION

## 4.1 Introduction

This chapter entails the presentation of results of the study, which focused on the stakeholders' perceptions on the influence of adoption of environmental policy on economic performance of manufacturing SMEs in Nakuru County. The first part of the chapter presented demographics which include the study's response rate, details of the respondents and their firm's profile. The later parts of the chapter present the results on the descriptive and inferential statistics of the study as per the research objectives.

## 4.2 Demographics

This section presents respondents response rates and the characteristics of respondents and SMEs.

### 4.2.1 Participants Response Rate

The study had a sample size of 76 participants. The questionnaire was successfully administered to all 76 SMEs proprietors, all of whom responded. This implied a 100 percent response rate. Additionally, the study also included a sample of 30 SME proprietors and two county environmental officers for interviews. The SME proprietors' interview guide was conducted with 15 SME proprietors, and the county environmental officer interview guide was conducted with two environmental officers in Nakuru County. This implies a 50% response rate for SME owners/managers and a 100% response rate for environmental officers respectively. The 50% response rate was attributed to the reluctance of some of the SMEs to participate because they thought this information would be given to the government for taxation purposes. Despite this limitation, the collected data was deemed sufficient for analysis. According to Cooper and Schindler (2011) response rates of above 50% are acceptable to analyze and publication, with 60% considered good, 70% very good and above 80% excellent. Similarly, Mugenda and Mugenda, (2008) affirm that a response rate of 50% is adequate for analysis and reporting. Therefore, the data collected was utilized for further analysis

### 4.2.2 Characteristic of Respondents

Demographic data of the respondents as well as their enterprises was collected. Table 4 provides a summary of the results on the respondent's characteristics in terms of age, gender, tenure with the company, and their highest level of educational achievement.

**Table 4**

*SME Owner/Manager Characteristics*

| **Age of the Respondents** | **Age of Owner/ Manager** | **Percent** |
|---|---|---|
| | 18-29 Years | 14.5 |
| | 30-39 Years | 38.2 |
| | 40-49 Years | 28.9 |
| | 50+ Years | 18.4 |
| | **Total** | **100.0** |
| **Gender of Proprietors** | **Gender** | **Percent** |
| | Male | 80.3 |
| | Female | 19.7 |
| | **Total** | **100.0** |
| **Years Worked in the Firm** | **Years** | **Percent** |
| | 0-2 Years | 7.9 |
| | 3-5 Years | 38.2 |
| | 6-8 Years | 17.1 |
| | 9-11 Years | 11.8 |
| | 11+ Years | 25.0 |
| | **Total** | **100.0** |
| **Level of Education of respondents** | **Education Level** | **Percent** |
| | Primary School | 3.9 |
| | Secondary School | 19.7 |
| | TVET | 39.5 |
| | University | 36.8 |
| | **Total** | **100.0** |

Overall, the results in Table 4 indicate that the majority of the participants were aged between 30 - 39 years (38.2%) while the least percentage of the respondents were aged between 18-29 years (14.5%). In terms of gender, majority of SMEs proprietors surveyed were male (80.3 %) while women were 19.7 % of respondents.

Additionally, a predominant segment of participants (38.2%) reported tenure durations within their respective SMEs ranging from 3-5 years, while a smaller fraction of the respondents (7.9%) indicated their working durations within the range of 0-5 years. In terms of the level of education, a substantial percentage of respondents (39.5%) achieved their highest

level of education through Technical and Vocational Education and Training (TVET), while a minimal fraction of the respondents (3.9%) indicated that their highest level of education was primary school.

### 4.2.3 SMEs Characteristics

The research also collected demographic information about the characteristics of manufacturing SMEs. The results on the years of operation and the type of manufacturing sector are presented in Table 5.

**Table 5**

*Types of Manufacturing Enterprises and Years of Operation*

| | **Manufacturing Sector** | **Percent** |
|---|---|---|
| **SMEs Manufacturing Sector** | Textile and Apparels | 2.6 |
| | Paper and Board | 1.3 |
| | Energy, Electrical and Electronics | 3.9 |
| | Chemical and Allied | 6.6 |
| | Building and Construction | 13.2 |
| | Fresh Farm Produce | 1.3 |
| | Food and Beverage | 22.4 |
| | Metal and Allied | 23.7 |
| | Plastic and Rubber | 2.6 |
| | Carpentry | 11.8 |
| | Others | 10.5 |
| | **Total** | **100.0** |
| **SMEs years of operation** | **Years** | **Percent** |
| | 5-10 Years | 48.7 |
| | 11-15 Years | 21.1 |
| | 16-20 Years | 15.8 |
| | Above 20 Years | 14.5 |
| | **Total** | **100.0** |

The results in Table 5 indicate that the highest proportion of manufacturing SMEs are in the metal and allied sector (23.7%) while the least number of SMEs were from paper and board sector (1.3%) and fresh farm produce (1.3%). Additionally, the majority of the surveyed SMEs have been in business for a period spanning 5 - 10 years (48.7%) while only 14.5% of these SMEs have been in operation for over 20 years.

### 4.2.4 Number of Employees among SMEs

The study also examined the number of employees in the surveyed SMEs, including both temporary and permanent employees. Detailed results are presented in Table 6.

**Table 6**

*Number of Employees among Manufacturing*

| | **Temporary Staff** | **Permanent employees** |
|---|---|---|
| **Number of Employees** | **Percent** | **Percent** |
| 0-10 | 73.7 | 51.3 |
| 11-20 | 19.7 | 28.9 |
| 21-30 | 2.6 | 11.8 |
| 31-40 | 2.6 | 1.3 |
| 41-50 | 0 | 1.3 |
| Above 50 | 1.3 | 5.3 |
| **Total** | **100.0** | **100.0** |

The results revealed that most of the SMEs (73.7%) surveyed indicated that they employ approximately 0-10 temporary employees, while only 1.3% of the surveyed SMEs indicated they employ more than 50 temporary employees. Additionally, Table 6 indicates that the majority of the surveyed SMEs (51.3%) employ approximately 0 - 10 permanent staff, while 1.3% of SMEs employ between 31-50 permanent staff.

**Discussion of the Demographic Results**

The finding on SMEs proprietors' age group in Table 4 indicates that the majority of the respondents were aged between 30-39 Years (38.2%). This can be is attributed to the fact that the prevalence of early stage entrepreneurial activity tends to be relatively low in the 18-24 age categories, it peaks in the 25-34 year old category and then declines with increase in age with the sharpest decrease after the age of 54 (Lévesque & Minniti, 2006). Additionally, this study found that majority of sampled SMEs proprietors were male as shown in Table 4. This finding is consistent with other studies on ownership of SMEs in the manufacturing Sector. According Mugyenyi et al. (2020), companies in the manufacturing sector are predominately male owned and staffed across all its fourteen manufacturing subsectors except for the chemical and allied subsector. This is attributed to women lacking adequate science, technology, engineering and mathematics (STEM) skills, which limits their opportunities to fully participate in the manufacturing sector (Kuschel et al., 2020). This study finding can also be attributed to legal, socioeconomic and cultural discriminatory gender norms and practices

in Kenya, which limits women participation in entrepreneurship compared to men (Farah, 2014).

The findings in Table 4 also highlight that most SME owners/managers have worked within the sampled enterprises for 3-5 years. This implies that most SMEs have been in operation for five years or less, as SME owners/managers are typically the founders and major decision-makers within the firms. This is supported by findings from the Kenya Bankers Association (KBA) (2021), which reported that most SMEs in the country are young start-ups, with 53% having been in operation for less than five years. The results in Table 5 on the type of SMEs indicate that majority of manufacturing SMEs are in the metal and allied sector (23.7%) and food and beverages (22.4%). This finding can be attributed to the recognition that metal works have gained prominence because of its pivotal role in producing farming-related machinery in rural areas. Also the surge in construction activities across the country further fueled the demand for metal works, amplifying its significance within the informal manufacturing sphere (Were, 2016). This surge is driven by increase in the infrastructure development and housing projects within the country (Agayi & Karakayacı, 2020). Additionally, Kenya's national development blueprints, including Vision 2030 and the Big Four Agenda, place significant emphasis on manufacturing as a key driver of economic growth and job creation. Within these frameworks, there is a specific recognition of the pivotal role of agro-processing, agricultural value addition, and food manufacturing in fostering industrial development. As a result, there has been a concerted effort to promote and support ventures in these sectors (Oduor, 2021).

In terms of years of operation, the results in Table 5 indicate that majority of SMEs have been in operation between 5-10 Years (48.7%) and 14.5% SMEs have been in operation for over 20 years. This finding suggests that many businesses experience a peak around the fifth year of operation. However, beyond this point, entrepreneurs often encounter burnout. This phenomenon encompasses a decline in enthusiasm and motivation, potentially stemming from the challenges and demands of sustaining and growing the business over time (Bowen et al., 2009). The notion of entrepreneurial burnout correlates with the perception among some entrepreneurs that their businesses, particularly those exceeding the 5 -10 year threshold, are on a trajectory toward failure. Longenecker et al. (2006), discuss this phenomenon, suggesting that burnout may prompt entrepreneurs to lose interest in their current ventures and seek alternative opportunities.

In terms of the number of employees, the results indicated that 73.7% of surveyed SMEs indicated that they employ approximately 0-10 temporary employees. This implies that

these SMEs likely face fluctuating operational demands or project-based work that necessitates flexible staffing arrangements to manage costs and maintain agility (Anwar & Shah, 2021; Franco et al., 2016). Additionally, the results indicate that the majority of the surveyed SMEs (51.3%) employ approximately 0-10 permanent staff. This implies that these SMEs may prioritize cost-effective staffing solutions and maintain lean organizational structures to optimize resource allocation and adaptability in a dynamic business environment (Perera & Baker, 2007).

### 4.3 Stakeholders' Perceptions on the Nature of Environmental Management Practices Adopted among Manufacturing SMEs in Nakuru

The first objective of the study was to examine the nature of the environmental management practices adopted among manufacturing SMEs in Nakuru County. The objective focused on the; SMEs compliance with energy and environmental policies, types of waste SME's produce and how each type of waste is managed. This objective further focused on the perceptions of SMEs proprietors regarding the selected nature of EMPs.

#### 4.3.1 SMEs Compliance with Energy and Environmental Related Policies

Firms were consulted regarding their compliance with environmental and energy policies, specifically the EMCA of 1999 (amended in 2015), NEMA regulations, and The Energy Act of 2006 (CAP 314) and its regulations. The summary of the results is shown in Table 7.

**Table 7**

*SMEs conformity with Energy and Environmental related policies*

| **SMEs conformity with Environmental related policies and regulations** | **Responses** | **Percent** |
|---|---|---|
| | Yes | 96.1 |
| | No | 3.9 |
| | **Total** | **100.0** |
| **SMEs conformity with Energy policies and regulations** | **Responses** | **Percent** |
| | Yes | 94.7 |
| | No | 5.3 |
| | **Total** | **100.0** |
| **SMEs Environmental Policy Adoption** | **Responses** | **Percent** |
| | Yes | 97.4 |
| | No | 2.6 |
| | **Total** | **100.0** |

| Formalization of Environmental Policies | Responses | Percent |
|---|---|---|
| | Formal | 63.2 |
| | Informal | 36.8 |
| | **Total** | **100.0** |

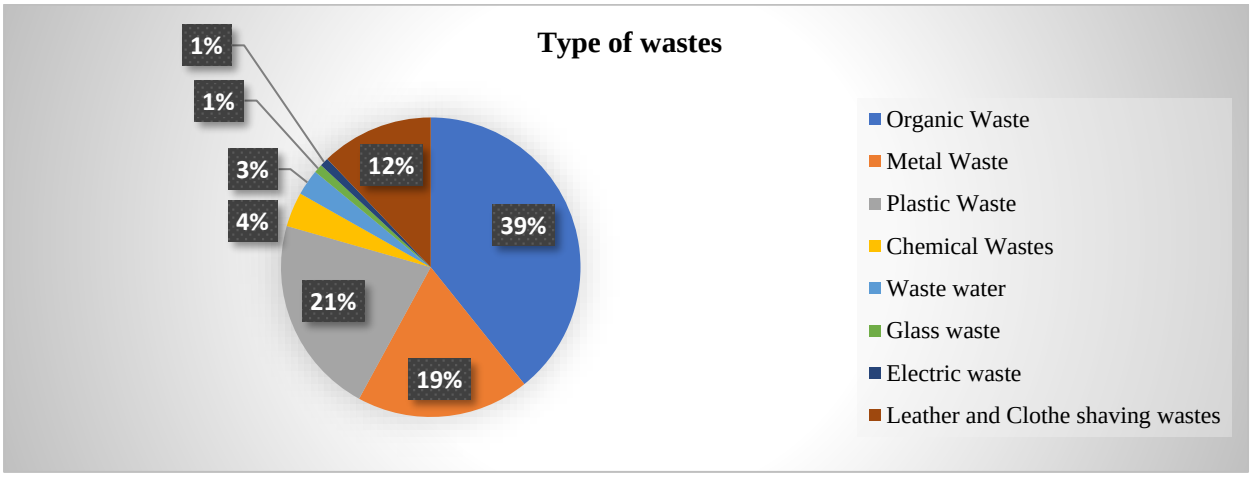
The results in Table 7 indicate that a majority of SMEs comply with both environmental policies (96.1%) and energy policies (94.7%). A small percentage of SMEs, on the other hand, report non-compliance with environmental policies (3.9%) and energy policies (5.3%). Additionally, the results reveal that a majority of SMEs have indeed adopted environmental policies (97.4%), with only a small minority of SMEs (2.6%) indicating non-adoption. Table 5 also indicates a majority of these SMEs have formalized such policies (63.2%), while a notable portion (36.8%) have not formalized them.

### 4.3.2 Type of Wastes

The study aimed to identify the specific types of waste generated during manufacturing processes and to determine the waste management practices used by the surveyed SMEs. Figure 3 presents a summary of the results on the types of waste produced.

**Figure 3**

*Type of waste produced by Manufacturing SMEs*




The results revealed that 39% of the SMEs surveyed generate organic waste while one percent indicated they produce glass waste and wastewater. This is because SMEs from the food and beverage sector constituted a relatively significant portion of the surveyed SMEs as shown in Table 4.

### 4.3.3 How the Waste Produced is Managed

The study evaluated the management practices employed on the specific types of waste generated during operational processes. The results are present in Figure 4.

**Figure 4**

*Frequency of Waste Management Practices among Manufacturing SMEs in Nakuru County*

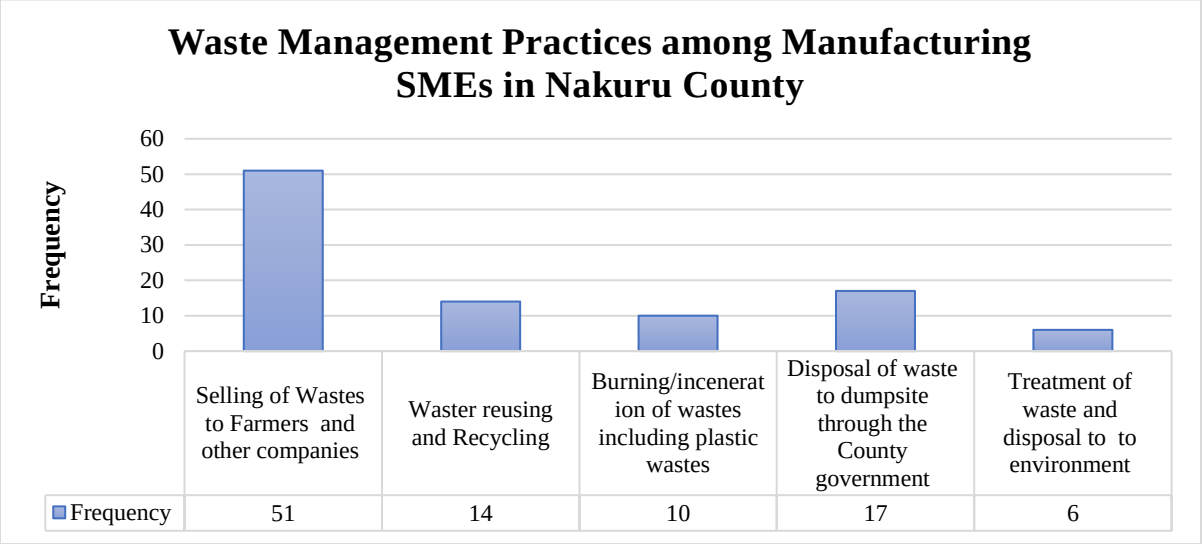



Figure 4 indicates that the majority of SME owners/managers indicated that they manage their waste by selling it to farmers or other companies (51 SMEs/owners/managers). The findings also highlight that 6 SMEs indicated that they treated waste and disposed of it into the environment

### 4.3.4 Stakeholders' Perceptions on the Nature of Environmental Management Practices Adopted

To further measure the first objective, respondents were asked to rate how they perceive the 11 items on the nature of EMPs adopted within their firms. This was done on a scale of 1 (strongly disagree) to 5 (strongly agree). The results are presented in Table 8.

