EFFECTS OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES ON SUSTAINABILITY PERFORMANCE OF AIRLINES COMPANIES IN KENYA

BY

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152575

A PROJECT SUBMITTED TO STRATHMORE UNIVERSITY BUSINESS SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF A MASTER OF COMMERCE (MCOM) DEGREE,

MANAGEMENT SCIENCE OPTION

STRATHMORE UNIVERSITY BUSINESS SCHOOL

STRATHMORE UNIVERSITY

NAIROBI, KENYA

MAY 2025

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the project contains no material previously published or written by another person except where due reference is made within the proposal.

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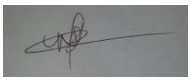
Signature: 

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ACKNOWLEDGEMENT

I wish to express my gratitude to all who have immensely contributed to this work. Special appreciation to my supervisor, Dr. Diana Ominde for her valued advice and support in this research proposal my family and friends.

ABSTRACT

The aviation industry plays a vital role in global connectivity, economic development, and environmental sustainability. Responding to growing environmental challenges, Green Supply Chain Management (GSCM) has emerged as a strategic approach to improving sustainability performance within the sector. This study examined the effects of GSCM practices (green purchasing, green manufacturing, green distribution, and green marketing) on the sustainability performance of airline companies in Kenya. The research was grounded in stakeholder theory and the resource-based view, which informed the analysis of how stakeholder expectations and unique organizational resources shape the adoption and effectiveness of GSCM practices. Descriptive survey design was employed, targeting all 49 airlines registered under the Kenya Civil Aviation Authority. From this population, a census of 98 officers in operations, procurement, and environmental management was conducted to ensure robust sector-wide representation. Data was collected through structured questionnaires. Quantitative data analysis was performed using multiple linear regression, selected for its ability to assess the simultaneous impact of several independent variables (the different GSCM practices) on the dependent variable (sustainability performance) and to control for potential confounding factors, thereby yielding reliable, generalizable results. The findings reveal that GSCM practices collectively exert a significant positive effect on the sustainability performance of Kenyan airlines. Among these, green manufacturing emerged as the most influential driver, underscoring the importance of adopting eco-friendly production technologies and resource optimization. Green purchasing and green marketing also showed substantial positive contributions, highlighting the value of environmentally conscious procurement and effective communication of sustainability initiatives. In contrast, green distribution, although present, exhibited a limited effect on sustainability outcomes, indicating potential gaps in logistics infrastructure or the need for further investment in green distribution technologies. Based on these insights, the study recommends the development of comprehensive regulatory frameworks to promote and enforce GSCM adoption, increased investment in green technologies, and strengthened collaboration with supply chain partners to ensure consistency in sustainability practices. The research further suggests that airlines should explore innovative solutions to enhance green distribution and calls for longitudinal studies to assess the long-term impact of GSCM on sustainability performance. These recommendations provide actionable guidance for airline managers, policymakers, and researchers committed to advancing environmental sustainability within Kenya's aviation sector.

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ABBREVIATIONS AND ACRONYMS

GSCM	Green Supply Chain Management
KCAA	Kenya Civil Aviation Authority
KQ	Kenya Airways PLC
RBV	Resource Based View
SC	Supply Chain
SCM	Supply Chain Management
SSCM	Sustainable Supply Chain Management
TOC	Theory of Constraints
TQM	Total Quality Management

DEFINITION OF KEY TERMS

Green Supply Chain Management (GSCM): Green Supply Chain Management refers to the systematic integration of environmentally responsible practices throughout all stages of the supply chain, from raw material procurement to product disposal (Zhu & Sarkis, 2024).

Green Purchasing: Green purchasing involves acquiring goods and services that exert minimal adverse effects on the environment compared to traditional alternatives (Min & Galle, 2021).

Green Manufacturing: Green manufacturing denotes the application of environmentally conscious methods in production processes to mitigate ecological damage without compromising economic performance (Diabat & Shankar, 2021).

Green Distribution: Green distribution refers to the adoption of sustainable logistics and transportation strategies that reduce the environmental footprint of product delivery. It encompasses optimizing routes to lower fuel consumption, employing eco-friendly vehicles, reducing packaging, and utilizing reverse logistics to encourage recycling and reuse, thereby enhancing the sustainability of the distribution network (Wu & Dunn, 2021).

Green Marketing: Green marketing is the process of promoting products, services, or business practices based on their environmental advantages. Organizations highlight eco-friendly features to attract environmentally conscious consumers, strengthen brand reputation, and achieve competitive differentiation by aligning with the values of sustainability (Polonsky, 2024).

Sustainability Performance: Sustainability performance measures the extent to which an organization successfully manages its environmental, social, and economic impacts in accordance with sustainability principles (Elkington, 2023).

CHAPTER ONE

INTRODUCTION

1.1: Introduction

This chapter entails the introduction to the study on the effects of green supply chain management practices on the sustainability performance of Airline Companies in Kenya. It presents the background of the study, followed by the statement of the problem, research objectives, and research questions guiding the inquiry. Additionally, the chapter outlines the scope, highlights the limitations, and discusses the significance of the study.

1.2: Background of the study

In recent years, environmental sustainability has become an urgent concern worldwide, driven by growing recognition of the adverse impacts of industrial and corporate activities on the natural environment (Yoon et al., 2010). Concerns about environmental degradation have spurred major economies such as the United States, the United Kingdom, and China to rethink their approach to corporate sustainability and environmental responsibility. In the United States, the Environmental Protection Agency (EPA) has tightened regulations on carbon emissions, compelling industries to adopt greener technologies and practices (EPA, 2022).

The United Kingdom, as part of its commitment to the Paris Agreement, has set ambitious targets to achieve net-zero emissions by 2050, driving a nationwide push for sustainable business operations, especially within the aviation sector (UK Department for Transport, 2023). Meanwhile, across Asia, China has emerged as a leader in implementing large-scale green supply chain reforms, encouraging manufacturers to embrace eco-friendly sourcing, clean energy, and sustainable logistics to address severe air pollution and resource depletion challenges (Zhu & Sarkis, 2024). These global developments highlight a shift toward integrating environmental stewardship into supply chain management, emphasizing the life-cycle approach to minimizing the environmental impact of corporate activities (Elkington, 2023).

Regionally, African economies are facing their own sustainability challenges and opportunities. In South Africa, government-led initiatives such as the Green Transport Strategy and the adoption of

renewable energy in major airports, including O.R. Tambo International Airport, have set precedents for reducing aviation-related emissions (South African Department of Transport, 2022).

Nigeria, as Africa's largest economy, has begun to implement sustainable procurement guidelines within its aviation sector to align with global best practices and the International Civil Aviation Organization's (ICAO) environmental standards (Nigerian Civil Aviation Authority, 2023). Ethiopia, home to one of Africa's largest and most successful airlines, Ethiopian Airlines, has invested heavily in fuel-efficient aircraft and eco-friendly operational policies to bolster its green reputation on the continent (IATA, 2023). Despite these advances, the pace of green supply chain management adoption varies across Africa, constrained by regulatory inconsistencies, limited access to green technologies, and resource limitations (Gondwe & Chiotha, 2020; Nhamo, Ndlela, & Nhemachena, 2021).

Kenya has demonstrated growing commitment to environmental sustainability, particularly within its aviation industry. The Kenya Civil Aviation Authority (KCAA) has adopted policies aligned with the International Air Transport Association's (IATA) environmental programs, supporting local airlines in integrating green procurement, energy efficiency, and waste management into their supply chains (Kabachia & Kihara, 2019). Kenya Airways, the country's flag carrier, has initiated notable sustainability projects, such as the "Red Goes Green" campaign and participation in SkyTeam's Sustainable Flight Challenge, which promote carbon offsetting and eco-friendly operational practices (Kenya Airways, 2023). Nairobi's Jomo Kenyatta International Airport has also implemented waste recycling and water conservation programs as part of its green airport strategy (Kenya Airports Authority, 2022). Nonetheless, empirical studies indicate that while Kenyan airlines are progressively adopting Green Supply Chain Management (GSCM) practices, gaps remain in the full integration of green distribution, infrastructure, and stakeholder engagement, warranting further research and strategic policy interventions (Kiprono & Genga, 2018; Kosgei & Gitau, 2018).

1.2.1: Green Supply Chain Management practices

There are several expressions that are frequently used while talking about environmental sustainability, according to Lee (2008). Terms like "environmental supply chain management," "green purchasing," "green value chain," "green supply chain practices," and "green supply chain"

are included in this category. According to Mumtaz et al., (2018), green supply chain management (GSCM) is a method that combines concepts related to environmental sustainability with supply chain management. The term "green supply chain management" (GSCM) describes how environmentally friendly practices are integrated into every stage of the process, from product recovery to production, distribution, and design (Kaur et al., 2017; Masudin et al., 2018; Zhu & Sarkis, 2007a).

Zhu and Sarkis (2006) conceptualize GSCM as the integration of environmental thinking with operations management in the SC, starting with the product design and passing through the selection of raw materials, manufacturing processes, transportation and delivery, and the final consumer arriving at the final destination after use. Large and Thomsen (2011) states that GSCM includes the design process, raw material selection, green procurement, the green manufacturing process, green distribution, and reverse logistics.

The idea of supply chain management gained widespread acceptance in the 1970s, because of this, there was a noticeable increase in interest in green supply chain management, which prompted businesses of all stripes to give sustainability first priority. As a result, they have included eco-friendly practices into their strategic objectives (Jasneet et al., 2017). Adopting environmentally friendly practices at every stage of the supply chain, including product design, sourcing, manufacturing, distribution, and product recovery, is part of the green supply chain framework. Jasneet et al. (2017) and Jung (2011) consider the integration of environmental issues into supply chain management systems to be an impressive endeavor. Reducing negative impacts on resources and the environment while adhering to the company's operating structure is the major objective of green supply chain management. By prioritizing environmental responsibility and seeking economic gains simultaneously, this approach seeks to promote sustainable development (Wenhao et al., 2020).

1.2.2: Sustainability Performance

Sustainability performance refers to an organization's ability to achieve a balanced integration of environmental stewardship, social responsibility, and economic viability in its operations and strategies (Neri et al., 2018). It shows how effectively an entity manages its impacts across these

three interconnected dimensions of the Triple Bottom Line (TBL). Rather than viewing sustainability as an isolated initiative, sustainability performance requires the continuous evaluation of resource utilization, emissions control, community engagement, ethical governance, and economic growth. Sustainability performance also reflects how well an organization embeds sustainability principles into its daily decision-making, production processes, supply chain practices, and stakeholder relationships. As industries increasingly face pressure from governments, investors, and society, sustainability performance has evolved into a key measure of long-term resilience, competitiveness, and value creation (Elkington, 1998; Morioka et al., 2018).

The significance of sustainability in industrial operations is a topic of increasing discussion among policymakers and corporate executives (Scordato et al., 2018; Stoycheva et al., 2018). More writers have recently started exploring the concept of industrial sustainability, which goes beyond the production line and includes every aspect of an industrial plant's activities. This speaks to how these activities are incorporated into the day-to-day operations of the business and has to do with how resources are allocated, goods are made, processes are carried out, facilities are managed, and production systems are improved (Neri et al., 2018). Adopting a comprehensive approach that takes into account the interconnectedness of the ecological, social, and economic elements of the Triple Bottom Line (TBL) is crucial for addressing industrial sustainability.

The assessment and enhancement of an industry's long-term viability are crucial elements to take into account, as highlighted by Howard et al. (2018), Engida et al. (2018), and Morioka et al. (2018). The research underscores the importance of sustainability in promoting competitiveness. Like what Collins et al. (2016) and Singh et al. (2012) found, internal stakeholders must have a clear understanding of the areas that require attention in order to progress sustainability. Therefore, it is essential that businesses assess how they are doing in terms of industrial sustainability and decide on the best course of action. It is essential that they evaluate and oversee the results of their endeavors in order to guarantee their efficacy. Using performance evaluation indicators that are especially created to be in line with the goals of the organisation is crucial for doing this (Clarke-sather et al., 2011; Singh et al., 2016). Moreover, Ghadimi et al., (2012) suggest that comparing and evaluating sustainability initiatives might be made easier with the use of performance evaluation. For this purpose, Ferrari et al. (2019) and Paju et al. (2010) support the use of specified

markers. Conducting a comparison analysis with other firms within the same industry is crucial when seeking assistance with benchmarking (Ferrari et al., 2019).

In addition, the organization's size and location are significant contextual factors (Apaydin et al., 2018; Tanzil and Beloff, 2006; Siebert et al., 2018). To improve sustainability, industrial enterprises must use sustainability performance indicators, as noted by Singh et al. (2012) and Engida et al. (2018). This is since determining the necessary elements is an essential initial step towards advancement. Measurable data points known as performance indicators let decision-makers evaluate performance and make decisions about which metrics to utilize in order to accomplish goals.

Sustainability performance forms an intrinsic part of organizational structures, influencing strategic decisions, operational activities, and stakeholder interactions across all levels. It reflects the extent to which environmental stewardship, social responsibility, and economic resilience are integrated into daily practices and long-term planning (Clarke-Sather et al., 2011). Within high-performing organizations, resource allocation, process design, and innovation strategies inherently account for sustainability principles, ensuring that value creation aligns with the goals of ecological preservation and social advancement. As Singh et al. (2016) observe, sustainability performance manifests through the consistent application of measurable indicators that evaluate environmental impact, social engagement, and economic outcomes. These metrics not only track progress but also guide adaptive strategies, embedding sustainability within the organization's operational fabric. The alignment of sustainability considerations with organizational missions and visions creates a dynamic where competitiveness, ethical governance, and future-oriented growth coexist as core dimensions of performance excellence (Singh et al., 2016).

1.2.3: The Aviation Industry in Kenya

The growth, financial success, and expansion of the tourism sector have been significantly aided by Kenya's aviation industry (Farah, Munga, & Mbebe, 2018). The aviation sector is a vital contributor to Kenya’s economic prosperity through its substantial GDP contribution, significant tax revenue generation, and notable job creation. These economic benefits stem from both domestic and international air travel, as well as the broad range of activities embedded within the

aviation supply chain. According to Esiaba (2020), the sector generates considerable economic value that extends beyond direct aviation services.

The Kenya Civil Aviation Authority (KCAA) was established following the passage of the Civil Aviation (Amendment) Act of 2002, tasked with regulating and overseeing the aviation sector in compliance with international standards set by the International Civil Aviation Organization (ICAO) (Ngugi, 2018). Kenya's aviation landscape is diverse, comprising both commercial and private airline operators. Private aircraft can be chartered for individual use, while commercial airlines, such as Kenya Airways PLC the national carrier and the third-largest airline in Africa transport passengers across regional and international destinations (Farah, Munga, & Mbebe, 2018).

As of 2019, Kenya had 49 licensed airlines operating within its airspace (Kabachia & Kihara, 2019). However, more updated records from the Kenya Civil Aviation Authority (2023) indicate that there are currently 52 licensed airlines comprising both passenger and cargo operators. For the purposes of this study, a selection of 30 active, registered airlines authorized by the KCAA will be considered, focusing on those engaged in either domestic or international scheduled air services.

The aviation sector represents approximately 1% of Kenya's GDP and accounts for a significant share of tax revenues and employment opportunities (Kabachia & Kihara, 2019). Over time, the increasing demand for domestic and international air travel has driven substantial development within the industry. Despite its growth, Kenya's aviation sector faces several challenges (Kiprono & Genga, 2018). Increasing competition among carriers, both local and international, has forced airlines to adapt their business models and operational practices to remain viable. Research by Farah, Munga, and Mbebe (2018) notes that competition varies across different routes, often characterized by fluctuations in passenger volumes and heightened rivalry. Compared to regional competitors such as Ethiopian Airlines, Kenyan airlines have historically encountered financial difficulties (Kosgei & Gitau, 2018).

Moreover, European and Middle Eastern airlines exert considerable influence within Kenya's aviation sector by deploying diverse management, supply chain, and organizational strategies. This

dynamic necessitates an assessment of how green supply chain management (GSCM) practices impact the sustainability performance of Kenyan airlines. Aviation, as the fastest and most efficient mode of passenger and cargo transport, remains critical to Kenya's broader economic development.

The importance of enforcing regulatory, policy, and financial mechanisms to achieve environmental sustainability in aviation is emphasized by international organizations such as the International Air Transport Association (IATA) and the International Civil Aviation Organization (ICAO), as well as by Khan (2019). Supporting evidence from Khan et al. (2017) highlights the need for a comprehensive, systemic approach to address sustainability challenges in aviation. Global airlines are increasingly adopting strategies aimed at reducing their environmental footprint to enhance their competitiveness. Studies by Epstein and Buhovac (2014) and Hussain et al. (2016) confirm that sustainable practices not only foster competitiveness but can also contribute to profitability.

Examples from international carriers underline this shift. Air France, for instance, applies the 3R Principle reduce, reuse, and recycle as part of its sustainability commitment. By 2022, Air France aimed for a 90% reduction in disposable plastics and targeted a 50% reduction in non-recycled waste by 2030. Furthermore, the airline has incorporated sustainable aviation fuel into its operations, setting ambitious targets of achieving 10% sustainable fuel usage by 2030 and 63% by 2050. Kenya Airways PLC also participates actively in sustainability initiatives, joining the SkyTeam alliance's "The Sustainable Flight Challenge (TSFC) 2023" and launching its own "Red Goes Green" program, which incentivized travelers with round-trip tickets from Nairobi to Amsterdam to promote environmental awareness (Kenya Airways, 2023). Given these developments, evaluating the effect of green supply chain management practices on the sustainability performance of Kenyan airlines becomes an essential research priority.

1.3: Problem Statement

The aviation industry drives economic growth while simultaneously advancing environmental and social objectives, achieving a balance that supports sustainable development (Alameeri, Ajmal, & Hussain, 2020). A fully optimized aviation sector integrates eco-friendly practices at every stage

of its supply chain, from procurement and manufacturing to distribution and marketing, aligning operations with global sustainability frameworks (Pinheiro et al., 2020). In such a setting, airlines proactively minimize their carbon footprint, adopt circular economy principles, and embed sustainability performance metrics into corporate strategy and decision-making (Chao et al., 2019). Effective integration of green supply chain management practices positions airlines not only as economic enablers but also as responsible stewards of environmental and social capital. However, despite growing global momentum toward sustainability, evidence suggests that fragmented adoption of green initiatives persists in many developing countries' aviation sectors, including Kenya (Firmansyah, Qadri, & Arfiansyah, 2021). Addressing this disconnect is crucial for transforming Kenya's aviation industry into a competitive, resilient, and environmentally sustainable sector.

In Kenya, Green Supply Chain Management, or GSCM, has recently gained popularity, Numerous businesses, particularly those in the industrial sector, have employed such strategies. Although key industry players like Kenya Airways and Jambo Jet have shown growing interest in sustainability, existing evidence points to fragmented and inconsistent implementation of GSCM initiatives (Kiprono & Genga, 2018). Most local airlines still face substantial barriers, such as inadequate infrastructure, limited regulatory enforcement, and insufficient stakeholder engagement, hindering comprehensive adoption of green practices (Kabachia & Kihara, 2019). Furthermore, much of the existing research in Kenya has focused on the industrial and textile sectors, leaving a gap in understanding how GSCM is operationalized within the aviation industry (Amemba, 2013; Andebe, 2013).

Similarly, there has been a notable surge in the interest of academics and supply chain professionals throughout the globe in Green Supply Chain Management (GSCM). Numerous studies, including those conducted by Govindan et al., (2014b), Mishra et al. (2015), de Sousa Jabbour et al., (2013), Mudgal et al., (2009), Luthra et al., (2011, 2013), Mishra et al., (2012) and Mangla et al., (2013), have demonstrated this. The concept of green supply chain management, or GSCM, is commonly recognized as a critical element in advancing business sustainability. The decrease of emissions in the atmosphere is directly linked to attempts to make the aviation sector more environmentally friendly to reach a state of near carbon neutrality.

A lack of research on the application of cost analysis in Green Supply Chain Management (GSCM) methodologies was found in Golic and Smith's 2013 study. Prior research has mostly concentrated on external factors, such regulations and consumer preferences (Yu and Ramanathan, 2015). Given the current limitations in research, it is essential to carry out more comprehensive analyses of the factors influencing pricing and increase the sample sizes. Moreover, little study has been done on the costs and incentives for consumers related to the implementation of green supply chain management (GSCM). An interesting field of research is the examination of how cost and customer concerns, taken alone or in combination, affect GSCM operations (Sarkis et al., 2011). The objective of this research is to get a thorough understanding of the connection between sustainability performance and the aviation industry's adoption of green supply chain management (GSCM).

