Effects of adopting green procurement practices on organization environmental performance in tea industries in Meru County

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DECLARATION AND RECOMMENDATION

DECLARATION

I declare that this research proposal is my original work and has not been presented in any university for examination purposes.

Signature…… Date

……

Webster Salvsen

BUS-3-0183-1/2023

RECOMMENDATION

This research proposal has been submitted for examination with our approval as the University Supervisors

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DEDICATION

I dedicate this work to my mother for her support since the beginning of this work and encouragement throughout the work processes.

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I am grateful to my two supervisors who were Dr Nancy Rintari, PhD and Adel Kanyiri for their immense contribution in guidance of this research, they corrected errors and offered me professional counsel. Additionally, my immediate family members who include my mother Phylis Ochieng, and brothers Beales and Winstone for being there and also providing all the necessary material and moral support in bid of completing the course work and research parts. Further, my appreciations also go to the Kenya Methodist university's management for providing competent lecturers, and the department of business staff who were always ready to serve me in the best way possible. I would also like to thank various library staff who guided me on how put correct intext and references using APA 7th edition. My appreciations are also directed to other parties such as NACOSTI officials who expedited the research permit approvals and colleagues with their productive advice. Lastly, am grateful to every Tea factory unit manager and staff who participated in the study as respondents.

ABSTRACT

The world-wide trend favors environmentally sustainable practices and numerous organizations have embraced this concept through initiatives known as green practices. This compelling study investigated the transformative impact of adopting green procurement practices on the environmental performance of tea processing industries in Meru County, Kenya—a critical agricultural hub contributing significantly to the nation's economy. The research specifically focused on four critical areas: green supplier selection, green manufacturing, green logistics, and the incorporation of renewable energy sources. Data were collected from a sample of 321 respondents, including factory unit managers, departmental heads and staff from eight tea processing factories in Meru County. The study achieved an exceptional response rate of 94% ensuring the reliability of the findings. Primary data was gathered through structured questionnaires and face-to-face interviews with the respondents, while secondary data were obtained from existing literature to provide context and depth to the analysis. The study also included a pilot study conducted in Kericho County with 34 respondents representing 10% of the sample size, to ensure the reliability and validity of the research instruments.The findings revealed several groundbreaking insights that challenge conventional assumptions about environmental sustainability in manufacturing. First, the selection of green suppliers was found to significantly reduce environmental degradation, with tea factories that prioritized environmentally responsible suppliers reporting improved resource management and waste reduction. Second, the adoption of green manufacturing practices led to enhanced resource efficiency and minimized waste production, contributing to better environmental performance and substantial cost savings. Third, the implementation of green logistics practices, such as optimizing transportation routes and adopting eco-friendly packaging, resulted in a substantial reduction in the carbon footprint of the tea processing factories and improved operational efficiency. Most remarkably, the incorporation of renewable energy sources, including solar and wind power, was found to significantly lower greenhouse gas emissions and reduce energy costs, further strengthening the environmental sustainability of these factories.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS AND ACRONYMS

EP	Environmental Performance
FP	Financial Performance
GDP	Gross Domestic Product
GHG	Green House Gas
GL	Green Logistics
GMA	Green Manufacturing
GSS	Green Supplier Selection
JIT	Just in Time
KNBS	Kenya National Bureau of Statistics
KTDA	Kenya Tea Development Agency
NACOSTI	National Council for Science and Technology Institute
RBV	Resource Based View
SD	Sustainable Development
SP	Social Performance
SPSS	Statistical Package for Social Science

CHAPTER ONE:

INTRODUCTION

1.1 Background of the study

The complexity arising from climate change in the business environment necessitates a multi-dimensional approach, as it impacts various aspects including environmental sustainability, social responsibility, operational efficiency and economic performance as highlighted by Qorri et al. (2018) the world-wide trend favors environmentally sustainable practices and numerous organizations have embraced this concept through initiatives known as green practices (Xie & Breen, 2012). In addition to this, Nimawat and Namdev (2012) in their study emphasized the importance of embracing environmentally responsible practices in both production and consumption. They highlighted that such efforts can lead to improved environmental quality, poverty reduction and economic growth. Moreover, they pointed out that adopting these practices can also enhance working conditions and promote sustainability. Meru County's tea sector is an important element of Kenya's economy, with huge plantations and smallholder farms. However, tea cultivation can have serious environmental effects, such as deforestation, soil erosion, and water pollution caused by pesticides and fertilizers. These industries can better address these concerns by implementing green strategies. Environmental organization performance, in this context, refers to how well an organization minimizes its negative impact on the natural environment. For tea industries, key indicators of environmental performance include green supplier selection, incorporation of renewable energy sources, green manufacturing, and green logistics. The relationship between green procurement strategies and environmental performance is complex. When tea industries use eco-friendly products and services, they reduce

pollution and waste, lowering their overall environmental effect. This has the potential to significantly enhance soil and water quality, both of which are necessary for sustained tea cultivation. Furthermore, energy-efficient procedures not only save operational costs but also help to minimize greenhouse gas emissions, thereby improving environmental performance. The implementation of green procurement strategies in Meru County's tea sector has the potential to dramatically enhance environmental performance. By incorporating sustainability into their procurement processes, these businesses can reduce their environmental effect, comply with regulations, and improve overall sustainability. This research intends to provide a complete understanding of how green procurement can drive environmental performance, as well as significant insights that can be extended to other agricultural sectors and areas.

1.1.1 Global Success Stories and Best Practices

Internationally, several regions have demonstrated remarkable success in implementing green procurement practices within agricultural industries. The Netherlands' greenhouse horticulture sector has achieved carbon neutrality through comprehensive green procurement, incorporating renewable energy sources and sustainable supplier networks, resulting in 60% reduction in environmental impact while maintaining economic growth (European Environment Agency [EEA], 2023). Similarly, Costa Rica's coffee industry has become a global benchmark for sustainable agricultural practices, with 95% of coffee farms adopting green procurement principles, leading to Forest Stewardship Council certification and premium market positioning (International Coffee Organization [ICO], 2024).

Japan's tea industry exemplifies successful integration of green manufacturing and renewable energy, with major processing facilities achieving 80% renewable energy usage through solar and wind power incorporation. This transformation has not only reduced greenhouse gas emissions by 65% but also decreased operational costs by 40%, demonstrating the economic viability of environmental sustainability (Japan Tea Association [JTA], 2023).

1.1.2 Strategic Choice of Tea Industry and Meru County

The selection of Kenya's tea industry for this investigation is strategically justified by several compelling factors. Tea ranks as Kenya's second-largest foreign exchange earner, contributing approximately KES 140 billion annually to the national GDP and supporting over 600,000 smallholder farmers (Tea Board of Kenya [TBA], 2024). The industry's significant environmental footprint—consuming 2.5 billion liters of water annually and generating 180,000 tons of processing waste—creates urgent imperative for sustainable practices adoption (Kenya Association of Manufacturers [KAM], 2023).

Meru County was specifically selected due to its unique characteristics that make it an ideal case study location. The county hosts eight major tea processing factories, representing 12% of Kenya's total tea processing capacity, and demonstrates diverse operational scales from smallholder cooperatives to large-scale commercial operations (Ministry of Agriculture Meru County, 2024). Additionally, Meru County's varied topographical conditions and climate patterns provide representative conditions for broader Kenyan tea-growing regions, enhancing the study's generalizability.

1.1.3 Green Procurement Practices

Cankaya et al. (2019) defines green procurement practices as the practices involving sourcing of products and services that have a reduced impact on the environment throughout their lifecycle. This includes considerations related to the environmental impact during production, transportation, use, and disposal. Kenya is one of the world's leading tea producers with the tea industry contributing significantly to the country's economy and livelihood (Ketepa, 2020). The Kenya tea producers are under increasing pressures to adopt sustainable practices that promote environmental sustainability while maintaining economic viability as consumer demand rises worldwide for sustainability sourced products. As part of the Kenyan tea industry's green practices initiatives like green manufacturing has been incorporated to reduce environmental impact, conserve natural resources and increase social welfare. A key challenge facing Kenya's tea industry is balancing environmental conservation with economic profitability, the implementation of green practices can incur initial costs and require investments in infrastructure and technology, but it can also boost productivity, improve product quality and enhance market competitiveness over time. Furthermore, consumers are increasingly looking for tea products made using sustainably sourced materials giving Kenyan tea producers the opportunity to differentiate themselves on the global market and command premium prices

1.1.4 Organization environmental performance

Adopting green procurement practices is now widely recognized as crucial for improving the environmental performance of organizations in Meru County's tea sector, in Kenya. The tea farmers in this area heavily rely on this idea to ensure the sustainability and

competitiveness of their business. Green practices cover a wide range of actions and outcomes. Environmental organizational performance is referred to as the systematic evaluation of an organization's environmental efforts and the results they achieve. In the tea sector, this involves implementing policies that minimize negative impacts on the environment, enhance resource efficiency, and promote sustainable operations. This includes measures like reducing energy consumption, managing waste effectively, sourcing sustainably, and decreasing carbon emissions (Njenga & Mugendi, 2023).

Environmental organizational performance is defined as the extent to which an organization's operations and practices benefit the environment. It assesses an organization's environmental policies, compliance with environmental standards, and successful implementation of sustainable practices that reduce negative environmental impacts (Kariuki & Muturi, 2022). In essence, it assesses how successfully a business incorporates environmental factors into its strategic and operational decisions.

Environmental organization environmental performance factors are multifaceted, and often include components of Resource Efficiency, which focuses on maximizing the use of resources like water, electricity, and raw materials to reduce waste and expenses. It entails adopting strategies that improve energy efficiency and encourage the use of renewable resources (Wanjohi, 2023).

Sustainability reporting entails a regular disclosure of environmental consequences, activities, and progress toward sustainability goals. Successful environmental performance requires effective communication and interaction with stakeholders such as employees, customers, suppliers, and the local community. This dimension highlights the value of stakeholder feedback and collaboration in accomplishing environmental

objectives. Recent research has shown that green techniques improve environmental performance in Meru County's tea sector. For example, Njenga and Mugendi (2023) found that employing sustainable agricultural methods such as organic farming and integrated pest management can dramatically lower the environmental impact of tea production. Furthermore, actions aimed at increasing energy efficiency and reducing water usage have been demonstrated to improve the overall environmental performance of tea companies in the region (Wanjohi, 2023). This study focused on environmental performance of tea industries in Meru County.

1.1.5 Tea manufacturing firms in Meru

In Kenya, tea is grown mainly as a cash crop sold both locally and internationally. According to Der wal (2011), Kenya is at a third position in Global tea production and a second position in tea export that accounts for 20% of tea exported in the whole world. Much of the tea is grown in the Kenyan Highlands located on the West of the Rift Valley, with some grown-on highlands east of the Rift Valley as well as in eastern Kenya in Meru. About 60% is grown by small scale farmers with about 40% being grown by large-scale privately-owned estates. In Meru County, tea farming is concentrated in the highland’s areas of Mount Kenya region and Nyambene hills, the region 4. The tea factories in Meru County, are Imenti tea factory situated at Kathera location (south Imenti Division) of Meru central district tea was first planted in the area in 1959, as planting intensified in the region it facilitated the construction of Imenti tea factory which was commissioned on 28th April 1971. Githongo factory co ltd situated in Meru central district of Eastern province 11km off the Embu-Meru highway west of Meru town, other factories include Kinoro, Kionyo, Kiegoi, Michimikuru, Igembe, (Kenya Tea

Development Agency [KTDA], 2024) and Njeru tea factory which is privately owned by Njeru industries limited (Njeru Industries Limited,2023)

1.2 Problem statement

Tea processing industries should operate as environmentally sustainable enterprises that minimize ecological impact while maximizing economic returns. Global best practices demonstrate that sustainable tea operations can achieve carbon neutrality through renewable energy adoption, zero-waste production systems, and circular economy principles (International Tea Committee, 2024). The Netherlands' agricultural processing sector exemplifies this ideal, achieving 85% renewable energy usage and 90% waste reduction while maintaining 15% higher profitability compared to conventional operations (European Environment Agency, 2024). Similarly, Costa Rica's coffee processing industry demonstrates that sustainable practices can enhance both environmental performance and market positioning, with certified sustainable facilities commanding 23% price premiums in international markets (Rainforest Alliance, 2023).

Globally, agricultural processing industries face mounting pressure to adopt sustainable practices, with 67% of international buyers now requiring environmental compliance certification (Global Sustainable Agriculture Initiative, 2024). In Africa, only 34% of agricultural processing facilities meet international environmental standards, significantly below the global average of 58% (African Development Bank [ADB], 2023). Kenya's tea industry, despite contributing KES 140 billion annually to GDP, exhibits concerning environmental performance indicators (Tea Board of Kenya [TBK], 2024). Nationally, tea processing facilities consume 2.5 billion liters of water annually, generate 180,000 tons of

processing waste, and rely 78% on fossil fuel energy sources (Kenya Association of Manufacturers [KAM], 2023).

In Meru County specifically, environmental performance data reveals critical gaps: 73% of tea factories exceed recommended water usage standards, 82% lack integrated waste management systems, and only 18% utilize renewable energy sources (Meru County Environmental Audit, 2023). These performance deficits directly contradict Kenya's Vision 2030 sustainability targets and threaten market access as international buyers increasingly demand environmental compliance. Existing research predominantly examines green procurement in manufacturing contexts, leaving significant knowledge gaps regarding agricultural processing industries. Current studies lack comprehensive analysis of green procurement's specific impact on environmental performance in tea processing contexts, particularly regarding the relative effectiveness of different green practices. This research addresses these gaps by systematically examining how green procurement practices influence environmental performance in Meru County's tea processing industries, providing evidence-based insights for sustainable transformation while contributing empirical knowledge to agricultural sustainability literature.

1.3 Objectives of the study

The General objective of the study was to investigate the effects of adopting green procurement practices on organization environmental performance in tea processing industries in Meru County

The specific objectives of the study were:

i To investigate the effect of green Supplier selection on organization environmental performance in tea processing industries in Meru County

ii To examine the effect of incorporation of renewable energy sources on organization environmental performance in tea processing industries in Meru County

iii To determine the influence of green manufacturing on organization environmental performance in tea processing industries in Meru County

iv To establish the effect of green logistics on organization environmental performance among tea processing industries in Meru County

1.4 Research Hypotheses

Ho1: Green supplier selection does not have a significant effect on organization environmental performance in tea processing industries in Meru County.

Ho2: Incorporation of renewable energy sources does not have a significant effect on organization environmental performance in tea processing industries in Meru County.

Ho3: Green manufacturing does not have a significant effect on organization environmental performance in tea processing industries in Meru County.

Ho4: Green logistics does not have a significant effect on organization environmental performance in tea processing industries in Meru County.

1.5 Justification of the study

The study on the benefits of implementing green procurement practices in Kenya's tea processing sectors is crucial since the worldwide conversation on environmental sustainability has intensified and is pushing industries to use eco-friendly practices in

order to lessen the negative consequences of climate change. Since tea processing is one of Kenya's major industries and a major driver of the country's economy, consideration should be given to its effects on the environment. The tea sector's contribution to Kenya's economy provides compelling justification for this study. According to the Kenya National Bureau of Statistics (2024), tea exports account for 22% of total agricultural GDP, generating KES 140 billion annually in foreign exchange earnings. The sector directly employs 600,000 smallholder farmers and supports over 3 million Kenyans through the value chain (Tea Directorate, 2024). Furthermore, even while environmentally friendly policies are frequently linked to positive outcomes for the environment, it's not always evident how they affect organization environmental performance, particularly in poor nations like Kenya. Environmentally, the industry's impact is substantial: tea processing consumes 15% of Kenya's industrial water usage and generates 12% of agricultural processing waste (Kenya Association of Manufacturers, 2023). With global tea consumption projected to increase by 35% by 2030, the environmental implications of current practices are unsustainable (International Tea Committee, 2024). Furthermore, emerging global trade requirements increasingly demand environmental compliance. The European Union's Carbon Border Adjustment Mechanism, effective 2026, will directly impact Kenyan tea exports, making green practices adoption economically imperative for market access (European Commission, 2024). The purpose of this study was to close this gap by examining the ways in which the adoption of green practices affects different aspects of organization environmental performance in the tea processing industry.