**Table 8**

*Nature of environmental management practices adopted by manufacturing SMEs in Nakuru County*

| Nature of EMPs | Strongly Disagree % | Disagree % | Slightly Disagree % | Agree % | Strongly Agree % | Total % |
|---|---|---|---|---|---|---|
| EMPs adopted to appeals new customers | 0.0 | 6.6 | 10.5 | 52.6 | 30.3 | **100.0** |
| EMPs adopted to improve firms' image | 0.0 | 9.2 | 6.6 | 51.3 | 32.9 | **100.0** |
| EMPs adopted to attract competitive employees | 5.3 | 32.9 | 11.8 | 35.5 | 14.5 | **100.0** |
| EMPs adopted motivates employees | 7.9 | 30.3 | 14.5 | 39.5 | 7.9 | **100.0** |
| EMPs adopted to improve the quality of products | 1.3 | 11.8 | 5.3 | 50.0 | 31.6 | **100.0** |
| EMPS adopted to lower environmental risks in our operation | 0.0 | 2.6 | 36.8 | 60.5 | 0.0 | **100.0** |
| EMPs adopted lower insurance premiums | 21.1 | 39.5 | 14.5 | 15.8 | 9.2 | **100.0** |
| EMPs adopted to lower taxes | 31.6 | 40.8 | 10.5 | 13.2 | 3.9 | **100.0** |
| EMPs adopted to enable access to financial incentives | 14.5 | 35.5 | 13.2 | 30.3 | 6.6 | **100.0** |
| EMPs adopted to save cost of production | 1.3 | 14.5 | 2.6 | 47.4 | 34.2 | **100.0** |
| EMPS adopted to create firm's product export opportunities | 7.9 | 43.4 | 14.5 | 23.7 | 10.5 | **100.0** |

The findings reveal that a majority of respondents (60.5%) agreed that they adopt EMPs to lower environmental risks in their operations. Additionally, 52.6% of the respondents agreed that they employ EMPs to appeal to new customers. Furthermore, 51.3% agreed that they use EMPs to enhance their firms' image among customers, while 47.4% agreed on using EMPs to reduce production costs. Contrastingly, 43.4% of respondents disagreed with the statement that EMPs are employed to create opportunities for enterprises to export their products, and 40.8% disagreed with the statement that they use EMPs to lower taxes.

### 4.4 Stakeholders' Perceptions on the Extent of Environmental Management Practices Adopted among Manufacturing SMEs in Nakuru County

The study's second objective focused on the stakeholders' perceptions of the adopted environmental management practices by manufacturing SMEs in Nakuru County. The environmental management practices included the extent of energy efficiency and waste management practices adopted.

#### 4.4.1 Stakeholders' Perceptions on the Extent of Energy Efficient Practices Adopted among Manufacturing SMEs in Nakuru County

The study examined the stakeholder's perceptions on the extent to which the SMEs have adopted energy efficiency practices. On a scale of 1 (very poor) to 5 (excellent), the SMEs proprietors were asked to rate the extent to which they have adopted the selected energy efficiency practices within their operation. The results are presented in Table 9.

**Table 9**

*Extent of energy efficient practices adopted among manufacturing SMEs in Nakuru County*

| Items | N | Mean | Std. Deviation |
|---|---|---|---|
| Efficient Use of Bulbs | 74 | 4.58 | .574 |
| Employees Education on energy efficient | 74 | 3.82 | 1.101 |
| Proper maintainace of equipment | 74 | 4.55 | .600 |
| Use of energy efficient equipments | 74 | 4.32 | .760 |
| Having a responsible officer for energy | 74 | 3.19 | 1.279 |
| Turning off-lights when not in use | 74 | 4.57 | .575 |
| Use Solar light | 74 | 2.35 | 1.339 |
| Insulation of equipment | 74 | 4.16 | .844 |
| Use of efficient machinery | 74 | 4.43 | .599 |
| Conducting energy audits | 74 | 2.95 | 1.344 |
| **Overall** | **74** | **3.89** | **0.434** |

The results indicate that the highest ranked item in energy efficiency category was use of energy efficient bulbs (M = 4.58, SD = 0.574) and turning of lights when not in use (M=4.57, SD =0.575), followed by proper maintenance of equipment (M = 4.55, SD = 0.600). The least ranked energy efficiency practice was the use of solar light (M = 2.35, SD =1.339). This implies that traditional energy-saving measures are highly preferred, indicated by a higher mean, while the adoption of solar lighting is less prevalent, as indicated by a lower mean.

### 4.4.2 Stakeholders' Perceptions on the Extent of Waste Management Practices Adoption Among Manufacturing SMEs In Nakuru County

The study examined the stakeholders' perceptions on the extent to which the SMEs have adopted waste Management Practices. On a scale of 1 (very poor) to 5 (excellent), the SMEs proprietors were asked to rate the extent to which they have adopted waste Management Practices with their operation. The results are presented in Table 10.

**Table 10**

*Extent of waste management practices adopted among manufacturing SMEs in Nakuru County*

| Items | N | Mean | Std. Deviation |
|---|---|---|---|
| Purchase of raw material that can be reused or recycled | 74 | 3.96 | .913 |
| Staff training in good waste management | 74 | 3.91 | .968 |
| Waste separation | 74 | 4.20 | .891 |
| Packing with biodegradable materials | 74 | 3.18 | 1.318 |
| Onsite waste Recycling (on firm) | 74 | 3.58 | 1.292 |
| Offsite waste recycling (away from the firm) | 74 | 3.20 | 1.260 |
| Reducing machinery downtime | 74 | 4.18 | .783 |
| Regular and routinely Preventive Maintenance | 74 | 4.54 | .553 |
| Selling waste to other organizations | 74 | 4.23 | 1.067 |
| **Overall** | **74** | **3.89** | **.444** |

The results in Table 10 indicate that the highest ranked item in adoption of waste management category was regular and routine maintenance of equipment (preventative maintenance) (M = 4.53, SD = 0.555). This is followed by selling waste to other organizations (M= 4.23, SD = 1.067), reducing time for firm machinery not in use (M= 4.16, SD = 0.784) and Waste separation (M= 4.20, SD = 0.891). The least ranked waste management practice was packing with biodegradable materials (M = 3.18, SD=1.318). The higher mean value indicates a preference for maintenance and operational efficiency practices over the use of biodegradable packaging in waste management, which is indicated by the lower mean value.

### 4.4.3 Stakeholders' Perceptions on the Extent of Environmental Management Practices Adoption Among Manufacturing SMEs In Nakuru County as Perceived by Stakeholders

Table 11 presents result on stakeholders' perceptions on the extent to which the SMEs have adopted environmental management practices.

**Table 11**

*Extent of Environmental management practices adopted among manufacturing SMEs in Nakuru County check line spacing*

| Item | N | Mean | Std. Deviation |
|---|---|---|---|
| Energy Efficiency Practices | 74 | 3.89 | 0.434 |
| Waste Management Practices | 74 | 3.89 | 0.444 |
| Environmental Management Practices | 74 | 3.89 | 0.363 |

The results in Table 11 indicate that manufacturing SMEs in Nakuru County have adopted environmental management practices to a relatively above average within their operations, as shown by a mean of 3.89 out of a maximum of 5 and a standard deviation of 0.363.

## 4.5 Hypotheses Testing

This section presents the results of the study's hypothesis. They include the following Ho1: There is no statistically significant influence of the waste management practices adopted on economic performance of manufacturing SME in Nakuru County as perceived by stakeholders. Ho2: There is no statistically significant influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders. Ho3: There is no statistically significant management practices adopted on economic performances of manufacturing SMEs in Nakuru County as perceived by stakeholders.

Before the analysis was done, an exploratory factor analysis (EFA) was conducted. This was to reduce the extensive questionnaire items associated with economic performance variables, namely Net Profits, Sales Growth, Market Share, and Number of Employees, to form super-ordinate variables in form of factor scores that were used for regression analysis.

### 4.5.1 Exploratory Factor Analysis (EFA)

EFA serves as a methodology that is often employed to determine the nature of the constructs or factors influencing a set of responses and reduce the data set to a small number

of factors (DiStefano et al., 2019). EFA is considered to place together closely related individual items to form a theoretical concept or factor, to detect simple patterns in more complex pattern of relationships among variables. Additionally, the factor scores generated from EFA are most commonly used for further statistical analyses in place of measured variables, especially when numerous outcome scores are available (Odum , 2011). Hence, the justification for using factor analysis in this study. A principal component analysis (PCA), with subsequent varimax rotation, was undertaken on a Likert scale comprising of 22 items. These items measured the economic performance of manufacturing SMEs in Nakuru County, focusing on metrics such as Net Profits, Sales Growth, Market Share, and Number of Employees.

**Exploratory Factor Analysis Assumptions**

EFA relies on several assumptions to ensure the validity and reliability of its results. This includes sampling adequacy whereby the sample should be large enough to yield reliable estimates of the correlations among the variables. This also includes presence of linear relationships among the pairs of variables (Burns & Burns, 2008). To fulfil the first assumption, Kaiser-Meyer-Olkin (KMO), should be value greater than 0.5 indicating that the factor analysis is satisfactory.

Additionally, Bartlett's Test, which is a measure of the overall correlation between the items should be significantly correlated with each other, that is the associated probability is less than 0.5, indicating that the variables do have some correlation hence EFA analysis to proceed (Shrestha, 2021). Table 12 provides the summary findings of the assumption for performing the EFA.

**Table 12**

*Kaiser-Meyer-Olkin and Bartlett's Test*

| **KMO and Bartlett's Test** | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .621 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 615.517 |
| | df | 231 |
| | Sig. | .000 |

The results of the Kaiser-Meyer-Olkin (KMO) and Bartlett's test in Table 11, indicates the KMO measure yielded a value of 0.621 which greater than 0.5, indicative of acceptable sampling adequacy, and Bartlett's test demonstrated statistical significance with a p-value of

0.000. Therefore, these outcomes suggest correlations among the variables under consideration. This implied the EFA assumptions were met.

**Correlation Matrix and Factor Loading**

A factor analysis typically begins with a correlation matrix, which shows the intercorrelation between all variables in the study. Moreover, there should be some significant correlations of 0.30 or above in the correlation matrix (R. B. Burns & Burns, 2008). The produced correlation matrix for this study showed how each of the 22-likert scale items is associated with each other. Appendix 1 indicates numerous correlations exceeded a threshold of 0.30. This indicates that items were associated and will probably be grouped together by the factor analysis.

Factor loading is the second step of the factor analysis, which entails the correlation between a variable and the factors that have been extracted from the data. This can be shown through communality results, which is the proportion of variance in that variable that can be explained by the common factors. Variables with high values of above 0.30 are well represented in the common factor space, while variables with low values are not well represented and should be removed from further steps of factor analysis (Antonio, 2011; Shrestha, 2021). Table 13 presents the commonality results.

**Table 13**

*Commonalities Table*

**Communalities**

| | Initial | Extraction |
|---|---|---|
| Increase revenue | 1.000 | .674 |
| Reduced operation expenses | 1.000 | .641 |
| Reduced taxes | 1.000 | .674 |
| Reduced compliance cost | 1.000 | .645 |
| reduced cost of goods | 1.000 | .638 |
| Before Sales was performing well | 1.000 | .597 |
| Before not performing well | 1.000 | .515 |
| After sales increased significantly | 1.000 | .809 |
| After Sales remained the same | 1.000 | .589 |
| After Sales reduced significantly | 1.000 | .724 |
| Before performing well than competitors | 1.000 | .710 |
| Before not performing well than competitors | 1.000 | .617 |

| | | |
|---|---|---|
| After sales increased compared to competitors | 1.000 | .707 |
| Cost of production declined | 1.000 | .642 |
| Before market size was large compared to competitors | 1.000 | .630 |
| Before market size small compared to competitors | 1.000 | .767 |
| After market size increased significantly compared to competitors | 1.000 | .756 |
| reputation improved | 1.000 | .736 |
| Prior More temporary staff | 1.000 | .677 |
| Prior more permanent staff | 1.000 | .654 |
| After more permanent staff | 1.000 | .604 |
| Still temporary Staff | 1.000 | .856 |

Extraction Method: Principal Component Analysis.

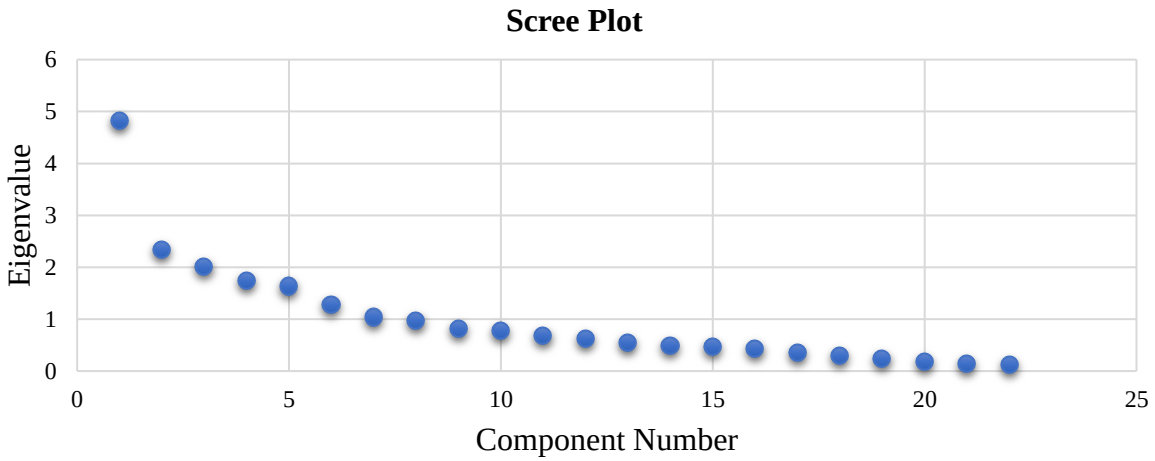
Results in Table 13 indicate that commonalities varied from 0.856 - 0.515. This means that the variables have high values, indicating that they were well represented in the common factor space.

**Factors Extracted and Naming of Factors**

Most PCA often produces a large number of factors where in most cases it produces as many theoretical underlying dimensions as there were original variables. However, these myriad factors would not help to explain as much variation as possible in scores across the items (variables) with a few underlying factors. Therefore, to determine how many dimensions to retain for further analysis, Kaiser's rule was applied (R. Burns & Burns, 2008). This rule suggests that only factors having eigenvalues (latent roots) greater than 1 are considered as common factors. Figure 5 illustrates the common factors extracted for subsequent analysis.

**Figure 5**

*Scree plot Indicating Factors Extracted*



Results from Figure 5 highlight that seven factors were extracted. Additionally, all the seven factors have their eigenvalues more than 1. This means that these factors contain the same amount of information as a single variable or items of the likert scale.

To further discuss the extracted factors, Table 14 shows all the factors extractable from the analysis along with their eigenvalues, the percentage of variance attributable to each factor, and the cumulative variance of the factor and the previous factors.

**Table 14**

*Total Variance Explained*

| Total Variance Explained | | | | | | |
|---|---|---|---|---|---|---|
| **Component** | **Initial Eigenvalues** | | | **Rotation Sums of Squared Loadings** | | |
| | **Total** | **% of Variance** | **Cumulative %** | **Total** | **% of Variance** | **Cumulative %** |
| 1 | 4.823 | 21.922 | 21.922 | 3.438 | 15.628 | 15.628 |
| 2 | 2.332 | 10.601 | 32.523 | 2.332 | 10.601 | 26.229 |
| 3 | 2.011 | 9.141 | 41.664 | 2.249 | 10.222 | 36.451 |
| 4 | 1.740 | 7.909 | 49.574 | 2.209 | 10.042 | 46.492 |
| 5 | 1.634 | 7.428 | 57.002 | 1.809 | 8.221 | 54.714 |
| 6 | 1.283 | 5.833 | 62.835 | 1.497 | 6.804 | 61.518 |
| 7 | 1.040 | 4.728 | 67.563 | 1.330 | 6.045 | 67.563 |

Extraction Method: Principal Component Analysis.

Results from Table 14 indicated that there are 7 extracted factors with eigenvalues greater that one. factor 1 = 4.823, factor 2= 2.332, factor 3 = 2.01, factor 4= 1.740, factor 5 = 1.634, factor 6 = 1.283, and factor 7 = 1.040. Additionally, the results indicate that the first factor explains 21.92% of the total variance, the second explains 10.601, third 9.141, forth 7.909 fifth 7.428, sixth 5.833 and seventh 4.728 and a total of 67.563 of the total variances. Thus, 7 factors are effective enough in representing all the characteristics or components.

Factors are only as good as the variable or item list that produced them, i.e. factors that emerge can only be based on the variables that went and this facilitates the naming of the factors (R. B. Burns & Burns, 2008). In this regard, Table 15 shows the loadings (extracted values of each item under 7 variables) of the 22 items on the 7 factors extracted.

**Table 15**

*Rotated Component Matrix*

| Rotated Component Matrix[a] | | | | | | | |
|---|---|---|---|---|---|---|---|
| | Component | | | | | | |
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Increase revenue | | .587 | | .454 | | | |
| Reduced operation Expenses | | | | .750 | | | |
| Reduced Taxes | | .767 | | | | | |
| reduced compliance cost | .336 | .649 | | | | | |
| Reduced cost of goods | | | | .716 | | | |
| Before sales was performing well | | .338 | .674 | | | | |
| Before sales not performing well | .617 | | | | | | |
| After sales increased significantly | .648 | .485 | | .371 | | | |
| After Sales remained the same | | -.321 | .614 | | | | |
| After sales reduced significantly | | | .788 | | | | |
| Before per forming well than competitors | | | .636 | | .317 | -.369 | |
| Before not performing well than competitors | .728 | | | | | | |
| After sales increased compared to competitors | .590 | .406 | | .327 | | | |
| Cost of production declined | | .398 | | | | .599 | |
| Before market size was large compared to competitors | | | | | .703 | | |
| Before market size small compared to competitors | .863 | | | | | | |
| After market size increase significantly compared to competitor | .747 | | | | | | .324 |
| Reputation improved | | | | | | | .818 |
| Prior More temporary staff | | | | | .675 | | |
| Prior more permanent staff | | | | | .754 | | |
| After more permanent staff | | | | .619 | | | .415 |
| Still temporary staff employed | | | | | | .882 | |

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.[a]

a. Rotation converged in 10 iterations.