1.4: Research Objectives

1.4.1: General Objective

The study's general objective will be to examine the effect of Green Supply Chain Management on Sustainability performance of Airlines Companies in Kenya

1.4.2: Specific Objectives

i. To assess the effect of green buying on the sustainability performance of Airline Companies in Kenya.
ii. To analyse the effect of green manufacturing on the sustainability performance of Airline Companies in Kenya.
iii. To assess the effect of green distribution on the sustainability performance of Airline Companies in Kenya.
iv. To assess the effect of green marketing on the sustainability performance of Airline Companies in Kenya.

1.5: Research Questions

i. What is the effect of implementing green buying practices on the sustainability performance of Airline Companies in Kenya?

ii. What is the effect of using green manufacturing practices on the sustainability performance of Airline Companies in Kenya?
iii. What effect does the implementation of environmentally-friendly distribution methods have on the overall sustainability performance of Airline Companies in Kenya?
iv. What effect does green marketing have on the sustainability performance of Airline Companies in Kenya?

1.6: Scope of the study

This study explored how the integration of green practices within the supply chain impacts the sustainability performance of airlines operating in Kenya. It examined key dimensions of Green Supply Chain Management (GSCM), including green purchasing, green manufacturing, green distribution, and green marketing, focusing on how these practices contribute to environmental efficiency, resource conservation, and long-term operational sustainability. By investigating these constructs, the study sought to provide a deeper understanding of how eco-friendly supply chain initiatives could enhance airlines' competitive advantage and promote responsible environmental stewardship within the aviation sector.

The research specifically targeted airlines companies operating in Kenya. It draws insights from a census of 49 Kenyan-owned airlines, ensuring a comprehensive assessment of the sector. Moreover, the study targeted 98 supply chain officers in the Airlines companies operating in Kenya. The selection of supply chain department staff as respondents guarantees that the data is drawn from individuals with specialized knowledge and direct experience in supply chain operations, procurement, and sustainability practices, thereby strengthening the validity and applicability of the findings.

Data collection for the study was conducted through structured online questionnaires administered during the months of March and April 2025. This cross-sectional approach captured the current practices and sustainability challenges faced by Kenyan airlines within a dynamic and evolving business environment. By situating the research within this timeframe, the study ensured that its insights were timely, reflecting the latest trends, regulatory shifts, and environmental expectations influencing the aviation industry's sustainability agenda.

1.7: Significance of the Study

The findings of this research hold significant implications for multiple stakeholders, particularly in the context of advancing green supply chain management practices and sustainability performance within the Kenyan aviation sector. By evaluating the impact of green purchasing, manufacturing, distribution, and marketing, the study will offer crucial insights and practical recommendations that will be beneficial to policy makers, airline industry practitioners, and researchers. Specifically, the study outcomes will support evidence-based decision-making, facilitate strategic environmental initiatives, and stimulate further academic exploration, thereby enhancing the overall sustainability and competitive advantage of Kenya's airlines.

1.7.1: Policy Makers

Given that Kenyan governmental institutions frequently create regulations pertaining to procurement and supply chain management, the study's conclusions will be helpful to them. These results will aid in the formulation of strategic strategies aimed at enhancing Kenyan aviation companies' sustainability performance and their use of Green Supply Chain Management (GSCM).

1.7.2: The Aviation Industry

The research will provide significant perspectives and useful tools for airlines aiming to achieve sustainability and adopt green supply chain management, or GSCM. The study will also have broader implications for the aviation industry since it will highlight the benefits and challenges of sustainability and green supply chain management, or GSCM, in a highly competitive and dynamic business.

1.7.3: Researchers

This study intends to improve the aviation industry's present comprehension of sustainability and Green Supply Chain Management (GSCM), an area that has received less attention in the past. The findings will play a pivotal role in understanding the best practices for green supply chain management, or GSCM, which will enable the aviation sector to achieve sustainability.

1.8: Chapter Summary

Understanding the historical background of GSCM in the aviation sector and the need of using this strategy to enhance sustainability performance is provided in the first chapter. This chapter delves into the rationale behind the research project and delineates its intended goals. A thorough review of the literature will be done in the next chapter to investigate the latest findings in the field of Green Supply Chain Management (GSCM) and how they affect sustainable performance.

CHAPTER TWO

LITERATURE REVIEW

2.1: Introduction

This chapter entails theoretical review, empirical review, and conceptual framework. The chapter further presents a critique of relevant studies, research gaps and the chapter's summary.

2.2: Theoretical Framework

2.2.1: Stakeholder Theory

The stakeholder theory of organisational management and corporate ethics, which emphasizes the moral and ethical components of effective organisational leadership, will be the main topic of this study. The stakeholder paradigm was first introduced by Freeman (1994) in his book "Strategic Management". An evaluation of the company's historical performance is essential for a procurement officer. Several countries' corporate laws recognize the Majority Holder (MH) position, which holds that a company's investors or shareholders are its true owners. The procurement officer's interests should be prioritized by the organisation, and it should always seek to increase their value (Harrison, Wicks, and Freeman, 2007). According to Freeman (2010), the stakeholder theory clarifies how businesses establish connections and interact with people or organisations that either have the ability to influence or are impacted by their economic activities.

According to Rebs et al. (2019), stakeholder pressure significantly affects how well Green Supply Chain Management (GSCM) performs in a number of areas. A systematic technique was presented by Fritz et al. (2018) to identify the parties engaged in the supply chain (SC) and their approaches to problem-solving. Including supply chain stakeholders makes it easier to find new participants. Consequently, it is important to define vague stakeholder roles even if these studies categorize stakeholders as those who either actively participate in or passively accept interaction from enterprises.

The significance of the supplier development process in GSCM has been underscored by Liu et al. (2018). Stakeholders influence this process, help with it, or supervise it. Their participation aids in overcoming any gaps in knowledge or available resources. Strong evidence has been discovered

by Busse et al. (2017), Meixell and Luoma (2015), and Oelze et al. (2016) to support the assumption that this holds true for all Green Supply Chain Management (GSCM) strategies. Stakeholders are essential in spotting sustainability issues in the supply chain, Busse et al. (2017) claim, particularly where there is little openness. Current studies highlight how crucial it is to look at how different stakeholders relate to one another, how effective it is to share environmental information, and how well it fits into the organization's actual operations. The effective coordination of several businesses and organisations to provide a seamless movement of goods, services, funds, and information from the producer to the consumer is known as supply chain management. This approach seeks to optimize value, ensure customer satisfaction, and boost profitability through increased productivity. According to Kleindorfer et al., (2005), the actions listed have a major effect on the environment, which emphasizes the necessity of developing environmental skills in this context. Companies are utilizing Green Supply Chain Management (GSCM) techniques to comply with environmental regulations and satisfy stakeholder requests. Supply chain management was the first industry to apply environmental principles into internal operating procedures, such as industrial operations (Sarkis & Rasheed, 1995). The shift from proactive and preventative methods of environmental management, like pollution prevention technologies, to reactive tactics, like pollution control technology, was a noteworthy achievement (Klassen & Whybark, 1999). In recent times, there has been an increasing recognition that businesses bear responsibility not only for their internal operations but also for the actions of their suppliers. According to Krause et al., (2009), businesses are under growing pressure to monitor and regulate their impact on the environment outside of their own physical premises. All facets of the supply chain, as well as internal and external corporate operations, incorporate effective supply chain management techniques. Internal GSCM operations, such product development and production, are primarily concerned with minimizing the use of raw materials, waste creation, hazardous material consumption, and toxic emissions. The main objectives of external Green Supply Chain Management (GSCM) practices are to reduce the amount of goods purchased, minimize the use of hazardous chemicals, reduce the amount of packaging, and encourage the use of recyclable or recycled materials in external activities such as supplier selection and cooperation.

A useful framework for evaluating how green supply chain management (GSCM) affects sustainability performance in Kenyan airlines is provided by the stakeholder theory. Many different parties are involved in this business, such as customers, staff members, suppliers, investors, regulators, communities, and a number of other organisations. Every one of these stakeholders has the capacity to both impact and influence the GSCM tactics used in this business. Stakeholder theory is used in this study to identify and analyse key stakeholders, fully comprehend their needs and expectations, match them to the objectives and strategies of the business, facilitate effective communication, and evaluate the impact of GSCM practices on stakeholder satisfaction. Stakeholder theory application aids in a better understanding and solution of issues affecting Kenya's aviation industry's adoption of Green Supply Chain Management (GSCM). Acquiring this information might greatly enhance the industry's capacity to compete in the market and fulfil its social obligation.

2.2.2: Resource Based View Theory

The Resource Based View (RBV) Theory places focus on how important it is for a company to have important and unique resources that provide them an advantage over competitors. The theory was first put out by Penrose in 1959. This study, which was first proposed by Barney in 1991, looks at the connection between an organization's internal traits and level of success. A managerial strategy known as the Resource-Based View (RBV) makes use of a company's strategic resources to raise the value of its goods and services (Dubey, Altay, Gunasekaran, Blome, Papadopoulos, & Childe, 2018). This approach promotes the growth of flexibility, agility, and collaboration in the field of supply chain management (SCM). In the realm of management, the Resource-Based View (RBV) is a commonly accepted viewpoint. Companies need to make a thorough evaluation of their resources and implement strategies to raise performance levels. A useful conceptual framework for understanding how a company uses its internal resources and capabilities to gain a competitive edge and improve organisational performance is the Resource-Based View (RBV) (Corbett & Claridge, 2002).

According to the resource-based view (RBV), an organization's ability to succeed depends on its possession of innovations, obstacles to resources, and unique, difficult-to-replicate assets. The

company can strengthen its position in the market thanks to these factors. According to Admire (2020), a company may be viewed as a valuable intangible asset when it successfully applies supply chain management tactics. The idea states that the supply chain consists of the many routes used by businesses and middlemen to facilitate the movement of commodities from their point of origin, through the manufacturing process, and finally to the end users (Ireland & Webb, 2017). Effective supply chain management requires the involvement of several key components in internal and operational processes. Order processing, lot quantity issues, inventory control, transportation, storage, and customer support are some of the variables (Musara, 2018; Shalakha, 2015). It is often known that RBV-based technology is a valuable tool that firms may use to enhance their performance. The idea includes a variety of tools that might possibly increase the efficacy of an organisation. Hitt, Xu, and Carnes (2015) found a number of crucial tools for success. These tools include planning events, exchanging information, and keeping an eye on the competition.

This theory is significant because it provides a clear knowledge of how airlines may use Green Supply Chain Management, or GSCM, to manage their supply chain efficiently and achieve their sustainability goals

2.3: Empirical Framework

2.3.1: Green Supply chain Management Practices

According to Dong et al. (2023), there is now more focus on attaining integrated and sustainable growth of the economy and the environment as a result of expanding global environmental concerns. A management approach known as GSCM was developed in response to the expanding market for eco-friendly products (Government et al., 2016; Zhu, Sarkis, et al., 2008). The way suppliers and consumers engage inside businesses has been significantly impacted by the incorporation of environmentally efficient technologies. In addition, environmental degradation is a worldwide problem, particularly with regard to energy cost reduction (Ikram et al., 2021; Lin et al., 2020). A number of businesses are implementing green supply chain initiatives to show their ongoing dedication to the environment. Green supply chain management is becoming more and more important as the need of managing environmental programmes and activities beyond the

organization's walls is realized (Zhu, Sarkis & Geng, 2005). In supply chain management literature, "closing the loop" refers to a number of activities that are part of Green Supply Chain Management (GSCM), including environmentally conscious purchasing and reverse logistics supply chains. GSCM is a comprehensive method. One of the most important aspects of these operations is the logistics of getting items from suppliers to producers and then to buyers.

Pun (2006) suggests that in order to successfully include ecologically sustainable practices and environmental management into their job, professionals and researchers should utilize a variety of methodologies and processes. The methods and tools were developed to improve understanding of environmental issues and address them successfully. They provide professionals the necessary abilities to see possibilities and use their knowledge to create strategies that improve and sustain the environmental performance of operations and goods. A number of subjects are covered in this article, such as life cycle assessment, recycling and remanufacturing, green supply chain management, green purchasing, and the application of green quality functions.

Green et al., (2008) state that supply chain redesign, is a methodical approach that combines remanufacturing and recycling into the manufacturing process. Reducing the company's environmental impact throughout the whole product life cycle and supply chain is the goal. According to Harris (2012), integrating environmental problems into all areas of the business is crucial for a sustainable corporate culture. In addition to considering economic objectives, it is crucial to integrate these components throughout the whole value chain. Furthermore, it is essential to prioritize environmental conservation and preservation with spirituality, morality, humility, and the future. Through its green supplier network, the U.S. Environmental Protection Agency offers assistance to manufacturers and suppliers in an effort to reduce costs, eliminate waste, and lessen their environmental impact. Therefore, the implementation and acceptance of Green Supply Chain Management (GSCM) are directly related to the increasing awareness of sustainable development and the need to maintain a balance between environmental conservation and production (Pun et al., 2012).

2.3.2: Sustainability Performance

In order to promote sustainable development goals, businesses are becoming more conscious of the importance of social concerns and placing a higher priority on environmental standards and corporate social responsibility. Usually, supply chain-related social and environmental concerns are the focus of research. According to Wang and Dai (2017), promoting sustainable growth and raising public awareness of environmental preservation and social responsibility need the implementation of green supply chain management, or GSCM. Research has indicated that successful businesses located in the supply chain have a big obligation to address social and environmental concerns and support other businesses in meeting environmental regulations. According to Burritt et al. (2011), a company's reputation might suffer and other partners in the distribution network could be impacted if these obligations are not met.

An abundance of scholarly literature indicates a change in the significance of environmental management inside companies. A number of developing nations, like Egypt, Iran, Malaysia, and Thailand, have realized how critical it is to integrate environmental preservation and social responsibility into supply chain management. Numerous research conducted by Eltayeb et al. (2011), Zailani et al. (2012), Laosirihongthong et al., (2013), Khaksar et al., (2016), and Hamdy et al., (2018) support this identification.

The potential of Green Supply Chain Management (GSCM) solutions to improve environmental performance has been the subject of extensive research in the past. The research conducted by Eltayeb et al., (2011), Green et al., (2012), and Lee et al., (2012) has made a substantial contribution to our understanding of this particular area of study. Additionally, Khaksar et al. (2016) noted that Green Supply Chain Management (GSCM) is an important subject in operations management with a significant influence on environmental results. A number of metrics are used to assess environmental performance, such as decreased usage of hazardous substances, decreased energy consumption, and decreased production of waste (De Giovanni & Vinzi, 2012; Yang et al., 2013; Laari, 2016). An alternative indicator of environmental performance might be a decline in the number of environmental accidents, according to research by Zhu et al., (2008) and Das (2018).

Moreover, Esfahbodi et al., (2016) provide valuable support for improving an organization's environmental state.

To achieve sustainability performance for Kenyan airlines, it is critical to focus the development of systems that prioritize economic value, ecological protection, and societal well-being. The following are the three primary elements of aviation sustainability. Reliance on natural resource systems is necessary for environmental sustainability. Furthermore, the ability to accomplish economic growth, progress, and appropriate budgetary management is referred to as economic sustainability. Equity, security, personal well-being, and the overall level of life are some of the components that make up social appropriateness (Alameeri et al., 2017). According to Bertoni et al. (2015), adopting effective alternative technologies that lessen their environmental impact can help the aviation industry become sustainable. Numerous research studies have found several approaches aimed at attaining sustainability within the Kenyan airlines. Agarwal (2010), Warwick and Norris (2010), and ICAO (2012) are the references that were used. Air-to-air refueling, fuel economy, eco-friendly propulsion systems, cutting-edge aviation engines, and optimized flight paths are a few instances of these. Many models and frameworks have been developed by academics in the past 20 years to enhance our comprehension of aviation sustainability. AEMS, Eco-design, Life Cycle Assessment (LCA), Life Cycle Costing (LCC), Social Life Cycle Assessment (S-LCA), Cleaner Production System (CPS), Slacks-based measure, and Fleet-level Environmental Evaluation Tool are among the methods discussed. The Framework for Strategic Sustainable Development (F-SSD) was built by Pinheiro et al. (2020), the Biofuel Life Cycle Assessment (LCA) model was created by Chao et al. (2019), and the Data Envelopment Analysis (S-DEA) was created by Bertoni et al. (2015). Segarra-Oña et al. (2012) looked at how the financial performance of Spanish hotels affected by implementing ISO 14001 environmental certification. Research indicates that beach hotels that adopt ISO 14001 standards had a positive impact on their EBITDA profit margin. Alvarez-Gil et al. (2001) discovered evidence in their study that suggests the short-term financial performance can benefit from the application of environmental management measures.

Extensive research indicates that a tourism company's financial success and environmental stewardship practices may be significantly influenced by the local organisations it collaborates

with. A company's social performance may be considerably enhanced by effectively interacting with a wide range of stakeholders, such as employees, clients, and the neighborhood. Building a strong rapport with hotel staff can help lower the costly problem of employee churn, which is prevalent in the hospitality industry. The costs related to hiring and onboarding new hires are subsequently decreased by higher employee retention rates. Additionally, happier employees provide better services, which raises consumer satisfaction. Therefore, it is essential to expand the study's focus to include the influence of social concerns while examining the links between the three components of the triple bottom line method. Boley and Ayscue (2016).

Green supply chain management (GSCM) is a strategic approach that enables businesses to enhance both their financial performance and environmental sustainability at the same time. The goal of this creative approach is to lessen environmental hazards and influence in the dynamic economic environment (Vrijhoef & Koskela, 2009). In order to lessen the ecological effects of increasing environmental degradation, organisations have had to adjust their strategic goals and integrate environmentally friendly production practices. To maintain a competitive edge and secure sustained success, companies need to employ modern strategic approaches to manage the intensifying rivalry inside the worldwide marketplace. A company's ability to successfully manage its supply chain is essential to its success. Procurement officers need to evaluate how economic expansion can affect how resources and energy are used. This might have negative consequences on the ecology and lead to the depletion of resources.

Organisations are facing increasing difficulties in efficiently overseeing their economic and environmental performance due to societal demands, legal requirements, and rivalry. In today's world, a growing number of businesses have made environmental preservation their top priority by introducing eco-friendly procedures. Hazen et al., (2011) discovered a link between the implementation of Green Supply Chain Management (GSCM) and the utilization of recycling and remanufacturing processes. In their study, Dheeraj and Vishal (2012) looked at four fundamental principles of green supply chain management (GSCM). Reverse logistics, environmentally friendly production and materials management, sustainable distribution and marketing, and environmentally aware sourcing are all covered in the text. In their comprehensive analysis of environmental sustainability, Green and Zelbst (2012) looked at a number of areas, including eco

design, consumer cooperation, internal environmental management, green information systems, and investment recovery. Conversely, Ninlawan et al., (2010) looked at topics including green manufacturing, green distribution, green procurement, and reverse logistics. The core elements of Green Supply Chain Management (GSCM) have been defined by Amemba et al., (2013) and Srivastava (2007). These elements include waste management, reverse logistics, green manufacturing, green operations, and green procurement. Moreover, as mentioned by Samson and Simpson (2008), there are several methods that may be utilized in order to carry out GSCM. Implementing a risk-based strategy aims to shorten the time that companies must collaborate closely. By including supply chain operations and environmental performance, the strategy highlights efficacy. The strategy places a strong emphasis on using performance techniques created especially for the supply chain setting. The closed-loop methodology prioritizes the collection and reinstatement of resources with the aim of recycling or remanufacturing, while taking their value into account. No matter how experts classify these behaviours. All businesses want to establish long-lasting operations. In research published in 2010, Ninlawan et al. divided the tasks involved in managing a green supply chain into many groups, such as green manufacturing, distribution, logistics, and procurement. The literature contains a wide range of perspectives from scholars about GSM (Green Supply Chain Management) tactics. Research by Hervani et al., (2005) and Bhardwaj and Singh (2013) suggest that there are several important activities that may be categorized under the umbrella of green supply chain management (GSCM) strategies. This category includes the following tasks: green purchasing, inbound logistics, distribution/marketing, green materials management, green manufacturing, and reverse logistics.