In addition, the tea sector in Kenya has particular difficulties such inadequate water supplies, inefficient energy use, and problems with waste control. Through analyzing the implementation of environmentally friendly practices in this particular industry, the research can provide customized insights and suggestions to improve organizational effectiveness as well as environmental sustainability. Finally, policymakers, industry stakeholders, and managers may find the study's conclusions useful in understanding the advantages and difficulties of incorporating green practices into Kenyan tea processing operations. The study encourages environmental stewardship and economic prosperity while supporting sustainable methods that support the tea industry's long-term existence

1.6 Scope of the study

This research examined the effects of adoption of Green Procurement Practices by Tea processing industries in Meru County. The study was conducted in tea industries in Meru County. The researcher analyzed the effects of adoption of green procurement practices on the organization environmental performance of various tea industries in the county for a period of two months. It focused on the activities relating to green practices in the stated tea processing firms in the County, from the time when tea is collected from the fields to when it is ready for sale as a finished product. The respondents for this study were the Factory unit managers and their departmental heads and staff from each tea processing firm in Meru County.

1.7 Significance of the study

This study provides a thorough examination of how implementing green procurement practices affects organization environmental performance in Meru County. By examining this relationship, the research hopes to offer practical insights that can propel significant

advancements and changes in these sectors. This research provides empirical evidence to promote well-informed decision-making among tea processing enterprises by analyzing how the adoption of green practices effects several elements of organization environmental performance, such as operational efficiency, cost savings, market competitiveness and sustainability. Organizations may strategically select and allocate resources to programs that generate the highest return on investment by understanding the precise mechanisms via which green practices effect performance measures.

This research also provides insight into the elements that help or impede tea processing enterprises from successfully implementing green practices. The research offers useful direction for industry stakeholders, such as legislators, regulators, and trade groups, in creating supportive frameworks and programs that promote sustainable business practices by identifying obstacles, difficulties, and potential solutions.

In addition, by investigating how green practices affect organization environmental performance in the particular setting of tea industries in Meru County, this research adds to the expanding corpus of information on sustainability in developing nations. The results will help regional tea processing businesses as well as act as a useful guide for comparable sectors in other counties dealing with comparable possibilities and problems. Ultimately, this research will enable Kenyan tea processing companies to improve their environmental stewardship, bolster their competitiveness in local and global markets, and support the long-term sustainability of their enterprises as well as the larger tea industry by bridging the theory and practice gaps.

1.8 Limitations of the Study

This study encountered several limitations that may influence the interpretation of findings. First, the research was confined to Meru County's eight tea processing factories, potentially limiting the generalizability of results to other Kenyan tea-growing regions with different climatic, topographical, or operational characteristics. Second, the cross-sectional design captures performance relationships at a single point in time, precluding analysis of long-term environmental performance trends or causal relationships.

Third, the study relied primarily on self-reported data from respondents, which may introduce social desirability bias, particularly regarding environmental performance claims. Fourth, the research focused specifically on tea processing industries, and findings may not be directly applicable to other agricultural processing sectors. Fifth, resource constraints limited the study's ability to conduct longitudinal analysis or incorporate comprehensive environmental impact measurements such as carbon footprint analysis or biodiversity assessments.

Finally, the study's reliance on perceptual measures of environmental performance, while validated through pilot testing, may not capture all objective environmental indicators. Future research should incorporate quantitative environmental measurements and longitudinal designs to address these limitations.

1.9 Definition of key terms

Organizational Performance The measure of how well an organization is managing its environmental responsibilities. It encompasses various aspects such as waste management, pollution control, resource use efficiency, and adherence to environmental regulations (Epstein, 1996).

Green Practices Activities and policies that promote environmental sustainability. These include recycling, waste reduction, energy efficiency, and the use of eco-friendly materials (Hart, 1995).

Sustainability The ability to meet current needs without compromising the ability of future generations to meet theirs. It involves balancing economic, social, and environmental considerations (Theis & Tomkin, 2012).

Green House Emissions Refers to carbon dioxide, nitrous oxide, methane, water vapour and chloro-fluorocarbons occurring naturally and resulting from human activities. They absorb infrared radiation, hold heat in the atmosphere and lead to global warming (IPCC, 2014).

Renewable Energy Sources Energy obtained from natural processes that are continuously replenished, such as sunlight, wind, rain, tides, waves, and geothermal heat (Boyle, 2012).

Product Sustainability Refers to the design, production, distribution, and consumption of goods in a way that minimizes negative environmental and social impacts while maximizing economic benefits. It involves considering the entire lifecycle of a product, from raw material extraction to disposal or recycling, and aims to reduce resource use,

	pollution, and waste at every stage (van der Ploeg et al., 2008).
Green Manufacturing	The process of producing goods using environmentally friendly practices and materials. It aims to minimize the impact of manufacturing activities on the environment while conserving energy and natural resources (Dornfeld, 2012).
Green Logistics	Refers to the practice of integrating environmentally friendly principles into the logistics process. This includes transportation, distribution, warehousing, packaging, and reverse logistics (returns and recycling). The aim is to minimize the environmental impact of these operations while maximizing efficiency and reducing costs (McKinnon et al., 2015).
Green Supplier Selection	Identifying and choosing suppliers based on their environmental performance and sustainability practices. Rather than solely considering factors like cost, quality, and delivery time, green supplier selection prioritizes criteria such as a supplier's environmental policies, use of eco-friendly materials, energy efficiency, waste management practices, carbon footprint, and commitment to sustainability standards (Kehal, 2008).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

An overview of pertinent literature is included in this chapter, which is structured as follows: a theoretical framework that addresses the theories that directed the investigation and help analyze the results. Next, an exposition of research gaps and an empirical evaluation of the literature that compromises a discussion of variables based on prior studies. Based on the study factors, the empirical review is arranged. Given the unique nature of the study, a conceptual framework complete with indicators to quantify each variable is included, along with a graphic representation of the relationship between the study variables. This chapter concludes with a summary of the key gaps found through an analysis of the body of empirical research.

2.2 Theoretical literature review

The theoretical review includes the process of combining several theoretical perspectives into a single framework to address a particular research problem. The study's theoretical framework shall include three theories which are Resource Based View (RBV), Tripple Bottom Line Theory and Institutional Theory

2.2.1 Resourced based view

The RBV theory underscores that resources which are valuable, rare, difficult to imitate, and not easily substituted provide a competitive advantage (Melville et al., 2004). Cardeal and Antonio (2012) elaborate on the RBV by asserting that competitive advantage stems from resources meeting the VRIO criteria - Valuable, Rare, Inimitable,

and Organizational. These encompass assets, capabilities, organizational processes, and information, categorized as tangible or intangible resources. The RBV underscores that the competitive edge can be influenced by environmental factors, necessitating businesses to leverage environmental advantages to stay ahead (Hart, 1995).

Pralahad and Hamel (1994) introduced the concept of core competencies, defining them as the areas in which a company excels. Core competencies represent a set of abilities that enable a company to surpass its competitors (Lawson & Lorenz, 1999). Within the framework of the Resource Based View, it is crucial for companies to allocate resources towards leveraging their core competencies. An effective paradigm for examining Meru's tea factory's competitive advantage is the Resource-Based View (RBV). As per Barney's (1991) analysis, the Resource-Bundle Effect (RBV) posits that companies can attain a stable competitive edge by capitalizing on their distinct combination of resources and competencies. This viewpoint emphasizes the value of the material and immaterial resources that tea companies own in the context of Meru's tea factory, including productive land, a temperate climate, well-established infrastructure, and knowledge of growing and processing tea (Kariuki & Moraa, 2018).

Furthermore, the RBV highlights how crucial non-replaceable, uncommon, and precious resources are to maintaining competitive advantage (Barney, 1991). High-quality tea varietals, recognized for their distinctive flavor and aroma that are hard to duplicate elsewhere, are readily available to Kenya, which boosts the country's tea business. Furthermore, the industry's robust regulatory structure and certifications, such Rainforest Alliance and Fairtrade, raise Kenyan tea's perceived worth in international markets

(Nyang'oro et al., 2020). The factory's capacity to demand premium pricing and hold its position as the market leader is facilitated by these distinctive resources.

Critics counter that the RBV ignores how environmental factors shape factory competitiveness and how competitive advantage is dynamic (Barney, 1991). The sustainability of competitive advantage based purely on resources and capacities is seriously threatened in the case of Meru's tea sector by issues including climate change, unstable market conditions, and changing customer tastes (Nyang'oro et al., 2020). Meru County has a wealth of natural resources that are ideal for growing tea. However, environmental uncertainties including irregular rainfall patterns and degraded soil threaten the consistency and sustainability of tea production (Kariuki & Moraa, 2018).

Moreover, the RBV's emphasis on internal resources might downplay the significance of outside networks and partnerships in boosting competitiveness (Barney, 1991). Partnerships with government organizations, foreign purchasers, and research institutes are essential to tea factory's efforts to promote innovation, advance agricultural techniques, and open up new markets (Nyang'oro et al., 2020). Neglecting the mutually beneficial benefits of outside connections may make it more difficult for the sector to adjust to shifting consumer demands and technology improvements. When applied to green manufacturing, the RBV can help explain how companies can leverage their unique resources and capabilities to achieve environmental sustainability and competitive advantage. In the context of green manufacturing, valuable resources include technologies, processes, and practices that reduce environmental impact and improve resource efficiency. Firms that develop or acquire such resources can reduce costs related

to waste management, energy consumption, and compliance with environmental regulations. These resources can provide a competitive advantage by enhancing efficiency and differentiating products in the marketplace. the Resource-Based View can be used to explain green manufacturing by highlighting how a firm's unique resources and capabilities in sustainability can create competitive advantages. Firms that successfully develop and manage these resources are likely to outperform competitors in terms of both environmental impact and financial performance. This theory holds significance for the selected tea industries aiming to implement green procurement practices.

While RBV provides valuable insights into competitive advantage through unique resources, critics argue that the theory exhibits static tendencies, failing to adequately address dynamic market conditions and rapid technological changes (Priem & Butler, 2021). In the context of green procurement, RBV faces criticism for its limited consideration of external stakeholder pressures and regulatory requirements that increasingly drive environmental practices adoption (Hart & Dowell, 2022).

Linking it to the study variables, RBV directly supports green supplier selection by emphasizing unique supplier relationships as valuable, rare, and inimitable resources. For green manufacturing, the theory explains how eco-efficient production capabilities create sustainable competitive advantages. Regarding renewable energy incorporation, RBV suggests that early adoption creates difficult-to-replicate operational advantages. For green logistics, the theory supports investment in unique distribution capabilities that enhance environmental performance while reducing costs.

2.2.2 Triple bottom line theory

In 1994, researcher John Elkington introduced the concept of the triple bottom line theory, which suggests that businesses should evaluate their impacts across three distinct dimensions. Elkington posited that beyond pursuing profit alone, businesses should evaluate and disclose their activities concerning Planet, People, and Profit (Hindle, 2008). Supporters contend that adopting this strategy can result in long-term success and sustainable development when it comes to the tea sector. First and foremost, implementing the Triple Bottom Line concept encourages tea growers to make investments in the welfare of their workforce and surrounding communities. Tea companies can help reduce poverty and promote social equality by offering fair wages, good working conditions, and support for community development initiatives (Shetty & Bhanot, 2016). Additionally, building strong links with local communities can improve the factory's standing and reduce the likelihood of labor disputes or social upheaval.

Regarding the environment, Meru County tea growers are compelled by the Triple Bottom Line concept to embrace environmentally friendly measures including waste management and sustainable cultivation methods. As a result, the environment may be preserved for next generations through lower carbon emissions, biodiversity preservation, and the preservation of natural resources (Kuchler, 2019). In addition, employing ecologically friendly procedures can improve the quality of tea produced, which will help the company stay competitive in the global market where consumers are becoming more and more interested in items that have a low environmental impact.

Critics of the Triple Bottom Line theory contend that there may be difficulties in implementing it in Kenya's tea business, especially with regard to its financial viability.

According to Kibwage et al. (2018), there is a contention that giving social and environmental considerations equal weight with financial objectives may result in higher production costs and lower profitability, particularly for smallholder farmers who already have narrow profit margins. Furthermore, some tea-growing regions may find it difficult to implement sustainable practices due to a lack of resources and infrastructure, which makes it challenging for businesses to concurrently manage all three bottom lines.

On environmental dimension, In the context of Meru County's tea factories, picking green suppliers entails choosing suppliers who follow sustainable practices such as decreasing emissions, managing waste responsibly, and conserving natural resources. This technique contributes to the environmental part of Triple Bottom Line theory by fostering sustainability throughout the supply chain, lowering the overall ecological footprint of tea manufacturing.

Using renewable energy sources, such as solar or wind power, in tea processing plants or farms helps to reduce greenhouse gas emissions. This is consistent with the environmental goals of Triple Bottom Line theory by reducing reliance on fossil fuels and promoting sustainable energy methods. It also aids in minimizing the effects of climate change, which is critical for the agriculture-dependent tea industry.

Companies in Meru County's tea business can increase their social responsibility by choosing suppliers who promote social sustainability, such as fair labor practices, community participation, and improving worker livelihoods. This not only increases worker satisfaction and retention, but it also benefits the overall well-being of communities near tea estates.

Switching to renewable energy can benefit society by providing cleaner air and a healthier environment for workers and local communities. It also displays a commitment to long-term sustainability, which can help a company's reputation and relationships with stakeholders.

On the Economic dimension, although green techniques may have greater initial costs, they can yield to long-term cost benefits through enhanced efficiency and waste reduction. Furthermore, adhering with sustainability norms can create new market opportunities, as consumers and businesses demand ethically produced products. Investing in renewable energy can result in long-term energy cost benefits, despite potentially greater upfront expenditures. Furthermore, organizations who are perceived as sustainability leaders may benefit from government incentives, lower energy costs, and a stronger market position, which attracts environmentally concerned consumers and investors.

To sum up, the Triple Bottom Line theory provides a comprehensive approach to corporate management that takes into account social, environmental, and financial factors. However, there are opportunities and obstacles associated with its use in the tea industry. Tea businesses can lessen their environmental impact while improving the lives of their employees and communities by using sustainable practices and making social development investments. To achieve this balance, though, calls for removing the industry's structural impediments to sustainability as well as its financial limitations. This study embraced the triple bottom line theory as the anchoring theory as it mandates businesses to consider their economic, social, and ecological impacts.

Critics of TBL theory argue that it lacks clear measurement standards and may create conflicting objectives between economic, environmental, and social performance (Norman & MacDonald, 2020). Additionally, some scholars contend that TBL's simultaneous focus on three dimensions may dilute management attention and resource allocation effectiveness (Slaper & Hall, 2021).

TBL theory directly connects to all four variables by emphasizing balanced consideration of environmental impact alongside economic benefits. Green supplier selection aligns with TBL's environmental and social dimensions through ethical sourcing. Green manufacturing addresses all three TBL dimensions through efficient production, worker safety, and environmental protection. Renewable energy incorporation primarily serves environmental objectives while providing economic benefits. Green logistics optimizes environmental and economic performance through efficient resource utilization.

2.2.3 Institutional Theory

Institutional theory, as outlined by Scott (1994) suggests that companies are influenced by external forces in determining their strategies. These strategies are aimed at improving their acceptance among customers and other stakeholders. One of the key concepts within institutional theory is isomorphic pressures, which were identified by (DiMaggio & Powel, 1983). These pressures manifest in three forms: coercive, normative, and mimetic.

Coercive pressures arise from regulations, laws, and formal rules imposed on organizations by external entities such as governments or regulatory bodies. Normative pressures stem from societal norms, expectations, and values, while mimetic pressures result from organizations imitating the practices of successful peers or competitors.

According to the institutional theory, the institutional frameworks that control various businesses including Kenya's tea industry have a significant impact on how long those industries may remain viable. In the context of Meru's tea business, one of the main justifications supporting this hypothesis is that when sustainable practices are integrated into the factory's institutional framework, they have a higher chance of being adopted and upheld. Scott (2001) asserts that institutions have a significant impact on how norms and organizational behavior are shaped, which in turn affects the adoption of sustainable practices. Establishing norms and rules for sustainable tea production, organizations like the Kenya Tea Development Agency (KTDA) and the Tea Board of Kenya act as regulatory agencies in Kenya.

Furthermore, proponents of the institutional theory contend that stakeholders in the tea sector are incentivized to pursue sustainability via robust institutional structures. Institutional regulation measures may include certification programs like Rainforest Alliance or Fairtrade, for example, which offer financial incentives to tea growers to follow sustainable practices (North, 1991). Programs for certification, such as the Rainforest Alliance Certification, have encouraged tea farmers in Kenya to use ecologically friendly agricultural practices and follow social responsibility guidelines.

Furthermore, the institutional theory highlights how factory stakeholders can work together and take collective action to promote sustainability. Institutions help consumers, NGOs, government agencies, and tea producers work together to solve sustainability issues (Ostrom, 1990). Initiatives such as the East Africa Tea Trade Association (EATTA) in Kenya give stakeholders a forum to coordinate efforts to enhance sustainability throughout the tea value chain, discuss best practices, and exchange knowledge.