Following rotation, factor 1 = sales-related items (was loaded on 7 items as shown in Table 14) and accounted for 15.6% variance (Table 13), Factor 2 = net profits related items (was loaded on 8 items) and accounted for 10.60% of variance. Factor 3 = sales growth related items (was loaded on 4 items) and accounted for 10.22% of the variance. Factor 4 = net profit related items (was loaded on 5 items) and accounted for 10.04 % of the variance. Factor 5 = market share (was loaded on 5 items) and accounted for 8.22% of the variance. Factor 6 = number of employees related items (was loaded on 3 items) and accounted for 6.80 % of the variance. Lastly, Factor 7 = market share related items (3 items) and accounted for 6.04 % of the variance.

**Computing and Usage of Factor Scores**

In terms of computing and usage factor scores, the computed factor scores for each of the seven factors were used as the outcome variable, economic performance of the manufacturing SMEs. The factor scores were produced as new variables in the data view screen in SPSS listing the factor scores for each case on theselected factors.

The estimate factor scores for each individual factors were added together to generate a composite factor score that was used in the subsequent regression analysis. The scores had a mean of 3.0227 and standard deviation of 0.25528. According to DiStefano et al. (2019), sum score method is most desirable because it preserves the variation in the original data. The generated composite factor scores were produced as a variable in the SPSS interface and were used for the regression analysis.

### 4.5.2 Stakeholders' Perceptions on the Influence of Waste Management Practices Adopted on Economic Performance of Manufacturing SMEs in Nakuru County.

Objective three of the study was to determine the stakeholders' perceptions on the influence of the adoption of waste management practices on economic performance of manufacturing SMEs in Nakuru County. The corresponding hypothesis stated that there is no statistically significant influence of the waste management practices adopted on economic performance of manufacturing SME in Nakuru County as perceived by stakeholders.

A linear regression analysis was conducted. The descriptive statistics results of study variables for the analysis are presented Table 16.

**Table 16**

*Mean and Standard deviation of waste management practices adopted and factor scores*

| Descriptive Statistics | | | |
|---|---|---|---|
| | **Mean** | **Std. Deviation** | **N** |
| Factor Score (Economic Performance) | 3.02 | .255 | 74 |
| Waste Management Practices Adopted | 3.89 | .444 | 74 |

Table 16 presents the descriptive results of the factor scores for economic performance and the waste management practices adopted. The factor score for economic performance has a mean of 3.02 (SD = 0.255), while the waste management practices adopted have a higher mean of 3.8904 (SD = 0.444).

To adequately assess the stakeholders' perceptions of the influence of the adopted waste management practices on the economic performance of manufacturing SMEs in Nakuru County, simple linear regression was employed. Before conducting the linear regression analysis, several assumptions had to be fulfilled, including linearity, normality of variables, and homoscedasticity. The assumption of linear relationships states that the relationship between independent and dependent variables must be linear (Flatt & Jacobs, 2019).

The assumption of linearity was tested first by examining the correlation of the dependent variable against the independent variable, as presented in Table 17.

**Table 17**

*Correlations of dependent and independent variable*

| Correlations | | | |
|---|---|---|---|
| | | **Factor Score (Economic Performance)** | **Extent of the Waste Management Practices Adopted** |
| Pearson Correlation | Factor Score (Economic Performance) | 1.000 | .199 |
| | Waste Management Practices Adopted | .199 | 1.000 |
| Sig. (1-tailed) | Factor Score (Economic Performance) | . | .045 |
| | Waste Management Practices Adopted | .045 | . |

Table 17 indicates a linear relationship between stakeholders' perception of the influence of the adopted waste management practices and the economic performance of manufacturing SMEs in Nakuru County. Hence, the linearity assumption was met.

Assumptions of normality state that the distribution of the test is normally distributed or bell-shaped with a mean of 0, a standard deviation of 1, and a symmetric bell-shaped curve (Flatt & Jacobs, 2019). However, Smith (2012) cautions against using stem-and-leaf plots and histograms. A histogram is not a good way to check for normality because different intervals influence the shape of the graph. Additionally, stem-and-leaf plots, excellent for displaying small data sets in detail, can become cluttered and less readable with larger data sets.

In this regard, the P-P plot was utilized, which compares the observed cumulative distribution function (CDF) of the standardized residual to the expected CDF of the normal distribution. Additionally, for a distribution to be considered normal, it is expected that the points cluster around the horizontal line within the graph (Schreiber-Gregory & Bader, 2018). The P-P plot is presented Figure 6.

**Figure 6**

*Normal P – P Plot of Regression Standardized Residuals*

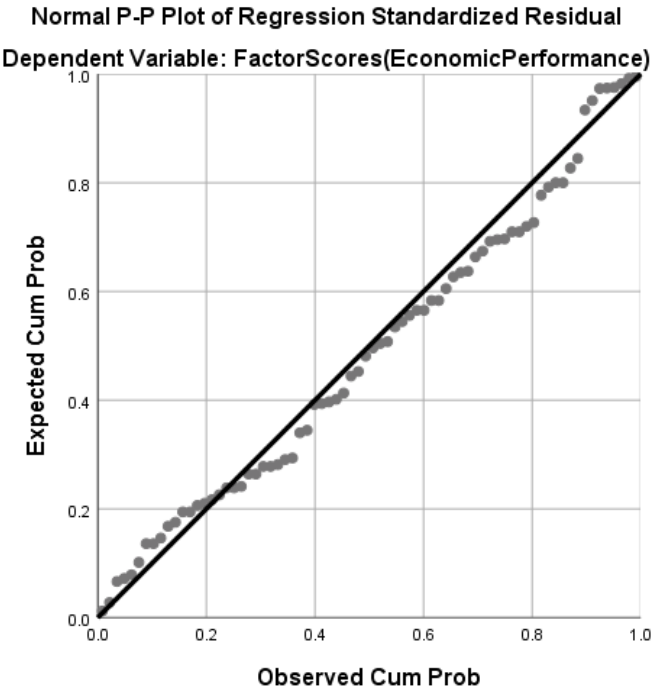



Figure 6 indicates that the residuals approximately followed a normal distribution; hence, the assumption of normality was met.

Homoscedasticity is an assumption of equal or similar variances in different groups being compared. In a scatterplot showing homoscedasticity, the points should roughly form a band or cloud around the line of zero residual (the horizontal line at y = 0). This indicates that the spread of residuals is relatively consistent across different levels of the predicted values (Peterson, 2018). The assumption of homoscedasticity was tested using a scatterplot of residuals and results presented in Figure 7**.**

**Figure 7**

*Scatterplot Showing Test of Homoscedasticity in the Economic performance of SMEs*

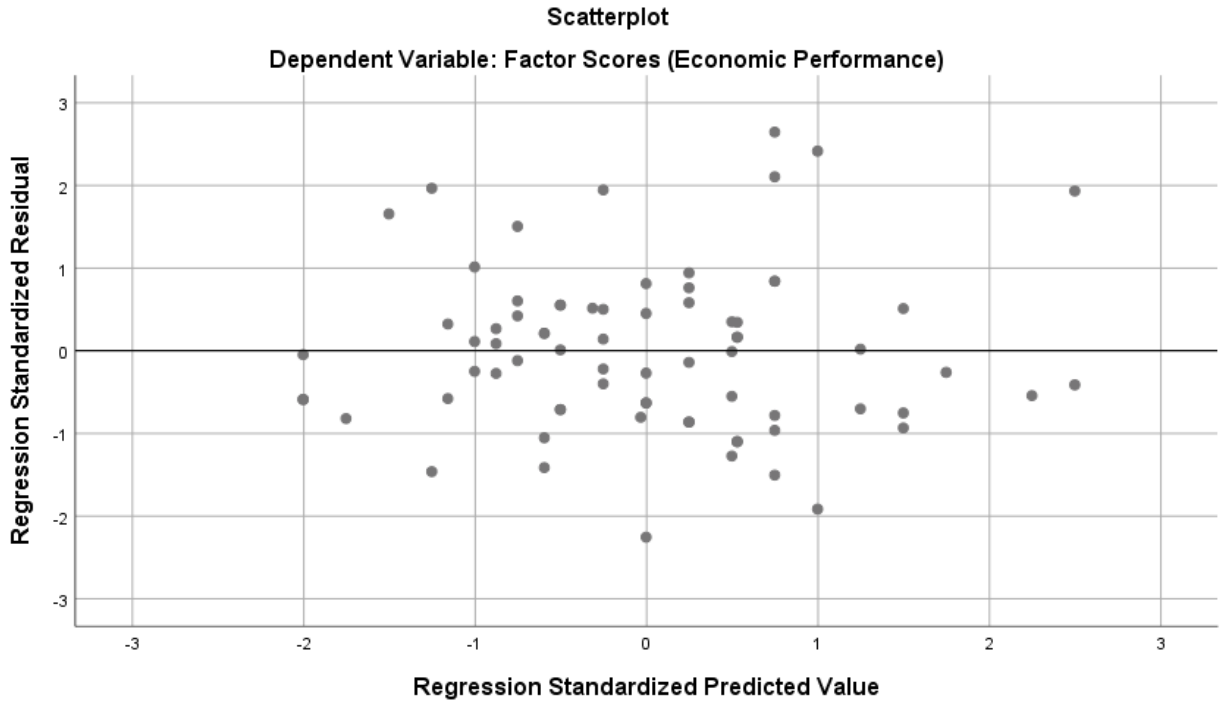



Figure 7 indicates that the assumption of homoscedasticity was met as the point roughly formed a band or cloud around the line of zero residual

To establish the stakeholders' perceptions on influence of the adoption of waste management practices on economic performance of manufacturing SMEs in Nakuru County, a linear regression analysis was conducted. The model summary of the analysis is shown in Table 18.

**Table 18**

*Model Summary of the influence of waste management practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders'*

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .199[a] | .039 | .026 | .25192 |

a. Predictors: (Constant), Waste Management Practices Adopted

b. Dependent Variable: Factor Scores (Economic Performance of SMES)

Table 18 presents the findings of the linear regression where the findings reveal that there is a very weak relationship between the waste management practice adopted and

economic performance of manufacturing SMEs. This was reflected in an R of + 0.199 and adjusted $R^2$ of 0.026 which means that approximately 2.6% of the variance in economic performance of manufacturing SMEs was accounted by its linear relationship with stakeholders' perception on the waste management practices adopted

Table 19 presents the results on determining whether the regression equation (model) between waste management practices adopted and economic performance among manufacturing SMEs is significant enough to determine the outcome

**Table 19**

*ANOVA Summary Table of regression analysis on influence of on waste management practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders'*

ANOVA[a]

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .188 | 1 | .188 | 2.960 | .090[b] |
| | Residual | 4.569 | 72 | .063 | | |
| | Total | 4.757 | 73 | | | |

a. Dependent Variable: Factor Scores (Economic Performance of SMES)

b. Predictors: (Constant), Waste Management Practices Adopted

ANOVA Table 19 indicates that the regression model between the waste management practices adopted and economic performance among manufacturing SMEs was not significant with an F = 2.960, P = 0.090 which was greater than 0.05. Therefore, based on the findings, the null Hypothesis: Ho1 (There is no statistically significant influence of the waste management practices adopted on economic performance of manufacturing SME in Nakuru County as perceived by stakeholders) was accepted.

Table 20 presents the results on the strength of the influence i.e. the significance of the waste management practices adopted in the model and magnitude with which it influences the economic performance of SMEs.

**Table 20**

*Coefficient Summary Table of regression analysis on the influence of waste management practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders'*

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
| | | **B** | **Std. Error** | **Beta** | | |
| 1 | (Constant) | 2.579 | .260 | | 9.924 | .000 |
| | Waste Management Practices Adoption | .114 | .066 | .199 | 1.720 | .090 |

a. Dependent Variable: Factor Scores (Economic Performance of SMES)

Table 20 presents that the regression model for predicting the economic performance of manufacturing SMEs in Nakuru County is: **Y = 2.579 + 0.114*x*** was not significant. This suggests that this relationship should be interpreted with caution.

### 4.5.3 Stakeholders' Perceptions on the Influence of Energy Efficiency Practices Adopted on Economic Performance of Manufacturing SMEs in Nakuru County

The fourth objective of the study was to determine stakeholders' perceptions on the influence of adopted energy efficiency practices on the economic performance of manufacturing SMEs in Nakuru County. The corresponding hypothesis was: There is no statistically significant influence of the energy efficiency practices adopted on the economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders.

A linear regression analysis was conducted. The mean and the standard deviation of each item were computed, and the results are presented in Table 21.

**Table 21**

*Mean and Standard deviation of energy efficiency practices adopted and factor score*

| Descriptive Statistics | | | |
|---|---|---|---|
| | **Mean** | **Std. Deviation** | **N** |
| Factor Score (Economic Performance) | 3.02 | .255 | 74 |
| Energy Efficiency Practices Adopted | 3.89 | .434 | 74 |

Table 21 presents the descriptive results of the factor scores for economic performance and the energy efficiency practices adopted. The factor score for economic performance has a mean of 3.0227 (SD = 0.25528), while the energy efficiency practices adopted have a higher mean of 3.8932 (SD = 0.43426).

To adequately assess the stakeholders' perceptions of the influence of the energy efficiency practices adopted on the economic performance of manufacturing SMEs in Nakuru County, simple linear regression was employed. Several assumptions had to be fulfilled, such as linearity, normality of the variable, and homoscedasticity.

The assumption of linearity was tested first by examining the correlation of the dependent variable against the independent variable, as presented in Table 22.

**Table 22**

*Correlations of dependent and independent variable*

| Correlations | | | |
|---|---|---|---|
| | | **Factor Score (Economic Performance)** | **Energy Efficiency Practices Adopted** |
| Pearson Correlation | Factor Score (Economic Performance) | 1.000 | .328 |
| | Energy Efficiency Practices Adopted | .328 | 1.000 |
| Sig. (1-tailed) | Factor Score (Economic Performance) | . | .002 |
| | Energy Efficiency Practices Adopted | .002 | . |

Table 22 indicates that of a linear relationship between stakeholders' perception of the influence of the adopted energy efficiency practices and the economic performance of manufacturing SMEs in Nakuru County. Hence, the linearity assumption was met.

Assumptions of normality was tested, and the P-P plot is presented Figure 8.

**Figure 8**

*Normal P – P Plot of Regression Standardized Residuals*

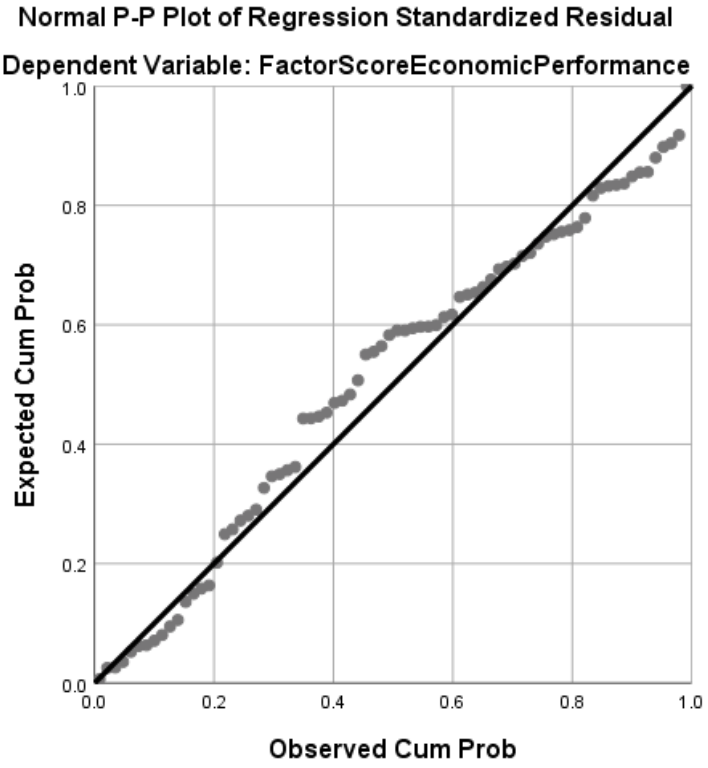



Figure 8 indicates that the residuals approximately followed a normal distribution; hence, the assumption of normality was met.

The assumption of homoscedasticity was tested using a scatterplot of residuals and results presented in Figure 9.