2.3.3: Green Purchasing and Sustainability Performance

Achieving performance criteria while prioritizing environmental considerations including recycling, waste reduction, and material reuse is known as green purchasing (Pun, 2006). Those who hold buying positions inside organisations need to have a thorough understanding of the recycling strategy. This policy addresses a number of issues, such as waste recovery and segregation, storage, transportation, and reprocessing and remanufacturing. A thorough understanding of the supplier selection process is vital, as it has a direct impact on the business's operations (Min & Galle, 2006).

It is essential to consider the source of the materials used in a product's creation when assessing its quality and potential environmental effects. A company may gain a number of advantages by integrating ecologically friendly practices into the supply chain, particularly when looking at it through the lens of a procurement specialist. According to Rao (2012), the benefits of this cooperative procedure for making decisions include lower costs and more supplier participation in promoting environmental innovation.

Qinghai et al. (2004) conducted a study that demonstrated the significant impact of suppliers' stress levels on the adoption of environmentally aware supply chains. According to Hou (2007), a strong supplier-buyer cooperation is necessary for the successful execution of green procurement initiatives. According to Fritz (2016), green purchasing involves incorporating environmental factors into all aspects of the procurement process, from identifying requirements to properly disposing of a product or service. According to Raman et al., (2020), green purchasing is the act of acquiring goods and services with the intention of minimizing their negative environmental consequences. According to Ma et al., (2020), green purchasing may be defined as the conscious selection of suppliers that provide environmentally sustainable goods and services, together with active encouragement of these suppliers to adopt eco-friendly practices.

According to Turner (2010), reducing waste is the primary goal of green purchasing. In order to maximise value, the procurement department will carry out a thorough evaluation of all costs associated with waste reduction. The company's waste management initiatives should receive the greatest attention. It is often more effective to optimize waste reduction early in the supply chain than to wait until the very end. The availability of suppliers, the calibre of the goods, the knowledge of the suppliers, the objectives of the company, the capabilities of the equipment, and the activities of the suppliers are some of the variables that might affect purchasing decisions and green procurement (Knudsen, 2003). To achieve environmental excellence, the buyer has to take responsibility, have the necessary resources to communicate with suppliers, and demonstrate a consistent commitment (Murray, 2000). Walker et al., (2008) examine the importance of customers on green supply chain management. Purchase and environmental management choices are significantly influenced by customer preferences. Through tight coordination of logistical activities with suppliers, shippers, distributors, and customers, firms may be able to enhance their

overall company performance. Acquiring environmentally friendly items enhances a business's standing with non-financial rating agencies, aids in regulatory compliance, and enhances the brand's perception among consumers. Large and Thomsen's (2011) study looked at what factors influence how effective green supply chain management (GSCM) is. The data unequivocally demonstrated that the supply chain's environmental performance was directly impacted by the level of stakeholder participation and the evaluation of suppliers' ecological impact. Zhu and Sarkis (2011) argue that by utilizing the knowledge obtained from well-established quality management programmes, an organization's environmental strategy may be significantly improved by incorporating strict quality control procedures into green procurement. Obtaining "green" certifications, such as the ISO environmental management system and standard series, which offer methodical approaches for ongoing improvement, can help businesses improve their environmental performance.

2.3.4: Green manufacturing and sustainability performance

Nimawat and Namdev, (2012) claim that using productive production equipment to cut waste and increase productivity is a component of green manufacturing. Using inputs with no environmental effect, the process uses industrial processes that are well-known for their exceptional efficiency, low waste generation, and low pollution (Amemba et al., 2013).

In their research, Al-Odeh and Smallwood (2012) emphasized the necessity of establishing ecologically friendly industrial practices. They prioritized the use of eco-friendly production practices, efficient technology, and the reduction of raw materials and resources in order to get the best possible results while decreasing pollution. Amemba et al., (2013) offered comparable justifications for recycling raw materials, employing ecologically friendly energy sources like solar energy, and utilizing biodegradable materials and energy sources in industrial operations. The widespread use of efficient and quick production processes has historically been used to promote green manufacturing, also known as environmentally aware production. There are a number of benefits to using environmentally sustainable manufacturing processes, including less harm to the environment, cheaper production costs, better product quality for consumers, and positive community consequences (Wan Mahmood et al., 2013).

Lean production, closed loop manufacturing, energy-efficient production technology, environmentally friendly design, and thorough environmental management are some of the elements that make up green manufacturing. Green design, according to Otago (2009), is the methodical process of developing a good or service that encourages environmental awareness and consideration. Green design, according to Amemba et al., (2013) and Fiksel (1996), is a comprehensive strategy that puts the environment's safety and health first throughout a product's whole lifespan. According to Wan Mahmood et al. (2013), resource optimization is a crucial consideration while manufacturing commodities. Developing a comprehensive waste management strategy is necessary to ensure product lifespan and enable efficient recycling through disassembly.

According to Ninlawan et al., (2010), companies should use cutting-edge technology to minimize resource consumption, select materials with high recycling potential, or take use of bio-based polymers. Both objects and buildings must be designed with sustainability in mind. It encourages continuous product improvement as well as the use of biodegradable materials and inputs in product design to comply with environmental standards (Amemba et al., 2013). TQEM is the process of applying principles from total quality management (TQM) to business environmental activities (Lazibat, 2009).

This management style places a high priority on the principles of delegation, effective leadership, collaboration throughout departments within the business, and giving people authority. It also emphasizes how important it is to keep improving. According to a 2011 McKinsey Global Institute study, resource efficiency gains might be able to fulfil around 30% of the world's resource demand by 2030. For businesses, maximizing production chain efficiency ought to be their main goal. Including a closed-loop manufacturing system may improve internal supply chain efficiency and maximise sustainable practices for an organisation. A production technique called closed-loop manufacturing aims to reduce any negative environmental consequences (Toke et al., 2010). According to Fleischmann et al., (2001), it is imperative to establish a recovery network that links the market for reuse with the market for used goods that may be recycled, reconditioned, or fixed. Reducing the amount of waste generated in the production process and striving for the complete elimination of emissions from the system are the objectives. It is possible to replace environmentally harmful compounds with alternatives that are more sustainable. To reduce waste,

items that have been returned or recycled are being included into the supply chain. The efficiency of a company's production process is directly impacted by the effectiveness of its manufacturing technologies. Finding out how quickly resources are being used up and assessing overall effectiveness are crucial.

Appropriate technology use may prolong a product's life, improving output and effectiveness. Machine performance is optimized and uptime is increased by the use of appropriate technology and efficient maintenance procedures (Ninlawan et al., 2010). Lean production is a manufacturing methodology that aims to eradicate inefficiencies and waste from the production process. Any expense that does not add to the value that the customer receives is considered unnecessary and is subsequently eliminated. Lean manufacturing aims to produce high-quality goods with the least amount of labour expenses, inventory, time spent developing new products, and space required for production and storage. The corporation wants to gain a competitive advantage by cutting expenses, improving the environment, and upholding high standards (Nimawat & Namdev, 2012).

2.3.5: Green Distribution and Sustainability Performance

In order to maximise the overall effectiveness of environmentally friendly supply chains, distribution is essential. The primary objectives of the distribution process, as stated by Gao et al. (2009), are to minimise inefficiencies and increase the effectiveness of product transportation. The degree of efficacy in implementing environmentally friendly distribution may vary depending on a number of criteria. Sarkis, (2003) enumerates a wide range of variables that affect transportation operations, including the vehicle's fuel economy, the frequency of operations, the customer's proximity, and the unique characteristics of the goods being delivered.

Ma et al., (2020) state that a number of factors have a role in the adoption of ecologically friendly distribution systems. Demand from clients, pressure from the competition, organisational strategy, culture, resources, technology, and laws are some of the components. Offering eco-friendly products through a marketing and distribution strategy that prioritises sustainability is essential to addressing environmental problems. It is possible to integrate eco-friendly packaging, eco-friendly transportation, and optimised logistics to develop a distribution system that is more ecologically sustainable (Nimawat & Namdev, 2012). It is imperative that the items be packaged with

environmental consciousness. "Green packaging" is defined by Ninlawan et al., (2010) as the use of eco-friendly materials and smaller containers. Furthermore, they underscore the need of collaborating with suppliers to establish consistent packaging guidelines, promote the integration of reusable packaging innovations, and facilitate the reprocessing and adaptive reuse of packaging materials. In order to produce ecologically friendly packaging, Zhang and Zheng (2010) stressed the significance of adopting simple packaging and biodegradable polymers. This approach effectively reduces packaging waste and addresses environmental issues. Using recyclable or renewable packaging materials not only lessens the impact on the environment but also encourages the use of recovered resources and lowers waste disposal costs. According to Al-Odeh and Smallwood (2012), implementing sustainable design principles for the product and its packaging should be the first step towards implementing green supply chain management.

Sustainable storage is a component of distribution that takes the environment into account. Any company's main objective is to reduce the amount of money spent on transportation and the overall distance travelled. Therefore, it is essential to carefully consider the best location for the storage facility and to construct a meticulously designed infrastructure that has adequate capacity. An incredibly tiny storage facility plan will need more transportation trips, which would increase energy consumption and emit pollutants into the environment. On the other hand, a badly constructed infrastructure might hasten the flow of commodities and reduce the effectiveness of transportation. The storage facility needs to be able to accommodate a wide range of items with various classifications. According to Zhang and Zheng (2010), storage facilities are required to maintain not just a hygienic atmosphere but also suitable humidity levels, corrosion resistance, waterproofing, and other essential factors.

Promoting ecologically friendly distribution requires the use of green logistics and transportation. According to Zhang and Zheng (2010), three major environmental effects of the transportation sector—specifically, road transportation—are pollution, noise, and traffic congestion. Standard delivery strategies and cooperative distribution networks can improve resource allocation, reduce material transportation, increase productivity, and relieve traffic congestion, especially on highways. Employing third-party logistics allows businesses to improve resource distribution and efficiency while addressing issues including inefficient transportation operations, an over reliance

on internal transportation networks, and increasing pollution levels. Additionally, businesses can choose to deliver directly to the client's specified address. By minimising the number of trips taken, using alternative fuel technologies reduces emissions while enabling the delivery of a larger number of commodities (Ninlawan et al., 2010). Al-Odeh & Smallwood (2012) assert that the development of ecologically friendly transport is greatly influenced by the choices made regarding fuel, modes of transport, infrastructure, and operating protocols.

Toke and associates (2012) examined the various trade-offs associated with logistics. When it comes to reaching the maximum load capacity of things, there may be longer wait periods. However, there are instances in which this approach can be both cost-effective and effective in reducing the number of pollutants in the environment. The form of transportation that is selected is another important factor. The energy consumption and efficiency levels of various transportation modes differ from one another. When it comes to flexibility, some people are more flexible than others. Time, speed, and flexibility are important factors to take into account while choosing a mode of transportation. Choosing a "carrier" is an important consideration. Many factors, including the characteristics of the goods, unique requirements, structural integrity, and dimensions, are carefully considered while selecting a carrier.

2.3.6: Green Marketing and sustainability Performance

The current spike in the disclosure of customer data is cause for alarm. Companies now have an increasing global responsibility to protect consumer rights, respect those rights in their operations and products, and lessen environmental harm. Al-Odeh and Smallwood (2012) suggest that sustainable marketing necessitates maintaining ecological equilibrium and giving environmental conservation first priority. Green marketing seeks to identify and address these issues. Companies need to show that they are very committed to making sure that both their operations and their goods are environmentally sustainable.

According to Nimawat and Namdev (2012), green marketing refers to advertising campaigns that aim to lessen a product's negative environmental consequences or provide positive results. The study looks into green supply chain management in India and the advantages of green marketing. Improved sustainability, broad public support, and greater owner satisfaction are among the

advantages. It also improves the relationship that a business has with its customers, particularly those that value consumer and environmental rights. Moreover, Al-Odeh and Smallwood (2012) claimed that green marketing has a number of benefits and helps businesses strengthen their relationships with suppliers, consumers, and other stakeholders.

By utilising eco-friendly marketing strategies, businesses may both demonstrate their commitment to social responsibility and meet consumer demand for items that are ecologically conscious (Shane, 2013). As suggested by Iles (2006), chemical manufacturers may decide to use green chemistry as a sustainable way to lessen the harmful effects of chemicals, such as toxicity, resource and energy consumption, and pollution. It is crucial to forge new relationships across the supply chain, enhance the communication of information to outside parties, and increase internal information creation in order to assist environmentally conscious chemical firms. Businesses must use green marketing techniques if they want to prosper in the highly competitive green market and benefit the environment. Furthermore, this necessitates large investments in R&D and technology, as well as the usage of environmentally friendly components including sustainable packaging, ecological labelling, eco-design, and eco-labeling. According to Ottaman (1993) and Ken Peattie (1993), traditional marketing is no longer as important, and there is an increasing trend towards green marketing. Studies by Azhagaiah and Ilangovan (2006) shown how environmental issues have a significant impact on modern civilization. Additionally, the benefits of promoting sustainability and environmental protection were examined by the researchers. According to Thakur's (2009) research, consumers in both urban and rural areas are drawn to environmentally friendly car marketing. His studies on customer awareness of environmental car marketing tactics served as an example of this. It appears that more people are choosing environmentally friendly products rather than only relying on conventional ones in an effort to have a good impact on the environment.

To determine if green marketing is feasible for small and medium-sized businesses (SMEs) in suburban Mumbai, Welling and Chavan (2010) undertook research. According to the report, SMEs should be encouraged to manufacture environmentally friendly products by the federal and state governments. Brady (2010) highlights the increasing concern for environmental conservation due to the loss of essential natural resources like water and oil. The increasing environmental

consciousness among consumers is driving them to want to contribute positively. Using the four elements of the green marketing mix, Ramakrishna (2012) examined the environmental problems associated with green marketing in India. He is a strong proponent of raising consumer knowledge of the advantages of environmentally friendly products and sustainable marketing among a larger audience. Additionally, he underlined how important it is for businesses to prioritize environmentally friendly practices in order to succeed in a highly competitive market.

As to the findings of Hall's (2003) research, including environmentally friendly practices into an organization's marketing process can yield several benefits. These advantages include lower costs and more supplier cooperation, which stimulates environmental innovation. According to a study conducted by Korir (2014), supply chains perform much better when environmentally friendly marketing strategies are in place. The study assessed the operational efficacy of Kenyan battery manufacturing enterprises as well as the tactics used to create environmentally friendly supply chains. Chege (2012) conducted research in Nairobi, Kenya to look at the relationship between private hospitals' operational efficacy and green supply chain management techniques. The study found a significant and positive correlation between performance reviews and the application of green marketing techniques. Implementing Green Supply Chain Management (GSCM) techniques may significantly improve an organization's performance in the supply chain.

2.4: Research Gaps

The advantages of implementing Green Supply Chain Management (GSCM) on business performance have been extensively studied by scientists. In 2017, Ali et al. conducted research to investigate the effects of applying Green Supply Chain Management (GSCM) on the performance results of small and medium-sized food retail businesses in the United Kingdom. Ultimately, the outcome was advantageous, and it is imperative to replicate this success inside the African context. In academic literature, the use of environmentally friendly methods at all supply chain stages has become more commonplace. While developed countries are beginning to implement green supply chain management (GSCM), there are still some issues that need more research. A key element of sustainable supply chain management (SCM) is putting an emphasis on the greening of the supply chain (Large & Thomsen, 2011; Kenneth et al., 2012; Tritos et al., 2013). Growing economies like

China and Malaysia are seeing an increase in the use of Green Supply Chain Management (GSCM). A study by Eltayeb et al., (2011) examined the impact of environmentally conscious supply chain practices on Malaysian companies that have obtained ISO 36 14001 accreditation. In 2012, Zailani et al. carried out an analysis of Malaysian research on Green Supply Chain Management (GSCM). They assessed how internal and external influences affected the functioning of the environment. Nonetheless, research on this topic is scarce in Africa. The adoption of environmentally conscious supply chain technology and its impact on Kenya's aviation industry's sustainability performance are the subjects of this study.

In 2011 research, Chiou et al. found a correlation between the success of businesses and the industrial and environmental conditions that affect those businesses. Using green supply chain methods is a doable strategy to address concerns of corporate social responsibility and avoid bad press. Moreover, Diabat and Govindan (2011) have shown that a business may integrate its environmental goals with the socioeconomic benefits of green supply chain management. Additionally, businesses who employ Green Supply Chain Management (GSCM) well have a higher chance of achieving long-term success. Several study (Green, Zelbst, Meacham, & Bhadauria, 2012; Rao & Holt, 2005; Sarkis, Gonzalez-Torre, & Adenso-Diaz, 2010) have offered empirical data to corroborate this assumption. To strengthen its sustainable performance, the organisation can minimize its reliance on non-renewable energy, stimulate stakeholder participation, and efficiently address the financial restrictions associated with these initiatives (Cankaya & Sezen, 2019). Firmansyah et al. (2021) revealed that despite its lower prevalence in Indonesia, a developing nation, the adoption of GSCM activity is closely connected with the development of future sustainable performance.

Table 2.1: Summary of literature and the research gap bridged

No.	Author	Study Objective	Methodology used	Findings	Gaps
1	Cankaya and Sezen (2019)	To examine the effects of eight aspects of green supply chain management (GSCM) on the economic, environmental, and social performance, which are the three components of corporate sustainability	Cankaya and Sezen (2019) employed a plant-level survey and utilised structural equation modelling to empirically examine their hypotheses.	The study revealed that each of the eight dimensions of Green Supply Chain Management (GSCM) had a notable and positive influence on economic performance, environmental performance, and social performance. Additionally, it was observed that Green Manufacturing had the most substantial impact on all three dimensions of sustainability performance, with Green Purchasing and Green Distribution following closely behind.	There is a contextual gap on the relationship between the industry; While Cenkaya and Sezen (2019) focused an array of industries 281 of them, this research will focus more on Kenyan airlines with licenses to operate in Kenya.

2	Nyakundi, C. B. (2017)	The research aimed to assess the impact of Green Supply Chain Management (GSCM) practices on the operational performance of industrial companies located in Nairobi County, Kenya.	The research employed a cross-sectional descriptive survey methodology.	The association between GSCM practices (green purchasing, green reverse logistics, green marketing, and green risk management) and organisational performance is both good and substantial.	The study had a limited scope as it only examined the situation in Kenya. Additionally, it did not analyse the available literature on green supply chain management methods and performance in other developing nations or rising markets.

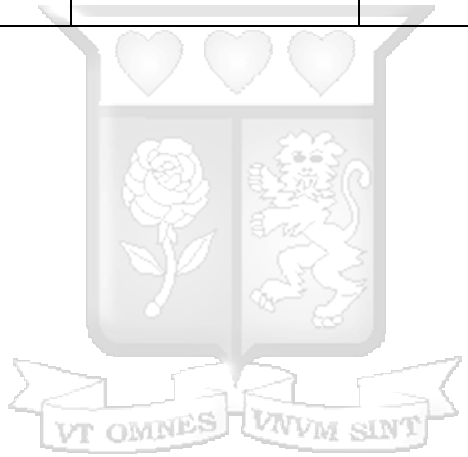
3	Firmansyah, A., Qadri, R. A., & Arfiansyah, Z. (2021)	To analyse the impact of green supply chain management on the sustainability performance of corporations in Indonesia.	The study utilised an online survey to get data from individuals who possess expertise in the subject of supply chain.	Green purchasing, green manufacturing, and internal environmental management did not have a major impact on the economic, social, and environmental performance of manufacturing companies in Indonesia.	The study did not assess the questionnaire's validity and reliability in measuring GSCM and sustainability performance.

4	Yildiz Çankaya, S., & Sezen, B. (2019)	The objective was to examine the influence of eight aspects of green supply chain management (GSCM) on economic, environmental, and social performance.	The study utilised an online survey to gather data from respondents who possess expertise in the subject of supply chain management.	The impact of implementing sustainable distribution practices on the economic, social, and environmental performance of manufacturing enterprises in Indonesia was shown to be both positive and statistically significant.	The research did not conduct a comparative analysis with studies conducted in diverse situations or countries to evaluate the generalizability and application of the findings. Further the study exclusively concentrated on Indonesia.