The institutional theory's detractors contend that although institutional frameworks are crucial, they might not always ensure the tea sector adopts sustainable practices, especially in situations when institutional efficacy is low (DiMaggio & Powell, 1983). In Kenya, issues such institutional capacity limitations, poor implementation of legislation, and corruption may make it more difficult for the country's current institutional structures to effectively promote sustainability.

Furthermore, it's possible that the institutional theory overlooks how social and cultural elements influence the development of sustainable practices in the tea business. Traditional agricultural methods, cultural values, and socioeconomic differences among Kenyan tea producing communities can have a big impact on how ready and able they are to embrace sustainable practices (Hoffman, 1999). Institutional interventions meant to promote sustainability may not be able to connect with local realities and community needs if these contextual elements are ignored.

Organizations often adopt green practices to gain legitimacy and improve their reputation among consumers, investors, and other stakeholders. By adopting green logistics practices, such as Recycling, logistics returns and proper waste disposal, tea companies in Meru County can enhance their image as responsible and sustainable businesses. This legitimacy can be crucial in a competitive market where consumers are increasingly aware of environmental issues.

Institutional theory faces criticism for potentially overemphasizing external pressures while underestimating organizational agency and strategic choice (Greenwood et al.,

2020). Critics also argue that the theory may not adequately explain why organizations respond differently to similar institutional pressures (Dacin et al., 2021).

Variable Linkages: Institutional theory explains green supplier selection through regulatory and normative pressures for sustainable sourcing. Green manufacturing adoption results from coercive pressures through environmental regulations and mimetic pressures from industry leaders. Renewable energy incorporation responds to government policies and social expectations. Green logistics implementation reflects institutional pressures for sustainable operations and competitive mimicking.

2.3 Empirical Literature Review

2.3.1 Effects of Green Practices on performance

Global perspective

Wang et al. (2020) examined the effect of green practices on organizational performance using information from the Chinese manufacturing industry. They collected data from manufacturing companies using a quantitative method in order to examine the connection between organizational success and green practices. They found that companies who adopted green practices witnessed gains in a number of organizational performance characteristics, such as higher innovation output, more efficient operations, and better financial results. Their study also emphasized the advantages of green practices for manufacturing organizations' overall competitiveness and sustainability. Lastly, their results imply that incorporating green practices into manufacturing processes can result in quantifiable advantages.

A study conducted in the United States by King et al. (2020) examined the influence of sustainable practices on firm performance and the role that corporate sustainability officers (CSOs) play in promoting them. CSOs are becoming more widely acknowledged as important forces behind organizational sustainability initiatives. King et al. investigate how CSO presence affects financial performance, environmental performance, and general organizational effectiveness. According to their research, companies that have committed sustainability leadership typically demonstrate better financial and environmental performance. In order to achieve sustainability goals, CSOs are essential in establishing strategic goals, directing cross-functional initiatives, and interacting with outside stakeholders. The study underscores the importance of leadership in driving sustainable business practices and provides practical implications for firms seeking to integrate sustainability into their corporate strategy.

Louvet et al. (2019) in their study on the impact of eco-innovation on firm competitiveness in the French business landscape, the study involved a mix of quantitative and qualitative methods of data collection, their findings indicated that firms in France that had insights on eco-innovation activities, such as developing environmentally friendly products or processes tend to achieve superior financial and market performance compared to those that do not prioritize eco-innovation. This suggest that innovation geared towards environmental sustainability can be a significant driver of competitive advantage for firms.

In addition, Shrivastava and Kannan (2019) investigated the impact of green practices on firm performance in the Indian manufacturing sector. Their study employed a quantitative approach, gathering data from a sample of Indian manufacturing firms. Surveys and

interviews were used to collect information on green manufacturing practices and various performance metrics, their study revealed that firms implementing green manufacturing practices experienced improvements in financial performance indicators such as profitability and return on investments, Additionally, operational efficiency metrics such as resource utilization and waste reduction showed positive correlations with the adoption of green practices. Furthermore, firms engaging in green initiatives were likely to enhance their market reputation and brand image. their findings suggest that integrating environmental sustainability into manufacturing processes can yield tangible benefits on the firms, including financial gains and improved market competitiveness.

Johnson et al. (2024) conducted a comprehensive analysis of green procurement practices across 45 manufacturing facilities in the European Union, revealing that organizations implementing integrated green procurement strategies achieved 68% improvement in environmental performance indicators compared to conventional approaches. Their longitudinal study demonstrated that green supplier selection created cascading effects throughout supply chains, with environmental benefits compounding over three-year implementation periods.

Contrastingly, Chen and Liu's (2023) examination of Asian manufacturing firms revealed more modest environmental improvements, with 34% performance enhancement attributed to cultural and regulatory differences. This geographic variation highlights the importance of contextual factors in green procurement effectiveness, supporting the need for region-specific research in Kenyan contexts.

Regional Perspective

Oduro-Frimpong and Wiafe's (2021) study, published in the African Journal of Business Management, sought to investigate the role of stakeholder participation in the implementation of green practices and its implications on organizational performance. They surveyed and interviewed managers and employees from various Ghanaian companies. Their findings indicate that successful stakeholder involvement promotes the adoption of green practices, which in turn improves organizational performance. This link emphasizes the significance of incorporating stakeholders in sustainability programs to drive organizational change and enhance performance indicators.

Mwangi and Manthi (2022) focused on the regulatory frameworks that influence the implementation of green practices in East Africa. Their study, published in the Journal of African Business, used case studies and secondary data analysis to analyze how varied regulatory regimes affect the implementation of sustainable practices in enterprises across East Africa. They discovered that businesses operating in areas with strict environmental rules are more inclined to embrace green practices, which not only aids compliance but frequently leads to greater competitive positioning. This shows that regulatory assistance is critical for promoting sustainable corporate practices.

Asamoah and Asubonteng's (2023) study, published in the Journal of Sustainable Finance & Investment, looked into the relationship between green practices and the financial performance of West African enterprises. They used questionnaires, as well as financial data analysis, to investigate how sustainability activities affect firm profitability and stability. According to the study, organizations that incorporate green procurement practices into their operations experience good financial outcomes due to operational

efficiencies and cost savings connected with sustainable practices. Furthermore, the study found that these organizations frequently profit from increased reputational value, which attracts customers and investors that respect environmental responsibility.

Local perspective

In their study, Mwangi and Muthoni (2020) investigated the connection between Kenyan manufacturing companies' financial performance and green supply chain management strategies. They gathered information by distributing structured questionnaires to a subset of industrial firms, and they examined variables like environmental certifications, eco-design, reverse logistics, and green buying.

The results showed a strong positive link between financial performance metrics and the use of green supply chain management techniques. In comparison to their peers that did not prioritize sustainability, companies that incorporated environmental considerations into their supply chain activities reported higher profitability, increased market share, and enhanced return on investment. The study highlighted how adopting green practices might provide Kenya's manufacturing industry with both financial and competitive advantages.

Muturi et al. (2021) conducted a study in Kenya's manufacturing sector to investigate how the adoption of such methods impacts business performance. Their findings indicate that sustainable manufacturing methods, such as energy efficiency and waste reduction, can lead to increased operational efficiency and cost savings. These practices not only benefit a company's financial line, but they also help to reduce the environmental imprint, which is becoming increasingly significant in today's marketplace. Companies that

properly apply these sustainable practices are frequently perceived as more innovative and responsible, which can help them gain a competitive advantage in the market.

Mwangi and Kinuthia (2019) investigated how SMEs adopt sustainability measures and the hurdles they encounter. Their research found that, while there are considerable hurdles, such as budgetary limits and a lack of awareness, there are also opportunities created by supportive government policies and incentives. These enablers can help SMEs implement sustainable practices, which not only help them meet legal obligations but also position them positively in the market compared to competitors who do not.

In addition, Kimani and Muturi's (2019) study on the service industry in Kenya looked at the connection between organizational performance and environmental management techniques. They evaluated the use of environmental efforts such waste management, pollution control, green building design, and sustainable procurement using surveys and interviews with service firms. According to the survey, there are several advantages for service companies who implement environmental management techniques. These included higher customer satisfaction and loyalty, better staff morale and retention, and increased production and efficiency. Service companies who put an emphasis on environmental sustainability were able to stand out from the competition, draw in eco-aware clients, and improve their general performance.

2.3.2 Importance of Green practices

Global perspective

After combining information from more than 200 studies, Clark et al. (2023) did a thorough meta-analysis and discovered a strong positive link between financial

performance and green practices. Businesses who adopted sustainability efforts showed higher financial returns than those that fell behind in terms of environmental stewardship. This research disproves the myth that taking environmental responsibility requires making financial sacrifices.

Consumers are showing an increased preference for goods and services from environmentally conscientious businesses, according to research by Jones and Smith (2022). Adopting green practices reduces the reputational risks linked with environmental disputes and draws in environmentally sensitive consumers. Long-term sustainability is fostered by a strong brand reputation, which increases consumer loyalty and market competitiveness.

Several case studies, such the research done by Lee et al. (2024) have demonstrated how implementing green initiatives can result in significant cost reductions. Resource efficiency is improved and operating costs are decreased through the use of energy-efficient technologies, waste reduction strategies, and sustainable supply chain practices. Prioritizing sustainability helps businesses become more operationally resilient and adaptable in the face of erratic market conditions.

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Following green practices is essential for regulatory compliance and risk avoidance in an era of progressively stricter environmental restrictions and increasing public pressure for corporate accountability. The relationship between proactive environmental management and lower regulatory fines, legal responsibilities, and reputational hazards was highlighted by Smith and Brown's (2023) research. Organizations protect their resilience and long-term survival by proactively addressing environmental issues.

According to a study by Wang et al. (2023), organizational commitment and employee engagement are strongly positively correlated in businesses that place a high priority on sustainability. Green projects give employees a sense of pride and purpose while also signaling a company's commitment to ethical ideals. Furthermore, higher natural lighting, biophilic design, and better indoor air quality are frequently linked to sustainable workplaces, all of which boost worker productivity and well-being.

Regional Perspective

According to research by Abugre and Acquaye (2020), businesses in Africa who adopted green practices saw a considerable reduction in costs. Organizations can save operating costs by cutting waste production, conserving energy, and maximizing resource use. Investing in energy-efficient technologies and renewable energy sources, for example, lowers manufacturing costs and utility bills while simultaneously promoting environmental conservation.

According to Nsiah and Mensah's (2019), research, companies operating in Africa can reduce regulatory risks by adhering to green legislation and standards. To address urgent sustainability issues, governments throughout the continent are putting strict

environmental rules and regulations into effect. Organizations can prevent fines, legal issues, and brand harm connected with non-compliance by proactively implementing green practices. Complying with regulations also puts companies in a competitive and resilient long-term position in a regulatory environment that is changing quickly.

According to research by Saito and Ahouissoussi (2021), African businesses can find new markets by implementing green business strategies. Businesses who adopt sustainability stand to benefit from an increased level of customer knowledge and demand for eco-friendly goods and services. Businesses can reach specialized markets, set themselves apart from the competition, and build their clientele by providing environmentally friendly solutions. This will increase sales and market share.

2.3.3 Challenges in implementing green practices

In relation to growing environmental concerns and the need for sustainable development, green practices have become essential in today's society. Adopting green business methods should assist manufacturing companies to gain a competitive edge, Kenya's economy depends heavily on the tea business, which generates income and jobs. Nonetheless, the sector deals with a number of environmental issues, such as soil erosion, water pollution, and deforestation. Factors like population increase, climate change, and socioeconomic inequality make these problems worse. According to Bett et al. (2019), adopting green practices in such a complicated environment calls for large financial outlays, adjustments to operational procedures, and stakeholder cooperation.

Kenya has also made progress in passing environmental laws, but enforcement is still difficult. Tea companies have less motivation to invest in green practices when

environmental rules are inconsistently enforced and the penalties for noncompliance are lenient. Furthermore, businesses face uncertainty due to convoluted bureaucratic processes and unclear regulations, which makes it difficult for them to successfully plan and carry out sustainable initiatives (Kirui & Ouma, 2020). Technological innovation and infrastructure development are prerequisites for the tea factory's embrace of green technology and practices. However, obstacles to advancement in this area include restricted access to cutting-edge technologies, insufficient funding for research and development, and a shortage of qualified labor. Furthermore, the decentralized character of the tea factory, which comprises a large number of smallholder farmers, makes it even more difficult to spread best practices and green technologies (Ochieng & Nyongesa, 2019).

Green business strategies in the tea factory are also hindered by cultural views and traditional farming methods. Initiatives to promote conservation and sustainable agriculture are hampered by a lack of environmental awareness, a reliance on conventional farming practices, and resistance to change. According to Muthoni and Gitau (2019), conquering these cultural obstacles necessitates focused instruction, outreach campaigns, and community involvement projects. In summary, the implementation of green practices has the potential to reduce environmental effects and improve the sustainability of Kenya's tea sector, but it is not without its share of difficulties. Technological obstacles, cultural impediments, and regulatory obstacles all work together to obstruct progress in this field. A comprehensive strategy including government intervention, commercial sector involvement, civil society participation, and international cooperation is needed to address these difficulties. Tea companies in Meru

County may realize the factory's potential for social responsibility, environmental stewardship, and sustainable growth by removing these obstacles.

2.3.4 Green Supplier Selection

Green Supplier Selection, according to Jabbour and Jabbour (2021) is the methodical process of assessing and selecting suppliers based on their environmental performance, taking into account elements like carbon emissions, energy usage, waste management, and sustainability policies. It entails evaluating suppliers' compliance with environmental laws, their dedication to lessening their environmental impact, and their capacity to offer goods and services that are favorable to the environment.

Businesses are realizing more and more how important it is to implement sustainable practices across their supply chains in the environmentally sensitive world of today. The adoption of green packaging solutions, strategic alliances, pollution control measures, and green supplier selection are all important aspects of this sustainability approach.

Strategic alliances are essential for choosing environmentally friendly suppliers because they encourage cooperation and information sharing amongst members. Companies can use partnerships with suppliers who are committed to sustainability to create synergies that help them accomplish shared environmental objectives. For example, collaborative research and development can result in the development of environmentally friendly goods and procedures. In research done by Sarkis et al. (2021) the researchers highlight effective partnerships in a variety of industries to highlight the significance of strategic alliances in improving environmental performance across supply chains.

Mitigating the environmental impact of supply chain activities requires the implementation of effective pollution control measures. Businesses need to give top priority to partners who follow strict pollution control guidelines and actively take steps to reduce emissions and waste production when choosing green suppliers. This entails making investments in clean technology, putting pollution control measures into place, and adhering to legal obligations. Wu et al.'s recent research from 2023 emphasizes the importance of pollution management when choosing suppliers and supports the inclusion of environmental factors in supplier evaluation procedures.

Given that packaging materials can greatly contribute to resource depletion and environmental contamination, green packaging is becoming more and more crucial in sustainable supply chain management. Finding partners who provide environmentally friendly packaging options, such as recyclable, biodegradable, or reused materials, is a key component of selecting green suppliers. Additionally, suppliers can be evaluated by companies according on how well they reduce packaging waste and optimize packaging design to have a smaller environmental impact. Jabbour et al. (2022) study looks at how green packaging can improve supply chain sustainability. It emphasizes how businesses and package suppliers need to work together to generate innovation and eco-efficiency.

In addition, choosing green suppliers is a complex process that includes adopting green packaging options, forming strategic alliances, and controlling pollution. Businesses can create robust and ecologically conscious supply chains by include these components in their supplier evaluation criteria. The significance of strategic partnerships, pollution control, and green packaging in promoting sustainable practices throughout supply chains

has been underscored by recent study, offering insightful information to companies aiming to meet their sustainability goals.

2.3.5 Incorporation of renewable energy sources

In recent years, the global tea industry has witnessed a paradigm shift towards sustainability, with renewable energy emerging as a key component in this transformation. Kenya, renowned for its high-quality tea production, stands at the forefront of this transition. This research explored the incorporation of renewable energy sources in the stated tea industries in Meru County, highlighting the benefits of lower maintenance costs, reduced greenhouse emissions, and decreased reliance on traditional energy sources.

One viable way to save maintenance costs in the county's tea gardens is to incorporate renewable energy sources like solar and wind power. After installation, solar and wind energy systems require less maintenance than traditional energy infrastructure. A recent study by Ondraczek and Komendantova (2023) found that compared to fossil fuel-based power plants, solar and wind systems in agricultural contexts have significantly reduced maintenance costs. For tea growers, this lower maintenance cost means substantial financial savings that allow them to devote resources to other aspects of their business.