**Figure 9**

*Scatterplot Showing Test of Homoscedasticity in the Economic performance of SMEs*

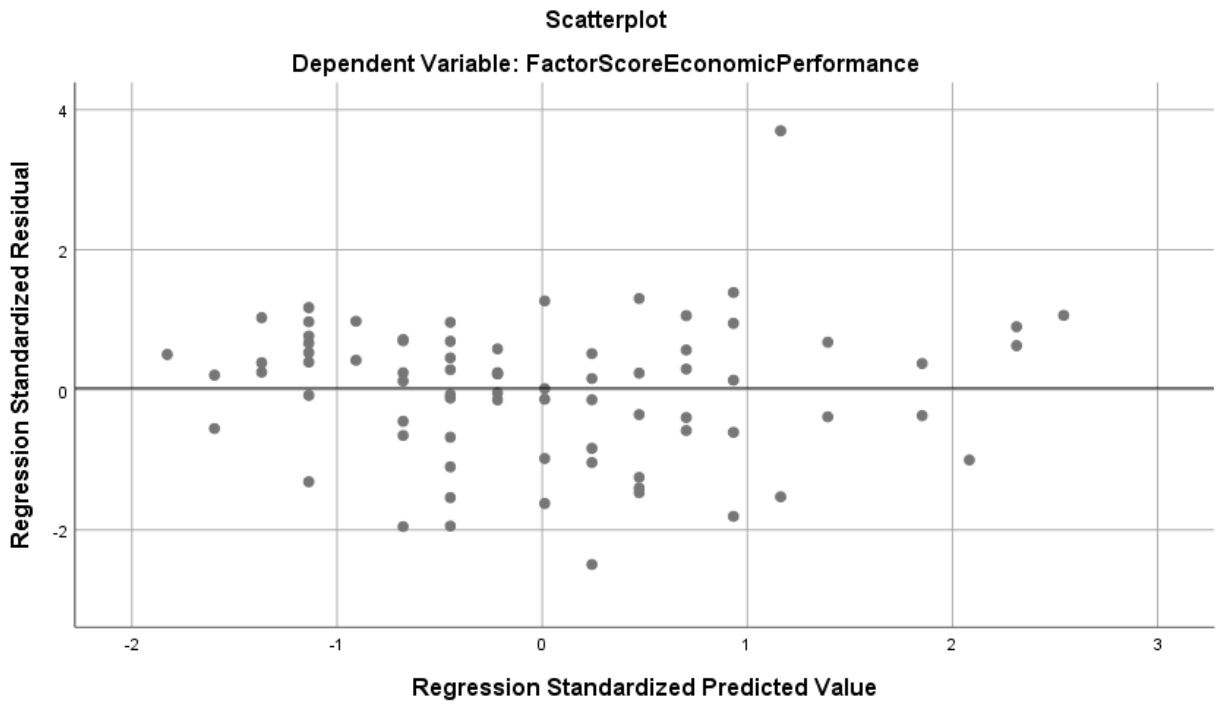



Figure 9 indicates that the assumption of homoscedasticity was met as the point roughly formed a band or cloud around the line of zero residual.

To establish the stakeholder's perceptions on influence of energy efficiency practices adopted on the economic performance of manufacturing SMEs in Nakuru County, a linear regression analysis was conducted. The model summary of the regression analysis is present on Table 23.

**Table 23**

*Model Summary on the influence of energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders*

| Model Summary[b] | | | | |
|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** |
| 1 | .328[a] | .109 | .095 | .24280 |

a. Predictors: (Constant), Energy Efficiency Practices Adopted

b. Dependent Variable: Factor Scores (Economic Performance of SMES)

Table 22 reveals that there is a weak relationship between the energy efficiency practices adopted and economic performance of Manufacturing SMEs. This was reflected in an R of +0.328 and adjusted $R^2$ of 0.095. Approximately 9.5% of the variance in economic

performance of manufacturing SMEs was accounted for by its linear relationship with the energy efficiency practices adopted.

Table 24 presents the results on determining whether the regression equation (model) between adopted energy efficiency practices and economic performance among manufacturing SMEs is significant enough to determine the outcome.

**Table 24**

*ANOVA Summary Table of regression analysis on influence of energy efficiency adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders*

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .513 | 1 | .513 | 8.698 | .004[b] |
| | Residual | 4.244 | 72 | .059 | | |
| | Total | 4.757 | 73 | | | |

a. Dependent Variable: Factor Scores (Economic Performance of SMES)

b. Predictors: (Constant), Energy Efficiency Practices Adopted

The ANOVA Table 24 indicates that indicates that the regression model between Stakeholders perception on energy efficiency practices adopted and economic performance was significant with an F = 8.698, P = 0.004 which is less than 0.05. Based on these findings, the null Hypothesis - Ho2 (There is no statistically significant influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders) was rejected.

Table 25 presents the results on the strength of the influence i.e. the significance of the energy efficiency practices adopted in the model and magnitude with which it influences the economic performance of SMEs.

**Table 25**

*Coefficient Summary Table of regression analysis on influence of on the adoption of waste management practices on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders*

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Unstandardized Coefficients** | | **Standardized Coefficients** | **t** | **Sig.** |
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 2.271 | .256 | | 8.861 | .000 |
| | Energy Efficiency Practices Adoption | .193 | .065 | .328 | 2.949 | .004 |

a. Dependent Variable: Factor Scores (Economic Performance of SMES)

Table 25 displays the values for constant and beta from which the regression equation is derived. The regression results suggest a positive and significant relationship between the energy efficiency practices adopted and economic performance. The regression model for predicting the economic performance of manufacturing SMEs in Nakuru County is $Y = 2.271 + 0.193x$. This implies that for every unit change in the adopted energy efficiency practices, the economic performance of manufacturing SMEs changes by 0.193.

### 4.5.4 Stakeholders' Perceptions on the Influence of Environmental Management Practices Adopted on Economic Performance of Manufacturing SMEs in Nakuru County

The fifth objective of the study was to determine stakeholders' perceptions of the influence of adopted environmental management practices on the economic performance of manufacturing SMEs in Nakuru County. The corresponding hypothesis was: There is no statistically significant influence of adopted environmental management practices on the economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders. A linear regression analysis was conducted to test this hypothesis.

Table 26 shows the computed mean score and standard deviation of each item.

**Table 26**

*Mean and Standard deviation of environmental management practices adopted and factor scores*

| Descriptive Statistics | | | |
|---|---|---|---|
| | **Mean** | **Std. Deviation** | **N** |
| Factor Score (Economic Performance) | 3.0227 | .25528 | 74 |
| Environmental Management Practices Adopted | 3.8911 | .36392 | 74 |

Table 26 presents the descriptive results of the factor scores for economic performance and the environmental management practices adopted. The factor score for economic performance has a mean of 3.0227 (SD = 0.25528), while the environmental management practices adopted have a higher mean of 3.8911 (SD = 0.36392).

To adequately assess the stakeholders' perception of the influence of the environmental management practices adopted on the economic performance of manufacturing SMEs in Nakuru County, a linear regression was employed. Several assumptions had to be fulfilled, such as linearity, normality of the variable, homoscedasticity and multicollinearity.

The assumption of linearity was tested first by examining the correlation of the dependent variable against the independent variable, as presented in Table 27.

**Table 27**

*Partial Correlation table*

| Correlations | | | |
|---|---|---|---|
| | | **Factor Score (Economic Performance)** | **Environmental Management Practices Adopted** |
| Pearson Correlation | Factor Score (Economic Performance) | 1.000 | .321 |
| | Environmental Management Practices Adopted | .321 | 1.000 |
| Sig. (1-tailed) | Factor Score (Economic Performance) | . | .003 |
| | Environmental Management Practices Adopted | .003 | . |

Table 27 indicates that of a linear relationship between stakeholders' perception of the influence of the adopted environmental management practices and the economic performance of manufacturing SMEs in Nakuru County.

Assumptions of normality was tested, and the P-P plot is presented figure 10.

**Figure 10**

*Normal P – P Plot of Regression Standardized Residuals*

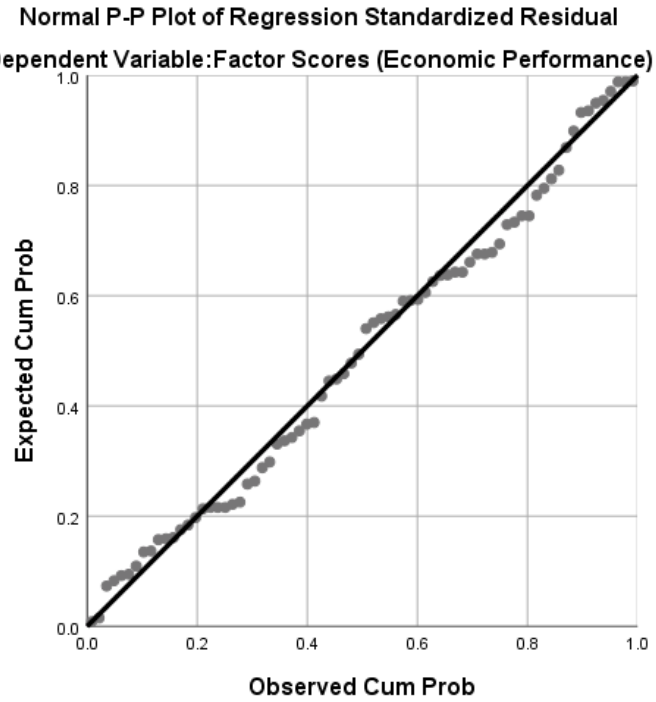



Figure 10 indicates that the residuals approximately followed a normal distribution; hence, the assumption of normality was met.

The assumption of homoscedasticity was tested using a scatterplot of residuals and results presented in Figure 11

**Figure 11**

*Scatterplot Showing Test of Homoscedasticity in the Economic performance of SMEs*

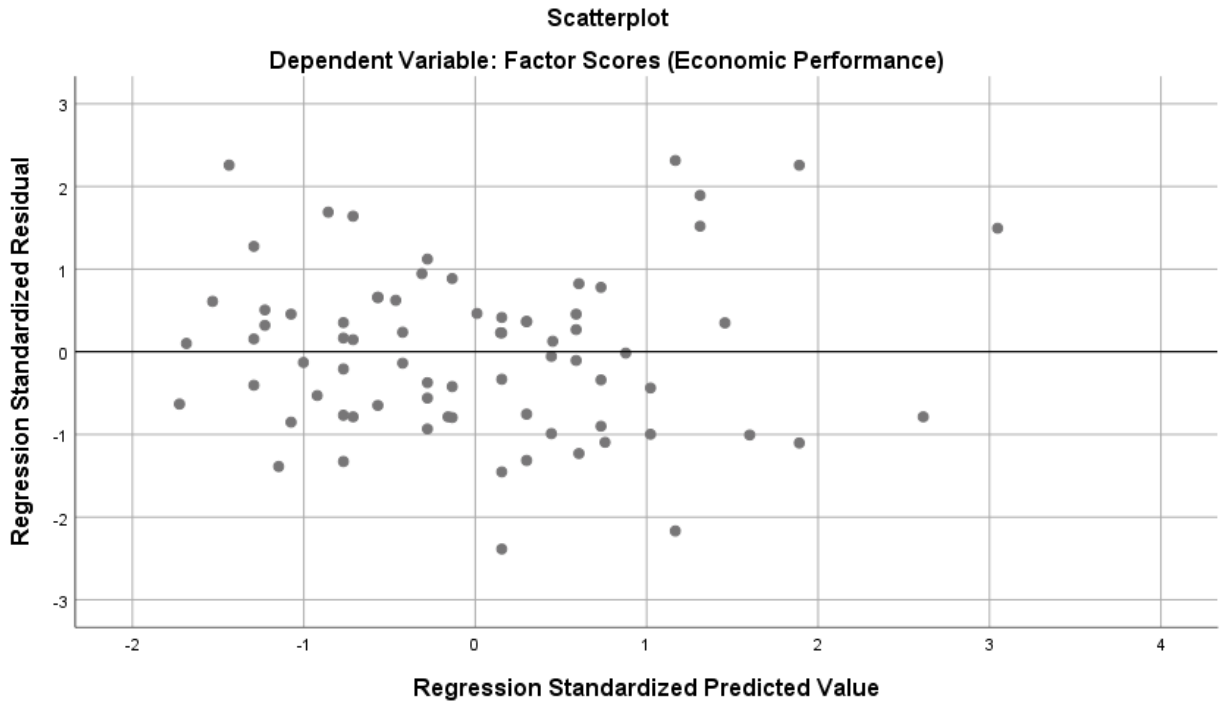



Figure 11 indicates that the assumption of homoscedasticity was met as the point roughly formed a band or cloud around the line of zero residual.

To establish the stakeholder's perception on influence of environmental practices adopted on the economic performance of manufacturing SMEs in Nakuru County, a linear regression analysis was conducted. The model summary of the regression analysis is present on Table 28.

**Table 28**

*Model Summary of regression analysis of the influence environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County*

| Model Summary[b] | | | | |
|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** |
| 1 | .321[a] | .103 | .091 | .24342 |

a. Predictors: (Constant) Environmental Management Practices Adopted

b. Dependent Variable: Factor Scores (Economic Performance of SMES)

Table 28 reveals that a weak relationship between the environmental management practices adopted and economic performance of Manufacturing SMEs. This was reflected in an R of +0.321 and adjusted $R^2$ of 0.103. Approximately 9.1% of the variance in economic performance of manufacturing SMEs was accounted for by its linear relationship with environmental management practices adopted**.**

Table 29 presents the result on the determination to whether the regression equation (model) of the environmental management practices adopted and economic performance among manufacturing SMEs is significant enough to determine the outcome.

**Table 29**

*ANOVA Summary Table of regression analysis on the influence of environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders*

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | .491 | 1 | .491 | 8.286 | .005[b] |
| | Residual | 4.266 | 72 | .059 | | |
| | Total | 4.757 | 73 | | | |

a. Dependent Variable: Factor Scores (Economic Performance of SMES)

b. Predictors: (Constant), Environmental Management Practices Adopted

ANOVA Table 29 indicates that the regression model between environmental management practices adopted and economic performance as perceived with stakeholders was significant with an F = 8.286, P = 0.005 which is less than 0.05. Based on these findings, the null Hypothesis Ho3 (There is no statistically significant management practices adopted on economic performances of manufacturing SMEs in Nakuru County as perceived by stakeholders) was rejected.

Table 30 presents the results on the determination to whether the regression equation (model) of between the environmental management practices adopted and economic performance among manufacturing SMEs is significant enough to determine the outcome.

**Table 30**

*Coefficient Summary Table of regression analysis on the stakeholder's perception on influence of environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County*

| Coefficients[a] | | | | | | |
|---|---|---|---|---|---|---|
| | | Unstandardized Coefficients | | Standardized Coefficients | | |
| **Model** | | **B** | **Std. Error** | **Beta** | **t** | **Sig.** |
| 1 | (Constant) | 2.146 | .306 | | 7.014 | .000 |
| | Environmental Management Practices Adopted | .225 | .078 | .321 | 2.878 | .005 |

a. Dependent Variable: Factor Scores (Economic Performance of SMES)

Table 30 indicates the regression model was significant. The model for predicting the economic performance of manufacturing SMEs in Nakuru County was $Y = 2.149 + 0.225x$. This implies that for every unit change in the energy efficiency practices adopted, leads to change economic performance of manufacturing SMEs by 0.225.

### 4.6 Qualitative Analysis of Interviews with SMEs Proprietors through Content Analysis

To deeply understand the perception of the influence of the adopted environmental management practices on the economic performance of manufacturing SMEs in Nakuru County, the perspectives of SMEs proprietors were solicited through interviews. A total of 15 interviews were conducted despite the unwillingness of other SMEs proprietors to participate, with the notion that the data being collected was to be used for government purposes. Participants were guaranteed confidentiality, and they were assured that the data collected would only be used for this study. The interview lasted between 15 to 20 minutes, and the discussions were recorded and transcribed for content analysis using MaxQDA.

#### 4.6.1 Stakeholders' Perceptions on the Nature and Extent of Environmental Management Practices Adopted

This section presents qualitative results from interviews conducted with SME owners and managers. The interviews focused on the nature and extent of the environmental management practices adopted, addressing the first and second objectives of the study.

The interviewees noted that they produce diverse types of waste, such as polythene bags, rice husks, maize husks, honeycombs, among others as shown Table 31.

**Table 31**

*SMES Interviews*

| Type Manufacturing SME | Type of Waste produced by manufacturing SMEs |
|---|---|
| Fresh farm produce | Organic waste, such as maize bran, maize germ, and cobs |
| Food and beverage sector | Maize and wheat dust, husk and flour, paper wrappings, cereal kernels, |
| Carpentry | Wood chips, sawdust, and offcuts from leather and clothing |
| Textile and apparel | Leather waste, mattress fiber waste, cotton, yarn rags, |
| Metal and allied | Metal chips and plastic waste among others |

The following comment illustrates the KII results;

> *"We often produce organic wastes such as maize bran and germ…….* ***(KII P14, Male, Fresh Farm Produce sector)***
>
> *"We mostly produce leather wastes during skiving, and material wastes when we are making our products such as bags" (****KII P15, Male, Leather and Apparel Sector)***

The interviewees noted they have adopted diverse ways of managing the waste they produce. Those in the carpentry sector highlighted that they sell wood chips and waste timber as firewood, sell sawdust to poultry farmers or briquette manufacturers, and reuse some of the waste they produce. In the food and beverage sector, waste is sold as animal feed, similar to the fresh produce sector, while some indicated they burn waste, such as plastic. The majority of interviewees in the metal and allied sector noted that metal waste is collected and sold as scrap metal, and plastic waste is collected by Nakuru County Council to be disposed in the landfill. These results imply that SMEs adopt practices to expand their business income as well as reduce the cost of purchasing raw materials for producing other products within their portfolio. The following statements from the KII illustrate this;

> *"We do not have no waste. The waste we produce we sell it as firewood and the shavings we sell it to farmers."* (*KII P2, Male, Carpentry sector*)
>
> *"We often produce organic wastes such as maize bran and germ which we always use it for manufacturing animal feeds……." (KII P14, Male, food and beverage sector)*

*"For us we often reuse of clothing offcuts to make pillows" (KII P7, Male, Carpentry sector)*

SMEs proprietors noted they use a blend of renewable and non-renewable energy sources within their operations. The majority of interviewees across diverse manufacturing sectors highlighted their use of electricity, a commonly utilized renewable energy source in Kenya. In the food and beverage sector, most interviewees noted the use of solar energy panels or solar bulbs in conjunction with electricity. Additionally, a small number (approximately 1 each) of SME owners/managers interviewed in the metal and allied, building and construction, and leather sectors also mentioned the use solar energy for instance some use solar panels while others use of transparent sheets on roof top for lighting during the day. Some interviewees from the carpentry sector noted the continued use of firewood and diesel for operations. The findings can be illustrated in the following statements;

*"We mostly use electricity and diesel for our machinery because the motors we use cannot be supported with solar unless we have so many solar panels, which can be expensive".* **(*KII P09, Male, Carpentry Sector*)**

*"…we use solar energy to power water pumps, and in major levels we us wood energy in cooking,"* ***(KII P10, Female, Fresh Farm Produce Sector)***

The respondents indicated they choose electricity because of its convenience and reliability, as it is considered cheaper particularly during installation. Additionally, some respondents noted that solar energy is an expensive type of energy because solar panels purchase and installation requires substantial capital costs. Additionally, the interviewees noted that for large-scale usage of solar energy, it requires the installation of a lot of panels, which tends to be expensive for SMEs. This implied that the SMEs interviewed adopt type of energy that is found cheaper which does not affect their economic bottom line. The following statements from the discussion illustrate this.