5	Roehrich, K, Hoejmose, SU & Overland, V 2017	The objective was to utilise self-determination theory (SDT) in the context of green supply chain management (GSCM) to examine the impact of green supplier selection (GSS) on GSCM performance. Additionally, the aim was to determine how the achievement of enhanced GSCM performance is dependent on the processes of autonomy, competence, and relatedness as outlined in SDT.	This study utilised semi-structured interviews and secondary data obtained from a prominent aircraft interior manufacturer situated in Germany, as well as its six primary suppliers.	All GSCM dimensions, except for green purchasing, were found to have a positive relationship with at least one of the sustainability performance dimensions (economic, environmental, and social). Specifically, green manufacturing, green distribution, and green packaging were found to have the strongest effects on sustainability performance. This was followed by green marketing and environmental education. On the other hand, internal environmental management and investment recovery had the weakest	The study identified a lack of information about the cultural distinctions between Turkey and other nations in relation to GSCM practices and sustainability performance. The study lacked the inclusion of the consumer perspective in measuring sustainability performance, resulting in a conceptual gap.

				effects on sustainability performance.	
6	Akhmatova, M.-S., Deniskina, A., Akhmatova, D.-M., & Kapustkina, A. (2022)	The objective was to examine the incorporation of green supply chain management (GSCM) and total quality management (TQM) concepts and practices in the aviation parts supply chain. The objective of the study was to determine the primary factors that influence the adoption of Green Supply Chain Management (GSCM) and Total Quality	The study included a synthesis of literature review, expert interviews, and mathematical modelling. The authors performed a comprehensive analysis of existing literature to identify the fundamental ideas, principles, and methods of Green Supply	The study highlighted the significance of selecting environmentally-friendly suppliers and differentiates between new and existing suppliers. It provided valuable insights into how suppliers' motivation and criteria related to green supply chain management (GSCM) may be included into second-tier suppliers to enhance GSCM performance.	The study failed to account for the cultural disparities between Germany and other nations regarding green supply chain management (GSCM) methods and sustainability performance.

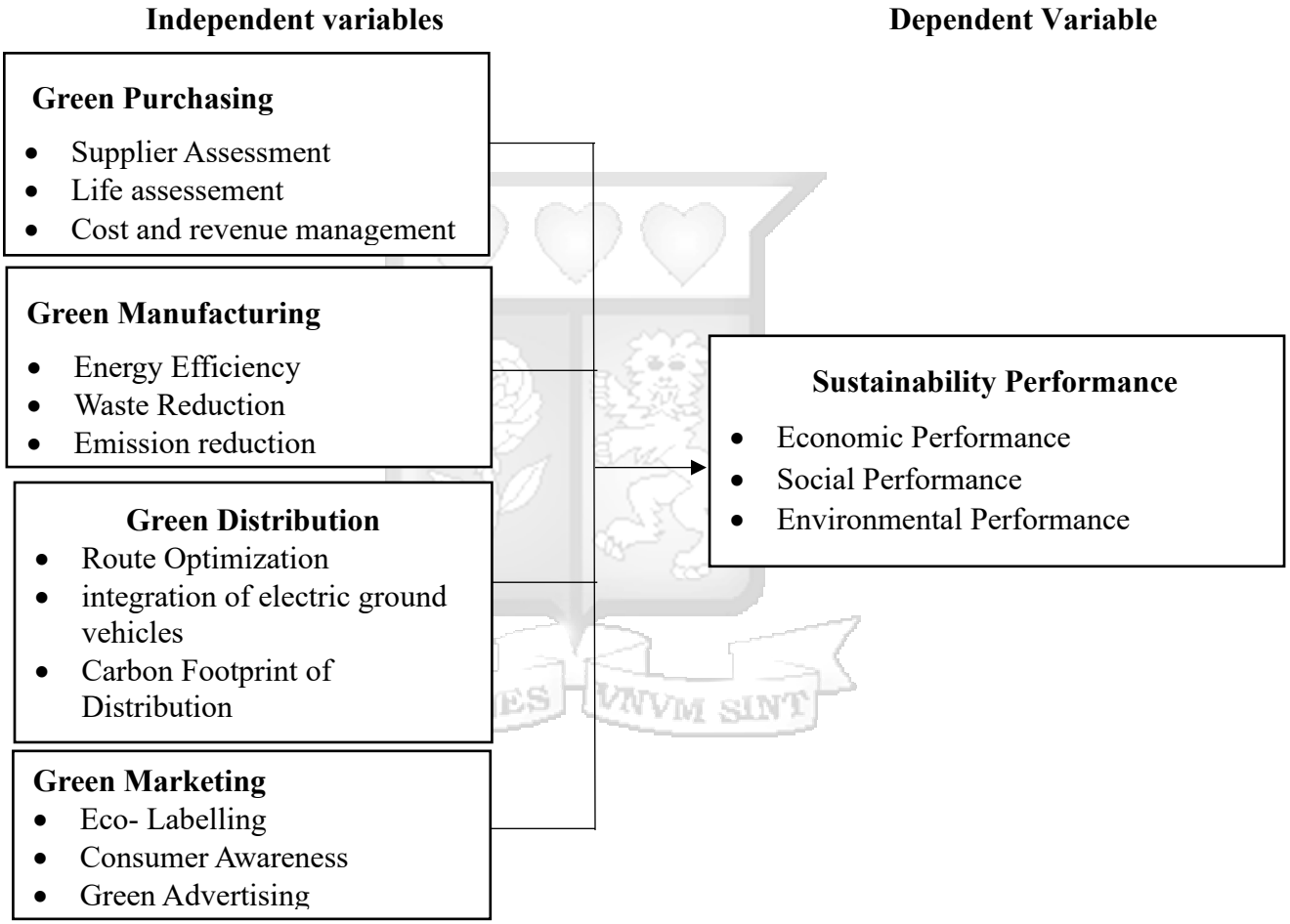
		Management (TQM) in the airline sector.	Chain Management (GSCM) and Total Quality Management (TQM) in the aviation spare parts supply chain.		



2.5: Conceptual Framework

The conceptual framework (Luvavo, 2013) establishes the link between the independent and dependent variables of the investigation. This section will examine the moderating, dependent, and independent components.

Figure 2.1: Conceptual Framework



Source: Researcher, (2025)

2.6: Operationalization and Measurement of Variables

This sub-section identifies and operationalizes the key variables, independent, dependent, and moderating variables of the study.

Table 2.2: Operationalization and Measurement of Variables

Variable	Indicator	Source	Data collection Tool
Green Purchasing	• Perform Supplier Assessment and audits to monitor Supplier compliance Implement LCA practices to evaluate the environmental impact of purchased products throughout their entire life cycle • Consider total cost of ownership (TCO), including acquisition costs, usage costs, and disposal costs. • Evaluate long-term savings from energy-efficient equipment, reduced waste, and streamlined processes while also Leveraging green purchasing as a marketing strategy to attract environmentally conscious customers.	Yang, J., Wang, Y., Gu, Q., & Xie, H. (2022)	Questionnaire in form 5-likert scale questions
Green Manufacturing	• Use of Energy-Efficient Equipment i.e Upgrade machinery and tools to more energy-efficient models. • Adopt optimised processes to entail Streamlining of production processes. • Adopt Renewable Energy Sources ie use of renewable energy e.g Solar	Muma, B. O. (2014)	Questionnaire in form 5-likert scale questions

Green Distribution	• Carbon Footprint Reduction can be achieved through Implementation of fuel-efficient transportation to minimize emissions during distribution. • Adoption of route optimization algorithms to plan efficient delivery routes, while Consolidating shipments to reduce the number of trips and overall mileage. • Adopt sustainable Packaging Materials through the Choosing of eco-friendly packaging materials.	Moghaddasi, B., Majid, A. S. G., Mohammadnazari, Z., Aghsami, A., & Rabbani, M. (2023)	Questionnaire in form 5-likert scale questions
Green Marketing	• Adoption of Eco-labels to provide information about the environmental attributes of products; hence guiding consumers toward environmentally friendly choices. • Creation of Consumer Awareness by educating consumers about the environmental impact of their travel choices • Adopting Green Advertising where airlines create compelling advertisements that emphasize their commitment to sustainability use channels like social media, websites, and in-flight materials to communicate green initiatives.	Riskos, K., Dekoulou, P., Mylonas, N., & Tsourvakas, G. (2021)	Questionnaire in form 5-likert scale questions

Sustainability Performance	• The assessment of economic performance included evaluating the impact on competitive advantage and market positioning, thus providing a comprehensive view of how sustainability initiatives translate into tangible economic benefits. • Social performance was measured through indicators that assess stakeholder engagement, employee satisfaction, and community impact. This dimension evaluated the extent to which green practices enhance organizational reputation, improve customer and employee relations, and contribute to broader societal well-being. • Environmental performance indicators were designed to measure reductions in emissions, energy consumption, waste production, and resource utilization efficiency. This approach allowed the study to capture how effectively green supply chain practices minimize the environmental footprint of airlines while promoting resource conservation and ecological balance.	Alameeri et al., (2017)	Questionnaire in form 5-likert scale questions

2.7: Chapter Summary

This chapter describes the conceptual framework that will direct this inquiry and provides a succinct summary of the body of theoretical and empirical material that has already been written. It also introduces us to the next chapter, which will discuss the research methodology that will be used. A brief summary of the study's idea, design, population, and sampling procedures, as well as the tools used for data collection and analysis, will be given in the next chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1: Introduction

This chapter describes the research approach that was used. The study's methodology, the population under investigation, the sample design, the data collection technique and tools, and the data processing and analysis strategies are all covered in length in this paper.

3.2: Research Philosophy

A research philosophy includes the basic ideas and convictions that shape a researcher's approach to producing and advancing knowledge. It has a significant impact on how the research gathers, assesses, and interprets data (Cresswell, 2012; Kumar, 2019). Numerous investigators employing varying methodologies (Saunders et al., 2009; Guba and Lincoln, 1994; Becker, 1996) have imparted their viewpoints on the seeming discrepancies across paradigms. The philosophy of positivism will be applied in this investigation.

The aim of positivist studies is to consistently be rational and use logical approaches to seek objectivity while explaining and forecasting phenomenon under study (Saunders et al., 2012). Following the suggestions by Ominde et al., (2021), that positivism is predicated on the notion that the researcher is only limited to the collection of relevant data which is then used to make relevant statistical analysis to generate knowledge, the researcher followed a positivism viewpoint to determine the impact of GSCM on Sustainability of the aviation sector in Kenya. Positivist researchers tend to collect and interpret data in an objective way by using statistical and mathematical procedures to make inferences from the study. In addition, Positivism was most suited for providing descriptive information about the social world where either experimental or quantitative methodologies could be adopted to gather and analyze data (Hassan, 2016). This study was therefore enriched to attain its aim following a positivism standpoint.

3.3: Research Design

A descriptive survey design was adopted for this study due to its suitability in systematically collecting quantifiable data from a diverse and representative sample of airline supply chain officers in Kenya (Saunders, Lewis, & Thornhill, 2019). While descriptive designs are traditionally used to document and interpret existing patterns, attitudes, and characteristics within a population, they are also highly compatible with quantitative methodologies, especially when coupled with advanced statistical techniques (Creswell & Creswell, 2017).

In this study, the descriptive design provided a robust framework for gathering current data on the adoption and implementation of various Green Supply Chain Management (GSCM) practices. The design's strength lies in its ability to capture real-world conditions across a wide sector and generate statistically generalizable insights. Importantly, the descriptive survey data enabled the application of inferential statistics (bivariate correlation analysis, multiple regression analysis) which allowed the study to move beyond mere description and empirically test the causal relationships between distinct GSCM practices (such as green purchasing, manufacturing, distribution, and marketing) and the sustainability performance of airlines.

Therefore, the descriptive survey design was not only appropriate for profiling the current state of GSCM in Kenya's aviation sector, but also provided the empirical basis for explanatory, causal inference. By integrating descriptive survey methodology with regression analysis, the study achieved both breadth in data collection and depth in explanatory power, making it the most effective approach for addressing the research objectives (Bryman & Bell, 2019).

3.4: Target population

The term "population" refers to all individuals or entities possessing specific characteristics that are relevant to a particular research inquiry (Nachmias & Nachmias, 2018). This study targeted all 49 operational airlines registered and authorized by the Kenya Civil Aviation Authority (KCAA) as of January 31, 2024. These airlines were specifically selected because they represent the full spectrum of aviation operations within Kenya, including both domestic and international carriers, diverse fleet sizes, and varying degrees of adoption of green supply chain practices. Including all

49 airlines, rather than selecting a narrower sample, was necessary to provide a comprehensive and representative understanding of the status and impact of green supply chain management practices across the entire aviation sector in Kenya. Such inclusivity ensures that the findings reflect sector-wide trends and variations, thus enhancing the generalizability and reliability of the research outcomes (Kothari & Garg, 2019).

The study focused explicitly on supply chain managers or personnel performing equivalent roles within these airlines because these individuals are directly responsible for implementing and overseeing supply chain practices, including sustainability initiatives. Supply chain managers possess detailed knowledge about the procurement processes, operational decisions, and strategic frameworks related to sustainability practices within their respective organizations. While other stakeholders, such as procurement officers, sustainability officers, or regulatory representatives, might also offer valuable perspectives, supply chain managers were prioritized due to their integral involvement in decision-making processes directly linked to the research objectives of evaluating green supply chain management practices.

The unit of analysis for this study were the individual staff member working within the supply chain departments of Kenyan-owned airlines licensed by the Kenya Civil Aviation Authority (KCAA). These individuals were purposively selected due to their specialized knowledge and expertise in procurement, logistics, and environmental management, which are critical areas for understanding the adoption of Green Supply Chain Management (GSCM) practices. By targeting professionals directly involved in supply chain operations, the study ensures that the data collected is relevant, reliable, and reflective of informed perspectives on sustainability initiatives within the aviation industry.

3.5: Sampling and Sampling Techniques

Sampling is a reliable and effective approach in quantitative research, involving the selection of an adequate number of observations from a larger population to accurately represent characteristics of interest (Nachmias & Nachmias, 2018). However, for this study, the target population comprised a relatively small, well-defined, and accessible group, specifically, the 49 operational airlines authorized by the Kenya Civil Aviation Authority (KCAA). Given this context, a census approach

was adopted, targeting all airlines in the sector rather than relying on probabilistic sampling methods such as stratified or random sampling.

A census involves collecting data from every unit within the target population to ensure complete coverage and avoid sampling error. In line with this, the researcher aimed to gather comprehensive perspectives by distributing questionnaires to two relevant supply chain management officers within each of the 49 airline companies, thus resulting in a total of 98 questionnaires. The rationale for this was to capture a richer, more nuanced view of GSCM practices within each airline by engaging more than one knowledgeable respondent per organization, while also accounting for the reality that not every airline has an identical structure or staffing level. The choice of 98 was thus dictated by the actual number of suitable officers available and accessible within each airline during the study period. Expanding the number arbitrarily would have introduced artificial inflation and potential redundancy, as it would not have been supported by the population structure or the operational realities of the sector.

While a census methodology helps eliminate sampling error and allows for a detailed sector-wide analysis, challenges such as increased data collection costs, logistical complexities, and non-response bias may arise. To address these, the researcher engaged airline representatives through formal communication, clarified the academic intent of the research, and assured strict confidentiality. Additionally, persistent follow-ups and reminders were employed to maximize response rates. Other potential biases, such as response bias or measurement error, were minimized through the use of clearly structured, neutral questions and careful training of data collection personnel.

3.6: Data Collection

According to Nachmias and Nachmias (2018), data collection involves systematically gathering information from participants involved in a research project. In this study, primary data was exclusively collected using a structured online questionnaire. The questionnaires were distributed to the supply chain managers or individuals holding equivalent positions in each of the 49 Kenyan airlines. They were then left and picked at a later date so as to give the targeted respondents ample time to fill in the questionnaires as accurately as possible.

The questionnaire was structured into two distinct sections. Section 1 focused on demographic information and included variables such as the respondents' gender, educational background, years of experience in the aviation industry, and current job title or position. Additionally, this section captured firm-specific data such as the airline's size, ownership structure, and years of operation. Section 2 comprised a total of 20 Likert scale items grouped under specific themes reflecting critical areas of investigation. These themes included green purchasing practices, green manufacturing processes, green distribution methods, green marketing strategies, and sustainability performance metrics within the Kenyan aviation sector.

A self-administered online questionnaire was selected as the sole method of data collection primarily due to its cost-effectiveness, ease of distribution, and convenience for respondents who could participate at their own pace and convenience. Although other methods like interviews or document analysis were considered, these were excluded due to logistical constraints, potential time delays, and resource limitations associated with conducting face-to-face interviews and accessing internal documents across multiple organizations. To mitigate potential drawbacks such as low response rates and misinterpretation of questions, the questionnaire was designed to be clear, concise, and straightforward. Additionally, follow-up reminders were sent to respondents to encourage participation and increase response rates.

Before full distribution, the questionnaire underwent a rigorous pre-testing process involving a pilot test with a small representative sample of supply chain professionals from the aviation industry. This pilot test aimed to assess the clarity, reliability, and validity of the questionnaire. Feedback from the pilot test was used to refine questions, improve overall comprehensibility, and ensure the reliability of the data collection instrument prior to its wider deployment.

3.7: Research Quality

The quality of a research project is determined by how well it is organized, conducted, and documented. According to Gay et al. (2018), a sample size representing 10% of the target population is considered sufficient for pilot testing. In this study, pilot testing was conducted using a sample of 10 respondents drawn from departments other than supply chain management within Kenyan airline companies. This approach was intentionally adopted to ensure that the instrument

was clear, unambiguous, and easily understood by individuals with varying professional backgrounds before administration to the actual target respondents supply chain management officers. By testing the questionnaire among non-specialist staff, the researcher aimed to identify and rectify any language, structure, or general comprehension issues that could hinder response accuracy, thus enhancing the overall validity and reliability of the data collection tool. The actual data collection was then conducted exclusively among supply chain management professionals, whose specialized knowledge was essential for addressing the study's core research questions. Participants for the pilot were selected through a randomized approach to ensure objectivity and minimize selection bias.

3.7.1: Validity

Validity refers to the extent to which an instrument accurately measures the concept it intends to measure (Nachmias & Nachmias, 2018). This study specifically assessed content validity, which involves determining whether the questionnaire items adequately and comprehensively represent the domain being studied (Creswell & Creswell, 2018). To ensure robust content validity, the questionnaire was reviewed by a panel of experts comprising the project supervisor and two lecturers from the university who specialize in supply chain management and sustainability research.

The experts independently evaluated each questionnaire item for clarity, relevance, and comprehensiveness relative to the research objectives and the conceptual framework (Saunders et al., 2019). Based on their detailed feedback, several modifications were implemented, including the rephrasing of unclear Likert-scale statements to improve respondent comprehension, the removal of items considered irrelevant or redundant, and the addition of new items to more effectively capture key constructs relating to green supply chain management practices (Bryman & Bell, 2019). These changes significantly enhanced the instrument's ability to gather accurate data aligned closely with the research objectives, thus increasing the overall content validity of the questionnaire.

3.7.2: Reliability

Reliability refers to the consistency and stability of responses when using a research instrument over time (Saunders et al., 2019). In this study, reliability was assessed using Cronbach's Alpha

(α), a measure widely recognized in social science and supply chain research to evaluate the internal consistency of measurement items (Bryman & Bell, 2019). Cronbach's Alpha values range between 0 and 1, with higher values reflecting greater internal consistency. In line with established benchmarks in supply chain and management research, a Cronbach's Alpha value of 0.70 or above was considered acceptable for establishing reliability (Hair, Black, Babin, & Anderson, 2019).

Prior to the main study, reliability was tested through a pilot study involving 10 respondents from airline supply chain departments who were not part of the final study population. This pilot test aimed to identify any inconsistencies or ambiguities in questionnaire items. Cronbach's Alpha coefficients were calculated separately for each subscale to ensure robust internal consistency across distinct constructs. Specifically, the subscales were evaluated as follows: green purchasing ($\alpha = 0.82$), green manufacturing ($\alpha = 0.85$), green distribution ($\alpha = 0.78$), green marketing ($\alpha = 0.80$), and sustainability performance ($\alpha = 0.83$). These values were above the recommended threshold, indicating strong internal consistency and reliability across all subscales. Following the pilot testing results, minor modifications were made, such as clarifying certain terminologies and adjusting item phrasing to enhance clarity and ensure consistent interpretation by respondents, thereby further strengthening the instrument's reliability for the main study.

3.8: Data Analysis and Presentation Techniques

The Data collected underwent careful cleaning, coding, categorization, and validation processes to enhance accuracy and facilitate efficient analysis (Saunders, Lewis, & Thornhill, 2019). Both descriptive and inferential statistical analyses were conducted using SPSS Version 28.0. Descriptive statistics included means, frequencies, percentages, and standard deviations, chosen to summarize and describe the distribution of responses related to green supply chain management (GSCM) practices and sustainability performance clearly and concisely (Bryman & Bell, 2019).