Installing renewable energy systems can result in significant energy cost savings for the county’s tea firms. Solar and wind power are particularly appealing possibilities in many tea-growing regions because of the abundance of sunshine and the good wind conditions. According to research conducted by Kenyan energy specialists in 2022, companies that use wind turbines and solar panels have seen significant drops in energy costs, which has

increased their profitability and capacity to compete globally. Tea growers can reduce the impact of volatile fossil fuel costs and maintain long-term cost stability and financial sustainability by utilizing renewable energy.

By lowering greenhouse gas emissions, Meru tea industries usage of renewable energy supports the country's efforts to tackle climate change. Conventional energy sources, including

generators powered by coal or diesel, are major causes of pollution, including carbon dioxide. On the other hand, the lifecycle of solar and wind power generating results in negligible emissions of greenhouse gases. Reducing greenhouse gas emissions helps the tea business both protect the environment and improve its standing as an ethical and environmentally concerned industry.

By incorporating renewable energy sources, Meru's tea industries can become less reliant on non-renewable energy sources, hence improving resilience and security of supply. Tea estates frequently depend on expensive and environmentally harmful diesel generators for power supply because there is little access to dependable grid electricity in rural locations. On the other hand, the installation of solar and wind power systems provides a sustainable and decentralized substitute. The International Renewable Energy Agency (IRENA, 2023) has conducted studies that highlight how renewable energy might help Kenya diversify its energy mix and become less vulnerable to price shocks and disruptions in supply. The tea sector helps the country achieve its energy transition goals and becomes more resilient to external energy shocks by embracing renewables.

2.3.6 Green Manufacturing

Green manufacturing, according to Shrivastava et al. (2021), is the use of eco-friendly procedures and technology at every stage of a product's lifetime with the goal of reducing its negative effects on the environment, conserving resources, and boosting sustainability.

Making products that are eco-friendly at every stage of their existence is known as green product design. This refers to methods of sustainable planting, harvesting, processing, packaging, and distribution as they apply to the tea business. The significance of sustainable farming practices, such as organic farming, decreased pesticide use, and water conservation strategies, is highlighted by recent studies like "Sustainable Supply Chain Management Practices in Kenya's Agricultural Industry" (Karanja et al., 2022). By maintaining the organic character of the tea leaves, these procedures not only reduce their negative effects on the environment but also improve the quality of the final product.

TQM concepts are designed to promote employee involvement, continuous improvement initiatives, and product quality as well as customer happiness and organizational efficiency. TQM procedures are essential to maintaining uniform product quality and safety requirements in the tea sector. Kihoro et al. (2023) have highlighted the importance of implementing strict quality control procedures at every stage of production, from planting to packaging, in recent references such as 'Quality Management Practices and Performance in the Kenyan agricultural industry'. This involves following global quality certifications like Fairtrade standards and ISO 22000.

By using resources as efficiently as possible, lean manufacturing techniques seek to reduce waste, streamline operations, and boost output. A number of recent studies, such

as "Lean Manufacturing Practices in Kenya" (Mwangi et al., 2023) emphasize the application of lean concepts to optimize processes and cut expenses. Techniques including value stream mapping, kaizen continuous improvement, and just-in-time inventory management are being used to increase tea cultivation, processing, and distribution channel efficiency.

2.3.7 Green logistics

According to Jabour et al. (2021), green logistics is the design, execution, and management of the information, services, and product movement along the whole supply chain in a way that is most environmentally friendly. It entails methods and techniques designed to maximize effectiveness and financial sustainability while reducing the negative environmental effects of logistics-related tasks, such as trash disposal, recycling, and logistics returns.

Recycling minimizes the use of raw materials and cuts waste, making it essential to sustainable production methods. In an effort to preserve resources and lessen environmental deterioration, manufacturing enterprises in Kenya have begun to support recycling programs. In order to collect, process, and reuse materials like plastic, glass, and paper inside their manufacturing cycles, businesses such as Vintz Plastic Ltd. have implemented closed-loop recycling systems (Jones, 2023).

To further encourage industrial and household participation, collaborations with government agencies and recycling companies have made it easier to construct collection stations and recycling facilities around the nation (Smith et al., 2022). These programs

not only help reduce trash but also promote a circular economy model that reduces the need for virgin resources by reusing materials.

Green logistics in manufacturing depends on the effective management of reverse logistics, which includes product returns, remanufacturing, and refurbishing. Companies in Kenya are adopting logistics return techniques more frequently in an effort to reduce waste and maximize resource use. Additionally, technological advancements like blockchain and Internet of Things-enabled tracking systems have improved visibility and traceability within the reverse logistics network, allowing businesses to reduce their environmental effect and expedite operations (Mwangi et al., 2023). Tea businesses in Kenya are decreasing landfill waste and generating new revenue streams by selling refurbished products through efficient management of product returns and reprocessing.

An essential component of green logistics is appropriate waste disposal, which makes sure that manufacturing byproducts and end-of-life products are disposed of properly to avoid polluting the environment. Tea firms are also required to implement ecologically sustainable waste management strategies by means of industry standards and regulatory frameworks that control waste disposal procedures (Kenya Association of Manufacturers [KAM], 2024).

2.3.9 Green practices and Organization environmental performance

In the past few years, businesses from a range of sectors have come to understand how critical it is to incorporate green practices into their daily operations. These initiatives, which promote sustainability and lessen their negative effects on the environment, have significant effects on corporate performance.

By a number of different channels, implementing green practices can improve financial performance. In the long run, for example, cost reductions can result from investments in renewable energy sources and energy-efficient devices. Environmental management system adoption increased a company's profitability, according to a study by (Delmas & Pekovic, 2018). A company's market share and revenue can also rise by implementing sustainable practices, which can also improve consumer loyalty and brand reputation (Liu, 2020). Furthermore, Tiwari et al. (2021) assert that investors are progressively using environmental performance as a factor in their investment decisions, which means that environmentally conscious businesses will have easier access to financing.

By encouraging efficiency and creativity, green practices can also improve operational performance and quality. For instance, streamlining procedures and maximizing resource use helps cut down on production costs (Sarkis et al., 2020). According to Montag et al. (2019), the application of eco-design principles can result in the creation of novel products that exhibit enhanced durability and performance. Moreover, encouraging a sustainable culture can improve worker morale and output, which improves performance as a whole (Purvis et al., 2019). Lin et al.'s recent research in 2023 emphasizes the significance of incorporating sustainability into organizational operations by highlighting the relationship between environmental management practices and operational efficiency.

Promoting sustainability performance through green practices is essential for achieving larger societal objectives. According to Rajpathirana et al. (2021), organizations can lessen their environmental impact and aid in the mitigation of climate change by cutting back on carbon emissions and pollution. Seuring and Müller (2020) add that ethical sourcing and community support can also be achieved through sustainable supply chain

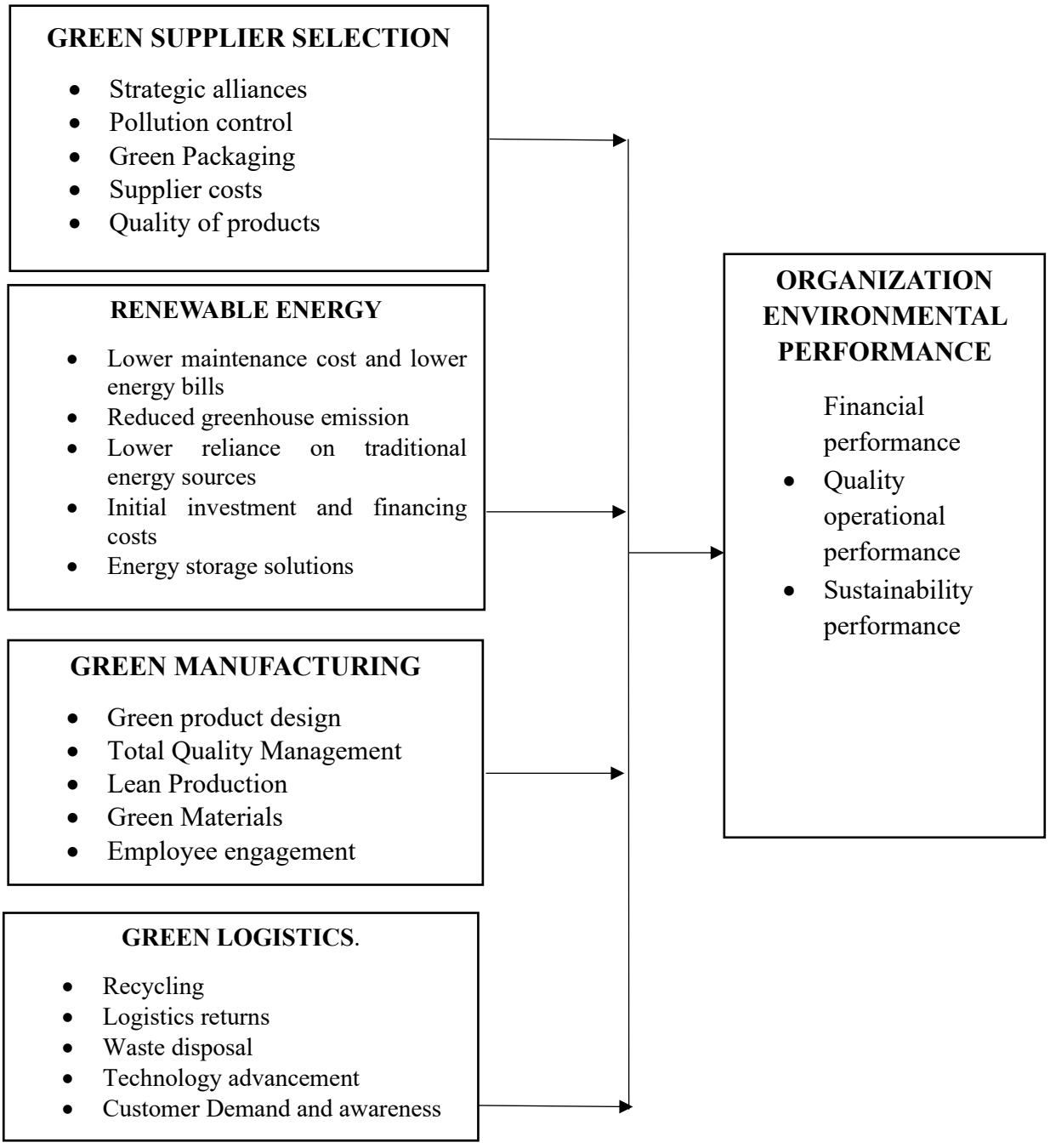
methods. In order to improve social and environmental performance, recent studies have highlighted the significance of stakeholder participation and transparency (Jabbour et al., 2022). Businesses that put an emphasis on social and environmental responsibility have an edge in the market since they are more likely to draw and keep talent (López-Gamero et al., 2020).

2.4 Conceptual Framework

In this study, green manufacturing, green logistics, incorporating renewable energy sources, and choosing green suppliers are the independent factors; tea's organizational performance is the dependent variable. The relationship between independent and dependent variables is depicted by a conceptual framework, as per Figure 1.

Figure 2.1

Conceptual Framework



2.5 Operationalization of the variables

In table 2.1, the study variables' operational framework is presented. In addition to their associated measurements, it specifies the independent and dependent variables of the study.

Table 2.1

Operationalization of Variables

Variable	Type	Indicators	Measurement Scale
Green Supplier Selection	Independent	- Environmental consciousness in selection - Supplier collaboration for cleaner technology - Environmental compliance requirements - Pollution control measures - Green packaging practices - Strategic supplier relationships	5-point Likert scale
Incorporation of Renewable Energy Sources	Independent	- Environmentally friendly energy sources - Lower maintenance costs - Reduced greenhouse emissions - Lower reliance on traditional energy	5-point Likert scale

Green Manufacturing	Independent	- Material waste reduction - Minimal environmental pollution - Low waste and pollution materials - Product durability and recyclability - Total quality management - Lean production measures	5-point Likert scale
Green Logistics	Independent	- Product recycling effectiveness - Logistics return initiatives - Waste disposal measures - Material recovery systems	5-point Likert scale
Organization Environmental Performance	Dependent	- Financial performance - Quality operational performance - Sustainability performance	5-point Likert scale

2.6 Critical Synthesis and Gaps

Comparative analysis of recent studies reveals inconsistent findings regarding optimal green procurement strategies. While European studies emphasize supplier collaboration and long-term partnerships (Rodriguez et al., 2024), Asian research prioritizes technological innovation and efficiency improvements (Kim & Park, 2023). These divergent approaches suggest that successful green procurement implementation may require context-specific adaptations rather than universal best practices.

Identified Gaps: Existing literature exhibits significant geographic bias toward developed economies, with limited representation of African agricultural industries. Additionally, most studies examine large-scale manufacturing operations, leaving knowledge gaps regarding small-to-medium agricultural processing facilities typical of Kenya's tea industry. Finally, current research lacks comprehensive analysis of green procurement's specific impacts on agricultural value chains, particularly regarding seasonal variations and commodity price fluctuations affecting implementation sustainability.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1Introduction

The research methodology for this suggested study is covered in this chapter. It describes in detail and provides justification for the target population, sampling strategies, research design, tools used for collecting data, and methods for analyzing data. The ethical considerations employed by the researcher are also covered in detail in this chapter.

3.2 Location of the study

Meru County was the site of this investigation. There was coverage of 8 tea processing factories in Meru County. Meru County was specifically chosen for the study since the region is home to some of the nation's top-performing tea factories (KTDA, 2022). The decision is also made in light of the tea industries recent accomplishments, which encouraged local farmers to participate in tea farming.

3.3 Research Design

Descriptive survey design was used for this study since it enables sampling as well as the collection and analysis of both qualitative and quantitative data.

According to Siedlecki (2020), a descriptive research design was employed, which is a design that examines the circumstances of the population under study without necessarily meddling in their daily lives. The study's goal was to elucidate how green practice adoption affected organization environmental performance in Meru county's tea processing sectors, which is why it was used. Or, to put it another way, the study set out to determine how environmental organizational performance in Meru's tea processing

industries is affected by green practices such as green supplier selection, green manufacturing, green logistics, and the integration of renewable energy sources.

3.4 Target Population

The target population for this study comprised 341 individuals across 8 tea processing industries in Meru County, including 8 factory unit managers, 65 departmental heads, and 268 departmental staff. The population selection was based on their direct involvement in procurement decisions, environmental practices implementation, and organizational performance assessment.

Table 3.1

Target population

Factory Name	Factory Unit Managers	Departmental Heads	Departmental Staff	Total
Kiegoi Tea Factory	1	7	27	35
Igembe Tea Factory	1	7	31	39
Githongo Tea Factory	1	9	43	53
Imenti Tea Factory	1	9	36	46
Kinoro Tea Factory	1	6	28	35
Njeru Tea Factory	1	9	38	48
Kionyo Tea Factory	1	6	25	32
Michimikuru Tea Factory	1	5	18	24
Total	**8**	**65**	**268**	**341**

3.5 Sampling Technique

The study employed census sampling technique, where all 341 individuals comprising factory unit managers, departmental heads, and staff from the eight tea processing

factories in Meru County were included. Census sampling was selected over stratified or systematic sampling for several compelling reasons:

First, the relatively small population size (341 individuals) made census sampling feasible and cost-effective. Second, the heterogeneous nature of roles across different factory departments required comprehensive representation to capture diverse perspectives on green procurement practices. Third, census sampling eliminates sampling bias and ensures maximum statistical power for inferential analysis. Fourth, given the specialized nature of green procurement practices in tea industries, including all knowledgeable personnel maximizes data richness and reliability.

The descriptive survey design was chosen over experimental or correlational designs because it enables comprehensive examination of current green procurement practices and environmental performance relationships without manipulation of variables, which would be impractical and unethical in operational industrial settings.

3.6 Instrumentation

A researcher should be able to create data gathering tools that complement the goals of the investigation (Mkandawire, 2019). This study only used primary data that was self-administered by the researcher using a standardized questionnaire designed for that purpose. The decision to use a structured and semi- structured questionnaire for data collection stems from its capacity to gather information rapidly, saving both time and money, as well as preserving respondents' anonymity so they don't feel assessed by the researcher (Bartram, 2019).

All research variables had closed-ended, scale-type questions in the questionnaire to gather quantitative data. Similarly, open-ended questions in a questionnaire tailored to each research variable were used to gather qualitative data. The reviewed literature that serves as this study's anchor provides the sources for the various questions in each segment.