*"……the motors we use cannot be supported with solar unless we have so many solar panels, which can be expensive….".* **(KII P09, Male, *Carpentry Sector*)**

*"We use electricity because it's readily available and convenient us. The electricity is also cheaper when installing compared to solar. Besides, we tend to not use diesel as much also because there are spillages"* **(*KII P03, Female, food and Beverage Sector*)**

The respondents further noted that they utilize various energy efficiency practices. Among the strategies emphasized by the interviewees are scheduled bulk production,

contrasting with periodic small-scale operations. They emphasized the practice of powering off all machinery when operations are idle to conserve energy. Additionally, measures such as insulating machinery to prevent energy loss and incorporating manual machinery alongside energy-powered machines were highlighted. The adoption of energy-saving bulbs and adherence to timely repair and maintenance schedules for machinery were also underscored. Furthermore, interviewees mentioned the installation of power factor correction equipment as part of their energy management efforts. Lastly, they mentioned the use of energy-efficient machines, coupled with energy-saving bulbs, and the incorporation of additional ventilation to maximize natural light within their premises. These findings implied that SMEs recognize the importance of energy efficiency in reducing cost of operation within their operations. The following statements from the interview illustrate this;

> *"We have scheduled bulk production unlike small unscheduled. Additionally, the power is switched off for all machinery when no operations are ongoing. This helps us to save on the cost of electricity. You know recently Kenya KPLC has increased electricity tariff, so we have to try the best that we can to reduce unnecessary use of electricity" (**KII P14, Male, Food and Beverage sector)***
>
> *"…… we have the most modern programmable cantilever woodworking machine that minimizes movement when not in use. This help use in reducing energy loses because in our work we spend a lot of money on energy, so we have been looking for way to reduce our consumption …"* **(*KII P09, Male, Carpentry Sector*)**

It was also noted that the interviewed SMEs proprietors were aware of regulations regarding the ban of plastic bags, which guide them towards environmentally friendly packaging. Additionally, the respondents indicated their awareness of various laws guiding corporate social responsibility activities, such as tree planting and environmental awareness campaigns. They also mentioned their recognition of laws and policies, such as forest-related regulations in Kenya, guiding them on the use of natural resources and waste disposal. However, some interviewees indicated their lack of awareness of other environmental policies that would govern manufacturing SMEs' interaction with the environment and resources, such as waste management regulations. These findings imply that while some SMEs are aware of pertinent environmental regulations and policies affecting their operations, others are not. Some of the excerpts to illustrate the findings;

> *"We are aware of what governs us for instance forestry policies that highlights some components on protection of the forestry as well as the aspect*

*of dressing codes among others. It also indicates to use on how we can dispose of the waste cuttings and leaves when we harvest the trees. It also indicated to use that once you cut a tree you should plant another"* ***(KII P2, Male, Carpentry sector)***

*"We are not aware of other policies maybe it is because we are starting out but when we grow, we will have to know more policies"* ***(KII P08, Female, Food and Beverage Sector)***

### 4.6.2 Stakeholders' Perceptions on the Influence of Environmental Management Practices Adopted on Economic Performance

This section presents KII findings on how stakeholders perceive the influence of adopted EMPs on the economic performance of manufacturing SMEs. It focuses on the third, fourth, and fifth objectives of the study.

The participants noted that waste management practices enable them to increase profitability because selling waste signifies that nothing is going to waste but rather serves as an additional income stream. Despite this, it was noted that the income generated from selling waste is relatively small. Additionally, besides selling waste, there are other factors that contribute to profitability in the firm. For instance, the type of raw materials used, and the products produced, among other factors, also play a significant role. The excerpt illustrates some of findings;

*"Additionally on profits, when the forests were closed, we have been getting the timber from farmers and in most cases, they are not of good quality. Whatever you are getting is not mature. In most cases, the work we are doing is not making a lot of profit, but it is good to maintain our business such as paying for electricity, pay staff among others".* (***KII P2, Male, Carpentry sector)***

Additionally, the interviewed SMEs proprietors noted that there are energy regulations that mandate them to install energy-efficient equipment, which aids in reducing energy consumption and waste. They also indicated that employing a combination of electricity and solar energy is to lower their electricity tariffs, particularly during the day. Furthermore, they highlight that adopting environmental management practices reduces competition. For example, utilizing waste materials like human waste to produce briquettes helps eliminate competition and enables the company to acquire a larger market share. Additionally,

interviewees noted that with the growth of environmentally conscious markets, SMEs are provided with an opportunity to produce. The following statement illustrates the finding.

> *"For the machinery, for instance, the motors they use a lot of energy regardless they type of the motor, but we have installed using power factors, which helps in reducing power consumption and wastages. This is very mandatory for the enterprise to have and with this installed it has reduced the cost of production and this contributes largely on the profits."* (***KKI P1, Male, Metal and Allied Sector)***
>
> *"We also use solar lights but during the night as we use solar powered bulbs as security lights, and this also reduced consumption of energy."* ***(KII P09, Male, Carpentry Sector)***

The interviewees noted that EMPs can be costly. For example, the use of solar energy was highlighted as an expensive undertaking for them, especially considering their status as small and growing enterprises. Additionally, SME owners/managers interviewed indicated that the adoption of alternative packaging has introduced new costs to their firms. They now must identify sustainable and hygienic packaging alternatives, whereas previously they relied on plastics. Some interview excerpts illustrate these findings.

> *"While there are some positive aspects to these practices, more often, we always experience additional costs for the transfer and treatment of waste, particularly liquid waste".* (***KII P2, Male, Carpentry Sector)***

## 4.7 Qualitative Analysis of Interviews with Environmental Officer through Content Analysis

To further understand the influence of the environmental management practices adopted on the economic performance of manufacturing SMEs in Nakuru County, the perspectives of environmental officers were solicited through interviews. A total of 2 interviews were conducted which lasted between 15 to 20 minutes, and the discussions were recorded and transcribed for content analysis using MaxQDA. The findings of the interviews analysis were presented as follows.

### 4.7.1 Stakeholders' Perceptions on the Nature and Extent of Environmental Management Practices Adopted

This section presents qualitative results for interviews conducted among the environmental officers on the nature and extent of the environmental management practices adopted, which are the first and second objectives of the study.

The participants indicated that while the country boasts robust environmental regulations, implementation remains challenging, particularly for SMEs. They attributed this to the lack of awareness of these policies, especially among small enterprises. Additionally, they noted that compliance with existing laws is predominantly observed in medium-sized enterprises, as the county governments prioritize these businesses over smaller counterparts. They indicated that frequently inspect these enterprises because they require substantial capital expenditure with a larger turnover compared to small enterprises. Additionally, the participants noted that compliance can be attributed to the fact that the existing laws are also punitive in this case medium enterprises, hence are obliged to adhere to these regulations particularly on aspects of effluence discharge, and noise pollution among others. The following comments illustrate this;

> *"We have good policies, but implementation is the problem"* ***(EF_2, female)***
>
> *"The SMEs are not aware of environmental policies and the importance of environmental management"* ***(EF_2, female)***
>
> *"The compliance is really good because our Kenyan laws are very punitive. There are penalties with non-compliance"* ***(EF_1, Male)***
>
> *"When it comes to inspections, we only conduct it to general buildings undergoing constructions in areas such as Naivasha, waste manufacturing firms, flower firms, container deport (SGR), vegetable firms, that are a bit established and also the county government dictates who we should be inspecting"* ***(EF_1, Male)***

Regarding, the nature of the adoption of environmental management practices among SMEs in line with existing environmental and energy policies and regulations in Kenya, the participants noted that SMEs particularly those have conducted environmental and social impact assessment (ESIA) adopt diverse environmental management practices that are geared towards the compliance of provision of ESIA license. This includes effluent management, occupation health and safety practices as well as corporate social responsibility initiatives. Therefore, these findings imply that SMEs adopt EMPs to stay compliant with environmental regulations in the country. The following comments illustrate this;

> *".... every facility must do an EIA and in the EIA there is environmental management plans which highlights how the enterprises will mitigate identified environmental risk, and also highlight who will be responsible as well the budget. In this regard firms often highlight practice such occupational health*

*and safety (OHS), cooperate social responsibility (CSR) and affluent management among others"* ***(EF_1, Male)***

The participants highlighted that SMEs in Nakuru County are not proactively embracing waste management practices as guided by the NEMA regulations. The respondent indicated that the NEMA regulations guide the enterprises to either manage waste on their premises or pay for these services to the county. This finding implies that SMEs have adopted waste management practices to a very small extent as per relevant policies. The respondents indicated that this reluctance among SMEs to waste management may stem from understanding that SMES don't consider waste management a basic necessity for their enterprises but rather a luxury.

*".... waste management is not a basic need for established business, and these are the issues we experience during inspection because most of them are not willing to pay for waste to the county..."* ***(EF_2, Female)***

The interviewee noted that SMEs in Nakuru County are adopting clean energy and sustainable production primarily for cost-saving purposes rather than for the environmental benefits such practices would offer. They further indicated that adopting environmentally conscious practices proves costly for SMEs, for instance adoption of clean energy technologies such as solar within the SME level seems to be expensive particularly at the acquisition phase but in the long-term it is considered to save energy cost. This finding implies that SMEs are adopting energy efficiency practices to a relatively larger extent and majorly to reduce the costs associated with energy consumption. The following comment illustrated this;

*".... for energy efficiency most SMEs adopt because of the cost and not because they are concerned about the environment. Clean energy cuts energy particularly in light of high energy rate"* ***(EF_2, Female)***

### 4.7.2 Stakeholders' Perceptions on the Influence of Environmental Management Practices on the Economic Performance of SMEs

This section presents KII findings on how environmental officers perceive the influence of adopted EMPs on the economic performance of manufacturing SMEs. It focuses on the third, fourth, and fifth objectives of the study.

The participants indicated that adoption of EMPs, particularly energy efficiency practices are costly in the short-term because they require a substantial amount of capital. Despite this, the officers highlighted that EMPs in the long term they contribute a lot to economic bottom-line of SMEs by saving energy costs. The participants also indicated that

adopting EMPs in line with existing regulations at global, national, and county levels might reduce compliance costs among SMEs. Complying with these regulations reduces unnecessary court cases, which often require a substantial amount of money.

*".... negatively, EMPs are expensive"* ***(EF_1, Male)***

*".. most of the SMEs adopt energy efficiency practices because they save energy especially now electricity is very expensive"* ***(EF_2, Female)***

*"besides in long term solar contributes to economic performance of SMEs but at in short term, clean energy such as solar systems are very expensive particularly during adoption"* ***(EF_2, Female)***

*".. it saves firms unnecessary court cases, maybe the firm is sued by NEMA and other Authorities for non-compliance"* ***(EF_1, Male)***

The participants also highlighted that adoption of EMPs might improve the marketability of SMEs produces, particularly those that are imported to foreign markets such as European market. The officers indicated that in European markets and the larger abroad markets, enterprises are required to indicate whether the production and processing of their goods was environmentally sound. The officers further indicated that adoption of environmental management practices might also influence non-financial gains such as environmental awards which in turn create visibility for more investment to business. The following statement illustrate this;

*".....for flower farms to sell anything in Europe, they have to indicate how the managed effluents, and other environment provisions by the market..."* ***(EF_1, Male)***

*".... the firm might be recognized by the community by doing good for community and environment around them."* ***(EF_1, Male)***

The participants further highlighted that the SMEs are not aware of environmental laws and policies that govern their operations, and they also lack capacity particularly financial capacity to integrate EMPs in their operations. Additionally, they indicated the current laws are ambiguous and there is a lot of government bureaucracy which derails process for SMEs implying that SMEs tend to no comply with these laws. The following excerpts illustrate this;

*"The SMEs are not aware of environmental policies and the importance of environmental management"* ***(EF_2, Female)***

*"Most SMEs are not aware of the environmental laws and also they lack capacity building and financial resources"* ***(EF_1, Male)***

### 4.8 Discussion of the Research Results

This section discusses the results of the study, encompassing both qualitative and quantitative research findings. The discussion was structured around each of the study's objectives, aiming to provide a comprehensive understanding of the research outcomes. Additionally, the discussion was reinforced by current literature, contributing to a thorough and comprehensive examination.

The study findings on the nature of EMPs adopted by SMEs implies that SMEs adopt EMPs with qualities that will enhance their clientele, such as attracting new customers or improving their images. Additionally, it also implied that manufacturing SMES adopt EMPs that have features for reducing their production costs. These quantitative findings were in agreement with qualitative data where the SME owners/managers and county environmental officers explained that SMEs adopt energy types that help reduce energy consumption, which relates to production costs. The interviewees also highlighted that the adoption of EMPs presents an opportunity for export. This is because export markets such as the European markets are more interested in goods produced under environmentally sound practices. This result can be attributed to the fact that manufacturing SMEs often strive to improve their business performance, which emphasizes cost reductions, efficiency, and satisfying customer needs. This is because the pressures from market stakeholders which do not encourage manufacturing SMEs to undertake voluntary actions for the benefit of wider stakeholders and society (Williamson et al., 2006). Additionally, SMEs with a proactive orientation are more likely to adopt diverse and higher quality applications of environmental practices that are considered to help them increase efficiency and lower costs in internal operations, as well as improve quality with suppliers (Cohen &Winn, 2007).

The findings on the nature of EMPs adopted by SMEs were supported by other research findings. For instance, in a study by Blasi et al. (2021), on the on the relationship between circularity promotion and the performance of manufacturing SMEs in Italy, their findings indicated that manufacturing SMEs explore opportunities to generate operational efficiencies. These efficiencies often arise from greater attention to areas in the production process where they can eliminate inefficiencies and waste using new technology, and enhancements in products and processes that lower production costs. Dey et al. (2018), study on environmental management and corporate social responsibility practices of small and medium-sized enterprises, found that majority of SMEs are motivated to adopt environmental management practices because they believe it improves their firm’s image, and it is their moral duty to be environmentally conscious. Additionally, studies by Gadenne et al. (2009); Veselova and

Sidorenko (2022), indicated a correlation between the environmental effort of the managers of SMEs and organizational operating efficiency, profits and business image. The finding further elaborates that SMEs use EMPs to extend their market share and enhance their corporate image. This is built on the notion that being environmentally responsible can be a marketing strategy to attract more customers and stand out from competitors.

The findings on the extent of adoption of waste management practices among manufacturing SMEs in Nakuru County, it was found that the SMEs largely adopt the efficient use of materials which is highlighted in regular and routine maintenance of equipment (preventive maintenance), selling waste to other organizations, and reducing machine down time. Additionally, to a smaller extent, they adopt packing with biodegradable materials. These results were reinforced by interviews by SME owner/manager, who highlighted that they sell the waste they produce. It was indicated that SMEs sell wood shavings, maize bran, and germ to farmers as firewood and raw materials for animal feed manufacturing. These findings can be attributed to the recognition that SMEs tend to adopt the minimum practices required by regulation due to lack of resources or interest, and to some extent, SMEs consider EMPs as a strategic financial threat (Williamson et al., 2006). In Kenya, policies require firms to adopt cleaner production principles, including the improvement of production processes through the conservation of raw materials and energy. Additionally, they should enable the recovery and reuse of products where possible, and the collection, segregation, and disposal of waste according to the law (Kituyi & Marani, 2000).