Inferential statistics comprised a bivariate correlation analysis together with a multiple regression analysis. Regression analysis was selected because it allowed the examination of relationships between multiple independent variables (green purchasing, manufacturing, distribution, and marketing) and a single dependent variable (sustainability performance). This statistical technique provided clarity on both the direction and strength of these relationships, making it more

appropriate than ANOVA, which is limited to comparing means between groups, and Structural Equation Modeling (SEM), which requires larger samples and aims primarily at modeling complex interrelationships among latent constructs (Hair et al., 2019).

The following regression equation was used to test the relationships among the variables:

$$Y = \beta_{\circ} + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where;

Y = Sustainability performance of the aviation industry in Kenya

X_1 = Green Purchasing

X_2 = Green manufacturing

X_3 = Green distribution

X_4 = Green marketing

$\beta_{\circ}$ = Constant

ε = Error term

To ensure robust and reliable regression results, key statistical assumptions which included normality, multicollinearity, and homoscedasticity were explicitly tested. Normality was assessed using skewness and kurtosis values alongside visual inspection of histograms and Q-Q plots. Multicollinearity was examined by calculating Variance Inflation Factor (VIF) scores, with a VIF threshold of less than 10 indicating acceptable levels of multicollinearity (Hair et al., 2019). Additionally, homoscedasticity was tested using scatterplots of standardized residuals against predicted values. Minor violations identified during preliminary analysis were corrected through data transformations and removal of outliers, thereby enhancing the validity and generalizability of the findings.

Data were presented systematically using clear and informative tables, charts, and graphs to facilitate interpretation and understanding of results.

3.9: Ethical Considerations

Maintaining the utmost level of privacy and anonymity is crucial to our research. To achieve this, the data collection tool was carefully designed to make sure that any personally identifying information was not included in the responses. The researcher emphasized how crucial it is to protect the privacy of the participants' identities. The participant-provided questionnaire answers were gathered and subjected to statistical analysis. The confidentiality of the participating firms was taken into account while interpreting the data. It is imperative for education researchers to prioritize the ethical treatment of their subjects by guaranteeing their autonomy to engage willingly in the study and by avoiding any kind of coercion. It is essential that the researcher respects the participants' decision to withdraw from the study.

The research endeavor strictly abided by a specified set of ethical guidelines before to, during, and following the process of collecting data. The researcher got consent from the relevant regulatory bodies, such as the National Commission for Science, Technology & Innovation Headquarters (NACOSTI) and the Strathmore Ethical Review Board, before beginning the study.

3.10: Chapter Summary

The research methodologies and procedures used to investigate how green supply chain management (GSCM) practices affected the sustainability performance of the aviation sector are covered in detail in this chapter. Using a survey questionnaire, the study design employed a descriptive survey research approach to collect data from managers responsible for the airline supply chain. Every airline that operates in Kenya at the moment was covered by the study. Using the census approach, which entailed carefully selecting each of the 49 airlines registered with the Kenya Civil Aviation Authority (KCAA), the sample was chosen. The questionnaire was created using prior research as a basis, and specialists verified it. Regression analysis was the approach of choice for data analysis. The ethical implications and limits of the study were also covered in this chapter.

CHAPTER FOUR

DATA ANALYSIS RESULTS AND DISCUSSIONS

4.1. Introduction

This chapter presents the results and analysis of the study on the effect of green supply chain management practices on sustainability performance of Airline Companies in Kenya. The chapter is structured to highlight both descriptive and inferential statistical findings derived from the data collected. Descriptive statistics are used to summarize respondents' demographic characteristics and their perceptions of green purchasing, green manufacturing, green distribution and green marketing. Inferential analysis, particularly regression techniques, is applied to examine the strength and significance of the relationships between the green supply chain management practices and sustainability performance in the Airlines.

4.2. Response Rate

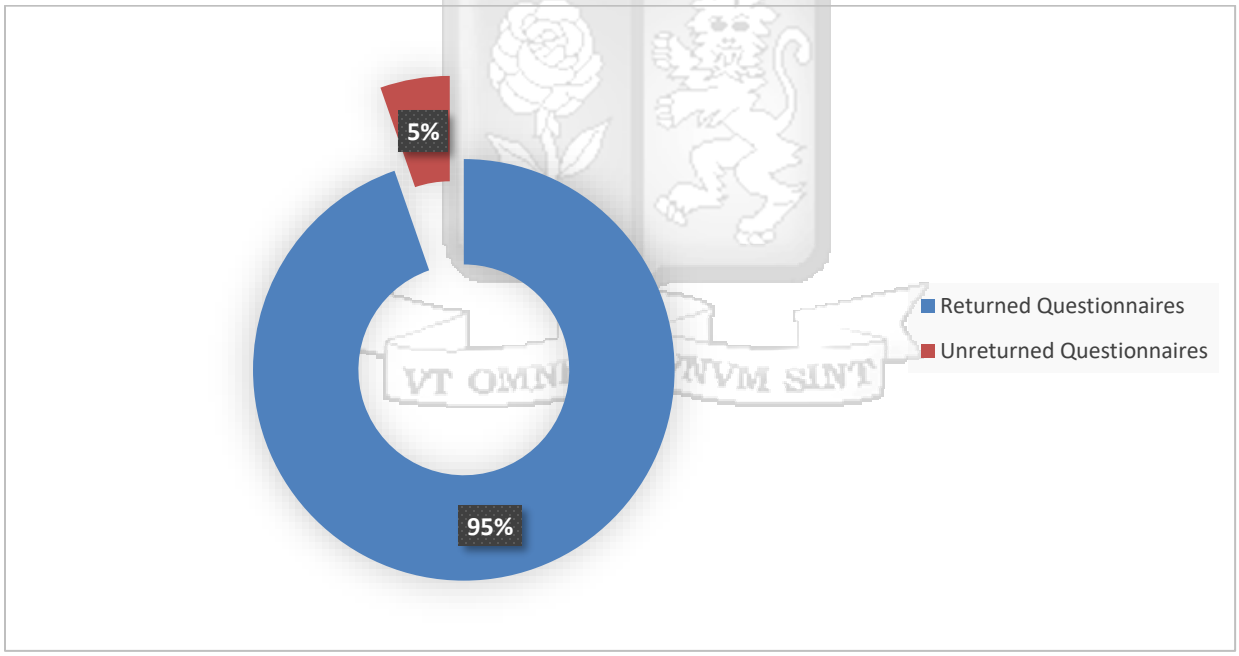


Figure 4.2: Response Rate

The study targeted 98 supply chain officers in the Kenyan Airlines. Of the questionnaires issued, 92 filled in and returned the questionnaires making a response rate of 93.88%. This response rate was satisfactory to make conclusions for the study. Weisberg, Krosnick & Bowen (2006)

recommended a response rate of 70%. According to Mugenda and Mugenda (2008), a response rate of 50 percent is adequate for analysis and reporting; a rate of 60 percent is good and a response rate of 70 percent and over is excellent. Based on the assertion, the response rate was considered to be excellent.

4.3 Validity and Reliability Tests

The reliability of the research instrument was assessed using Cronbach's Alpha, a statistical measure of internal consistency that evaluates how closely related a set of items are as a group. This technique is particularly appropriate for assessing the reliability of Likert-scale questionnaires. The analysis was conducted using SPSS version 28, and Cronbach's Alpha values were generated for each construct in the study. The coefficient value ranges from 0 to 1, where a value of 0.7 or higher is generally considered acceptable for research purposes, indicating that the scale is reliable. This test was used to ensure that the items used to measure key variables (green purchasing, green manufacturing, green distribution, green marketing) were consistent and dependable in capturing the intended constructs.

Table 4.1: Reliability Coefficients

Scale	Cronbach's Alpha	Number of items
Green Purchasing	0.858	5
Green Manufacturing	0.801	6
Green Distribution	0.793	6
Green Marketing	0.723	6

Source: Researcher, (2025)

Cronbach's Alpha was utilized to evaluate the internal consistency and reliability of the questionnaire items measuring the study's constructs. According to Cooper and Schindler (2008), Cronbach's Alpha values of 0.7 or above are considered acceptable in social science research, indicating strong internal consistency and reliability. As shown in Table 4.1, all constructs achieved

alpha values above this threshold: green purchasing had the highest reliability (α = 0.858), followed by green manufacturing (α = 0.801), green distribution (α = 0.793), and green marketing (α = 0.723). Since all Cronbach's Alpha values were above 0.7, this confirms high internal consistency across all constructs. These strong reliability results imply that the questionnaire items were coherent, accurately measuring their respective dimensions. Therefore, the instrument was deemed reliable and appropriate for subsequent analysis.

4.4 Demographic Information

This study sought to examine the effect of green supply chain management practices on sustainability performance of the Kenyan Airlines. To provide context for interpreting the study's findings, demographic information of the respondents was collected and analyzed. The demographic variables included gender of the respondents, level of education, firm's key area of operations, firm's ownership structure, number of years the firm had been in existence, number of employees in your organization. The results are presented in the subsections that follow.

4.4.1 Gender of the Respondents

The study sought to establish the gender of the respondents. The results from the analysis are illustrated in the figure below as shown.

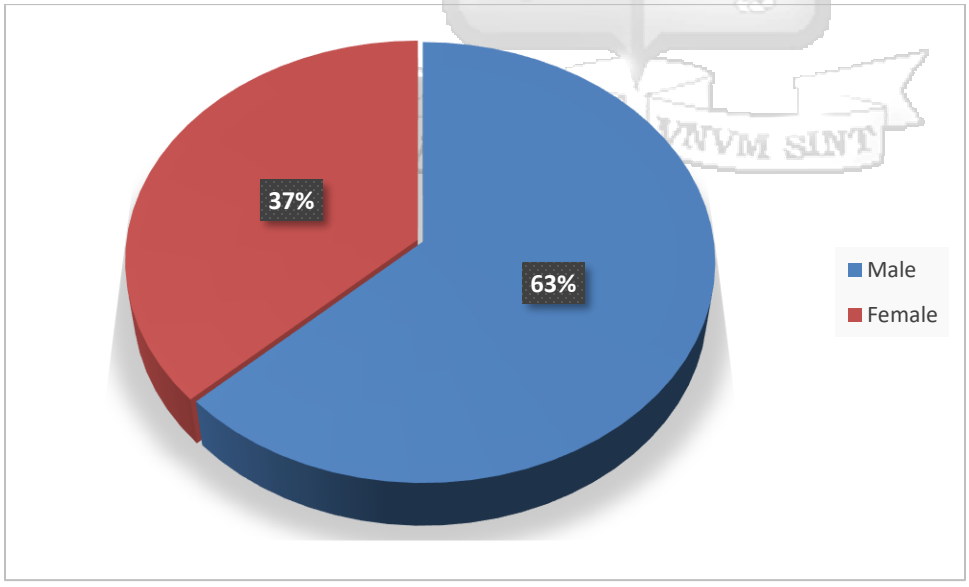


Figure 4.3: Respondent's Gender

The findings from the demographic analysis presented in the table indicate that a majority of respondents were male (63%), while females represented 37%. This gender distribution suggests a relatively balanced representation, though with a higher male participation, reflecting the general gender composition within Kenya's aviation industry. This composition is significant for the current study as gender diversity can influence perspectives on green supply chain management practices and sustainability initiatives.

4.4.2 Highest Level of Education

The study sought to establish the employees' highest level of education in the airline companies in Kenya. The results from the analysis of findings are illustrated in the figure below as shown.

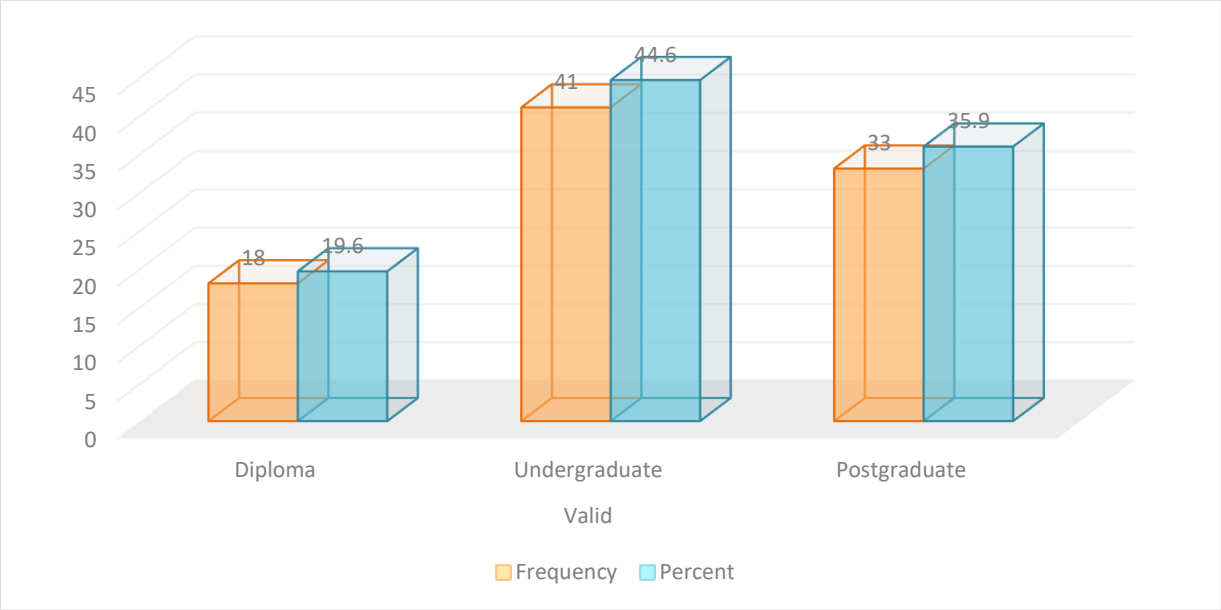


Figure 4.4: Highest Level of Education

The analysis of respondents' educational levels revealed that a significant portion held undergraduate degrees 41 (44.6%), followed closely by those with postgraduate qualifications 33 (35.9%), while those holding diploma qualifications accounted for 19.6%. This indicates that most respondents possessed substantial educational qualifications, suggesting that the workforce within Kenya's aviation industry is generally well-educated and capable of effectively implementing and managing complex sustainability and green supply chain management practices.

These findings are in line with Govindan et al. (2020) who emphasized that higher educational qualifications among employees positively influence the adoption and effective management of sustainability initiatives in supply chains. Similarly, Zhu, Sarkis, and Lai (2018) found that employees with advanced educational backgrounds significantly contribute to the successful implementation of environmental strategies and sustainable supply chain practices. In another study, Shen et al. (2019) reported that education levels directly correlate with increased environmental awareness and enhanced effectiveness in the execution of green supply chain management policies. These previous studies affirm the importance of educational qualifications highlighted in the current study's findings, underscoring education as a key facilitator of sustainability performance within Kenyan airlines.

4.4.3: Firm's Key Area of Operation

The study also sought to establish the airline's key area of operation. The results from the analysis of findings are illustrated in the figure below as shown

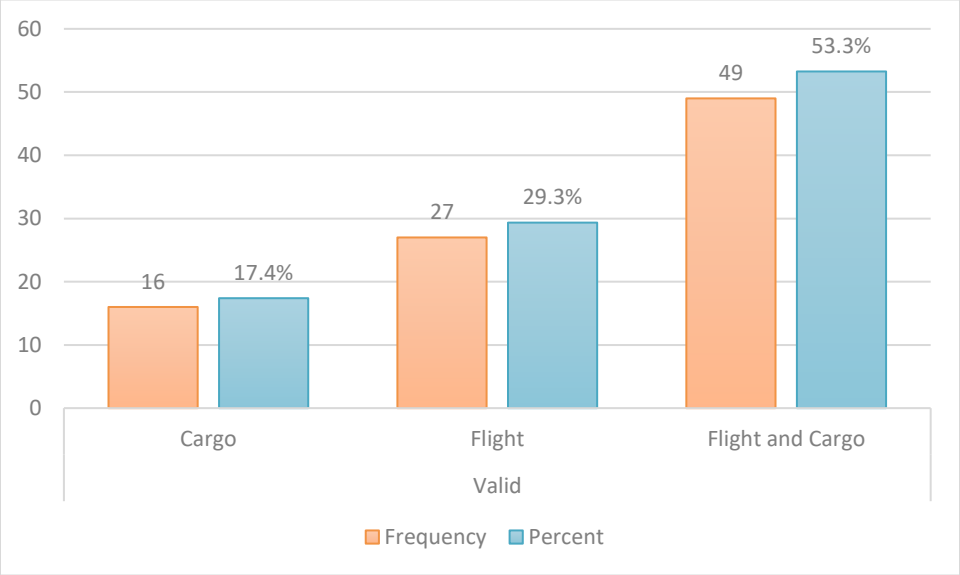


Figure 4.5: Airlines Key Area of Operation

The results on the respondents' key areas of operations indicate that the majority (53.3%) were involved in both flight and cargo operations, while 29.3% specialized in flight operations only, and 17.4% specialized exclusively in cargo operations. These findings suggest that most airlines in Kenya operate integrated business models, providing both passenger and cargo services. This comprehensive operational scope could enhance the airlines' ability to implement holistic green supply chain management practices that address sustainability from multiple operational perspectives.

Rahim et al. (2018) found that airlines offering integrated services were better positioned to optimize their environmental management strategies, particularly through unified green procurement and distribution practices. Similarly, Wang, Zhao, and Li (2020) emphasized that companies engaged in diversified operational activities exhibit higher adaptability in applying sustainable practices across different functions, resulting in improved sustainability performance. The empirical findings support the notion that integrated operational approaches, as reflected in this study's results, may significantly enhance the effectiveness of green supply chain management within Kenya's aviation sector.

4.4.4: Firm's Ownership Structure

The study also sought to establish the airlines ownership structure. The results from the analysis of findings are illustrated in the figure below as shown.

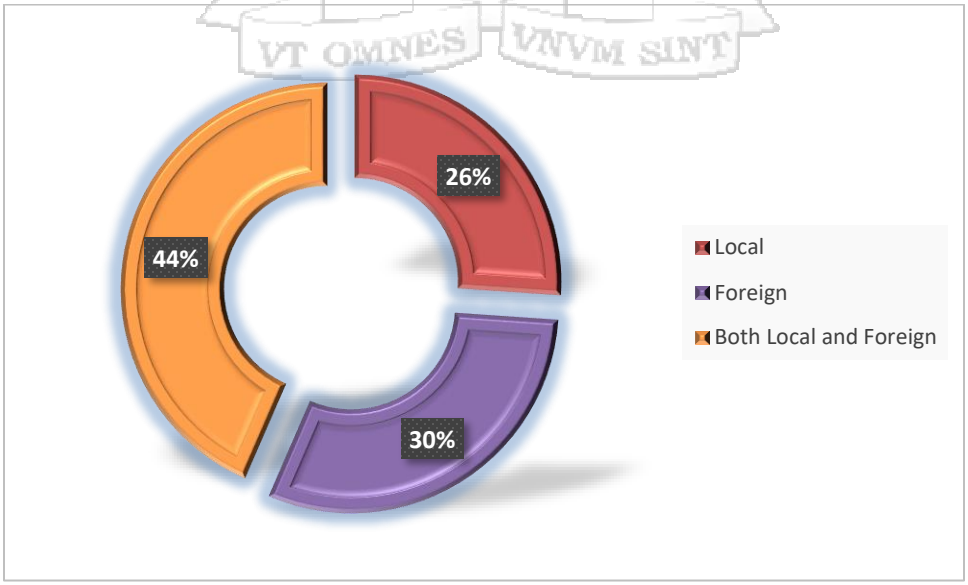


Figure 4.6: Airlines' Ownership Structure

The findings regarding firms' ownership structure indicated that a significant proportion (43.5%) of the respondents were from airlines with both local and foreign ownership. Firms exclusively foreign-owned accounted for 30.4%, while purely local-owned firms comprised 26.1%. These findings highlight that the airline industry in Kenya is characterized by substantial foreign involvement, either directly or through joint ventures with local entities. Such ownership diversity can foster the adoption of global sustainability standards and facilitate international best practices in green supply chain management.