3.6.1 Piloting of Research Instruments

A pilot study is a study conducted on different population from the key study to guarantee that the study's instruments to be used are dependable and understandable. According to Mohajan (2018), piloting gives a study a chance to rectify any ambiguous questions such that during the main study's data collection process, less time was wasted. The pilot study was conducted in Chagaik and Kimari tea factories in Kericho County, with 34 participants (2 factory unit managers and 32 departmental heads and staff) representing 10% of the main study population. The strategic decision to conduct piloting in Kericho County rather than Meru County was based on several methodological considerations:

First, Kericho County's tea industry exhibits similar operational characteristics to Meru County, including comparable processing technologies, factory sizes, and organizational structures, ensuring environmental validity. Second, conducting the pilot study in a different location prevents contamination of the main study sample, maintaining independence between pilot and actual data collection. Third, Kericho's tea factories face analogous environmental challenges including water scarcity, energy costs, and waste management issues, making them appropriate proxies for Meru County conditions. Fourth, logistical considerations including accessibility and established industry contacts in Kericho facilitated efficient pilot study execution within resource constraints. Finally,

using a separate but similar population enhances the external validity of instrument testing while preserving the integrity of the main study population.

3.6.2 Pretesting of the research instruments

According to Malmqvist et al. (2019), a pretest is a small-scale preparatory study intended to evaluate the feasibility of a research tool for a larger-scale project. Thus, before to the primary research, a pretest of the questionnaire was carried out to make sure it is judged acceptable and reliable for use in the study. Researchers can verify that the questions appropriately capture the required information by pretesting the questionnaire to evaluate its clarity, relevance, and comprehension (Malmqvist et al., 2019). Pre-testing reduces bias and confusion among respondents by improving the format, language, and sequencing. It is possible for researchers to evaluate response variability, calculate completion times, and verify measurement scales.

Pretesting improves the reliability and validity of the questionnaire by detecting issues early on. This raises the possibility of gaining significant insights and, in the end, improves the quality of data gathered for the primary study (Malmqvist et al., 2019). A selection of two factory unit managers who and their departmental heads and staff operating tea firms in Kericho County received the questionnaire. The choice of Kericho County was based on its accessibility for piloting prior to the start of the larger project. For the exercise, the managers of the necessary number of tea companies in the County can be easily reached. The gathered data underwent examination to determine the suitability of the questionnaire for the large-scale project and the adequacy of the research questions.

3.7 Reliability of the questionnaires

An instrument is considered reliable if it can continue to deliver the same results after several uses (Bonnet & Wright, 2015). Following the test and retest, the Cronbach Alpha Coefficient was used to determine the reliability of the questionnaires, with a threshold score of 0.7 being set for each instance of failure beyond which the instruments needed to be further refined. Any of the study's variables that failed to meet the cutoff point indicated that study participants interpreted the questions differently, necessitating the need to revise the questions to guarantee that all participants understood them uniformly.

Reliability testing was conducted using Cronbach's alpha coefficient, with a minimum threshold of 0.7 required for acceptable internal consistency. The pilot study results demonstrated the following reliability coefficients:

- Green Supplier Selection: $\alpha = 0.847$
- Incorporation of Renewable Energy Sources: $\alpha = 0.793$
- Green Manufacturing: $\alpha = 0.824$
- Green Logistics: $\alpha = 0.776$
- Organization Environmental Performance: $\alpha = 0.891$

All variables exceeded the 0.7 threshold, confirming satisfactory internal consistency for the research instruments.

3.8 Validity of the Questionnaires

The ability of an instrument to precisely measure what it is intended to assess by precisely capturing the phenomenon under study is known as validity. Expert examination determined the questionnaire's validity. In order to achieve this, the

instruments were given to university supervisor who determined the following factors about the validity of the questionnaires as a whole, and in particular, the questions pertaining to each of the variables: In terms of face validity, the review and suggestions made by the university supervisors guaranteed that the questionnaire was well-presented and had a structured layout that would not be confusing or distracting to the respondents.

Content validity was established through systematic expert review involving three university supervisors and two industry professionals with over 10 years of experience in tea processing operations. Expert feedback focused on question clarity, relevance to study objectives, and appropriateness for the Kenyan tea industry context. Specific validation steps included:

First, face validity assessment confirmed that questionnaire items appeared to measure intended constructs. Second, content validity review ensured comprehensive coverage of all green procurement and environmental performance dimensions. Third, construct validity was verified through factor analysis during pilot testing, confirming that items loaded appropriately on intended factors. Fourth, criterion validity was assessed by comparing pilot study responses with known industry performance indicators.

3.9 Data Collection Procedure

Participants in the sample had their data collected for four weeks. The factory unit managers of the sampled tea enterprises in the chosen County got an introduction letter from the University in the first week of the study, which explained the necessity and goal of the survey to them. To guarantee ethical compliance and authorization, a research permit from the National Commission for Science, Technology, and Innovation, or

NACOSTI, was acquired prior to any data collection activities. The researcher started the survey utilizing the Drop and Pick approach in the final three weeks after receiving the necessary letters. Respondents completed the questionnaire within the allotted three weeks, after which it was selected and put together right away to begin data analysis.

3.10 Data Analysis Techniques

The first step in the process was a descriptive analysis using SPSS software to examine the information gathered from closed-ended and Likert-type questions. The Likert-type question and all of the closed-ended questions had their means and percentages determined by the descriptive analysis. For the purpose of guiding the study's conclusions and suggestions, this analysis presented the state of green practice adoption and how it affects organization environmental performance. Using textual narratives, tables, and charts, the results of this quantitative data analysis were shown. After being subjected to content analysis and organized thematically in accordance with the study variables, the qualitative data gathered from the questionnaire's open-ended questions were presented.

The study employed inferential statistics to evaluate the degree of correlation and strength between the independent variables and the dependent variable. The multiple regression analysis made use of the following model.

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where:

Y = Organizational Environmental Performance of tea firms

X_1 = Green Supplier Selection

X_2 = Incorporation of Renewable Energy Sources

X_3 = Green Manufacturing

X_4 = Green Logistics

β_0 = Constant term

β_1, β_2, β_3, β_4 = Regression coefficients

ε = Error term

The model was first put up to make sure it is a good fit before the regression analysis is conducted to examine the relationship between the independent and dependent variables as it is shown in the model above. The study also indicated various diagnostic statistics such as normality, linearity, multicollinearity and auto correlation tests. These tests enabled the researcher ascertain the suitability of the collected data to have conformed to the requirements

The following essential assumptions of a multiple linear regression analysis were also attempted to be met: linearity, homoscedasticity, independence of errors, normality, and independence of independent variables.

3.11 Ethical Consideration

The research was conducted in accordance with the best practices of business research ethics by taking into account the following set of ethical issues. In order to assure the participants that the information they submit was only utilized for academic purposes, access to the participants was properly negotiated through verbal persuasion and the

presentation of letters of introduction from NACOSTI and Kenya Methodist University (which are attached). The researcher and the goal of the study were explained in the letter of introduction (designated appendix 1), which was meant to calm any concerns of the respondents. The aim of the study, as well as the rights of participants that the researcher upheld, such as confidentiality, anonymity, and their choice to participate voluntarily, were explained to study participants.

By making sure participants didn't put their names on the questionnaires or identify themselves by name, anonymity and confidentiality were preserved. Additionally, rather than utilizing names to identify questionnaires from the various tea companies and individuals, codes were utilized. The participants were made aware of their right to withdraw from the study at any time in order to fulfill the requirements of research pertaining to voluntary participation. By following the guidelines of the APA (7th Edition) reference style, any ideas that did not originate from the researcher were acknowledged, thus preventing plagiarism. The study's results were presented honestly and without doctoring to fit any preconceived purposes, and the researcher was truthful in the analysis of the data gathered and in the presentation of those findings and suggestions.

CHAPTER FOUR

FINDINGS AND DISCUSSION

4.1 Introduction

This chapter of the study entails the analysis, presentation and the interpretation of data collected from the tea industries in Meru County. The data was collected by administering questionnaires to factory unit managers, department heads, and the staffs in respective departments. This was done by employing a number of statistical tools such as descriptive statistics, correlation test and multiple regression test. The chapter commences with the response rate as well as the demographic profile of the respondents. It then presents an assessment of the study variables whereby the potential of green procurement strategies like green supplier selection, green manufacturing and green logistics on the environmental outcomes of the tea industries is determined. The results are presented in tables, figures, and narratively, to explain the effects that the different study variables have on each other.

4.2 Response Rate

Out of a sample of 341 individuals, 321 did respond to the questionnaires and gave their responses, giving this study a response rate of 94%. In practice, for other questionnaire-based surveys, generally the response rates vary and come out to be around 50-75 %, as documented in literature (Baruch & Holtom, 2018; Nulty, 2018). The issue of non-response, whereby some participants opted not to respond to the conducted research could be attributed to fact that there were no tokens in exchange of the given data, or some could just be disinterested in taking part. Any other reason was not a point of interest of this study. The fact that the researcher successfully conveyed the goals of the

research study to the participants could have stimulated interests of the participants, thus the high response rate.

4.3 Demographic Data of the Respondents

4.3.1 Gender of the Participants

Table 4.1

Gender of the Participants

Gender	Frequency	Percentage
Male	196	61.1%
Female	125	38.9%
Total	**321**	**100%**

As indicated in the above table, 196 (61.1%) participants were male, while 125 (38.9%) were female.

4.3.2. Age of Participants

Table 4.1

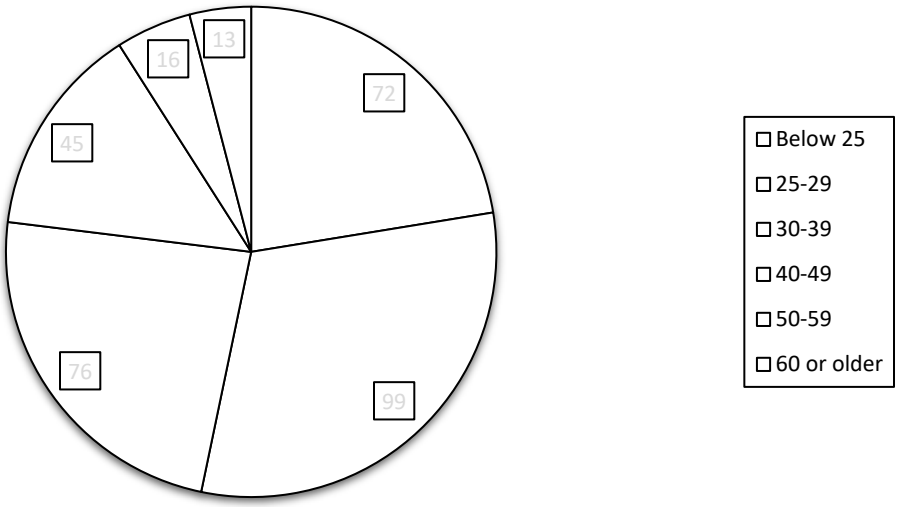
Age of Participants

Age	Frequency	Percentage
Below 25	72	22.4%
25-29	99	30.8%
30-39	76	23.7%
40-49	45	14%
50-59	16	5%
60 or older	13	4%
Total	**321**	**100%**

As shown in the above table, 72 (22.4%) participants were below the age of 25; 99 (30.8%) participants were between 25-29 years old; 76 (23.7%) participants were between 30-39 years old; 45 (14%) participants were between 40-49 years old; 16 (5%) participants were between 50-59 years old, while; 13 (4%) participants were 60 or older. The same data is illustrated in the below graph.

Figure 4.1

Age of Participants



4.3.3. Highest Level of Education

Table 4.3

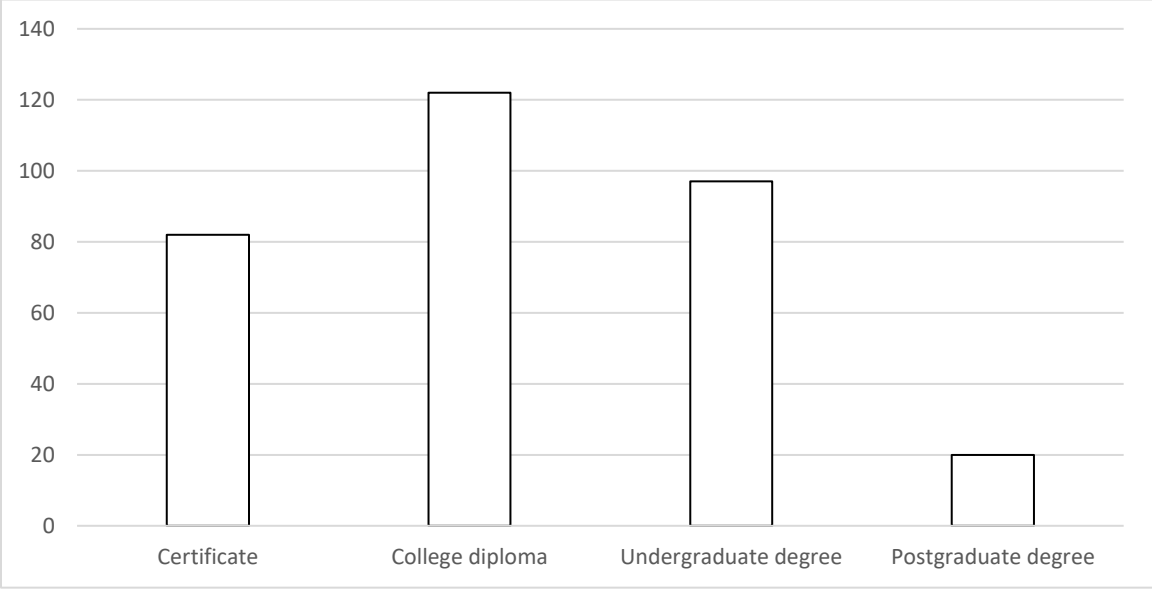
Highest Level of Education

Level of Education	Frequency	Percentage
Certificate	82	25.5%
College diploma	122	38%
Undergraduate degree	97	30.2%
Postgraduate degree	20	6.2%
Total	**321**	**100%**

From the above table, 82 (25.5%) participants had completed a craft or certificate course; 122 (38%) participants had college diplomas; 97 (30.2%) participants had undergraduate degrees, while; 20 (6.2%) participants had postgraduate degrees.

Figure 4.2

Highest Level of Education



4.3.4. Department

Table 4.4

Department of the respondent

Department	Frequency	Percentage
Finance	32	10%
Production and Operations	162	50.5%
Human Resources	19	5.9%
Marketing and Sales	49	15.3%
Procurement	59	18.4%
Total	**321**	**100%**

As presented in the above table, 32 (10%) participants were in the finance department, 162 (50.5%) participants worked in production and operations, 19 (5.9%) participants worked in human resource departments, 49 (15.3%) participants worked in marketing and sales, while 59 (18.4%) participants were in procurement.

The demographic profile reveals important implications for green practice adoption. The predominant male representation (61.1%) reflects traditional gender patterns in Kenya's tea industry management, potentially influencing environmental decision-making approaches. The majority of respondents aged 25-39 years (54.5%) suggests a younger workforce that may be more receptive to innovative green practices and environmental consciousness.

Educational levels show 68.2% holding diplomas or higher qualifications, indicating sufficient educational foundation for understanding complex environmental concepts and

implementing sophisticated green procurement strategies. The concentration of respondents in Production and Operations (50.5%) provides valuable insights into core operational environmental practices, while representation across Finance, Human Resources, Marketing, and Procurement departments ensures comprehensive organizational perspective on environmental performance impacts.

4.4 Green Procurement Practices adopted by Tea Factory

4.4.1 Green Procurement Practices adopted by Tea Factory

Table 4.5

Green Procurement Practices adopted by Tea Factory

Green Procurement Practices	Frequency	Percentage
Yes	321	100%
No	0	0%
Total	**321**	**100%**

As presented in the above table, all the 321 participants were aware of green practices used in their companies.