The results on the extent of waste management practices adopted by manufacturing SMEs concur with other empirical research. Tyler et al. (2023), study on waste minimization in small and medium-sized enterprise in Italy, France, Denmark, and the United States supports these findings. Their study revealed that reduction of waste in SMEs is driven more by the costs of raw materials than by waste costs. Therefore, SMEs increasingly adopt practices geared toward increasing the efficient use of materials, which consequently results in waste minimization. Additionally, Clayton et al. (2014), study on policies for cleaner technology indicates that pressures to reduce costs provide a direct incentive for firms to improve their resource efficiency and reduce wastage. In this way, they encourage firms to adopt cleaner solutions not only for financial reasons but also as a response to environmental pressures. Hoogendoorn et al. (2015), study on the influence of firm characteristics on SMEs' environmental behavior among 8,000 SMEs across 12 sectors in 36 countries. Their study found that the majority of SMEs (91%) are involved in greening processes to some extent. This includes improving resource efficiency, which further includes saving energy, using renewable

energy, saving materials, minimizing waste, selling scrap material to another company, and recycling. The findings on the extent of waste management practices were also contradicted by other studies. Seth et al. (2018), studied green manufacturing drivers and their relationships for SME and large industries. They found that only a small percentage of SMEs in the UK have material efficiency targets, while the largest share of UK SMEs (76%) reported adopting environmental targets such as recycling of waste and staff capacity building on environmental practices. In addition, only 20% and 50% of SMEs in India reported having recycling and training related EMPs, respectively. Despite this, the geographic location is considered an important predictor for the adoption of EMPs among SMEs, thus explaining the disparity in the findings.

The study findings on the extent of the adoption of energy efficiency practices, the study findings indicated that SMEs largely adopt the use of energy-efficient bulbs, turning off lights when not in use, and proper maintenance of equipment. The least ranked energy efficiency practice was the use of solar lights. The finding is also supported by interviews with SMEs proprietors who indicated that solar energy is considered an expensive type of energy due to the fact that the installation of solar panels requires substantial capital costs. Additionally, for large-scale usage of solar energy, it requires the installation of a lot of panels, which tends to be expensive for SMEs. This findings can be attributed by the fact that good house-keeping such as turning off the lights and proper maintenance of equipment is seen as good business practice among SMEs with the ability to lower energy cost and attract customers which should be everyone' responsibility at the workplace (Ahinful & Thuringian, 2019). Housekeeping is also considered as one of the low cost or no cost energy efficiency and conservation practices which is an excellent starting point for improving the methodology of operation among SMEs (Zohir, 2010). Additionally, SME owners and managers prioritize other investments over those that could enhance the energy efficiency performance of their organizations. Furthermore, SMEs often lack appropriate and specialized technical staff to monitor, evaluate, and improve their energy efficiency performance. According to Shipley and Elliott (2001), SMEs often encounter difficulties in accessing necessary information regarding both new and existing energy technologies. Furthermore, they typically lack the capital and technical expertise required to invest in energy-efficient technologies. While many SMEs are making efforts to improve resource efficiency, such as reducing energy consumption and minimizing waste, energy efficiency remains a relatively low priority overall.

The findings on the extent of energy practices adopted concurred with various studies. Trianni et al. (2014), study found that adoption of consumption monitoring, energy data

analysis, programs of staff training and motivation were barely implemented among 64 metal manufacturing SMEs in Northern Italy province. This attributed to economic and information barriers, where SMEs lack information about technology, regulations and opportunities for financing the energy efficiency practices. Kambule (2015), study on the state of energy efficiency adoption and related challenges amongst selected manufacturing SMMEs in the Booysens area of Johannesburg supported these findings. The study findings revealed that a significant portion of sampled manufacturing SMEs had implemented energy efficiency measures, such as using energy-efficient light bulbs and upgrading heating and air conditioning equipment. This underscores the importance of proactive steps taken by SMMEs towards sustainable energy practices in their operations. Gennitsaris et al. (2023) study, which indicates that, in most cases, energy efficiency, is not given high priority within SMEs. This lack of emphasis is attributed to limited available economic and time resources, as well as low awareness of the potential benefits that could be achieved. In summary, the prevailing trend suggests that energy efficiency is not given significant attention by SMEs, leading to a low level of energy management within this sector. Consequently, the majority of SMEs have not conducted energy audits, highlighting the need for increased awareness and support in this area (Southernwood et al., 2021).

The regression findings on the influence of waste management practices on the economic performance of SMEs, as perceived by stakeholders, implied that there was no statistically significant influence of the waste management practices adopted on the economic performance of manufacturing SMEs in Nakuru County, with an F = 2.960 and P = 0. 090.The findings also revealed a weak and positive relationship between the waste management adopted and economic performance of manufacturing SMEs. This was reflected in an R of + 0.199 and an adjusted $R^2$ of 0.026 which means that approximately 2.6% of the variance in economic performance of manufacturing SMEs was accounted for by its linear relationship with waste management practices adopted. This finding is supported by interviews with SMEs proprietors and environmental officers who explained that SMEs are not proactively embracing waste management practices, and this is because SMEs are not considering waste management basic necessity for their enterprises but rather a luxury. Additionally, EMPs are considered expensive, which affects financial performance negatively. These findings would stem from the understanding that the relationship between sustainability, particularly waste management, and firm performance isn't typically linear. When opportunities arise to boost a firm's performance by adopting more sustainable practices, it doesn't necessarily mean the firm should strive for maximum sustainability (Gull et al., 2022). It is interesting to note that, at

times, pushing for greater sustainability could actually harm a firm's financial standing (Bartolacci et al., 2018). Furthermore, it's worth noting that waste management practices are often deemed costly for SMEs and the financial burden associated with waste management practices can pose significant challenges for small and medium-sized enterprises (SMEs), impacting their ability to allocate resources effectively (Elshaer et al., 2023).

The study's findings on the influence of waste management practices on economic performance of SMEs, concurs with other research findings on environmental sustainability. De et al. (2020) study on the impact of waste management practices of Indian manufacturing SMEs on their financial performance. The study reveals that reverse logistics, including waste management, i.e., reuse and recycle, is loosely correlated to productivity and negatively related to the financial performance of SMEs. This is attributed to higher capital and operating cost for waste management initiatives, and negative perceptions of SMMEs' managers on benefits of waste reduction through reuse and recycle. Additionally, those managers perceive good financial conditions as one of the most important success factors for improving environmental performance. In this regard, SMEs tend to only adopt waste management practices that have been provided by the law which tend to be expensive (Lutfi et al., 2023). King and Lenox (2001), study on "Does It Really Pay to Be Green?" also confirms the findings of this research. Their study suggested that firms do not profit from waste management apart from waste prevention. These findings also aligns with Gull et al. (2022), study on "Does waste management affect firm performance?". Their study revealed a significant negative relationship between waste management including waste recycling and financial performance. Recycling, in particular, is viewed as contributing to firms' operating costs, potentially reducing profits for SMEs. The perceived high cost of recycling is often burdensome for small and medium-sized enterprises (SMEs).

The study's findings on the influence of waste management practices on the economic performance of SMEs also contradict some previous research findings. Maru et al. (2013) study showed that there is a relationship between waste recycling strategies adopted by SMEs on their financial performance. From their simple regression test the study findings; r=0.209 and r2 =0.440, which shows that 44% of the growth of financial performance can be explained by the adoption of waste recycling. Ahinful and Tauringana (2019) study also found that waste management positively influences financial performance in all manufacturing firm sizes. Micro and small firms seem to focus more on material and pollution management than medium firms do. This may be due to their relatively limited resources and their deep embeddedness in the local community, which necessitates close attention to pollution.

The regression findings influence of the adoption of energy efficiency practices on economic performance of manufacturing SMEs as perceived by stakeholders, revealed that there is statistically significant influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County, with F = 8.698, P = 0.004. Additionally, the findings revealed a weak and positive relationship between energy efficiency practices adopted and economic performance of manufacturing SMEs. This was reflected in an R of +0.328 and adjusted $R^2$ of 0.095. Approximately 9.5% in economic performance of manufacturing SMEs was accounted for by its linear relationship with stakeholders' perception on the extent of energy efficiency practices adoption. This finding is supported by KII with SMEs proprietors and environmental officers. It highlighted energy efficiency practices such as using energy efficient bulbs and solar use might reduce energy costs. Additionally, it was highlighted that in the short term energy efficiency practices such use of solar energy could be expensive because the acquisition and installation solar systems can be capital intensive but in the long term, they contribute a lot to economic bottom-line of SMEs by saving energy costs. The weak relationship between energy efficiency and economic performance of SMEs can be can be attributed to several factors such as technological capabilities, differences in resource allocation, organizational culture, and regulatory frameworks which might play pivotal roles in shaping the effectiveness of energy efficiency initiatives within SMEs (Henriques & Catarino, 2016). Additionally, the positive relationship between the two variables can be attributed to the fact that increasing energy efficiency among manufacturing SMEs represents considerable value for their bottom-line. Energy efficiency can deliver other benefits that can help SMEs grow and develop, for example by improving productivity, profitability and competitiveness and product quality since it helps them avoid rising energy prices (Ahinful & Tauringana, 2019).

This study finding is supported by other research findings. Sueyoshi et al. (2010), in their study on corporate governance and firm performance found that EMPs particularly energy efficiency practices positively influence the financial performance of Japanese 4 manufacturing firms. The firms focused on enhancing "energy awareness" and offered training to 5 their employees to increase overall "energy knowledge," and, as a result, achieved better financial performance. Ahinful and Tauringana (2019), study revealed a positive and significant relationship between energy efficiency practices and financial performance. This was because gains resulting from energy efficiency effectively reduce the per unit price of energy consumption. Sahu and Narayanan (2015) in their study on energy use patterns and firm performance among Indian SMEs, found a positive association between energy efficiency and

profitability among manufacturing firms arguing that firms may become more profitable through increased energy efficiency. De et al. (2020), study also revealed that process optimization and energy reduction ("reduce") enhance productivity and financial performance of the manufacturing SMEs. Conversely, Nyirenda et al (2013), study on energy efficiency practices of a listed South African company, found no association between energy efficiency and financial performance of a mining firm in South Africa. The study's findings elaborated that although the company's management felt it was important to be environmentally friendly, they did not necessarily expect to make more money because of it. They saw it as more of a moral duty rather than a way to earn extra profits. Pons et al. (2013), study revealed that the use of energy and material saving technologies does not have a clear and significant relationship with economic performance.

The study quantitative findings reveal that there is statistically significant influence of the environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County, with $F = 8.286$, $P = 0.005$ which is less than 0.05. Additionally, the findings revealed a weak and positive relationship between the environmental management practices adopted and economic performance of Manufacturing SMEs. This was reflected in an R of +0.321 and adjusted $R^2$ of 0.91. Approximately 9.1% of the variance in economic performance of manufacturing SMEs was accounted for by its linear relationship with waste management practices adopted. These findings are supported by interviews by SMEs proprietors as well as environmental officers. It was highlighted that waste management practices increases SMEs income stream through selling of waste. However, the income generated from selling waste is relatively small. Additionally, it was indicated that they use energy-efficient equipment coupled with solar energy which often reduces energy costs to a large extent.

This study finding on the influence of the environmental management practices adopted on economic performance of manufacturing SMEs, aligned with findings of other scholars in the field of environmental management. Ahinful and Tauringana (2019), investigated the impact of environmental management practices (EMPs) (energy efficiency, water, waste, material, pollution and biodiversity management) on financial performance (FP) of Ghanaian small and medium-sized enterprises. The study findings indicated that there is a positive and significant relationship between EMPs and SMEs' financial performance. Similarly, Earnhart and Lizal (2010), in their study on the effect of corporate environmental performance and financial outcome, found a positive relationship between environmental performances. In particular, their study findings implied that better environmental performance improves

profitability by driving down costs more than it drives down revenues. The environmental performance, especially lowering emissions charge rates, increases profitability of the firms. Kamande and Lokina, (2013), examined the linkage between the profitability of firms measured by return on assets (ROA) and environmental performance measured by eco-efficiency and the impact of a good environmental management system (EMS) on profitability and eco-efficiency of Kenyan Manufacturing Firms. The results indicated that there is a potential gain in the profitability of the firm by improving eco-efficiency in resource use. Furthermore, proactive firms were found to perform better than reactive firms in terms of profitability and eco-efficiency but firms that combine both proactive and reactive EMS perform even better, which shows the benefit of adopting commitment-based approaches alongside the compliance-based approaches to environmental management.

This finding on influence of the environmental management practices adopted on economic performance of manufacturing SMEs was also negated by another empirical research. Trumpp and Guenther (2017), suggested that there is no significant relationship between environmental management practices and financial performance of manufacturing firms from an instrumental perspective. They argued this from the standpoint of stakeholder expectations, which, on one hand, can enhance a company's reputation through improved stakeholder responsiveness and subsequently boost financial performance. However, they also emphasized that striving for enhanced environmental performance to satisfy stakeholders would lead to additional costs, as not all benefits from sustainable environmental practices can be fully internalized economically. Gilley and Rasheed (2000), identified a negative correlation between environmental and financial performance. Their findings also suggested that investors might prioritize product-driven environmental initiatives, which directly influence cost and profitability, over process-driven initiatives that could be indirectly influenced by the former. Moreover, they noted that the benefits of proactive environmental measures might take time to materialize, increasing investor uncertainty about outcomes. Consistent with these findings, Horváthová (2012) research concluded that while the effect of environmental performance on financial performance is negative in the short term, it becomes positive in the long term. Nyirenda et al. (2013), studied the impact of environmental management practices on the financial performance of a South African mining firm. The results showed no significant relationship between the variables, lending credence to information gathered from Green-Steel environmental reports that Green-Steel's environmental management practices are driven mostly by a desire to abide by regulations and a moral obligation to use environmental management practices to mitigate climate change impact.

# CHAPTER FIVE
# SUMMARY, CONCLUSIONS AND RECCOMENDATIONS

## 5.1 Introduction

This chapter presents the summary of the findings, conclusions, implications of the study and the recommendations drawn from the results. The chapter further provided suggestions for further research based on the study results.

## 5.2 Summary of the Findings

The study sought to assess the stakeholders' perceptions on the influence of environmental policy adopted on the economic performance of manufacturing small and medium sized enterprises in Nakuru County. The summary of the findings of the study were as follows;

i. On the stakeholders' perception on the nature of environmental management practices adopted among manufacturing SMEs in Nakuru County, a majority of respondents agreed that they employ EMPs to appeal new customers and to enhance their firms' image among customers. An equally substantial number of SMEs agreed that they adopt EMPs to reduce production costs, create opportunities for enterprises to export their products and lower taxes. From the interviews with SMEs proprietors and environmental officers, the findings implied that the SMEs adopt practices that have the characteristics of reducing cost especially energy consumption costs as well as those that seek to increase their income stream.

ii. On the extent of adoption EMPs, the stakeholders perceived that SMEs primarily prioritize good housekeeping practices. These practices include the use of energy-efficient bulbs, turning off lights when not in use, and proper equipment maintenance. Qualitative findings supplemented these results, highlighting additional adopted practices such as scheduled bulk production, shutting down machinery during idle times to conserve energy, insulating machinery to prevent energy loss, and integrating manual machinery with energy-powered machines. Furthermore, quantitative data indicated that SMEs also extensively adopted efficient material usage, as evidenced by regular and routine equipment maintenance (preventive maintenance), waste selling to other organizations, and minimizing machine downtime. Interviews provided further support, demonstrating that SMEs in the carpentry sector, for instance, sell wood chips and waste timber as firewood, sell sawdust to poultry farmers or briquette manufacturers, and engage in reusing some of the waste they produce.

iii. There was no statistically significant influence of the waste management practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders at 0.05 confidence level.

iv. There was a statistically significant influence of the energy efficiency practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived stakeholders by SMEs at 0.05 confidence level.

v. There was a statistically significant influence of environmental management practices adopted on economic performance of manufacturing SMEs in Nakuru County as perceived by stakeholders at 0.05 confidence level.

**5.3 Conclusions**

Based on the findings, the study made the following conclusions in line with the study objectives.

i. Stakeholders perceived that manufacturing SMEs in Nakuru County adopt EMPs to enhance their clientele, improve their business images as well as to reduce their production costs.

ii. Stakeholders perceived that manufacturing SMEs in Nakuru County adopt good house-keeping practices such as turning off lights and maintaining equipment, managing consumption, enhance material efficiency, and reduce their environmental footprint.

iii. Stakeholders perceived that adoption of waste management practices does not significantly influence the economic performance among manufacturing SMEs, even though there is a weak positive correlation between the two variables based on regression analysis. This underscores that waste management practices may have some influence on economic performance though not substantial enough.

iv. Stakeholders perceived that energy efficiency practices adopted by SMEs do have a significant influence on economic performance. Energy efficiency can deliver other benefits that can help SMEs grow and develop, for example by improving productivity, profitability and competitiveness and product quality since it helps them avoid rising energy prices.

v. Stakeholders perceive that environment management practices/ policies adopted have a significant influence on economic performance of manufacturing SMEs in Nakuru. Implying that better environmental performance improves profitability by driving down costs of operation and increasing customer base.

## 5.4 Recommendation

This section presents the study recommendations based on study findings and which may inform environmental policies at the national and county government, NGOs and SMES level. The recommendation includes;

i. The findings of the research revealed that there is a very weak relationship between waste management adopted and economic performance of Manufacturing SMEs as perceived by stakeholders. This weak relationship may be because waste management practices are often seen as expensive and burdensome for these small businesses. As a result, this study recommends that the government should provide incentives to help SMEs implement more effective and affordable waste management strategies. Furthermore, the research found that many manufacturing SMEs deal with their waste by selling it. However, the current regulations and policies on waste management do not focus much on expanding the market for waste and recycled products. Therefore, the recommendation is for both the County and National governments to amend their existing regulations and policies to include measures that encourage the growth of markets for waste and recycled products.

ii. The study findings reveal that there is a weak relationship between the energy efficiency adopted and economic performance of Manufacturing SMEs as perceived by stakeholders. The weak relationship could be attributed to several factors such as technological capabilities, differences in resource allocation, organizational culture, and regulatory frameworks. In this regard, the study recommends the government and other stakeholders to devise interventions that will encourage the adoption of energy-efficient technologies and innovation through targeted incentives, subsidies, and grants.

iii. The study findings reveal that there is a significant but weak relationship between the environmental management practices adopted and economic performance of Manufacturing SMEs as perceived by stakeholders. Therefore, the study recommends manufacturing SMEs to enhance the adoption of practical EMPs such as waste management and energy efficiency practices. These practices can be tailored to their specific operational needs to improve economic outcomes while maintaining environmental sustainability.