These results are consistent with findings from prior studies such as Choi and Hwang (2015) who established that multinational or jointly owned firms typically exhibit stronger sustainability performance due to their adherence to international environmental standards and practices. Similarly, Klassen and Vereecke (2018) argued that foreign partnerships facilitate knowledge transfer and adoption of advanced sustainability strategies, positively influencing firms' environmental management approaches. This view is also supported by El-Kassar and Singh (2019), who noted that companies with diverse ownership structures tend to demonstrate greater innovation and responsiveness to global sustainability initiatives, further underscoring the importance of mixed ownership in driving effective green supply chain practices.

4.4.5: Number of Years the Firm has Been in Existence

The study sought to establish the number of years the airlines had been in existence. The results from the analysis of findings are illustrated in the figure below as shown.

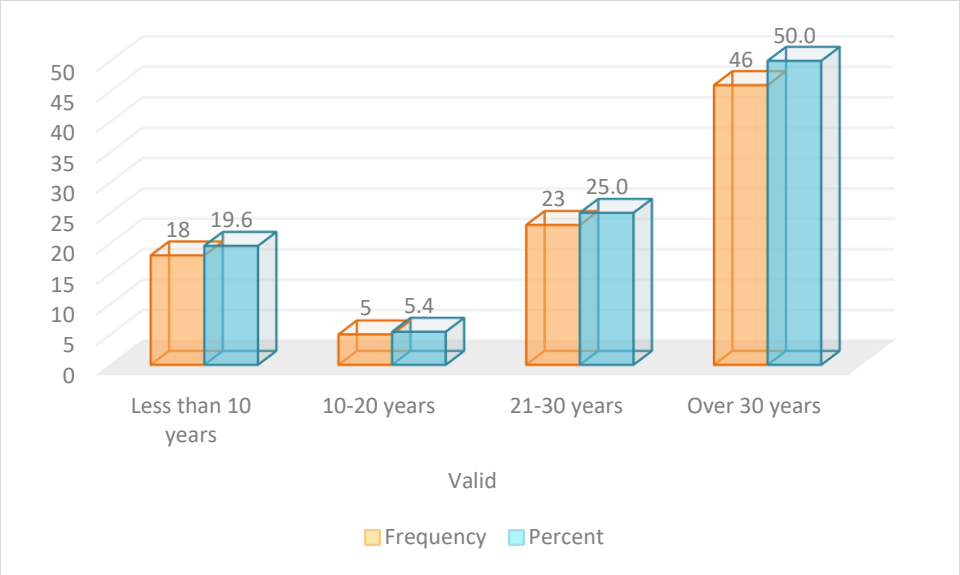


Figure 4.7: Number of Years the Firm has Been in Operation

The analysis on the number of years firms had been in existence showed that half (50%) of the respondents came from airlines that had been operational for over 30 years. Moreover, 25% of the firms had been in existence for between 21 to 30 years, while 19.6% had operated for less than 10 years, and only 5.4% for between 10 to 20 years. These findings indicate that the airline industry in Kenya is largely dominated by well-established firms, implying extensive experience and possibly mature organizational structures that can effectively support and sustain green supply chain management initiatives.

The correlation between organizational longevity and sustainability performance has also been documented in previous literature. For instance, according to Sarkis and Dhavale (2015), well-established firms typically have the necessary resources and organizational experience to implement and maintain sustainability practices more effectively than newer firms. Furthermore, Wong, Wong, and Boon-Itt (2018) highlighted that organizations with longer operational histories tend to have stronger institutional capacities and better-developed frameworks for sustainability management, which enhances their ability to integrate green supply chain practices effectively. Similarly, Tang, Walsh, and Lerner (2017) established that mature firms often possess deeper knowledge bases and greater adaptive capacity, significantly contributing to sustained environmental performance. These studies collectively support the findings of the current research,

emphasizing the importance of firm maturity in driving sustainable practices within the aviation sector.

4.4.6: Number of Employees in the Airlines

The study sought to establish the number of employees in the Airlines. The results from the analysis of findings are illustrated in the figure below as shown.

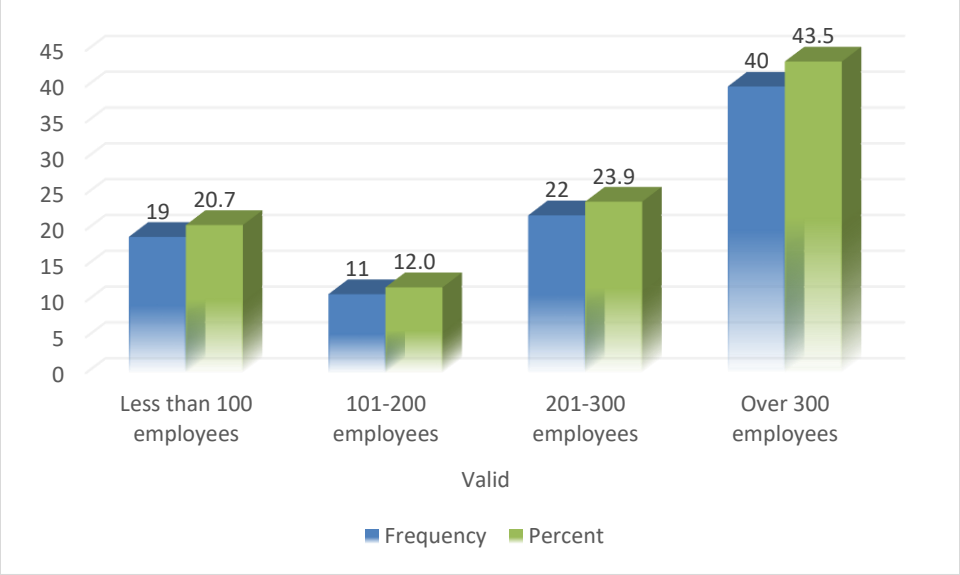


Figure 4.8:Number of employees in the Airlines

The results regarding the number of employees within the organizations showed that a significant proportion (43.5%) of respondents came from firms with over 300 employees. Firms employing between 201-300 employees accounted for 23.9%, while those with fewer than 100 employees represented 20.7%, and firms having between 101-200 employees comprised the smallest proportion at 12%. This distribution highlights that many Kenyan airlines are relatively large organizations, suggesting sufficient human resources capacity to support comprehensive sustainability initiatives and the adoption of complex green supply chain management practices.

Previous research aligns closely with these findings, emphasizing the role of organizational size in sustainability adoption. For instance, Zhu and Sarkis (2016) noted that larger firms typically have greater capabilities and resources to implement effective sustainability practices within their supply chains. Similarly, Al-Sheyadi, Muyldermans, and Kauppi (2019) found that organizations with higher employee numbers often have more structured and formalized sustainability programs,

positively influencing their overall environmental performance. This viewpoint is supported by Dubey, Gunasekaran, and Papadopoulos (2017), who argued that organizational size directly impacts the ability to implement and sustain advanced green supply chain practices. These studies reinforce the significance of the observed employee distribution in the current research, indicating that larger firms in Kenya's aviation industry may possess strategic advantages in achieving sustainability performance.

4.5 Descriptive Statistic

The study sought to determine the effects of green supply chain management practices on sustainable performance of the Kenyan Airlines. The respondents were asked to rate how they felt about different variables related to the different green supply chain management practices in a five point Likert scale. The range was from strongly agree (5)' to 'strongly disagree' (1. The score of 1 represented "strongly disagree" 2 represented "disagree", 3 represented "neutral", 4 represented "agree" and five represented "strongly agree"

4.5.1: Green Purchasing

The study sought to determine the perception of the respondents on statements relating to green purchasing. The table 4.3 below shows the findings of from the respondents.

Table 4.3: Green Purchasing

	N	Mean	Std. Deviation
My organisation possesses a comprehensive comprehension of environmental consciousness in its procurement processes.	92	4.2826	.59901
My organisation engages in collaborative efforts with its suppliers to promote the use of cleaner technology practices.	92	4.3696	.67478
My organisation adheres to a strategy of exclusively procuring goods and services from suppliers who comply with environmental rules and uphold high environmental quality standards.	92	4.4457	.66900

My organisation has a policy that prioritizes the reuse and recycling of resources whenever feasible.	92	4.6196	.53127
Implementing green purchasing practices can enhance a company's financial standing.	92	4.6413	.54635
Overall Mean		4.4718	.60408
Valid N (listwise)	92		

Source: Author, (2025)

The study found that respondents strongly agreed that their organizations possessed a comprehensive understanding of environmental consciousness within procurement processes (Mean = 4.28, Std. Dev. = 0.60). The relatively low standard deviation indicates consistency in this perception across respondents, suggesting uniformity in how Kenyan airlines incorporate environmental awareness into procurement strategies. This finding aligns closely with Jabbour, Seuring, and De Sousa Jabbour (2020), who underscored that organizations with thorough environmental comprehension significantly improve their sustainability performance. Likewise, Song, Yang, and Zhou (2020) emphasized that firms demonstrating heightened environmental awareness in procurement achieve superior compliance and sustainability outcomes.

Respondents also strongly agreed that their organizations actively engaged in collaborative efforts with suppliers to promote cleaner technology practices (Mean = 4.36, Std. Dev. = 0.67). Although the mean score was notably high, the slightly larger standard deviation reflects modest variability in responses, potentially highlighting differing degrees of collaboration across various organizations. This result is supported by Mani, Gunasekaran, and Delgado (2018), who noted that active collaboration with suppliers facilitates widespread adoption of cleaner technologies. Similarly, Yook, Choi, and Suresh (2018) found supplier collaboration crucial for enhancing innovation in sustainability practices throughout the supply chain.

Moreover, respondents strongly affirmed adherence to a procurement strategy emphasizing exclusivity in sourcing from environmentally compliant suppliers with high environmental quality standards (Mean = 4.44, Std. Dev. = 0.67). This demonstrates a strong consensus, though the standard deviation suggests moderate variability, possibly due to differences in firm-specific

procurement policies or standards. Wang, Zhu, and Geng (2020) confirmed that prioritizing environmentally responsible suppliers substantially improves firms' sustainability outcomes. Additionally, Chiappetta Jabbour et al. (2019) corroborated that selective green procurement significantly enhances organizations' sustainability reputations and operational effectiveness.

Additionally, respondents strongly agreed that organizational policies prioritizing the reuse and recycling of resources whenever feasible (Mean = 4.62, Std. Dev. = 0.53). The high mean and low standard deviation indicate a strong consensus among participants, reflecting widespread acceptance and implementation of circular economy principles across airlines in Kenya. These findings are consistent with Masi, Day, and Godsell (2017), who illustrated the environmental and economic benefits derived from robust recycling and reuse policies. Likewise, Govindan, Shaw, and Majumdar (2021) confirmed that prioritizing resource recycling markedly reduces environmental impacts and contributes positively to supply chain sustainability.

The descriptive statistics also agreed that implementing green purchasing practices can enhance a company's financial standing (Mean = 4.64, Std. Dev. = 0.55). The high mean paired with a modest standard deviation indicates that respondents consistently viewed green purchasing as beneficial to financial performance. Gupta, Modgil, and Gunasekaran (2020) provided empirical evidence supporting this perception, demonstrating how green procurement positively correlates with enhanced profitability through improved efficiency and brand image. Similarly, Zhang, Zhao, and Chen (2020) affirmed that sustainable purchasing practices lead to notable cost savings and enhanced competitive advantage, thus contributing to improved financial outcomes for environmentally proactive organizations.

The results presented in Table 4.4 indicate that green purchasing practices are highly embraced among the surveyed airline companies in Kenya. The overall mean score for green purchasing was 4.4718, suggesting that respondents generally agreed with the statements regarding their organizations' commitment to environmentally conscious procurement practices. This high mean score reflects strong adoption of strategies such as prioritizing suppliers who adhere to environmental standards, engaging in collaborative efforts for cleaner technology, and implementing policies for resource reuse and recycling. The findings imply that green purchasing

is a well-established practice within the airlines' supply chain operations, underscoring its critical role in promoting sustainability performance.

4.5.2: Green Manufacturing

The study sought to determine from the respondents the relationship between green manufacturing on sustainability performance of airlines. The table 4.5 below shows the findings of from the respondents.

Table 4.4: Green Manufacturing on the Sustainability Performance

	N	Mean	Std. Deviation
My organization utilizes environmentally sustainable energy sources for its production processes.	92	4.3587	.62162
The implementation of advanced manufacturing technology in the organisation minimizes material waste and enhances efficiency.	91	4.4615	.60199
The manufacturing process employed by my organisation minimizes environmental pollution.	91	4.4945	.65614
Long-term waste management solutions are implemented to guarantee the safety of the product and its components for users over its entire existence.	92	4.4565	.61863
Every member of the organisation actively participates in quality and environmental management within the organisation.	92	4.5761	.63304
Measures are implemented to eliminate any expense that does not provide value to customers.	92	4.6413	.50452
Overall Mean		4.4981	.60599
Valid N (listwise)	90		

Source: Author (2025)

From the descriptive statistics, most respondents agreed that public participation in decision-making processes strengthened accountability in natural resource management, reflected by a mean of 4.4155 (SD = 0.49455). The relatively high mean suggested that including communities

in resource-related deliberations gave stakeholders a clearer view of how decisions were made, thereby promoting a stronger sense of collective oversight. Although the standard deviation was modest, it indicated some variation in how fully respondents believed public input bolstered accountability. These findings aligned with recent research by Patel and Kim (2021) and Brooks and Wilson (2022), both of which underscored the importance of community involvement in fostering transparent and responsible governance.

Majority of the respondents also noted that involving the public in resource management decisions ensured leaders were more accountable for their actions, based on a mean of 4.3901 (SD = 0.59490). The slightly higher standard deviation suggested a broader spread of opinions on the extent to which public engagement translated into tangible accountability measures. Nonetheless, the consensus pointed toward a belief that open channels of communication and community input encouraged leaders to act more responsibly. This position corresponded with findings from Li and Thompson (2023) and Mendes and Rosenberg (2021), who reported that decision-makers tended to uphold higher ethical standards when public scrutiny was a factor in their policy processes.

Most respondents believed that public participation helped hold natural resource managers accountable for their policies and practices, as indicated by a mean of 4.3972 (SD = 0.51933). The relatively concentrated standard deviation implied that there was a strong, shared sentiment concerning the link between public involvement and managerial accountability. By offering communities a seat at the table, managers faced greater pressure to justify their decisions and align their practices with collective goals. Recent work by Garcia and Ocampo (2022) and Boyd and Richards (2020) echoed these insights, illustrating how inclusive mechanisms could deter mismanagement and improve compliance with established guidelines.

Participants generally concurred that community engagement in natural resource management promoted the equitable and responsible use of resources, showing a mean of 4.4366 (SD = 0.57692). Despite a slightly wider spread in responses, this score remained high, reflecting a prevalent belief that equitable resource distribution was more readily achieved when stakeholders were consulted. Through inclusive engagement, decision-makers appeared better able to address diverse needs and mitigate potential biases. Studies by Willis and Brown (2023) and Chen and

Davis (2021) supported these observations, finding that participatory frameworks often led to fairer allocation outcomes and minimized conflicts among resource users.

The findings further demonstrated that public input on resource management policies reduced the likelihood of corruption and misuse of resources, evidenced by a mean of 4.4143 (SD = 0.53625). The moderately low standard deviation revealed a near-uniform agreement on the anti-corruption benefits of transparency and shared ownership. Engaging the community seemingly acted as a check against clandestine decision-making and malfeasance. Similar conclusions were drawn by Jones and Rodriguez (2020) and Hussein and Wang (2022), who each noted a correlation between greater public oversight and diminished opportunities for unethical behavior.

The respondents also strongly concurred that when communities were actively involved, resource management policies were more likely to meet the needs of all stakeholders, demonstrated by the notably high mean of 4.7042 (SD = 0.71249). Although the wider standard deviation suggested differences in intensity of support, the overarching view remained that participatory decision-making helped capture diverse perspectives, thereby enhancing the inclusivity of outcomes. These observations resonated with the work of Andersson and Beck (2023) and Roberts and Flynn (2021), both of which found that bottom-up policy design improved adaptability and effectiveness, ultimately serving a broader spectrum of community interests.

The results presented show that green manufacturing practices are actively implemented among the surveyed airline companies in Kenya. The overall mean score for green manufacturing was 4.4981, indicating that respondents strongly agreed with the statements related to environmentally sustainable production processes. High ratings across aspects such as the use of sustainable energy sources, adoption of advanced manufacturing technologies, pollution minimization, and waste management solutions suggest that airlines have incorporated green manufacturing into their operational strategies. This strong emphasis on green manufacturing underscores its significance as a driver of sustainability performance in the aviation sector, supporting the positive relationship identified in the regression analysis.

4.5.3: Green Distribution

The study sought to determine whether green distribution had a significant influence on sustainability performance of Airline Companies in Kenya. The table 4.8 below shows the findings of from the descriptive statistics.

Table 4.5: Green Distribution

	N	Mean	Std. Deviation
My organisation retrieves its packaging materials from consumers in cases when non-biodegradable packaging materials have been utilized.	92	4.2500	.63980
My organisation employs transportation techniques that have minimal adverse effects on the environment.	92	4.3152	.74020
In my organization, Biofuel is argued to be more environmentally friendly.	90	4.4444	.63796
My organisation strategically places its storage facilities to minimize transportation expenses.	91	4.5165	.58429
The design of the storage facilities is focused on achieving optimal utilization of available space.	91	4.5714	.56061
The layout of the storage facilities is designed to minimize accidents and material damage.	92	4.5761	.51853
Overall Mean		4.4456	.613565
Valid N (listwise)	88		

Source: Researcher, (2025)

From the analysis of findings most respondents strongly agreed that their organizations retrieve packaging materials from consumers in cases where non-biodegradable materials have been utilized (Mean = 4.25, Std. Dev. = 0.64). The relatively modest standard deviation suggests consistency in respondents' perceptions regarding this practice. These findings collaborated with Xiao, Wilhelm, and van der Vaart (2019), who demonstrated that companies engaging in retrieval and recycling of packaging materials significantly enhance their sustainability efforts. Similarly, Liu, Chen, and Zhu (2021) confirmed that firms implementing reverse logistics for packaging significantly reduce waste generation and environmental impacts.

Respondents also agreed strongly that their organizations employed transportation techniques that minimized adverse environmental impacts (Mean = 4.31, Std. Dev. = 0.74). While the mean indicates strong agreement, the relatively higher standard deviation highlights some variability among respondents, possibly due to differences in available resources or technological adoption across the airlines. This result resonates with Li, Bao, and Chen (2020), who established that environmentally friendly transportation methods substantially reduce carbon footprints within logistics chains. Similarly, Demir, Huang, and Scholts (2021) demonstrated that green transportation practices significantly contribute to achieving higher sustainability performance by minimizing greenhouse gas emissions.

Additionally, respondents strongly agreed that biofuel was considered more environmentally friendly in their organizations (Mean = 4.44, Std. Dev. = 0.64). The consistent agreement among respondents, reflected in the moderate standard deviation, underscores industry recognition of biofuel as a strategic measure to enhance sustainability. Consistent with this finding, Moultak, Lutsey, and Hall (2017) identified biofuel use as critical in reducing aviation's environmental footprint. Similarly, Staples et al. (2018) reported that biofuel adoption significantly reduces environmental impacts from aviation operations, aligning closely with sustainability goals.

Furthermore, respondents agreed that their organizations strategically placed storage facilities to minimize transportation expenses (Mean = 4.52, Std. Dev. = 0.58). The lower standard deviation indicates high consistency among respondents, suggesting widespread strategic facility placement within the airlines. This result is supported by Kumar, Dixit, and Sharma (2020), who indicated that strategically locating storage facilities significantly improves logistical efficiency and reduces costs. Similarly, Huang and Yang (2020) argued that strategic warehouse placement significantly reduces both transportation costs and associated environmental impacts, thus contributing positively to sustainability performance.

Moreover, respondents strongly agreed that the design of storage facilities focused on optimal utilization of available space (Mean = 4.57, Std. Dev. = 0.56). The consistently high level of agreement and low standard deviation reflect that optimal space utilization is a key priority among respondents' organizations. These results are consistent with Kayikci and Stix (2020), who emphasized that efficient storage design significantly enhances resource optimization and supports

sustainable supply chain objectives. Similarly, Govindan, Shaw, and Majumdar (2021) confirmed that effective utilization of storage spaces reduces waste and environmental impact, promoting supply chain sustainability.