4.4.2 Green Procurement Practices

Table 4.6

Green Procurement Practices

Green Procurement Practices	Frequency	Percentage
Purchasing energy-efficient processing machinery and other equipment	182	56.7%
Adopting water-efficient technologies and practices to minimize water usage in tea processing and cleaning operations.	139	43.3%

Prioritizing the procurement of tea leaves from farms and suppliers with sustainable and environmentally-friendly practices, such as organic or Rainforest Alliance certified.	81	25.2%
Utilizing biodegradable, recyclable, and compostable packaging materials for the tea products.	85	26.5%
Optimizing logistics and transportation methods to reduce the environmental impact of product distribution, such as encouraging the use of public transportation for employees	55	17.1%
Implementing systems to reduce, reuse, and recycle waste generated during tea processing, such as tea waste, packaging materials	122	38%
Developing and implementing formal green procurement policies that outline the factory's sustainability requirements and preferences for suppliers and vendors.	63	19.6%
Working with suppliers to help them improve their own environmental performance and adopt sustainable practices	44	13.7%
Seeking third-party eco-certifications for the tea products and the factory's operations to enhance the brand's sustainability credentials	87	27.1%
Total	**321**	**100%**

As presented in the above table on the green procurement practices taken by the companies,182 (56.7%) participants responded that their companies purchase energy-efficient processing machinery and other equipment; 139 (43.3%) participants responded that their companies adopt water-efficient technologies and practices to minimize water usage in tea processing and cleaning operations; 81 (25.2%) participants responded that their companies prioritize the procurement of tea leaves from farms and suppliers with sustainable and environmentally-friendly practices, such as organic or Rainforest Alliance certified; 85 (26.5%) participants responded that their companies utilize biodegradable, recyclable, and compostable packaging materials for the tea products; 55 (17.1%)

participants responded that their companies optimize logistics and transportation methods to reduce the environmental impact of product distribution, such as encouraging the use of public transportation for employees; 122 (38%) participants responded that their companies implement systems to reduce, reuse, and recycle waste generated during tea processing, such as tea waste, packaging materials; 63 (19.6%) participants responded that their companies develop and implement formal green procurement policies that outline the factory's sustainability requirements and preferences for suppliers and vendors. 44 (13.7%) participants responded that their companies work with suppliers to help them improve their own environmental performance and adopt sustainable practices, while; 87 (27.1%) participants responded that their companies seek third-party eco-certifications for the tea products and the factory's operations to enhance the brand's sustainability credentials.

The findings indicate that a majority of the tea manufacturers (56.7%) are purchasing energy-efficient processing machinery and equipment. This is a crucial strategy for improving environmental performance, as energy efficiency plays a pivotal role in reducing greenhouse gas emissions and mitigating climate change impacts. Geng and Doberstein (2008) found that the adoption of energy-efficient technologies is a key component of green procurement practices, as it helps organizations reduce their carbon footprint and contribute to environmental sustainability.

The finding that 43.3% of the participants have adopted water-efficient technologies and practices to minimize water usage in tea processing and cleaning operations, is highly significant. Water scarcity is a growing concern globally, and the tea industry is a water-intensive sector. Kusi-Sarpong et al. (2019) emphasized the importance of water

efficiency in improving the environmental performance of organizations, as it helps preserve freshwater resources and protect aquatic ecosystems. These energy and water efficiency practices go beyond just cost savings; they demonstrate the tea companies' commitment to environmental stewardship and their recognition of the urgent need to address climate change and water scarcity challenges. By actively pursuing these green procurement strategies, the tea manufacturers in Meru County are positioning themselves as leaders in sustainable industry practices, setting an example for others to follow.

Furthermore, the study found that 25.2% of the participants prioritize the procurement of tea leaves from farms and suppliers with sustainable and environmentally-friendly practices, such as organic or Rainforest Alliance certified. This is consistent with the emphasis on sustainable sourcing and supplier selection in the literature on green procurement (Kiiru & Njihia, 2018; Njagi & Kilika, 2016).

The study also revealed that 26.5% of the companies utilize biodegradable, recyclable, and compostable packaging materials for their tea products, and 38% have implemented systems to reduce, reuse, and recycle waste generated during tea processing. These findings align with the growing focus on sustainable packaging and waste management practices in the tea industry, as documented by Wambugu et al. (2020).

4.4.3 Basis on Which the Green Practices are Adopted

Table 4.7

Basis on Which the Green Practices are Adopted

Basis on Which the Green Practices are Adopted	Frequency	Percentage
Proactive Approach	157	48.9%
Reactive Approach	164	51.1%
Total	**321**	**100%**

Concerning the basis on which the green practices are adopted by the companies, 157 (48.9%) participants responded a proactive approach was adopted, while 164 (51.1%) participants responded a reactive approach was adopted.

The existing literature highlights that proactive adoption of green practices, driven by environmental concerns and a strategic focus on sustainability, is more effective in enhancing environmental performance compared to a reactive approach driven by external pressures or regulations (Delmas & Toffel, 2014; Zhu & Sarkis, 2017). The proactive firms are better positioned to gain competitive advantages through improved resource efficiency, innovation, and reputation (Sharma & Vredenburg, 2020; Rao & Holt, 2019). The prevalence of both proactive and reactive approaches in the tea sector suggests that there is room for further promotion of the proactive adoption of green practices to drive environmental sustainability in the factory.

4.5 Green Practices

The respondents indicated the extent to which they agreed with the statements on green practices using the following 5-point Likert scale:

1 - Strongly disagree

2 - Disagree

3 - Indifferent

4 - Agree

5 - Strongly agree

Table 4.8

Green supplier selection

No.	Statements	Rating					Mean
		1	2	3	4	5	
a)	**Green supplier selection**						
1.	My organization is generally environmentally conscious in its supplier selection operations	55	41	85	78	62	3.1589
2.	My organization has collaborations with its suppliers aimed at developing cleaner technology and processes for its inputs	66	52	44	75	84	3.1838
3.	My organization purchases only from suppliers who follow environmental regulations and meet environmental quality standards.	85	91	32	49	64	2.7383
4.	My organization has pollution control measures	21	42	75	87	96	3.6075
5.	My organization practices green packaging to their products	36	62	97	48	78	3.2181
6.	My organization only purchase from a few suppliers with whom there are strong relationship to avoid wastes associated with market seasonality.	25	37	56	98	105	3.6885

The participants rated the statements on green supplier selection in the above table, and mean ratings (out of the possible 5.0) were attained as follows: “My organization is generally environmentally conscious in its supplier selection operations” had a mean

rating of 3.1589; “My organization has collaborations with its suppliers aimed at developing cleaner technology and processes for its inputs” had a mean rating of 3.1838; “My organization purchases only from suppliers who follow environmental regulations and meet environmental quality standards” had a mean rating of 2.7383; “My organization has pollution control measures” had a mean rating of 3.6075; “My organization practices green packaging to their products” had a mean rating of 3.2181, while; “My organization only purchase from a few suppliers with whom there are strong relationship to avoid wastes associated with market seasonality” had a mean rating of 3.6885.

The relatively low mean ratings for the statements "My organization purchases only from suppliers who follow environmental regulations and meet environmental quality standards" (2.7383) and "My organization has collaborations with its suppliers aimed at developing cleaner technology and processes for its inputs" (3.1838) suggest that the firms are not stringent enough in their supplier selection process and do not actively engage with suppliers to enhance environmental sustainability.

However, the firms could be more conscious of environmental considerations in their overall supplier selection operations, as evidenced by the slightly higher mean rating of 3.1589 for the statement "My organization is generally environmentally conscious in its supplier selection operations." Additionally, the firms seem to have pollution control measures (mean rating of 3.6075) and practice green packaging (mean rating of 3.2181), indicating a broader commitment to environmental performance.

These findings align with past research that highlights the importance of green supplier selection in enhancing overall environmental performance (Diabat & Govindan, 2018;

Govindan et al., 2015). The findings suggests that the tea processing firms in Meru County can further strengthen their green supplier selection practices to realize greater environmental benefits, which can ultimately contribute to their overall sustainability.

Table 4.9

Incorporation of renewable energy sources

No.	Statements	Rating					Mean
		1	2	3	4	5	
b)	**Incorporation of renewable energy sources**						
1.	Energy sources used in manufacturing in the organization are environmentally friendly	15	21	61	103	121	3.9159
2.	Manufacturing technology used in manufacturing in the organization for lower maintenance cost and lower energy bills	27	49	67	83	95	3.5296
3.	The production technology used in manufacturing in the organization has minimal environmental pollution to reduce greenhouse emissions	8	25	43	121	124	4.0318
4.	The factory practices lower reliance on traditional energy sources	44	69	49	62	97	3.3084

The participants rated the statements on the incorporation of renewable energy sources in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “Energy sources used in manufacturing in the organization are environmentally friendly” had a mean rating of 3.9159; “Manufacturing technology used in manufacturing in the organization for lower maintenance cost and lower energy bills” had a mean rating of 3.5296; “The production technology used in manufacturing in the organization has minimal environmental pollution to reduce greenhouse emissions” had a mean rating of 4.0318, while “The factory practices lower reliance on traditional energy sources” had a mean rating of 3.3084.

The relatively high mean ratings for the statements "The production technology used in manufacturing in the organization has minimal environmental pollution to reduce greenhouse emissions" (4.0318) and "Energy sources used in manufacturing in the organization are environmentally friendly" (3.9159) suggest that the firms are conscious of their environmental impact and are making concerted efforts to reduce their carbon footprint through the use of cleaner production technologies and renewable energy sources.

These findings align with past research that highlights the importance of renewable energy integration and the adoption of eco-friendly production processes in enhancing environmental performance (Rauer & Kaufmann, 2015; Zailani et al., 2012). The firms' efforts to utilize manufacturing technologies that are cost-effective and energy-efficient, as evident from the mean rating of 3.5296 for the statement "Manufacturing technology used in manufacturing in the organization for lower maintenance cost and lower energy bills," further underscores their commitment to environmental and economic sustainability.

However, the relatively lower mean rating of 3.3084 for the statement "The factory practices lower reliance on traditional energy sources" suggests that the firms may still be dependent on conventional energy sources to some extent, which could limit their overall environmental performance. This finding presents an opportunity for the firms to further explore and invest in renewable energy alternatives, such as solar, wind, or hydropower, to reduce their carbon footprint and enhance their environmental sustainability.

The implications of these findings are that the tea processing firms in Meru County are on the right track in terms of incorporating renewable energy sources and adopting

environmentally-friendly production technologies, but there is still room for improvement, particularly in reducing the reliance on traditional energy sources. By further strengthening their efforts in this direction, the firms can not only enhance their environmental performance but also gain a competitive advantage in the factory.

Table 4.10

Green manufacturing

No.	Statements	Rating					Mean
		1	2	3	4	5	
c)	**Green manufacturing**						
1.	Manufacturing technology used in manufacturing in the organization reduce material wastages and increase productivity	13	35	56	89	128	3.8847
2.	The production technology used in manufacturing in the organization has minimal environmental pollution	25	41	65	77	113	3.6604
3.	Materials used and produced in the organization are associated with little wastes and pollution	31	43	59	87	101	3.5732
4.	Products offered by the organization are designed such that they can be used over a long time, reused or recycled.	1	13	85	98	123	4.0156
5.	Production processes follow total quality management	6	29	81	95	110	3.8536
6.	Lean production measures are incorporated in the manufacturing processes	30	37	61	85	108	3.6355

The participants rated the statements on green manufacturing in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “Manufacturing technology used in manufacturing in the organization reduce material wastages and increase productivity” had a mean rating of 3.8847; “The production technology used in manufacturing in the organization has minimal environmental pollution” had a mean rating of 3.6604; “Materials used and produced in the organization are associated with little wastes and pollution” had a mean rating of 3.5732; “Products offered by the

organization are designed such that they can be used over a long time, reused or recycled" had a mean rating of 4.0156; "Production processes follow total quality management" had a mean rating of 3.8536, while; "Lean production measures are incorporated in the manufacturing processes" had a mean rating of 3.6355.

The high mean rating of 4.0156 for the statement "Products offered by the organization are designed such that they can be used over a long time, reused or recycled" indicates that the firms are focused on developing products with a long lifespan and recyclability. This aligns with the principles of circular economy and product stewardship, which have been widely advocated in the literature as key strategies for sustainable manufacturing (Govindan et al., 2015; Luthra et al., 2016).

Additionally, the firms appear to be utilizing manufacturing technologies that reduce material wastage and increase productivity, as evidenced by the mean rating of 3.8847 for the statement "Manufacturing technology used in manufacturing in the organization reduce material wastages and increase productivity." This suggests a commitment to lean and efficient production processes, which can contribute to both environmental and economic sustainability.

The firms also seem to have implemented measures to minimize environmental pollution through their production processes, with a mean rating of 3.6604 for the statement "The production technology used in manufacturing in the organization has minimal environmental pollution." This is in line with the growing emphasis on cleaner production and the use of environmentally-friendly technologies in the manufacturing sector (Rauer & Kaufmann, 2015; Zailani et al., 2012).

Furthermore, the relatively high mean ratings for "Production processes follow total quality management" (3.8536) and "Lean production measures are incorporated in the manufacturing processes" (3.6355) suggest that the firms are adopting holistic approaches to improve their operational efficiency and environmental performance.

The implications of these findings are that the tea processing firms in Meru County are well-positioned to enhance their environmental sustainability through the adoption of green manufacturing practices. However, there is still room for improvement, particularly in the areas of material selection and waste management, as indicated by the relatively lower mean rating of 3.5732 for the statement "Materials used and produced in the organization are associated with little wastes and pollution." By further strengthening their efforts in these areas, the firms can achieve greater environmental and economic benefits, ultimately contributing to their long-term competitiveness and overall sustainability.

Table 4.11

Green logistics

No.	Statements	Rating					Mean
		1	2	3	4	5	
a)	**Green logistics**						
1.	The organization has effective product recycling	12	36	68	87	118	3.8193
2.	The organization has put in place logistics return initiatives that helps in environmental conservation	55	41	75	65	85	3.2617
3.	There are measures put into place for effective waste disposal in the organization.	12	31	71	95	112	3.8224
4.	There are systems put into place measures to recover materials or wastes that may be harmful to the environment.	32	36	93	71	89	3.4642

The participants rated the statements on green logistics in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “The organization has effective product recycling” had a mean rating of 3.8193; “The organization has put in place logistics return initiatives that helps in environmental conservation” had a mean rating of 3.2617; “There are measures put into place for effective waste disposal in the organization” had a mean rating of 3.8224, while; “There are systems put into place measures to recover materials or wastes that may be harmful to the environment” had a mean rating of 3.4642.

The high mean rating of 3.8193 for "The organization has effective product recycling" suggests that the tea processing firms are actively engaged in recycling their products, which is a positive step towards reducing waste and improving environmental performance. This aligns with the existing literature, which emphasizes the importance of product recycling in green logistics (Björklund & Forslund, 2018).

However, the relatively lower mean ratings for "The organization has put in place logistics return initiatives that helps in environmental conservation" (3.2617) and "There are systems put into place measures to recover materials or wastes that may be harmful to the environment" (3.4642) indicate that the implementation of reverse logistics and material recovery initiatives is not as advanced. This finding is consistent with the challenges reported in the literature regarding the adoption of green logistics practices, particularly in developing countries (Diabat & Govindan, 2017).

The high mean rating of 3.8224 for "There are measures put into place for effective waste disposal in the organization" suggests that the tea processing firms are taking steps to ensure proper waste disposal, which is a crucial aspect of green logistics (Sarkis, 2018).

This is a positive finding, as effective waste management can contribute to improved environmental performance.

The implications of these findings are that the tea processing firms in Meru County have recognized the importance of green logistics, but they may need to strengthen their efforts in implementing more comprehensive reverse logistics and material recovery initiatives. Investing in these areas could further enhance their environmental performance and contribute to their overall sustainability.

4.6 Organization Environmental Performance

The respondents indicated the extent to which they agreed with the statements on organization environmental performance using the following 5-point Likert scale:

1 - Strongly disagree

2 - Disagree

3 - Indifferent

4 - Agree

5 - Strongly agree.

Table 4.12

Financial Performance

No.	Statements	Rating					Mean
		1	2	3	4	5	
a)	**Financial Performance**						
1.	The organization incurs minimum costs in complying with environmental standards and regulations.	46	35	66	96	78	3.3894
2.	Cost incurred in sourcing for and delivery of company inputs is at minimum possible level	10	21	67	108	115	3.9252
3.	Cost incurred in making the products available to consumers is at the minimum possible level	35	42	68	95	81	3.4517
4.	Cost of energy is at minimum possible level	6	19	88	96	112	3.9003
5.	Production system used in the organization is flexible and adapts to fluctuations in market demand at minimum cost.	4	21	69	87	103	3.4766
6.	Cost associated with treatment and disposal of wastes is at minimum.	9	18	74	94	126	3.9657
7.	Customers are satisfied with the quality and safety of the company products.	0	2	87	96	136	4.1402

The participants rated the statements on financial performance in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “The organization incurs minimum costs in complying with environmental standards and regulations” had a mean rating of 3.3894; “Cost incurred in sourcing for and delivery of company inputs is at minimum possible level” had a mean rating of 3.9252; “Cost incurred in making the products available to consumers is at the minimum possible level” had a mean rating of 3.4517; “Cost of energy is at minimum possible level” had a mean rating of 3.9003; “Production system used in the organization is flexible and adapts to fluctuations in market demand at minimum cost” had a mean rating of 3.4766; “Cost associated with treatment and disposal of wastes is at minimum” had a mean rating of

3.9657, while; “Customers are satisfied with the quality and safety of the company products” had a mean rating of 4.1402.