## 5.5 Suggestion for Further Research

Based on the findings of this study, it recommends that research studies be done on the following areas to further understand the influence of environmental policy adoption on the economic performance of manufacturing small and medium sized enterprises;

i. There is a need for further research on the influence of other environmental management practices, such as biodiversity protection, water management, pollution prevention strategies, as well as environmental disclosure, on the economic performance of manufacturing SMEs. This is because the study limited its focus to only two environmental management practices.

ii. This is also a need to further evaluate existing policies and regulatory frameworks related to environmental management practices specifically waste management and energy efficiency practices in the context of Manufacturing SMEs. This is to assess the adequacy and effectiveness of current policies in incentivizing adoption of EMPs and identify potential areas for improvement or revision to better support SMEs in this regard.

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## APPENDICES

### Appendix I: Correlation Matrix

| Correlation Matrix | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Q191a** | **Q191b** | **Q191c** | **Q191d** | **Q191e** | **Q192a** | **Q192b** | **Q192c** | **Q192d** | **Q192e** | **Q193a** | **Q193b** | **Q193c** | **Q193d** | **Q193e** | **Q193f** | **Q193g** | **Q193h** | **Q194a** | **Q194b** | **Q194c** | **Q194d** |
| **Correlation** | **Q191a-Increase revenue** | 1.000 | 0.394 | 0.338 | 0.263 | 0.233 | 0.004 | 0.323 | 0.521 | -0.294 | -0.226 | -0.054 | 0.178 | 0.507 | 0.234 | -0.087 | 0.135 | 0.242 | 0.069 | 0.189 | 0.014 | 0.094 | -0.016 |
| | **Q191b-ReducedOpExpenses** | 0.394 | 1.000 | 0.028 | 0.056 | 0.366 | -0.181 | 0.109 | 0.298 | -0.138 | -0.142 | -0.041 | 0.018 | 0.175 | 0.160 | -0.092 | -0.033 | 0.149 | 0.032 | 0.207 | 0.038 | 0.350 | -0.038 |
| | **Q191c-Reduced Taxes** | 0.338 | 0.028 | 1.000 | 0.415 | -0.015 | 0.286 | 0.075 | 0.281 | -0.122 | 0.204 | -0.072 | 0.103 | 0.253 | 0.243 | 0.064 | -0.042 | 0.146 | 0.207 | -0.192 | 0.039 | 0.010 | 0.188 |
| | **Q191d-reducedCompCost** | 0.263 | 0.056 | 0.415 | 1.000 | 0.080 | 0.109 | 0.216 | 0.461 | -0.223 | 0.077 | -0.101 | 0.223 | 0.314 | 0.278 | -0.103 | 0.309 | 0.423 | 0.352 | -0.078 | -0.031 | -0.027 | -0.093 |
| | **Q191e-reducedCostofgood** | 0.233 | 0.366 | -0.015 | 0.080 | 1.000 | 0.028 | 0.239 | 0.429 | -0.109 | -0.020 | 0.144 | 0.136 | 0.326 | 0.064 | -0.251 | 0.133 | 0.307 | 0.155 | 0.128 | -0.187 | 0.277 | 0.167 |
| | **Q192a-Before Sales Was performingwell** | 0.004 | -0.181 | 0.286 | 0.109 | 0.028 | 1.000 | -0.052 | 0.042 | 0.190 | 0.430 | 0.271 | 0.034 | 0.278 | 0.062 | 0.100 | -0.083 | -0.013 | -0.021 | -0.129 | 0.178 | -0.064 | 0.157 |
| | **Q192b-Beforenotperformingwell** | 0.323 | 0.109 | 0.075 | 0.216 | 0.239 | -0.052 | 1.000 | 0.573 | -0.295 | -0.115 | 0.020 | 0.339 | 0.368 | 0.206 | 0.055 | 0.406 | 0.353 | 0.088 | 0.236 | -0.087 | 0.124 | -0.085 |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Q192c-Aftersalesincreasedsignificantly** | 0.521 | 0.298 | 0.281 | 0.461 | 0.429 | 0.042 | 0.573 | 1.000 | -0.465 | -0.111 | -0.089 | 0.352 | 0.687 | 0.304 | -0.105 | 0.466 | 0.683 | 0.227 | 0.117 | -0.075 | 0.168 | -0.021 |
| | **192d-AfterSalesremained** | -0.294 | -0.138 | -0.122 | -0.223 | -0.109 | 0.190 | -0.295 | -0.465 | 1.000 | 0.456 | 0.326 | -0.197 | -0.254 | -0.229 | -0.028 | -0.212 | -0.259 | -0.177 | -0.151 | 0.070 | 0.055 | 0.031 |
| | **192e-AfterSalesreducedsignificantly** | -0.226 | -0.142 | 0.204 | 0.077 | -0.020 | 0.430 | -0.115 | -0.111 | 0.456 | 1.000 | 0.273 | -0.037 | 0.063 | -0.047 | 0.114 | -0.067 | -0.035 | 0.032 | -0.220 | -0.085 | -0.064 | 0.363 |
| | **Q193a-Beforeperformingwellthancompetitors** | -0.054 | -0.041 | -0.072 | -0.101 | 0.144 | 0.271 | 0.020 | -0.089 | 0.326 | 0.273 | 1.000 | -0.252 | 0.041 | -0.256 | 0.349 | -0.079 | -0.165 | -0.074 | 0.109 | 0.136 | 0.108 | -0.130 |
| | **Q193b-Beforenotperformingwellthancompetitors** | 0.178 | 0.018 | 0.103 | 0.223 | 0.136 | 0.034 | 0.339 | 0.352 | -0.197 | -0.037 | -0.252 | 1.000 | 0.313 | 0.105 | -0.173 | 0.583 | 0.509 | 0.117 | 0.017 | -0.235 | 0.062 | 0.087 |
| | **Q193c-Aftersalesincreasedcomparedtocompetitors** | 0.507 | 0.175 | 0.253 | 0.314 | 0.326 | 0.278 | 0.368 | 0.687 | -0.254 | 0.063 | 0.041 | 0.313 | 1.000 | 0.188 | 0.081 | 0.401 | 0.634 | 0.246 | 0.119 | 0.024 | 0.231 | 0.086 |
| | **Q193d-Costofproductiondeclined** | 0.234 | 0.160 | 0.243 | 0.278 | 0.064 | 0.062 | 0.206 | 0.304 | -0.229 | -0.047 | -0.256 | 0.105 | 0.188 | 1.000 | -0.028 | 0.056 | 0.258 | -0.047 | 0.054 | -0.051 | -0.108 | 0.307 |
| | **Q193e-Beforemarketsizewaslarge** | -0.087 | -0.092 | 0.064 | -0.103 | -0.251 | 0.100 | 0.055 | -0.105 | -0.028 | 0.114 | 0.349 | -0.173 | 0.081 | -0.028 | 1.000 | 0.008 | -0.202 | -0.106 | 0.220 | 0.289 | -0.206 | 0.043 |

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **comparedtocompetitors** | | | | | | | | | | | | | | | | | | | | | |
| | **Q193f-Beforemarketsizesmallcompared to competitors** | 0.135 | -0.033 | -0.042 | 0.309 | 0.133 | -0.083 | 0.406 | 0.466 | -0.212 | -0.067 | -0.079 | 0.583 | 0.401 | 0.056 | 0.008 | 1.000 | 0.552 | -0.013 | 0.215 | -0.095 | 0.046 | -0.048 |
| | **Q193g-Aftermarketsizeincreasesignificantlycompared to competitors** | 0.242 | 0.149 | 0.146 | 0.423 | 0.307 | -0.013 | 0.353 | 0.683 | -0.259 | -0.035 | -0.165 | 0.509 | 0.634 | 0.258 | -0.202 | 0.552 | 1.000 | 0.323 | 0.158 | -0.149 | 0.252 | 0.021 |
| | **Q193h-reputationimproved** | 0.069 | 0.032 | 0.207 | 0.352 | 0.155 | -0.021 | 0.088 | 0.227 | -0.177 | 0.032 | -0.074 | 0.117 | 0.246 | -0.047 | -0.106 | -0.013 | 0.323 | 1.000 | -0.079 | -0.047 | 0.172 | 0.138 |
| | **Q194a-PriorMoretempstaff** | 0.189 | 0.207 | -0.192 | -0.078 | 0.128 | -0.129 | 0.236 | 0.117 | -0.151 | -0.220 | 0.109 | 0.017 | 0.119 | 0.054 | 0.220 | 0.215 | 0.158 | -0.079 | 1.000 | 0.358 | 0.010 | -0.154 |
| | **Q194b-priormorepermanentstaff** | 0.014 | 0.038 | 0.039 | -0.031 | -0.187 | 0.178 | -0.087 | -0.075 | 0.070 | -0.085 | 0.136 | -0.235 | 0.024 | -0.051 | 0.289 | -0.095 | -0.149 | -0.047 | 0.358 | 1.000 | 0.063 | -0.084 |
| | **Q194c-Aftermorepermanentstaff** | 0.094 | 0.350 | 0.010 | -0.027 | 0.277 | -0.064 | 0.124 | 0.168 | 0.055 | -0.064 | 0.108 | 0.062 | 0.231 | -0.108 | -0.206 | 0.046 | 0.252 | 0.172 | 0.010 | 0.063 | 1.000 | -0.027 |
| | **Q194d-stilltempStaff** | -0.016 | -0.038 | 0.188 | -0.093 | 0.167 | 0.157 | -0.085 | -0.021 | 0.031 | 0.363 | -0.130 | 0.087 | 0.086 | 0.307 | 0.043 | -0.048 | 0.021 | 0.138 | -0.154 | -0.084 | -0.027 | 1.000 |

**Appendix II: Questionnaires for SMEs Proprietors**

Dear Participant,

I am Lindah Fatuma Kakai, a student at Egerton University pursuing Masters of Research and Public Policy. I am undertaking research on "Influence of Environmental policy on Economic Performance of Manufacturing Small and Medium Sized Enterprises in Nakuru County" I would kindly request that you fill in this questionnaire to the best of your knowledge. The information you provide will be treated with utmost confidentiality and will be used purely for academic purposes only. Thank you

**SECTION A: OWNER-MANAGER INFORMATION**

1. What is your age group (in years)?

| | |
|---|---|
| 18- 29 | |
| 30-39 | |
| 40-49 | |
| 50 + years | |

2. Please indicate your gender

| | |
|---|---|
| Male | |
| Female | |

3. How long have you worked with the firm?

| | |
|---|---|
| 0-2 years | |
| 3- 5 years | |
| 6-8 years | |
| 9- 11 years | |
| 11 + years | |

4. Please indicate your highest level of education

| | |
|---|---|
| No formal schooling | |
| Primary school | |
| Secondary school | |
| Technical Educational Training Colleges (TVET) | |
| University (Bachelors/Postgraduate) | |

**SECTION B: FIRM CHARACTERISTICS**

5. How many people are full-time employees of your firm at present?
6.

| | |
|---|---|
| Fulltime | |
| Temporary | |

7. How many years has your firm been in operation?

   ……

   (Years)

8. Which manufacturing sector does your firm best fit in?

| **Sectors** | **Response** |
|---|---|
| 1. Textile and Apparels | |
| 2. Energy, Electrical and Electronics | |
| 3. Chemical and Allied, | |
| 4. Building & construction | |
| 5. Fresh farm produce | |
| 6. Food & beverage | |
| 7. Metal and Allied Sector. | |
| 8. Plastic and Rubber | |
| 9. Carpentry | |
| 10. Entertainment | |
| 11. Paper and Board | |
| 12. Motor vehicle and accessories | |
| 13. Others | |

9. Do the operations of your firm conform to the Environmental Management Coordination Act, 1999, and NEMA regulations?

| | |
|---|---|
| Yes | |
| No | |

10. Do the operations of your firm conform to the Energy ACT (2019) and Energy regulations in Kenya?

| | |
|---|---|
| Yes | |

| | |
|---|---|
| No | |

11. If **YES in 8 and 9**, is your firm implementing policy/policies to stay compliant with the provision of Environmental and Energy regulations such as EMCA 1999, and NEMA regulations and Energy ACT?

| | |
|---|---|
| Yes | |
| No | |

12. If **YES** in question **8** and 9, indicate whether the Environmental policies currently implementing are formal or informal?

| | |
|---|---|
| Formal | |
| Informal | |

13. If **NO** in question **8** and **9,** what strategies are you using to comply with the provisions of Kenyan environmental regulations?

……

……

**SECTION C: ENVIRONMENTAL MANAGEMENT PRACTICES**

**Waste Management Practices Adoption**

14. Kindly state the type of waste you produce from your firm's manufacturing process.

……

……

……

15. How do you deal with each type of waste produced?

……

……

……

**Energy Efficiency Practices Adoption**

16. Kindly state the practices you use to ensure efficient use of energy within your firm's operations?

……

……

……

17. Nature of Environmental Management Practices

**To what extent do you agree or disagree to each of the following statements indicating the nature of environmental management practices that your firm has adopted. With a scale 1-5, Where 5 being "Strongly Agree", 4 being "Agree", 3 being "Slightly Disagree", 2 being "Disagree" and 1 being "Strongly Disagree"**

| **Statement** | **Strongly Agree** | **Agree** | **Slightly Disagree** | **Disagree** | **Strongly Disagree** |
|---|---|---|---|---|---|
| | **5** | **4** | **3** | **2** | **1** |
| The EMPs we currently use appeals to the needs of customers | | | | | |
| We use the EMPs to improve the firm's image with customers | | | | | |
| We use the EMPs to attract employees with competitive skills | | | | | |
| We use the EMPs to motivate employees | | | | | |
| We use the EMPs to improve the quality of products | | | | | |
| We use the EMPs to lower environmental risks in our operations | | | | | |
| We use the EMPs to lower premiums from insurers | | | | | |
| We use the EMPs to lower taxes from the government | | | | | |
| We use the EMPs to enable us to acquire financial incentives from lenders | | | | | |
| We use the EMPs to save on cost of production | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| We use the EMPs to create opportunities for the enterprise to export its products | | | | | |

18. Energy Efficiency Practices Adoption

**On a scale of 1-5 (1 = Very poor, 2 = Poor, 3 = Slightly Disagree ,4 = Good and while 5= Excellent) how do you rate your firm's extent in practicing the Energy efficiency practices/activities indicated in the table below?**

| **Practices** | **Excellent** | **Good** | **Slightly Poor** | **Poor** | **Very poor** |
|---|---|---|---|---|---|
| Use of energy efficient bulbs | | | | | |
| Employee education and training on energy efficiency | | | | | |
| Proper and timely maintenance of equipment | | | | | |
| Use of most efficient type of electric equipment's | | | | | |
| Having an officer responsible for energy consumption | | | | | |
| Turning off lights and equipment when not in use | | | | | |
| Use of solar energy such as solar lighting and solar to run the machines | | | | | |
| Proper insulation of manufacturing equipment's | | | | | |
| Use of energy efficient machinery and equipment | | | | | |
| Conducting energy Audits | | | | | |

19. Extent of Waste Management Practices adoption

**On a scale of 1-5 (1 = Very poor, 2 = Poor, 3 = Slightly Poor, 4 = Good and while 5 = Excellent) how do you rate your firm's extent of the adoption of Waste Management practices/activities indicated in the table below**?

| Practices | Excellent | Good | Slightly Poor | Poor | Very poor |
|---|---|---|---|---|---|
| Regular purchasing of raw materials that can be reused or recycled | | | | | |
| Regular training of staff on good waste management procedures | | | | | |
| Regular separation of waste into different kinds such as plastics, organic, glass among others. | | | | | |
| Regularly packaging of firm products with biodegradable materials | | | | | |
| Carrying out waste recycling at the firm's manufacturing site | | | | | |
| Carrying out waste recycling away from the firm. | | | | | |
| Reducing the time the firm's machinery are not in use. | | | | | |
| Regularly and routinely maintenance of machinery to reduce equipment failure and unplanned downtime | | | | | |
| Selling your wastes to other organizations | | | | | |

**SECTION D: ECONOMIC PERFORMANCE of MANUFACTURING SMES**.

20. **Economic performance Measures**

To what extent do you agree or disagree to each of the following statements indicating the influence of environmental management practices adopted on economic performance at your organization. With a scale 1-5, Where 5 being "Strongly Agree", 4 being "Agree", 3 being "Slightly Disagree", 2 being "Disagree "and 1 being "Strongly Disagree".