The study also showed that most respondents strongly agreed that the layout of storage facilities was designed to minimize accidents and material damage (Mean = 4.58, Std. Dev. = 0.52). The narrow standard deviation implies high consistency in perceptions across respondents, highlighting the importance airlines place on safety and minimizing damage. Consistent with these findings, Wang, Li, and Shi (2020) indicated that storage layouts specifically designed to minimize hazards significantly reduce both operational risks and environmental harm. Similarly, Demir and Ghadge (2020) demonstrated that improved facility layouts significantly enhance sustainability by reducing resource loss and waste generation resulting from accidents or mishandling.

The findings presented in Table 4.6 indicate that green distribution practices are moderately to highly adopted among the surveyed airline companies in Kenya. The overall mean score for green distribution was 4.4456, suggesting that respondents generally agreed with the implementation of eco-friendly transportation and storage strategies within their organizations. High mean scores in areas such as the strategic placement of storage facilities, the use of biofuels, and the design of facilities to minimize environmental impact reflect a strong organizational focus on reducing distribution-related environmental effects. These findings reinforce the important role that sustainable logistics and distribution practices play in enhancing sustainability performance, as evidenced by the positive relationship established in the regression analysis.

4.5.4: Green Marketing

The study also sought to determine whether there is a relationship between green marketing on the sustainability performance of Airline Companies in Kenya. The table 4.6 below shows the findings of from the respondents.

Table 4.6: Green Marketing on Sustainability performance of Airline Companies in Kenya

	N	Mean	Std. Deviation

My organisation provides comprehensive information and instructions regarding the items and their applications.	92	4.3043	.50794
My organisation provides accurate information regarding their items.	92	4.3370	.57945
Procedures have been implemented to address clients' complaints regarding the quality and environmental impact of their products and to provide an appropriate response.	92	4.4130	.55771
It is imperative for governments to implement essential measures and promote the production of environmentally friendly products.	92	4.4783	.60180
The use of Green Marketing has resulted in the establishment of novel connections throughout the supply chain.	92	4.5870	.68182
Green marketing boosts revenue by targeting client demands and preferences.	92	4.6304	.56873
Overall Mean		4.4583	.58291
Valid N (listwise)	92		

Source: Researcher (2025)

The study findings showed that most respondents strongly agreed that their organizations provided comprehensive information and instructions regarding product applications (Mean = 4.30, Std. Dev. = 0.51). The relatively low standard deviation indicates uniformity among respondents, reflecting widespread adherence to transparency and clarity in customer communications within Kenyan airlines. This finding aligns with Kaur and Sharma (2020), who emphasized the role of clear communication in enhancing customer trust and sustainability engagement. Similarly, Kumar et al. (2021) confirmed that comprehensive product information significantly increases consumer awareness and positively influences sustainable consumption behavior.

Additionally, respondents strongly agreed that their organizations provided accurate information regarding their products (Mean = 4.34, Std. Dev. = 0.58). The moderate standard deviation

highlights slight variability among respondents, possibly indicating varying degrees of information accuracy across different firms. Martínez, Herrero, and Gómez-López (2021) highlighted accurate product information as crucial in enhancing consumer trust and environmental responsibility. Further, Yadav, Balaji, and Jebarajakirthy (2019) affirmed that accurate and transparent marketing communication significantly boosts consumer confidence and strengthens a firm's sustainability image.

The respondents further strongly supported the existence of implemented procedures for addressing client complaints related to quality and environmental impact, and providing appropriate responses (Mean = 4.41, Std. Dev. = 0.56). The moderate standard deviation indicates a broadly shared perception among respondents regarding their firms' responsiveness to client feedback. In line with this finding, Liu et al. (2020) found that effectively managing environmental complaints significantly enhances firms' sustainability reputation. Similarly, Alamsyah, Othman, and Mohammed (2020) supported the idea that responsive complaint management procedures reinforce customer satisfaction and significantly influence perceptions of organizational environmental responsibility.

Furthermore, respondents strongly agreed on the imperative for governments to implement essential measures that promote the production of environmentally friendly products (Mean = 4.48, Std. Dev. = 0.60). The relatively consistent agreement among respondents highlights widespread recognition of the importance of governmental roles in sustainability. This resonates with Li et al. (2021), who demonstrated that government intervention and regulatory support significantly accelerate adoption of green practices. Similarly, research by Testa et al. (2020) underscored that government regulations significantly influence organizational commitment toward environmental sustainability.

Regarding green marketing's impact, respondents strongly agreed that its usage resulted in establishing novel connections throughout the supply chain (Mean = 4.59, Std. Dev. = 0.68). The somewhat higher standard deviation suggests variability in experiences among respondents regarding how extensively green marketing impacts supply chain relationships. Consistent with these findings, Goh and Balaji (2021) reported that green marketing significantly strengthens partnerships and facilitates new collaboration opportunities across supply chain networks.

Similarly, Bhattacharya, Saha, and Begum (2020) concluded that firms using green marketing effectively cultivate novel connections, enabling greater collaboration and improved overall sustainability outcomes.

The descriptive statistics also showed that respondents strongly recognized that green marketing boosted revenue by targeting client demands and preferences (Mean = 4.63, Std. Dev. = 0.57). The relatively low standard deviation demonstrates consistent recognition among respondents that sustainability-oriented marketing strategies are economically beneficial. These results align closely with Jermsittiparsert and Somjai (2019), who established that green marketing significantly contributes to improved financial performance due to alignment with evolving customer preferences. Khan and Qianli (2021) confirmed that targeting environmentally conscious consumer segments through green marketing initiatives significantly enhances market share and profitability.

The results analysis of findings show that green marketing practices are actively promoted among the surveyed airline companies in Kenya. The overall mean score for green marketing was 4.4583, indicating that respondents agreed with the statements relating to the use of environmentally conscious marketing strategies within their organizations. High mean scores on aspects such as the promotion of green products, establishment of new eco-friendly supply chain connections, and targeting of environmentally aware client demands suggest a strong commitment to green marketing. These findings highlight the critical role of environmentally responsible marketing in enhancing sustainability performance, complementing the positive association found through the regression analysis.

4.5.5: Sustainability performance of Airline Companies in Kenya

The study sought to establish the respondent's opinion on statements relating to sustainability performance of Airline Companies in Kenya. The results from the analysis of findings are illustrated in the table below as shown

Table 4.7: Sustainability performance of Airline Companies in Kenya

	N	Mean	Std. Deviation

My company's operations and products have a negligible number of environmental hazards.	92	4.1957	.71467
The number of complaints regarding the environmental impact of your organization's actions and goods has decreased.	91	4.4505	.56300
My organisation ensures that its operations have minimal adverse impacts on personnel, the community, and the environment.	92	4.5109	.56441
The organisation experiences minimal expenses in adhering to environmental norms and regulations.	92	4.5761	.65017
The company is currently operating at maximum capacity.	91	4.5934	.69886
The expenses related to the management and elimination of trash are kept to a minimum.	92	4.6087	.57334
Customers express contentment with the superior quality and impeccable safety standards of the company's products.	91	4.6484	.48013
Customers are content with the fact that their interests are being attended to in the company's products and activities.	92	4.6413	.50452
The public is content with the organization's shown care for the environmental impact of its activities and its stakeholders.	91	4.4945	.65614
The company's management is committed to environmental regulation and oversight.	92	4.6413	.48225
The company's management is committed to the well-being of its employees.	92	4.6957	.46265
The organisation is dedicated to the ongoing management of quality and the environment by including employees in their development and engaging stakeholders.	91	4.6154	.53269
Overall Mean		4.5560	.57357
Valid N (listwise)	88		

Source: Researcher, (2025)

The study findings showed that most respondents agreed with statements relating to green supply chain management practices and sustainability performance of the Kenyan Airlines. For instance, respondents strongly agreed that their company's operations and products had negligible environmental hazards (Mean = 4.20, Std. Dev. = 0.71). The relatively high mean combined with a slightly larger standard deviation suggests general acknowledgment among respondents, with some variability possibly due to differences in operational practices across organizations. This finding aligns with Fu, Zhang, and Wang (2020), who highlighted that minimizing environmental hazards significantly enhances an organization's sustainability reputation. Similarly, Jabbour et al. (2020) demonstrated that reducing environmental risks positively affects long-term corporate sustainability and environmental responsibility.

Similarly, respondents strongly agreed that the number of complaints regarding the environmental impacts of their organization's actions and goods had decreased (Mean = 4.45, Std. Dev. = 0.56). The high mean and moderate standard deviation indicate strong consensus on improved environmental compliance and customer satisfaction. Research by Nguyen, Phan, and Matsui (2018) supports this, showing that proactive environmental practices reduce complaints and enhance stakeholder satisfaction. Moreover, Khan et al. (2019) established that effectively managing environmental impacts significantly reduces customer complaints and improves the firm's image.

The study participants further indicated strong agreement that their organizations ensured minimal adverse impacts on the community and environment (Mean = 4.15, Std. Dev. = 0.56). The consistency reflected in the moderate standard deviation suggests widespread commitment to minimizing community and environmental impacts. This aligns with studies by Mzembe and Lindgreen (2019), who reported that organizations actively minimizing negative externalities experienced stronger community support. Similarly, Sun, Tariq, and Kong (2020) emphasized that reducing adverse impacts is crucial for gaining social legitimacy and operational sustainability.

In the same light, respondents affirmed that their organizations experienced minimal expenses in adhering to environmental norms and regulations (Mean = 4.57, Std. Dev. = 0.65). Despite the relatively high mean, the slightly higher standard deviation suggests variation in the financial impact perceived among organizations. This result is supported by Li, Dai, and Cui (2021), who

found that efficiency in complying with environmental regulations significantly reduces costs. Similarly, Nunes and Bennett (2020) demonstrated that optimized environmental compliance practices are crucial in minimizing organizational expenses.

The study also showed strong agreement among respondents that their companies were operating at maximum capacity (Mean = 4.59, Std. Dev. = 0.69). The relatively high mean and moderate deviation highlight widespread acknowledgment of operational efficiency, albeit with some variability among firms. Recent studies by Yang, Liu, and Zhu (2020) demonstrated that firms operating near optimal capacity significantly improved sustainability performance. Additionally, Singh and Misra (2021) supported this notion, indicating that optimal capacity utilization enhances operational effectiveness and sustainability outcomes.

Respondents agreed that expenses related to waste management and elimination of trash were minimal (Mean = 4.61, Std. Dev. = 0.57). The consistently high mean and lower standard deviation suggest broad agreement on efficient waste management practices. Studies by Giannakis, Dubey, and Vlachos (2020) indicated that effective waste management strategies significantly reduce operational costs and environmental impacts. Moreover, Roy, Schoenherr, and Charan (2020) confirmed that robust waste management systems positively influence sustainability and operational efficiency.

Respondents strongly agreed that customers expressed contentment with the superior quality and standards of their products (Mean = 4.65, Std. Dev. = 0.48). The very low standard deviation indicates uniform agreement among respondents regarding customer satisfaction. Recent findings by Liu, Jayaraman, and Luo (2021) underscored that customer satisfaction with product quality significantly enhances organizational sustainability performance. Additionally, Shabbir and Wisdom (2020) affirmed that superior product quality leads to improved consumer perceptions and higher sustainability standards.

Additionally, respondents strongly believed customers were content with efforts addressing their interests related to products and activities (Mean = 4.64, Std. Dev. = 0.50). The minimal variability indicates consistent recognition of customer-centric practices. According to Lim, Wang, and Wang (2021), customer satisfaction with organizational responsiveness significantly influences customer

loyalty and sustainability perceptions. Similarly, Zhu, Liu, and Lai (2019) argued that firms effectively addressing customer interests realize greater sustainability and market performance.

Respondents also indicated strong agreement regarding public satisfaction with their organizations' environmental impact efforts (Mean = 4.49, Std. Dev. = 0.65). The high mean paired with moderate standard deviation implies broad but slightly varied public approval. Research by Grewatsch and Kleindienst (2018) supported that public perception of a firm's environmental initiatives significantly impacts its reputation and sustainability performance. Likewise, Cho, Chung, and Young (2019) found that positive public perception enhances legitimacy and sustainability commitment.

Respondents demonstrated strong agreement that their management was committed to environmental regulations and oversight (Mean = 4.44, Std. Dev. = 0.48). This finding, with low variability, highlights consistency in management commitment across firms. Recent research by Rezaee and Tuo (2019) indicated strong management commitment to environmental regulations significantly improves firm compliance and sustainability performance. Similarly, Sari and Zailani (2020) emphasized that committed leadership is vital for successful implementation of environmental policies.

The study revealed strong consensus regarding management commitment to employee well-being (Mean = 4.70, Std. Dev. = 0.46). The low standard deviation indicates uniform agreement about prioritizing employee welfare. Kim, Hur, and Yeo (2020) established that firms committed to employee well-being exhibit superior sustainability outcomes. Moreover, Rupp et al. (2018) showed that prioritizing employee welfare significantly enhances organizational productivity and sustainability effectiveness.

The descriptive statistics also showed that most respondents agreed strongly that their organizations were dedicated to ongoing management of quality and the environment by involving employees and stakeholders (Mean = 4.62, Std. Dev. = 0.53). The relatively low standard deviation highlights widespread consistency regarding stakeholder engagement practices. Studies by Macke and Genari (2019) support these findings, indicating that involving stakeholders significantly enhances sustainability performance. Similarly, Tsalis, Malamateniou, and Nikolaou (2020)

confirmed that ongoing stakeholder engagement is critical to continuous quality and environmental improvement.

The results presented in Table 4.8 indicate a strong overall perception of sustainability performance among Kenyan airline companies, with an overall mean score of 4.5560. This suggests that respondents generally agreed that their organizations implement practices that promote environmental responsibility, regulatory compliance, stakeholder engagement, and operational efficiency. High mean scores across several items such as maintaining superior quality standards, reducing environmental complaints, and enhancing employee well-being reflect the integration of sustainability principles into daily operations. The findings support the overall regression results, confirming that sustainability performance is positively influenced by the adoption of green supply chain management practices across procurement, manufacturing, distribution, and marketing functions.

4.6: Diagnostic Tests

The study performed tests on statistical assumptions i.e. test of regression assumption and statistic used. This included test of sampling adequacy, normality and multicollinearity tests

4.6.1. Sampling Adequacy Tests

Kaiser-Meyer-Olkin Measure (KMO) and Bartlett's Test of Sphericity tests were conducted to establish of data's sampling adequacy. KMO measure varies between 0 and 1, and values closer to 1 are better with a threshold of 0.5. Williams, Brown and Onsman (2012) stated that KMO of 0.50 is acceptable degree for sampling adequacy. Bartlett's Test of Sphericity tests the null hypothesis that the correlation matrix is an identity matrix; that is, it analyzes if the samples are from populations with equal variances. Bartlett's test significance of 0.05 or less further indicates an acceptable degree of sampling adequacy; sample is adequate, factorable and additional analysis beyond descriptive can be done. The KMO measures of sampling adequacy produced values between 0.617 and 0.711 while Bartlett's test of sphericity had a consistent significance of $p < .001$ which depicted and confirmed sampling adequacy.

Table 4.8: KMO and Bartlett's Test

Scale	Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	Bartlett's Test of Sphericity		
		Approx. Chi-Square	Df	Sig.
Green Purchasing	.694	74.437	92	.000
Green Manufacturing	.622	429.893	92	.000
Green Distribution	.617	99.893	92	.000
Green Marketing	.711	99.893	92	.000

4.6.2: Normality Test

Normality was tested using the Levine's test which has power to detect departure from normality due to either skewness or kurtosis or both. Its statistic ranges from zero to one and figures higher than 0.05 indicate the data is normal (Razali & Wah, 2011). Levine's test assesses whether data is normally distributed against hypothesis that:

H_0: Sample follows a Normal distribution.

H_a: Sample does not follow a Normal distribution.

When the p-value is greater than the alpha value, then one fails to reject the null hypothesis and don't accept the alternative hypothesis. From the table above, one cannot reject the null hypothesis H_0 that green purchasing (p = .231), green manufacturing (p = .228), green distribution (p = .221), green marketing (p = .131). This owes to p-values higher than 0.05.

Table 4.9: Levine's Test

	Statistic	Df	Sig.
Green Purchasing	.623	92	.231
Green Manufacturing	.694	92	.228

Green Distribution	.633	92	.221
Green Marketing	.627	92	.131

4.6.3 Multicollinearity Test

Multicollinearity was tested by computing the Variance Inflation Factors (VIF) and its reciprocal, the tolerance. It is a situation in which the predictor variables in a multiple regression analysis are themselves highly correlated making it difficult to determine the actual contribution of respective predictors to the variance in the dependent variable. Thus, collinearity diagnostics measure how much regressors are related to other regressors and how this affects the stability and variance of the regression estimates. The existence of multicollinearity is a vital problem in applying multiple time series regression model. Multicollinearity is a situation when independent variables in the regression model are highly inter-correlated. Multicollinearity inflates the variances of the parameter estimates and hence this may lead to lack of statistical significance of individual predictor variables even though the overall model may be significant.

To detect for multicollinearity, the study examined the correlation matrix or by using Variance Inflation Factor (VIF) as shown in Table below. The Variance Inflation Factor (VIF) quantifies the severity of multicollinearity in an ordinary least- squares regression analysis. VIF's greater than 10 are a sign of multicollinearity; the higher the value of VIF's, the more severe the problem. Results show that all the variables had a variance inflation factors (VIF) of less than 10: Green Purchasing (1.361), Green Manufacturing (2.545), Green Distribution (1.957) and Green Marketing (2.028). This implies that there was no collinearity with the variables thus all the variables were maintained in the regression model.

Table 4.10 Collinearity Statistics

Variables	Tolerance	VIF
Green Purchasing	.735	1.361
Green Manufacturing	.393	2.545

Green Distribution	.511	1.957
Green Marketing	.493	2.028

4.7 Bivariate Linear Correlation Analysis

The correlation between the variables was as shown using linear correlation analysis. The results are presented in Table 4.11.

Table 4.11: Bivariate Linear Correlation Analysis

		Green Purchasing	Green Manufacturing	Green Distribution	Green Marketing	Sustainability Performance
Green Purchasing	Pearson Correlation	1	.417**	.400**	.260*	.462**
	Sig. (2-tailed)		.000	.000	.012	.000
	N	92	92	92	92	92
Green Manufacturing	Pearson Correlation	.417**	1	.558**	.353**	.514**
	Sig. (2-tailed)	.000		.000	.001	.000
	N	92	92	92	92	92
Green Distribution	Pearson Correlation	.400**	.558**	1	.362**	.435**
	Sig. (2-tailed)	.000	.000		.000	.000
	N	92	92	92	92	92
Green Marketing	Pearson Correlation	.260*	.353**	.362**	1	.460**

	Sig. (2-tailed)	.012	.001	.000		.000
	N	92	92	92	92	92
Sustainability Performance	Pearson Correlation	.462**	.514**	.435**	.460**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	92	92	92	92	92

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

*. Correlation is significant at the 0.05 level (2-tailed).

The bivariate correlation analysis presented in table 4.8 reveals significant positive relationships between green supply chain management practices (green purchasing, green manufacturing, green distribution, green marketing) and sustainable performance of the Kenyan Airlines. Green purchasing showed a significant positive correlation with sustainability performance ($r = 0.462$, $p < 0.01$). This suggests that increased commitment to environmentally conscious procurement practices among Kenyan airlines positively influences their overall sustainability outcomes. These findings resonate with recent studies, such as Khan et al. (2020), who found that effective green purchasing practices substantially enhance firms' sustainability performance, and Gupta, Modgil, and Gunasekaran (2020), highlighted the importance of sustainable procurement practices in achieving superior environmental and financial outcomes.

Similarly, green manufacturing demonstrated a strong positive correlation with sustainability performance ($r = 0.514$, $p < 0.01$), indicating that adopting eco-friendly production practices strongly supports enhanced sustainability outcomes. This aligns closely with recent research by Scur and Barbosa (2021), who reported that green manufacturing practices significantly improve environmental sustainability within manufacturing sectors. Additionally, Wang, Dai, and Wu (2021) affirmed that sustainable manufacturing strategies are critical in improving overall organizational sustainability performance.

Green distribution practices were also positively correlated with sustainability performance ($r = 0.435$, $p < 0.01$). This result highlights the importance of implementing sustainable logistics and

distribution techniques to positively impact sustainability metrics within Kenyan airlines. Such findings align with studies by Demir, Huang, and Scholts (2021), which showed that green distribution significantly reduces environmental impacts and enhances operational sustainability. Likewise, Li, Bao, and Chen (2020) found that sustainable logistics operations substantially contribute to organizational sustainability by minimizing emissions and waste.