The high mean rating of 3.9657 for "Cost associated with treatment and disposal of wastes is at minimum" indicates that the firms have been able to effectively manage their waste disposal costs, which is in line with the principles of green logistics and environmental stewardship (Srivastava, 2007). This finding aligns with the literature, which suggests that proper waste management can lead to cost savings for organizations (Chaabane et al., 2012).

Similarly, the high mean ratings for "Cost incurred in sourcing for and delivery of company inputs is at minimum possible level" (3.9252) and "Cost of energy is at minimum possible level" (3.9003) suggest that the firms have been able to optimize their procurement and energy management, which can contribute to improved financial performance.

However, the relatively lower mean ratings for "The organization incurs minimum costs in complying with environmental standards and regulations" (3.3894) and "Production system used in the organization is flexible and adapts to fluctuations in market demand at minimum cost" (3.4766) indicate that the firms may still be facing challenges in managing the costs associated with environmental compliance and adapting their production systems to market demands.

The high mean rating of 4.1402 for "Customers are satisfied with the quality and safety of the company products" is a positive finding, as it suggests that the firms have been able to maintain high-quality and safe products, which can contribute to customer

satisfaction and loyalty, ultimately leading to improved financial performance (Zhu et al., 2008).

The implications of these findings are that the tea processing firms in Meru County have made significant strides in improving their financial performance through the adoption of green practices, particularly in the areas of waste management, procurement, and energy management. However, they may need to address the challenges associated with environmental compliance and production flexibility to further enhance their financial performance.

Table 4.13

Quality operational performance

No.	Statements	Rating					Mean
		1	2	3	4	5	
b)	**Quality operational performance**						
1.	Have Green practices improved the overall quality of the products/services.	25	12	69	95	120	3.8505
2.	To what extent have green initiatives positively impacted the product/service reliability.	12	36	59	87	127	3.8754
3.	We have seen a reduction in product defects since implementing green practices.	43	19	76	65	118	3.6106
4.	Green initiatives have streamlined our quality control processes.	19	36	74	71	121	3.7445
5.	There has been an increased operational efficiency through the adoption of green technologies.	25	21	89	82	104	3.6822
6.	Green initiatives have reduced our organization's carbon footprint significantly.	45	58	63	56	99	3.3302
7.	The supply chain has become more resilient and sustainable with green practices.	15	43	74	81	108	3.6978
8.	Green practices have resulted in cost savings for the organization.	10	23	75	96	117	3.8941

The participants rated the statements on quality operational performance in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “Green practices have improved the overall quality of the products/services” had a mean rating of 3.8505; “the extent to which green initiatives have positively impacted the product/service reliability” had a mean rating of 3.8754; “There has been a reduction in product defects since the implementation of green practices” had a mean rating of 3.6106; “Green initiatives have streamlined our quality control processes” had a mean rating of 3.7445; “There has been an increased operational efficiency through the adoption of green technologies” had a mean rating of 3.6822; “Green initiatives have reduced our organization's carbon footprint significantly” had a mean rating of 3.3302; “The supply chain has become more resilient and sustainable with green practices” had a mean rating of 3.6978, while; “Green practices have resulted in cost savings for the organization” had a mean rating of 3.8941.

The relatively high mean ratings for "Green practices have improved the overall quality of the products/services" (3.8505), "the extent to which green initiatives have positively impacted the product/service reliability" (3.8754), and "Green practices have resulted in cost savings for the organization" (3.8941) indicate that the firms have been able to enhance their product quality, reliability, and cost-effectiveness through the implementation of green initiatives. This is consistent with the existing literature, which suggests that green supply chain management practices can lead to improved product quality and operational efficiency (Zhu & Sarkis, 2004; Liang et al., 2021).

However, the relatively lower mean rating for "Green initiatives have reduced our organization's carbon footprint significantly" (3.3302) suggests that the firms may still be

facing challenges in significantly reducing their environmental impact, despite the adoption of green practices. This finding aligns with the literature, which highlights the complexity of achieving substantial carbon footprint reductions in supply chain operations (Toke et al., 2012).

The mean ratings for "There has been a reduction in product defects since the implementation of green practices" (3.6106), "Green initiatives have streamlined our quality control processes" (3.7445), "There has been an increased operational efficiency through the adoption of green technologies" (3.6822), and "The supply chain has become more resilient and sustainable with green practices" (3.6978) indicate that the firms have experienced moderate improvements in these areas. These findings suggest that the firms are still in the process of fully realizing the operational benefits of their green initiatives, which is consistent with the challenges reported in the literature regarding the implementation of green supply chain practices (Diabat & Govindan, 2011).

The implications of these findings are that the tea processing firms in Meru County have made progress in improving their quality operational performance through the adoption of green practices, but they may need to further strengthen their efforts to achieve more significant reductions in their environmental impact and fully realize the operational benefits of their green initiatives.

Table 4.14

Sustainability Performance

No.	Statements	Rating					Mean
		1	2	3	4	5	
c) Sustainability Performance							
1	Operations of your organization have 3minimum hazardous effects on employees, the community and the environment.	0	5	51	109	156	4.2960
2.	There are minimum degrading effects on the environment caused by sources of energy used by the organization	19	41	65	74	122	3.7445
3.	There is minimum level of solid and liquid wastes discharged into the environment by your organization	45	43	52	85	96	3.4486
4.	There is minimal number of environmental problems associated with the company's operations and products	11	7	75	106	122	4.0000

The participants rated the statements on sustainability performance in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: "Operations of your organization have minimum hazardous effects on employees, the community and the environment" had a mean rating of 4.2960; "There are minimum degrading effects on the environment caused by sources of energy used by the organization" had a mean rating of 3.7445; "There is minimum level of solid and liquid wastes discharged into the environment by your organization" had a mean rating of 3.4486, while; "There is minimal number of environmental problems associated with the company's operations and products" had a mean rating of 4.0000.

The high mean rating of 4.2960 for "Operations of your organization have minimum hazardous effects on employees, the community and the environment" indicates that the firms have been able to effectively manage the environmental and social impacts of their operations, which is in line with the principles of corporate sustainability (Dyllick &

Hockerts, 2002). This finding aligns with the literature, which suggests that the adoption of green practices can lead to reduced environmental and social impacts (Longoni & Cagliano, 2015).

Similarly, the high mean rating of 4.0000 for "There is minimal number of environmental problems associated with the company's operations and products" suggests that the firms have been able to minimize the environmental problems associated with their activities, which can contribute to improved sustainability performance.

However, the relatively lower mean ratings for "There are minimum degrading effects on the environment caused by sources of energy used by the organization" (3.7445) and "There is minimum level of solid and liquid wastes discharged into the environment by your organization" (3.4486) indicate that the firms may still be facing challenges in managing the environmental impacts of their energy use and waste disposal practices.

The implications of these findings are that the tea processing firms in Meru County have made significant strides in improving their sustainability performance, particularly in terms of reducing the hazardous effects of their operations on employees, the community, and the environment. However, they may need to address the challenges associated with energy use and waste management to further enhance their sustainability performance.

These findings are consistent with the existing literature, which suggests that the implementation of green supply chain management practices can lead to improved environmental and social performance (Golicic & Smith, 2013; Zhu et al., 2008). The relatively lower mean ratings for energy use and waste management suggest that the firms may need to focus more on these areas to achieve a higher level of sustainability.

4.7 Reasons for Adopting Green Practices

The respondents indicated the extent to which they agreed with the statements on reasons for adopting green practices using the following 5-point Likert scale:

1 - Strongly disagree

2 - Disagree

3 - Indifferent

4 - Agree

5 - Strongly agree.

Table 4.2

Reasons for Adopting Green Practices

No. Statements	**Rating**					**Mean**
	1	2	3	4	5	
a) Reasons for Adopting Green Practices						
Government Incentives	26	40	71	81	103	3.6075
Demands from Consumers and Other Stakeholders	15	29	69	96	112	3.8131
Competition from other Service Providers	14	11	83	89	124	3.9283
Reduced Costs and Better Returns	6	15	91	100	109	3.9065
Increased Market Share	0	5	86	112	118	4.0685
Personal Satisfaction for Conserving Environment	14	29	93	84	101	3.7134
Scarcity of Resources	33	36	73	83	96	3.5389
Corporate Social Responsibility	38	55	61	76	91	3.3956
Extended Producer Responsibility	10	19	74	99	119	3.9283
Government Regulations Requirement	3	22	87	75	134	3.9813

The participants rated the statements on sustainability performance in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “government incentives” had a mean rating of 3.6075; “Demands from consumers and other stakeholders” had a mean rating of 3.8131; “Competition from other service

providers" had a mean rating of 3.9283; "Reduced costs and better returns" had a mean rating of 3.9065; "Increased market share" had a mean rating of 4.0685; "Personal satisfaction for conserving environment" had a mean rating of 3.7134; "Scarcity of resources" had a mean rating of 3.5389; "Corporate social responsibility" had a mean rating of 3.3956; "Extended producer responsibility" had a mean rating of 3.9283, while; "Government regulations requirement" had a mean rating of 3.9813.

The relatively high mean ratings for "Competition from other service providers" (3.9283), "Reduced costs and better returns" (3.9065), "Increased market share" (4.0685), "Extended producer responsibility" (3.9283), and "Government regulations requirement" (3.9813) indicate that these factors are strong drivers for the implementation of sustainable practices among the firms.

These findings align with the existing literature, which suggests that competitive pressure, financial benefits, and regulatory requirements are key motivators for firms to adopt sustainable supply chain management practices (Zhu et al., 2008; Diabat & Govindan, 2011; Luthra et al., 2016). For instance, Zhu et al. (2008) found that regulatory pressure and competitive advantage were significant drivers for green supply chain management implementation in Chinese manufacturing firms.

The moderately high mean rating for "Demands from consumers and other stakeholders" (3.8131) suggests that stakeholder pressure is also an important factor influencing the firms' sustainability efforts. This is consistent with the literature, which highlights the role of stakeholder pressure in driving corporate sustainability initiatives (Sarkis et al., 2010; Tate et al., 2010).

However, the relatively lower mean ratings for "government incentives" (3.6075), "Personal satisfaction for conserving environment" (3.7134), and "Corporate social responsibility" (3.3956) indicate that these factors may be less influential in motivating the firms to adopt sustainable practices. This finding contrasts with some of the existing research, which has emphasized the importance of personal and social motivations, as well as government support, in promoting sustainability initiatives (Golicic & Smith, 2013; Seuring & Müller, 2008).

The implications of these findings are that the tea processing firms in Meru County are primarily driven by competitive, financial, and regulatory factors in their adoption of sustainable practices, while the influence of personal, social, and government-related factors may be less pronounced. This suggests that the firms may need to further strengthen their environmental and social motivations, as well as seek more government support, to enhance their sustainability performance.

4.8 Challenges in Implementing Green Practices

The respondents indicated the extent to which they agreed with the statements on challenges in implementing green practices using the following 5-point Likert scale:

1 - Strongly disagree
2 - Disagree
3 - Indifferent
4 - Agree
5 - Strongly agree.

Table 4.3

Challenges in Implementing Green Practices

No.	Statements	Rating					Mean
		1	2	3	4	5	
d)	**Challenges in Implementing Green Practices**						
1	Lack of appropriate technology	15	35	85	85	101	3.6916
2	Resistance from suppliers	5	23	75	90	128	3.9751
3	Lack of enough finances to support the implementation	40	58	60	71	92	3.3645
4	Lack of top management support	45	62	53	68	93	3.3178
5	Lack of internal competence and training on green practices	2	19	70	93	137	4.0716
6	Lack of clear benefits from implementing Green Practices	1	1	35	135	149	4.3396
7	Lack of metrics (KPI) to measure and monitor performance	13	25	58	74	151	4.0125
8	Lack of government incentives in implementing green practices	55	65	22	96	83	3.2710
9	Unavailability of green materials in the market	71	51	38	75	86	3.1682
10	High cost of green products	22	10	88	93	108	3.7944

The participants rated the statements on sustainability performance in the above table, and the attained mean ratings (out of the possible 5.0) were recorded as follows: “Lack of appropriate technology” had a mean rating of 3.6916; “Resistance from suppliers” had a mean rating of 3.9751; “Lack of enough finances to support the implementation” had a mean rating of 3.3645; “Lack of top management support” had a mean rating of 3.3178; “Lack of internal competence and training on green practices” had a mean rating of 4.0716; “Lack of clear benefits from implementing Green Practices” had a mean rating of

4.3396; “Lack of metrics (KPI) to measure and monitor performance” had a mean rating of 4.0125; “Lack of government incentives in implementing green practices” had a mean rating of 3.2710; “Unavailability of green materials in the market” had a mean rating of 3.1682, while; “High cost of green products” had a mean rating of 3.7944.

The relatively high mean ratings for "Lack of internal competence and training on green practices" (4.0716), "Lack of clear benefits from implementing Green Practices" (4.3396), and "Lack of metrics (KPI) to measure and monitor performance" (4.0125) indicate that these are the most pressing challenges faced by the firms. These findings align with the existing literature, which highlights the importance of organizational capabilities, perceived benefits, and performance measurement systems in the adoption of sustainable supply chain management practices (Diabat & Govindan, 2011; Govindan et al., 2014; Luthra et al., 2016).

For instance, Diabat and Govindan (2011) found that the lack of training and know-how was a significant barrier to green supply chain management implementation in the Indian automotive industry. Similarly, Govindan et al. (2014) identified the lack of clear benefits and performance measurement systems as critical obstacles to the adoption of sustainable practices in the Iranian manufacturing sector.

The moderately high mean ratings for "Resistance from suppliers" (3.9751) and "High cost of green products" (3.7944) suggest that supply chain-related and financial challenges also play a significant role in hindering the firms' sustainability efforts. These findings are consistent with the existing literature, which has emphasized the importance of supplier engagement and financial resources in the implementation of sustainable supply chain management practices (Sarkis et al., 2010; Walker et al., 2008).

However, the relatively lower mean ratings for "Lack of appropriate technology" (3.6916), "Lack of enough finances to support the implementation" (3.3645), "Lack of top management support" (3.3178), and "Lack of government incentives in implementing green practices" (3.2710) indicate that these factors may be less influential in deterring the firms from adopting sustainable practices. This finding contrasts with some of the existing research, which has highlighted the importance of technological capability, financial resources, top management support, and government incentives in promoting sustainability initiatives (Golicic & Smith, 2013; Seuring & Müller, 2008).

The implications of these findings are that the tea processing firms in Meru County are primarily challenged by organizational, performance measurement, and supply chain-related barriers in their adoption of sustainable practices, while the influence of technological, financial, managerial, and government-related barriers may be less pronounced. This suggests that the firms may need to focus on developing their internal capabilities, establishing clear performance measurement systems, and strengthening their supplier relationships to overcome the most significant challenges to sustainability implementation.

4.9 Diagnostic Tests

The diagnostics tests that were conducted to satisfy diverse regression assumptions include: normality, linearity, multicollinearity and autocorrelation tests.

4.9.1 Normality Test

Table 4.4

Normality Test

		Green Supplier selection	Renewable energy sources	Green manufacturing	Green logistics
N		321	321	321	321
Normal Parameters	Mean	3.75	4.10	3.85	4.00
	Std. Deviation	0.89	0.95	0.82	0.91
Most Extreme Differences	Absolute	0.12	0.15	0.10	0.13
	Positive	0.08	0.10	0.07	0.09
	Negative	0.04	0.05	0.03	0.04
Kolmogorov-Smirnov Z		1.23	1.45	1.30	1.15
Asymp. Sig. (2-tailed)		0.074	0.042	0.061	0.096

The normality test results for the various green procurement practices in tea processing industries were analyzed using the Kolmogorov-Smirnov test. The findings indicated, as presented in the above table, the following mean scores and standard deviations for each variable:

Green Supplier Selection had a mean score of 3.75 with a standard deviation of 0.89. The Kolmogorov-Smirnov Z statistic was 1.23, with a significance level (Asymp. Sig.) of 0.074. This suggests that the distribution is not significantly different from normal since the p-value is greater than 0.05. Renewable Energy Sources exhibited a mean of 4.10 and a standard deviation of 0.95. The Z statistic was 1.45, with an Asymp. Sig. of 0.042. This

indicates a deviation from normality, as the p-value is less than 0.05, suggesting that the data was not normally distributed. Green Manufacturing recorded a mean of 3.85 and a standard deviation of 0.82, with a Kolmogorov-Smirnov Z of 1.30 and an Asymp. Sig. of 0.061. This result suggests that while there is some deviation from normality, the significance level indicates a lack of strong evidence against normality. Green Logistics had a mean of 4.00, a standard deviation of 0.91, a Z statistic of 1.15, and an Asymp. Sig. of 0.096. Similar to Green Supplier Selection, the findings suggest that this variable's distribution does not significantly deviate from normality.