**Firm's performance in Net profit margins**

| Statement | Strongly Agree | Agree | Slightly Disagree | Disagree | Strongly Disagree |
|---|---|---|---|---|---|

| | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|
| Our firm's revenue increased after the implementation of the environmental management practices (EMPs) | | | | | |
| Implementation of EMPs has reduced the operating expenses of our business | | | | | |
| Implementation of EMPs has reduced our firms' taxes. | | | | | |
| Our firm reduced its compliance costs after the implementing of the EMPs | | | | | |
| Our firm reduced costs of the goods it sold after implementing its EMPs | | | | | |

**Amount of Annual Sales**

| **Statement** | **Strongly Agree** | **Agree** | **Slightly Disagree** | **Disagree** | **Strongly Disagree** |
|---|---|---|---|---|---|
| | **5** | **4** | **3** | **2** | **1** |
| Our firms' annual sales were performing well in comparison to the current values, before the implementation of EMPs | | | | | |
| Our firm's annual sale was not performing well in comparison to the current values, before the implementation of the EMPs | | | | | |
| Our firm's annual sales increased significantly, after implementing the EMPs. | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Our firms' annual sales remained the same after the implementing the EMPs | | | | | |
| Our firms' annual sales reduced significantly, after the implementing the EMPs | | | | | |

**The level of Market Share**

| **Statement** | **Strongly Agree** | **Agree** | **Slightly Disagree** | **Disagree** | **Strongly Disagree** |
|---|---|---|---|---|---|
| | **5** | **4** | **3** | **2** | **1** |
| Our total sales were performing well compared to all of our competitors in the market, before the implementation of Environmental Management Practices (EMPs) | | | | | |
| Our total sales were not performing well compared to all of our competitors in the market before the implementation of EMPs | | | | | |
| Our firms' sales have increased significantly compared all of our competitors in the industry, after the implementation of EMPs | | | | | |
| The cost of distributing and producing our products have declined significantly, after the implementation of EMPs. | | | | | |
| The market size of our products was large in comparison to all of our competitors in the industry, before the implementation of EMPs | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| The market size of our product was small compared to all of our competitors in the industry, before the implementation of EMPs. | | | | | |
| The market size of our products increases significantly in comparison to our competitors in the industry, after the implementation of EMPs | | | | | |
| Our business reputation improved significantly, after the implementation of EMPs | | | | | |

**Number of employees**

| **Statement** | **Strongly Agree** | **Agree** | **Slightly Disagree** | **Disagree** | **Strongly Disagree** |
|---|---|---|---|---|---|
| Our firm was employing more temporary staff, before the implementation of Environmental Management Practices (EMPs) | | | | | |
| Our firm was employing more permanent staff members, before the implementation of EMPs, | | | | | |
| Our firm is employing more permanent employees, after the implementation of EMPs. | | | | | |
| Our firm is still employing more temporary staff after the implementation of EMPs | | | | | |

**Thank you very much for participating in my research, may Almighty God bless you abundantly**

**Appendix III: SMEs Proprietors Interview Guide**

**SECTION A: BUILDING RAPPORT**

**1. Appreciation and introduction:**

Thank you so much for participating in this study. First, I would like to thank you for your time and accepting to participate in this discussion. I am Lindah Kakai, a master's student from Egerton University, pursuing Master of Research and Public Policy.

**2. Overview of purpose and goals:**

The aim of this research is to investigate the effects of environmental management in practices on Economic performance among the manufacturing Small and medium sized enterprises in Nakuru County. During the discussion, the interviewer will ask questions about the research objectives. Please note that there are no right or wrong responses, the interviewer is very interested in your perspectives regarding the research.

**3. Confidentiality:**

The Interviewer will write about your experiences and perspectives and coded name will be used instead. The research may quote what you say but will not use your name. Moreover, you do not need to answer every question, and you can decide to skip a question. The interviewer will provide more clarification for any question that you might feel is not clear.

**4. Recording:**

The interviewer will make occasional notes so as give you complete attention during the discussion. In addition, upon your consent, the discussion will digitally be recorded and if you want to see any part of the transcript, a copy will be provided later.

Please confirm that you agree to be part of the survey: Signature…….

**SECTION B: BASIC INFORMATION ON THE SME**

1. What is the type of your business/firm?
2. Which year was your firm established?

**SECTION C: THE NATURE AND EXTENT OF ENVIRONMENTAL POLICY ADOPTION**

1. Which type of waste does your firm's operation produce?
2. How are you managing these wastes?
3. What type of energy/fuel (s) is your firm currently using?
4. How is your firm ensuring that it efficiently uses the energy/fuel?
5. What are some of the policies and strategies adopted by your firm (informal/formal) that guide the operations especially on environmental issues?

**SECTION D: ENVIRONMENTAL MANAGEMENT PRACTICES (EMPs) AND ECONOMIC PERFORMANCE**

6. How do the practices/strategies you are currently adopting to manage waste(s) produced influence the overall economic performance (profit margins, sales, market share and the number of employees) of your business?

How do the practices/strategies that you have adopted for ensuring energy efficiency influencing the overall economic performance (profit margins, sales, market share and the number of employees) of your business?

**Appendix IV: County Environmental Officer Interview Guide**

**Introduction**

The purpose of this study is to establish the influence of Environmental management policy on the Economic performance of Small and medium Sized Enterprises in Nakuru County. Feel free to respond to all the questions, as the responses will be used only for the study.

**SECTION A: Background information**

1. Please indicate your gender.

| | |
|---|---|
| Male | |
| Female | |

2. How long have you been the environmental officer in Nakuru County?

……
….

3. What is the highest education qualification attained?

| | |
|---|---|
| Certificate | |
| Diploma | |
| Degree | |
| Postgraduate | |
| Others (specify) | |

**SECTION B: Issues related to the influence of environmental policy to economic performance of Manufacturing SMEs in Nakuru County**

4. How often do you conduct inspections in manufacturing firms in the County?

……
……
…….

5. What is the extent of the adoption of environmental management practices among the SMEs regarding compliance to environmental regulation in Kenya for instance Waste Management regulation, 2006

……
……
……
……

6. What is the nature of the adoption of environmental management practices among the SMEs regarding compliance to environmental regulation in Kenya for instance Waste Management regulation, 2006?

……

……

……

……

7. In your own opinion, what is the implication of adopting environmental management practices on the economic performance of SMEs for both short term and long term.

……

……

……

……..

8. In your own opinion, what are the barriers to the adoption of environmental management practices among SMEs?

……

……

……

……..

9. In your own Opinion, what are the possible solutions to solve the barriers that you have highlighted?

……

……

……

….....

**Appendix V: List of Firms in the Manufacturing Sector in Nakuru County**

**Table 32**

*List of Manufacturing Firms in Nakuru County*

| **Name** | **Sector** |
|---|---|

| | |
|---|---|
| **1.** Bidco | Food & Beverages |
| **2.** Brookside Dairly Ltd | Food & Beverages |
| **3.** Bunda Cakes | Food & Beverages |
| **4.** Happy Cow Ltd | Food & Beverages |
| **5.** Kenya Seed Co.Ltd | Food & Beverages |
| **6.** Keroche Industries Ltd | Food & Beverages |
| **7.** Kinangop | Food & Beverages |
| **8.** Mdi Ltd | Food & Beverages |
| **9.** Hygiene Supa Chemicals | Chemical and allied |
| **10.** Valley Convectionery | Food & Beverages |
| **11.** Realfood Africa | Agri-Business |
| **12.** Mutsimoto Motor Co. Ltd. | Motor Vehicle & Accessories |
| **13.** Gone Fishing Ltd | Metal & Allied |
| **14.** Hobra Manufacturing Ltd | Metal & Allied |
| **15.** Nalin Steel Works Ltd | Metal & Allied |
| **16.** Ndume Ltd | Food & beverage and Metal & Allied |
| **17.** Beberavi Collections Ltd | Textile & Apparels |
| **18.** Bedi Investments Ltd. | Textile & Apparels |
| **19.** Ubuntu Life Foundation | Textile & Apparels |
| **20.** Spin Knit Ltd | Textile & Apparels |
| **21.** Tulips Collections Ltd | Textile & Apparels |
| **22.** Kapi Ltd | Chemical & ALLIED SECTOR |
| **23.** Francis Mwaura | Carpentry |
| **24.** Mea Limited | Chemical & Allied Sector |
| **25.** Osho Chemicals | Chemical & Allied Sector |
| **26.** Pyrethrum Board of Kenya | Chemical & Allied Sector |
| **27.** African Diatomite Industries Ltd | Building, Mining & Construction |
| **28.** Reliable Concrete Works Ltd | Building, Mining & Construction |
| **29.** Comply Industries Ltd | Timber, Wood & Furniture |
| **30.** Economic Housing Group | Timber, Wood & Furniture |
| **31.** Elburgit Enterprises | Timber, Wood & Furniture |
| **32.** Shayona Timber | Timber, Wood & Furniture |

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| **33.** Cartubox Industries Ltd. | Paper & Board Sector |
| **34.** Mega Pack Ltd | Paper & Board Sector |
| **35.** Roka Industries Ltd | Energy, Electrical & Electronics |
| **36.** Soliinc East Africa Ltd | Energy, Electrical & Electronics |
| **37.** Aquilla Development Company | Fresh Produce |
| **38.** Fontana Limited | Fresh Produce |
| **39.** Groove Ltd | Fresh Produce |
| **40.** Imani Flowers | Fresh Produce |
| **41.** Maridadi Flowers | Fresh Produce |
| **42.** Rainforest Farmlands | Fresh Produce |
| **43.** Xpressions Flora | Fresh Produce |
| **44.** Sierra Flora | Fresh Produce |
| **45.** Oserian Development Co. Ltd | Fresh Produce |
| **46.** Nakuru Platics Ltd | Plastics & Rubber |
| **47.** Automobile Warehouse Ltd | Motor Vehicle & Accessories |
| **48.** Nakuru Modern Feeds Ltd | Animal products |
| **49.** Biashara Master Sawmills Ltd | Timber, Wood & Furniture |
| **50.** Goldox (K) Ltd | Food and beverage |
| **51.** Mourice Juma | Entertainment |
| **52.** Ganesh Eco Solutions | Chemical & Allied Sector |
| **53.** Royal Group Industries K. Ltd | Plastic and rubber |
| **54.** Nakuru Crater Pure Water Bottlers Ltd | Food and beverage |
| **55.** Iso Panels Ltd | Energy, Electrical & Electronics |
| **56.** Wonder Feeds Ltd | |
| **57.** Oil Crop Development Ltd | Chemical & Allied Sector |
| **58.** Nakuru Tanners Ltd | Leather |
| **59.** Kenya Flexo Gravure Ltd | Textile and apparels |
| **60.** Nakuru Polyplast Ltd | Plastic and rubber |
| **61.** Lanet Flour Mills | Food and beverage |
| **62.** Nakuru Industries Ltd | Textile and apparels |
| **63.** Transafric Timber | Timber, Wood & Furniture |
| **64.** Mashwa Breweries Ltd | Food and beverage |

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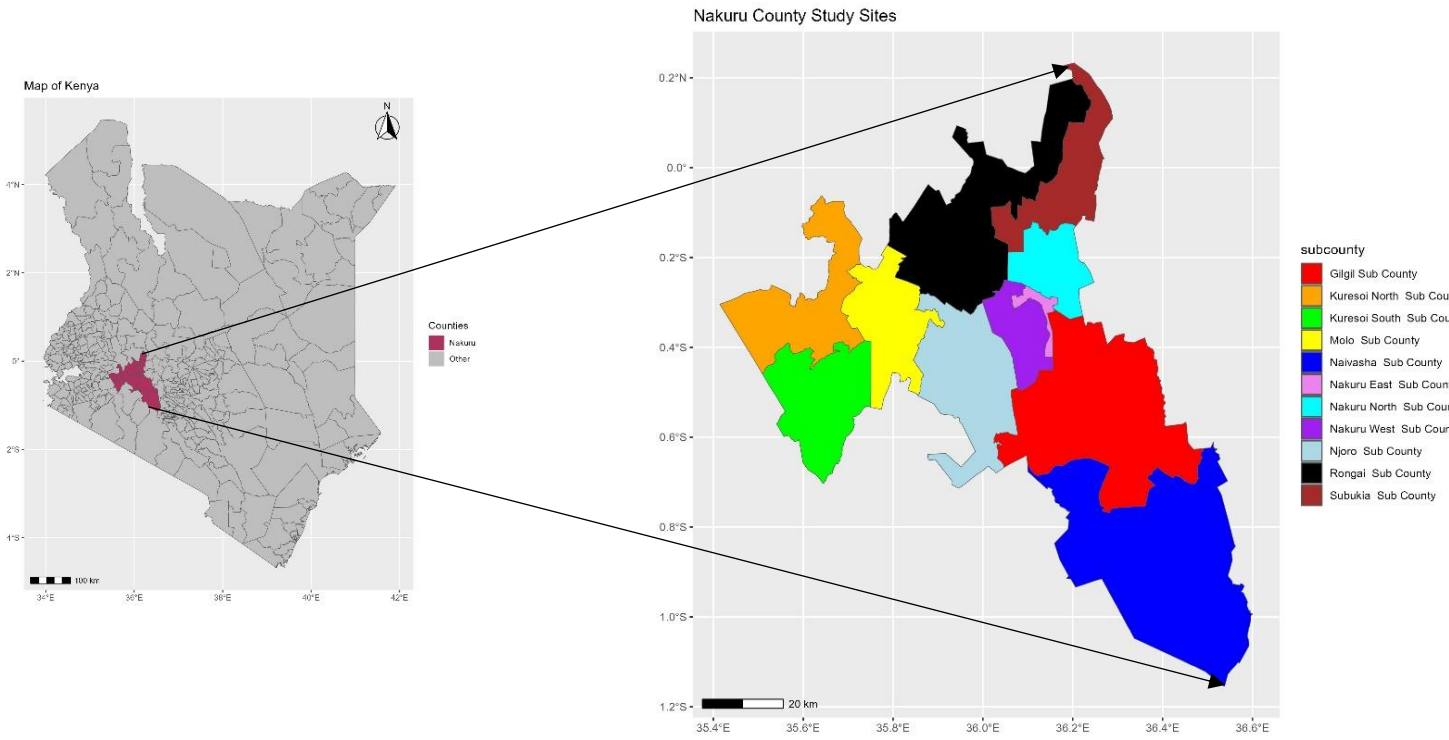
|---|---|
| **65.** Danson Muchai | Textile |
| **66.** Rift Valley Products Ltd | Food and beverages |
| **67.** Equator Milk | Food and beverages |
| **68.** Botto-Solar | Energy |
| **69.** Crown Foods | Food and beverages |
| **70.** Cartobox | Food and beverages |
| **71.** Milling Corporation (2009) Ltd | Food and beverages |
| **72.** Valley Bakery | Food and beverage |
| **73.** Hobra Ltd | Plastic and rubber |
| **74.** Nakuru Blankets | Textile and apparels |
| **75.** Nakuwell Ltd | Food and beverages |
| **76.** Gull Foods (EGERTON) | Food and beverages |
| **77.** Bedi Ltd | Textiles and apparels |
| **78.** Londra Ltd | Textile and apparels |
| **79.** Spinit Textiles | Textile and apparels |
| **80.** Diatomite | Mining |
| **81.** Kenana Knitters | Plastic and rubber |
| **82.** Timsales | Wood, timber and furniture |
| **83.** Majani Mingi Estates | Food and beverages |
| **84.** Kenya Seed Co Ltd | Food & Beverages |
| **85.** Keroche Industries Ltd | Food & Beverages |
| **86.** Kinangop Dairy Ltd | Food & Beverages |
| **87.** Mdi Ltd | Food & Beverages |
| **88.** Menengai Oil Refineries Ltd. | Food & Beverages |
| **89.** Mombasa Maize Millers | Food & Beverages |
| **90.** Real Foods Ltd | Food & Beverages |
| **91.** New Kcc | Food & beverage |
| **92.** Jacob Kibet Rono | Carpentry |

**Source: Ministry of Industry, Trade and Cooperation,**

**Appendix VI: Map of Nakuru County**

**Figure 12**

*Map of Nakuru County*




**Source: Author, (2024)**

## Appendix VII: Research Authorization Document

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **953117**

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## Appendix VIII: Research Outputs

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*Original Article*

# Stakeholders' Perceptions on Influence of Energy Efficiency Practices Adopted on Economic Performance of Selected Small and Medium Sized Manufacturing Enterprises in Nakuru County, Kenya

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**ABSTRACT**

The adoption of environmental policy among large manufacturing firms has been recognized for enhancing their economic performance. This is crucial for achieving Kenya's Vision 2030, the fourth medium term plan (2023-2027) and the Bottom-Up Economic Transformation Agenda (BETA) for Inclusive Growth. Despite the slow pace, small and medium-sized enterprises (SMEs) are now adopting these policies to reduce their environmental footprint. However, there is limited documentation on how these practices affect their economic performance. Hence, this study aimed at examining stakeholders' perceptions on the influence of adopting energy efficiency practices on the economic performance of selected manufacturing SMEs in Nakuru County. The study was guided by the ecological modernization theory (Win-Win principle). An explanatory sequential mixed-method research design was employed, targeting SME proprietors in the manufacturing sector with a sample size of 76 respondents. Descriptive and inferential statistics (linear regression) was used to analyze quantitative data, while content analysis was used to analyze qualitative data. The study found out that SMEs largely adopted the use of energy-efficient bulbs and turned off lights when not in use. However, they used solar lighting as an energy efficiency practice to a lesser extent because they consider this practice expensive. The study also found that stakeholders perceived that energy efficiency practices adopted had a significant influence on the economic performance of selected manufacturing SMEs. This finding implied that energy efficiency practices adopted by manufacturing SMEs would have an influence on SMEs economic performance. This study recommends that the government, both national and county should sensitize the SMEs as well as allocate financial and technical resources to support SMEs implement and upscale their energy efficiency practices within their operations. The focus of energy efficiency practices should be on those that reduce production costs and enhance competitiveness such as those that improve SMEs customer base.

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