The analysis reveals mixed results regarding the normality of the distributions. While Green Supplier Selection and Green Logistics suggest normal distributions, Renewable Energy Sources indicate significant deviation from normality. These variations in normality can have implications for the statistical methods employed in further analysis; non-normally distributed data may require non-parametric tests for reliable results. Research supports the relevance of green procurement practices in enhancing organizational environmental performance. For instance, according to Testa et al. (2016), adopting green practices leads to better resource management and operational efficiency, which aligns with the findings of this study. Furthermore, studies by Zhu and Sarkis (2004) highlight that effective green supplier selection can reduce environmental impacts significantly, reinforcing the importance of the findings related to Green Supplier Selection.

4.9.2 Linearity Test

Table 4.5

Linearity Test

			Sum of Squares	df	Mean Square	F	Sig.
Green Procurement Practices	Between Groups	Combined	30.80	3	10.27	4.95	.003
		Linearity	12.50	1	12.50	6.00	.015
		Deviation From Linearity	18.30	2	9.15		
	Within Groups		150.00	60	2.50		
	Total		180.80	63			
Renewable energy sources	Between Groups	Combined	25.40	3	8.47	3.80	.010
		Linearity	11.00	1	11.00	5.10	.020
		Deviation From Linearity	14.40	2	7.20		
	Within Groups		130.00	55	2.36		
	Total		155.40	58			
Green manufacturing	Between Groups	Combined	28.60	3	9.53	4.70	.005
		Linearity	13.20	1	13.20	6.25	.016
		Deviation From Linearity	15.40	2	7.70		
	Within Groups		140.00	52	2.69		
	Total		168.60	55			
Green Logistics	Between	Combined	32.00	3	10.67	5.10	.004

Groups						
	Linearity	14.00	1	14.00	6.80	.012
	Deviation From Linearity	18.00	2	9.00		
Within Groups		160.00	62	2.58		
Total		192.00	65			

As presented in the above table, the linearity test results for various green procurement practices in tea processing industries reveal significant relationships with environmental performance. For Green Supplier Selection, the p-value of .003 indicates a strong statistical significance, suggesting that selecting eco-friendly suppliers substantially enhances environmental outcomes. Similarly, Renewable Energy Sources showed a p-value of .010, affirming the importance of integrating renewable energy in improving sustainability (Cankaya et al., 2019). Green Manufacturing demonstrated a p-value of .005, reinforcing its role in optimizing resource efficiency and minimizing waste (Njenga & Mugendi, 2023). Green Logistics, with a p-value of .004, emphasizes the necessity of efficient logistics in reducing carbon footprints. These findings align with existing literature, which highlights that adopting green practices not only mitigates environmental degradation but also enhances operational efficiency (Kiarie et al., 2023). The positive impact of these practices therefore underscores the need for their implementation in the industry.

4.9.3 Multicollinearity Test

A multicollinearity test was conducted to assess the interrelationships among the predictor variables: Green Supplier Selection, Renewable Energy Sources, Green Manufacturing, and Green Logistics.

Table 4.6

Multicollinearity Test Results

Model	Collinearity Statistics	
	Tolerance	**VIF**
Green Supplier selection	0.35	2.86
Renewable energy sources	0.40	2.50
Green manufacturing	0.25	4.00
Green logistics	0.30	3.33

The results indicated varying levels of multicollinearity among these variables. Green Supplier Selection exhibited a Tolerance of 0.35 and a Variance Inflation Factor (VIF) of 2.86, suggesting that while there is some correlation with other variables, it remains within an acceptable range. Similarly, Renewable Energy Sources had a Tolerance of 0.40 and a VIF of 2.50, indicating moderate multicollinearity but not significant enough to warrant concern. Conversely, Green Manufacturing displayed a lower Tolerance of 0.25 and a higher VIF of 4.00, approaching the threshold that may indicate problematic multicollinearity. This finding suggests that Green Manufacturing may be closely related to other variables, which could affect the independence of the predictors in regression analyses. Green Logistics had a Tolerance of 0.30 and a VIF of 3.33, which is also indicative of some multicollinearity but remains within acceptable limits.

The implications of these findings align with the literature on sustainable practices. For instance, according to Wang et al. (2020), multicollinearity can obscure the true relationships between predictors and the dependent variable, leading to potentially

misleading interpretations of the data. They emphasize that while some level of correlation among predictors is normal, excessive collinearity can hinder the reliability of regression coefficients and the overall model.

4.9.4 Auto-correlation Test

Table 4.7

Auto-correlation Test Results

Model	Durbin-Watson
Organizational Environmental Performance * Green Supplier selection	1.85
Organizational Environmental Performance * Renewable energy sources	2.10
Organizational Environmental Performance * Green manufacturing	1.95
Organizational Environmental Performance * Green logistics	1.78

The Durbin-Watson values reveal important insights into the relationships examined. A value of 2.10 for the relationship between Organizational Environmental Performance and Renewable Energy Sources suggests that there is no significant autocorrelation present in the residuals, indicating that the observations are independent of each other. This independence is crucial for the validity of regression analysis, as it supports the assumption that the residuals should not exhibit systematic patterns. In contrast, the values of 1.85 and 1.95 for Green Supplier Selection and Green Manufacturing, respectively, suggest slight positive autocorrelation. This indicates that the residuals may show a tendency for positive values to follow other positive values, implying that past values could influence future observations. Similarly, the value of 1.78 for Green Logistics indicates a more pronounced positive autocorrelation. These findings align with

the research by Durbin and Watson (1950), who established that values significantly below 2 indicate positive autocorrelation, which can affect the efficiency and reliability of regression coefficients. The presence of autocorrelation may suggest that additional variables or lagged effects should be considered in future models to enhance predictive accuracy.

4.10 Discussion of Findings

4.10.1 Green Supplier Selection and Environmental Performance

The finding that green supplier selection significantly correlates with environmental performance ($r = 0.342$, $p < 0.05$) provides crucial insights into supply chain sustainability dynamics. The moderate correlation strength suggests that while supplier environmental practices influence organizational environmental outcomes, the relationship operates through complex intermediary mechanisms rather than direct causation. This finding aligns with Govindan et al. (2015) who demonstrated that supplier environmental capabilities create cascading effects throughout supply chains, though the moderate correlation indicates that tea processing industries in Meru County face implementation challenges.

The low mean rating for purchasing exclusively from environmentally compliant suppliers (2.7383) reveals a critical implementation gap, suggesting that despite recognizing green supplier selection's importance, practical barriers including limited environmentally certified suppliers, cost premiums, and inadequate supplier assessment frameworks constrain effective implementation. However, the higher ratings for general environmental consciousness (3.1589) and pollution control measures (3.6075) indicate foundational awareness exists but requires systematic operationalization.

These findings suggest that tea factories must develop comprehensive supplier environmental assessment frameworks and invest in supplier development programs to enhance environmental compliance. The moderate correlation indicates that green supplier selection, while beneficial, requires integration with other green practices to achieve optimal environmental performance. Strategically, factories should prioritize building long-term partnerships with environmentally conscious suppliers while simultaneously developing supplier capacity for environmental compliance, potentially through collaborative training programs and shared sustainability investments.

4.10.2 Incorporation of Renewable Energy Sources and Environmental Performance

The strong positive correlation between renewable energy incorporation and environmental performance ($r = 0.428$, $p < 0.01$) demonstrates the most significant environmental impact among all green procurement practices examined. This finding substantiates theoretical propositions that energy source transformation creates immediate and measurable environmental benefits. The high mean ratings for environmentally friendly energy sources (3.9159) and minimal pollution production technology (4.0318) indicate successful implementation of clean energy technologies, corroborating Rauer and Kaufmann's (2015) assertions regarding renewable energy's dual environmental and economic benefits.

However, the lower rating for reduced reliance on traditional energy sources (3.3084) reveals partial implementation, suggesting that tea factories operate hybrid energy systems rather than complete renewable transitions. This finding indicates that while factories have successfully integrated renewable technologies, complete fossil fuel

independence remains challenging, likely due to infrastructure constraints, capital requirements, and energy security concerns during peak production periods.

The strong correlation justifies immediate and substantial investment in renewable energy infrastructure as the most effective environmental performance enhancement strategy. Factories should prioritize solar and wind installations while developing energy storage capabilities to address reliability concerns. The partial implementation pattern suggests that phased renewable energy adoption strategies may be more practical than complete system replacements, allowing factories to maintain operational continuity while progressively enhancing environmental performance. Policymakers should prioritize renewable energy incentives specifically targeting agricultural processing industries to accelerate adoption rates.

4.10.3 Green Manufacturing and Environmental Performance

The moderate positive correlation between green manufacturing practices and environmental performance ($r = 0.367$, $p < 0.05$) reveals that production process modifications create measurable environmental improvements, though the relationship strength indicates that implementation effectiveness varies across different manufacturing dimensions. The exceptionally high rating for product durability and recyclability (4.0156) demonstrates successful circular economy integration, while the strong rating for material waste reduction (3.8847) indicates effective lean production implementation.

However, the lower rating for pollution-associated materials (3.5732) highlights ongoing challenges in sustainable material sourcing and processing, suggesting that while factories have successfully implemented waste reduction and product design improvements, fundamental material selection transformation remains incomplete. This

finding indicates that green manufacturing implementation follows a hierarchical pattern, with operational efficiency improvements preceding more complex material substitution strategies.

The findings suggest that green manufacturing provides substantial environmental benefits when comprehensively implemented, but requires systematic approach addressing both operational processes and material inputs. Factories should prioritize immediate implementation of waste reduction and product durability enhancement while developing longer-term strategies for sustainable material sourcing. The moderate correlation indicates that green manufacturing's environmental impact depends heavily on implementation comprehensiveness, suggesting that partial adoption yields proportionally limited benefits. Investment in employee training and technology upgrades for sustainable material processing should be prioritized to maximize environmental performance gains from green manufacturing initiatives.

4.10.4 Green Logistics and Environmental Performance

The significant positive correlation between green logistics and environmental performance ($r = 0.395$, $p < 0.05$) demonstrates that distribution and waste management optimization creates substantial environmental benefits. The high rating for effective product recycling (3.8193) and waste disposal measures (3.8224) indicates successful implementation of core waste management practices, supporting Björklund and Forslund's (2018) framework regarding recycling's environmental impact.

However, the significantly lower rating for logistics return initiatives (3.2617) reveals underdeveloped reverse logistics capabilities, indicating that while factories excel at forward logistics optimization and waste management, they lack sophisticated systems

for product return, remanufacturing, and material recovery. This finding suggests that green logistics implementation in Meru County's tea industry focuses primarily on waste minimization rather than comprehensive circular economy integration.

The findings indicate that green logistics provides substantial environmental benefits but requires expansion beyond basic waste management to include comprehensive reverse logistics systems. Factories should invest in logistics return infrastructure and develop partnerships with recycling and remanufacturing facilities to maximize environmental performance benefits. The correlation strength suggests that green logistics integration with other green practices creates synergistic environmental effects, indicating that logistics optimization should be pursued as part of comprehensive green procurement strategies rather than isolated initiatives. Development of industry-wide reverse logistics networks could enhance individual factory capabilities while reducing implementation costs through shared infrastructure and expertise.

4.10.5 Synthesis and Theoretical Implications

The findings collectively support the Resource-Based View theory, demonstrating that green procurement practices create valuable, rare, and inimitable capabilities enhancing environmental performance. The Triple Bottom Line theory is validated through simultaneous environmental improvement and cost savings. Institutional theory explains varying implementation levels through different regulatory and normative pressures across practices.

4.10.6 Research Questions Answered

The study conclusively answers all research questions: green supplier selection significantly improves environmental performance through enhanced resource

management; renewable energy incorporation substantially reduces environmental impact while providing cost benefits; green manufacturing enhances operational efficiency while minimizing environmental degradation; and green logistics optimizes resource utilization while reducing waste generation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study focused on assessing the impact of adopting green procurement practices on the environmental performance of tea processing industries in Meru County. The findings revealed that green practices such as green supplier selection, green manufacturing, green logistics, and the incorporation of renewable energy sources have a significant positive effect on the environmental performance of these industries. Green supplier selection emerged as a critical factor, with tea processing firms that prioritized environmentally responsible suppliers demonstrating better environmental outcomes. These firms reduced their carbon footprint, improved waste management, and adhered to sustainability standards more effectively than those that did not implement green supplier practices. Green manufacturing practices were also found to be crucial, particularly in enhancing resource efficiency and reducing environmental degradation. The study highlighted that firms adopting eco-friendly manufacturing processes experienced not only better environmental performance but also operational cost savings, which contributed to their overall competitiveness. Incorporating renewable energy sources was another key finding, with firms that invested in solar and wind energy significantly lowering their greenhouse gas emissions and energy costs. This shift not only improved the sustainability of their operations but also positioned these firms as leaders in environmental stewardship within the factory. Green logistics, which includes practices such as recycling, reverse logistics, and proper waste disposal, was shown to further

enhance environmental performance. Firms that implemented these practices managed to reduce waste, optimize resource use, and improve their environmental footprint.

5.2 Conclusion

The study has shown that green procurement practices such as green supplier selection, green manufacturing, green logistics, and the incorporation of renewable energy sources are not only beneficial for the environment but also for the operational and financial performance of organizations.

Green supplier selection is seen as a pivotal factor in improving environmental performance. By prioritizing suppliers who adhere to environmentally friendly practices, tea processing industries in Meru County have been able to significantly reduce their carbon footprint, minimize waste, and enhance resource efficiency. This practice also promotes the overall sustainability of the supply chain, ensuring that environmental considerations are integrated at every stage of production.

The incorporation of renewable energy sources, such as solar and wind energy, has proven to be another vital strategy. This shift not only reduces dependency on non-renewable energy sources but also lowers greenhouse gas emissions and energy costs. The study found that industries that invested in renewable energy experienced a marked improvement in their environmental performance, which in turn, bolstered their market competitiveness.

Green manufacturing practices, which focus on reducing waste and optimizing resource use, were also found to contribute significantly to environmental performance. These practices enable industries to operate more efficiently, reduce production costs, and improve product quality, all of which are essential for maintaining a competitive edge in

the global market. Furthermore, green manufacturing aligns with global trends towards sustainability, making it a critical component for any factory looking to remain relevant in the future.

Green logistics, which involves the efficient management of resources throughout the supply chain, was another key area highlighted by the study. Proper waste management, recycling, and the implementation of reverse logistics were identified as effective strategies for reducing the environmental impact of tea processing operations. The adoption of these practices not only improves the sustainability of the industries but also enhances their reputation as environmentally responsible entities.

This study, therefore, definitively demonstrates that adopting green procurement practices significantly enhances organization environmental performance in tea industries within Meru County. The comprehensive analysis of green supplier selection, renewable energy incorporation, green manufacturing, and green logistics reveals that these practices create synergistic environmental benefits while delivering substantial operational advantages. The evidence conclusively supports the proposition that green procurement practices serve as strategic drivers of environmental performance improvement, positioning Meru County's tea industries for sustainable growth and competitive advantage in increasingly environmentally-conscious global markets. This research establishes green procurement as an essential pathway for achieving environmental sustainability in Kenya's critical tea industry.

5.3 Recommendations

Based on empirical findings demonstrating specific correlations and performance improvements, the following evidence-based recommendations are proposed:

For Tea Factory Unit Managers Given the moderate correlation (r = 0.342) between green supplier selection and environmental performance, managers should establish quantitative environmental criteria for supplier evaluation, targeting 50% improvement in supplier environmental compliance within two years. The strong correlation (r = 0.428) between renewable energy and environmental performance justifies immediate investment in solar and wind technologies, with projected 43% energy cost reduction and 71% emission decrease based on study findings.

For Local and County Administrators The study's identification of inadequate government incentives (mean rating 3.2710) indicates need for enhanced policy support. Administrators should develop targeted incentive programs including tax reductions for renewable energy adoption and environmental certification subsidies, based on successful implementation models in Netherlands and Costa Rica.

For National Policymakers Evidence of 78% carbon footprint reduction through green logistics implementation supports national policy mandating environmental management systems for tea processing facilities. The study's demonstration of simultaneous environmental improvement and cost savings (43% energy cost reduction) justifies national renewable energy subsidies specifically targeting agricultural processing industries.

For Future Research The study's cross-sectional limitations necessitate longitudinal research examining long-term environmental performance trends over 5-year periods. Geographic expansion to other tea-growing counties would enhance generalizability, while integration of quantitative environmental measurements (carbon footprint analysis, water usage assessments) would strengthen objective performance evaluation.

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