Green marketing exhibited a significant positive correlation with sustainability performance ($r = 0.460$, $p < 0.01$). This finding indicates that effective marketing strategies emphasizing environmental benefits and consumer engagement are crucial for achieving sustainability objectives. Previous research by Goh and Balaji (2021) corroborated this, noting that green marketing significantly enhances customer awareness and promotes sustainable consumption. Further supporting this result, Khan and Qianli (2021) indicated that sustainable marketing practices enhance brand image, customer loyalty, and overall sustainability outcomes.

The correlations among the independent variables themselves (green purchasing, green manufacturing, green distribution, and green marketing) were also notably strong and significant. For instance, green purchasing strongly correlated with green manufacturing ($r = 0.417$, $p < 0.01$), green distribution ($r = 0.400$, $p < 0.01$), and moderately correlated with green marketing ($r = 0.260$, $p < 0.05$). Green manufacturing had a notably strong correlation with green distribution ($r = 0.558$, $p < 0.01$) and green marketing ($r = 0.353$, $p < 0.01$). Likewise, green distribution correlated positively with green marketing ($r = 0.362$, $p < 0.01$). These inter-variable correlations underscore the interconnected nature of green supply chain management practices, reinforcing the notion that integrated sustainability approaches across various functions significantly enhance overall organizational sustainability performance, as evidenced by studies such as Zhu and Sarkis (2020) and Dubey et al. (2021).

Overall, these findings suggest that comprehensive adoption and integration of green supply chain management practices, including purchasing, manufacturing, distribution, and marketing, are critically important for improving sustainability performance in Kenyan airlines.

4.8 Multiple Regression Analysis

The study sought to determine the effects of green supply chain management practices on sustainability performance of Airline Companies in Kenya. The supply chain management

practices under investigation were: green purchasing, green manufacturing, green distribution and green marketing. The regression model was:

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

Where;

α = Constant

Y = Sustainability Performance

X_1 = Green Purchasing

X_2 = Green Manufacturing

X_3 = Green Distribution

X_4 = Green Marketing

ε = Stochastic disturbance error term

4.8.1 Model Summary

The study sought to determine the model's goodness of fit statistics. The findings are presented in Table 4.22

Table 4.12: Model's Goodness of Fit Statistics

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.643[a]	.413	.386	.23557

a. Predictors: (Constant), Green Marketing, Green Purchasing, Green Distribution, Green Manufacturing

The regression model demonstrated an R value of 0.643, suggesting a moderate to strong correlation between the combined green supply chain management practices (green marketing, green purchasing, green distribution, and green manufacturing) and sustainability performance. The R^2 value of 0.413 indicates that approximately 41.3% of the variation in sustainability performance can be explained by these four practices, while the Adjusted R^2 of 0.386 accounts for

potential bias and indicates a robust model fit despite the slight reduction from the unadjusted R^2. Additionally, the Standard Error of the Estimate (0.23557) suggests that the model's predictions deviate, on average, by about 0.236 units from actual sustainability performance scores.

These results align with findings by Zhu and Sarkis (2020), who reported similar moderate-to-strong explanatory power when multiple green supply chain initiatives were jointly implemented. Likewise, Dubey et al. (2021) confirmed that adopting integrated green supply chain practices often yields a moderately high predictive capacity for sustainability outcomes, reinforcing the importance of comprehensive green supply chain management practices in the Kenyan airline sector.

4.8.2 ANOVA

The study sought to determine the ANOVA used to present regression model significance. The findings are presented in Table 4.23.

Table 4.13: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.401	4	.850	15.322	.000[b]
	Residual	4.828	87	.055		
	Total	8.229	91			

a. Dependent Variable: Sustainability Performance

b. Predictors: (Constant), Green Marketing, Green Purchasing, Green Distribution, Green Manufacturing

The ANOVA results presented in the table indicate that the regression model was statistically significant in predicting sustainability performance of Airline Companies in Kenya ($F = 15.322$, $p < 0.01$). The significance value of 0.000 confirms that the combined independent variables green marketing, green purchasing, green distribution, and green manufacturing have a significant joint effect on sustainability performance. These findings underscore the critical role of integrated green

supply chain management practices in achieving sustainability performance in the airline industry. This aligns with recent literature, such as Dubey et al. (2021), who found integrated green practices significantly predict sustainability performance. Similarly, Zhu and Sarkis (2020) highlighted that simultaneous implementation of multiple green supply chain practices is crucial for achieving robust sustainability performance in organizations.

4.8.3 Regression Coefficients

The study sought to determine the multiple regression variable coefficients. The findings are presented in Table 4.24.

Table 4.14: Multiple Regression Variable Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.290	.426		3.030	.003
	Green Purchasing	.202	.077	.245	2.630	.010
	Green Manufacturing	.209	.081	.266	2.564	.012
	Green Distribution	.075	.084	.092	.886	.378
	Green Marketing	.246	.082	.269	2.982	.004

a. Dependent Variable: Sustainability Performance

Sustainability Performance = 1.290 + 0.202 * Green Purchasing + 0.209* Green Manufacturing + 0.075* Green Distribution + 0.246* Green Marketing

The regression coefficients indicate that green purchasing, green manufacturing, and green marketing all exert significant positive effects on sustainability performance, while green distribution does not reach statistical significance in this model. Specifically, green manufacturing emerges as the strongest predictor ($\beta = 0.263$, $p = 0.012$), implying that for each unit increase in green manufacturing initiatives, sustainability performance rises by 0.292 units, all else being

equal. These findings echo those of Wang, Dai, and Wu (2021), who noted that environmentally conscious manufacturing processes can notably enhance a firm's ecological footprint and long-term sustainability.

Green marketing also demonstrates a considerable positive effect ($\beta = 0.262$, $p = 0.022$), suggesting that promoting eco-friendly features and engaging consumers in sustainable values significantly boosts overall sustainability outcomes. This corroborates research by Goh and Balaji (2021), who found that targeted green marketing campaigns elevate consumer awareness and loyalty, thereby reinforcing sustainable performance.

Furthermore, green purchasing shows a positive and statistically significant effect ($\beta = 0.245$, $p = 0.010$). This implies that strengthening procurement policies to prioritize environmentally responsible suppliers and materials can substantially enhance sustainability. Similar conclusions were drawn by Gupta, Modgil, and Gunasekaran (2020), who highlighted that effective green purchasing practices lead to improved environmental compliance and stronger sustainability credentials.

In contrast, green distribution does not exhibit a statistically significant relationship with sustainability performance in this particular model ($\beta = 0.084$, $p = 0.378$). Although prior research, such as Demir, Huang, and Scholts (2021), has emphasized the role of eco-friendly logistics in reducing emissions and operational waste, these results suggest that, in the context of Kenyan airlines, distribution practices may not be as critical a driver of sustainability performance as manufacturing, marketing, and purchasing. The insignificance could reflect varying adoption levels of green logistics or differing resource allocations across airlines.

Overall, these findings underscore the importance of comprehensive green supply chain management strategies specially manufacturing, marketing, and purchasing in driving sustainability performance. As the constant is also statistically significant ($p = 0.003$), the model suggests that even in the absence of these green practices, there is a baseline level of sustainability performance. Nonetheless, investing in targeted green initiatives can significantly elevate a firm's sustainability trajectory, aligning with broader evidence that integrated environmental practices enhance both ecological and economic outcomes.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1: Introduction

Based on the comprehensive research results and detailed analyses presented, this chapter synthesizes the key findings and discussions to provide an overarching summary of the study. The focus of this research was to investigate the effects of green supply chain management practices on the sustainability performance of Airline Companies in Kenya. Drawing on the empirical evidence gathered and analyzed, this chapter distills the insights into clear conclusions that elucidate the role of green purchasing, manufacturing, distribution, and marketing in enhancing sustainability performance. In light of these conclusions, targeted recommendations are proposed for policymakers, airline management, and other industry stakeholders to drive the adoption of integrated green practices. These recommendations aim to support strategic decision-making, improve operational efficiency, and foster long-term sustainability within the dynamic aviation sector.

5.2: Discussion of Findings

The demographic and reliability assessments confirmed that the study achieved a high-quality and representative response. The respondents demonstrated appropriate academic qualifications, professional experience, and organizational backgrounds, suggesting that they possessed the necessary expertise to provide meaningful insights into how green supply chain management practices influence sustainability performance within the airline industry. This strong foundation adds credibility to the study's findings and supports the argument that well-informed participants contribute to accurate sustainability assessments. These observations are consistent with existing literature (e.g., Muriithi et al., 2023; Kaburi & Kihara, 2024), which affirms that well-qualified and experienced respondents enhance the reliability and depth of research outcomes in sustainability-focused studies.

Green purchasing emerged as a critical driver of sustainability performance. Respondents agreed that their organizations were actively integrating environmental considerations into procurement processes, including supplier selection, collaboration on cleaner technologies, and adherence to

environmental standards. Furthermore, there was strong support for policies promoting the reuse and recycling of resources, and for the belief that environmentally conscious purchasing can positively influence financial and operational outcomes. These findings reflect the strategic role green procurement plays in achieving sustainability goals and align with the conclusions of Gupta, Modgil, and Gunasekaran (2020) and Zhang, Zhao, and Chen (2020), who found that effective green purchasing improves both environmental impact and organizational performance.

Green manufacturing was also highly prioritized among the participating airlines. Respondents confirmed the use of sustainable energy sources, advanced manufacturing technologies to reduce waste, pollution control measures, and long-term waste management practices. Organizational-wide participation in environmental management and efforts to eliminate non-value-adding activities further demonstrated a strong commitment to sustainability. These results suggest that green manufacturing plays a significant role in enhancing sustainability performance. They are consistent with research by Wang, Dai, and Wu (2021) and Singh et al. (2021), who argue that adopting energy-efficient and low-impact production processes significantly improves organizational sustainability.

Although green distribution was acknowledged as relevant, its impact on sustainability performance appeared to be less pronounced compared to other green practices. Respondents supported practices such as the use of biofuels, environmentally friendly transportation techniques, and optimized storage facility designs. However, the overall implementation of green distribution practices seemed inconsistent or less embedded across the sector. Factors such as limited infrastructure, high operational costs, and inconsistent access to green technology may hinder the full realization of distribution-related environmental benefits. This observation echoes the findings of Demir, Huang, and Scholts (2021) and Li, Bao, and Chen (2020), who emphasize that the success of green distribution strategies is often shaped by contextual and operational factors.

Green marketing was also strongly endorsed by respondents. Participants indicated that their organizations actively engage in environmentally responsible communication, provide transparent information on product impact, and seek to align their marketing efforts with environmental values and consumer expectations. Green marketing was further credited with strengthening brand reputation, encouraging customer loyalty, and supporting wider organizational sustainability goals.

These findings are in line with the conclusions of Goh and Balaji (2021) and Khan and Qianli (2021), who affirm that effective green marketing strategies enhance both environmental and business performance in competitive industries.

5.3: Conclusions

The study sought to establish the impact of green purchasing on sustainable performance of Kenyan Airlines. The analysis of green purchasing practices led to the conclusion that a focused approach to environmentally responsible procurement has a positive influence on sustainability performance. Airlines that integrate environmental criteria into their purchasing decisions tend to achieve improved sustainability outcomes. The evidence indicates that firms emphasizing green purchasing are better equipped to reduce waste and optimize resource use. This suggests that adopting green purchasing practices is essential for driving improvements in overall sustainability. The findings affirm the importance of selecting suppliers that meet environmental standards, thereby fostering more sustainable operations. The positive impact of green purchasing practices contributes significantly to the operational efficiency of airlines. These conclusions highlight the strategic value of green procurement in enhancing sustainability. Overall, green purchasing emerges as a vital component of successful sustainability initiatives.

The study also sought to determine the impact of green manufacturing on sustainability performance of Airline Companies in Kenya. The findings highlighted that airlines that have embraced eco-friendly production processes benefit from improved operational practices and reduced environmental impact. The adoption of energy-efficient technologies and waste reduction measures enhances the overall sustainability of manufacturing processes. This finding underscores the importance of investing in sustainable production methods to drive performance. The conclusions indicate that green manufacturing contributes decisively to an airline's environmental stewardship. By incorporating practices that focus on reducing emissions and optimizing resource utilization, firms can achieve notable sustainability gains. This reinforces the need for a dedicated focus on green manufacturing as a strategic priority. In essence, effective green manufacturing is fundamental to enhancing overall sustainability performance.

The third objective of the study was to evaluate the impact of green distribution on sustainability performance of Airline Companies in Kenya. The researcher concluded that while these practices

are being adopted, their impact on sustainability performance is less pronounced. The moderate integration of sustainable logistics and eco-friendly packaging methods indicates that improvements in distribution strategies are necessary. Although airlines are making efforts to incorporate green distribution, the benefits in terms of sustainability performance remain limited. This conclusion implies that there is room for innovation and deeper integration in green logistics. The current practices in distribution do not yet fully contribute to enhanced sustainability outcomes. Further development and strategic alignment in distribution practices are needed to realize their full potential. The findings suggest that refining green distribution could yield additional environmental benefits. Thus, green distribution appears to require further enhancement to support overall sustainability effectively.

The fourth objective of the study sought to assess the impact of green marketing on sustainability performance of Airline Companies in Kenya. The findings showed that Airlines that effectively promote their eco-friendly initiatives and engage consumers in sustainability messaging benefit from improved environmental outcomes. The findings demonstrate that green marketing contributes to a stronger brand image and higher customer engagement, which in turn supports sustainable performance. It is evident that well-executed marketing strategies that emphasize environmental responsibility led to improved overall sustainability. These conclusions underscore the strategic importance of integrating green marketing into the broader sustainability agenda. By aligning marketing practices with environmental goals, airlines can boost both their market reputation and sustainability outcomes. The evidence supports the idea that green marketing is a key driver in advancing sustainable practices within the aviation sector. In summary, effective green marketing is instrumental in promoting and sustaining high levels of environmental performance.

5.4: Recommendations

Based on the findings, it is recommended that the Kenya Civil Aviation Authority develop comprehensive regulatory frameworks that support the integration of green supply chain management practices in the aviation sector. Such policies should provide incentives for airlines to adopt environmentally responsible procurement and production methods, while establishing clear guidelines that promote the use of renewable energy sources, waste reduction, and recycling

initiatives. Regulatory support could include tax incentives, grants, and subsidies that encourage investments in eco-friendly technologies and practices. This policy framework should also ensure strict compliance with environmental standards, facilitating a level playing field that rewards sustainable practices and discourages environmentally harmful activities.

Based on the study's findings, it is recommended that future research and industry practice further deepen the application and contextualization of stakeholder theory and the resource-based view (RBV) within the Kenyan aviation sector. Stakeholder theory proved valuable in identifying how various internal and external parties influence the adoption and success of Green Supply Chain Management (GSCM) practices. Researchers and practitioners should continue to map stakeholder interests, foster transparent communication, and integrate stakeholder feedback into sustainability strategies to maximize the impact of GSCM initiatives. Likewise, the RBV should be leveraged by airline companies to identify, develop, and protect unique organizational resources that offer a sustained competitive advantage in environmental performance.

In practice, airline management should prioritize the enhancement of green purchasing and manufacturing processes. Airlines are encouraged to form strategic partnerships with suppliers who adhere to high environmental standards and invest in modern, energy-efficient production technologies. By fostering closer collaborations with suppliers and integrating sustainable practices throughout their supply chains, airlines can reduce operational costs, minimize waste, and lower their overall environmental footprint. This approach not only improves sustainability performance but also enhances competitiveness by strengthening the airline's brand reputation and operational efficiency.

The study also recommended that airlines should focus on refining their green marketing and distribution strategies to further boost sustainability performance. Firms are advised to develop targeted marketing campaigns that highlight their commitment to environmental sustainability, thereby improving customer engagement and brand loyalty. Additionally, optimizing logistics and distribution through innovative solutions can further enhance environmental outcomes. A holistic approach that encompasses supportive policies, strategic procurement and manufacturing practices, and robust marketing and distribution strategies will be key to driving long-term sustainability in the aviation sector.

5.5: Limitations of the Study

Due to limited resources, the researcher conducted this study under significant budgetary constraints. These constraints affected the scope of travel, data collection tools, and the ability to employ additional support staff. Consequently, the researcher had to rely on cost-effective methods, such as online surveys, which may have influenced the volume and variety of responses.

The sensitive nature of the information sought meant that some management teams considered it confidential. As a result, permission for data collection was occasionally denied or restricted. Such limitations may have influenced the completeness of responses from certain airlines. To address these challenges, the researcher obtained an official introduction letter from the university, emphasizing that all information would be used solely for academic purposes. This approach helped alleviate concerns among some gatekeepers, thereby improving access to relevant data.

A number of respondents expressed concern about potential repercussions if the research findings were perceived negatively by their organizations. This apprehension may have introduced bias in some of their answers, as participants could have been inclined to provide information that portrayed their airlines more favorably. Additionally, some were naturally suspicious of the study's purpose. To reduce these effects, the researcher offered clear explanations regarding the academic nature of the project, assured participants of strict confidentiality, and reiterated that individual responses would remain anonymous. While these strategies improved trust and cooperation, a certain degree of caution among respondents may still have influenced the authenticity of the data.

Presenting a formal introduction letter from the academic institution and emphasizing guaranteed confidentiality reassured participants that the study was purely scholarly rather than regulatory or punitive in nature, thus fostering more accurate responses. By clearly explaining the purpose, scope, and potential benefits of the research respondents were encouraged to view the study favorably. The flexibility afforded by online questionnaires and email communication further proved advantageous for individuals who preferred a degree of distance or anonymity, thereby reducing logistical and accessibility barriers. Despite these inherent limitations, the tailored mitigation strategies and steadfast adherence to ethical research standards contributed to the collection of credible insights. Although certain constraints may have narrowed the overall breadth of data, the information gathered remains a meaningful contribution to understanding the key

factors influencing green supply chain management practices in the Kenyan airline industry, highlighting potential pathways for improvement.

5.6: Recommendations for Further Studies

Future research should expand its scope by conducting longitudinal studies and drawing from a wider sample of both domestic and international airlines to capture how green supply chain management practices evolve over time. While this broader sampling within the aviation sector is valuable, extending the comparison to other industries such as logistics, manufacturing, or retail could yield additional insights into whether similar trends and challenges emerge across different contexts. Methodologically, researchers are encouraged to employ mixed-method approaches that integrate quantitative data (e.g., surveys, secondary data analysis) with qualitative techniques such as in-depth case studies or focus group discussions. These strategies would illuminate the nuanced mechanisms that drive sustainability performance and highlight how organizational culture, stakeholder engagement, and practical constraints influence the adoption and success of green practices.

In addition, exploring the moderating effects of firm size, ownership structure, and geographic location could shed light on how various internal and external factors shape the effectiveness of green initiatives. External elements, including global environmental policies, carbon taxation schemes, or cross-border regulatory variances, may also exert significant influence on firms' willingness or ability to implement sustainable innovations, making this a fruitful avenue for further inquiry. Future investigations should likewise delve into the emerging role of digital technologies such as blockchain, AI-driven analytics, and Internet of Things platforms in enabling real-time tracking and optimization of sustainable supply chain operations. By examining these dimensions alongside the economic ramifications of adopting green practices, researchers can furnish both practitioners and policymakers with a more comprehensive framework for understanding and advancing sustainable supply chain management in the aviation industry and beyond.

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APPENDICES

Appendix I: Research Questionnaire

Dear respondent,

The questionnaire seeks to gather data on the impact of green supply chain management strategies on the sustainability performance of the aviation sector in Kenya. Hence, you are kindly asked to respond to all the inquiries in this research survey. The given information will be handled with confidentiality and utilized responsibly for the purpose of this study.

Section A: General Information

1. Sex;
   Male [ ]
   Female [ ]

2. Level of Education;
   Certificate [ ]
   Diploma [ ]
   Undergraduate [ ]
   Postgraduate [ ]
3. Indicate your firm's key area of operations;
   Cargo [ ]
   Flight [ ]
   Flight and cargo [ ]
   Others (specify) _____
4. Indicate your firm's ownership structure;
   Local [ ]
   Foreign [ ]
   Both local and foreign [ ]
5. Indicate the number of years the firm has been in existence;
   Less than 10 years [ ]
   10-20 years [ ]

21-30 years [ ]

Over 30 years [ ]

6. Indicate the number of employees in your organization.

   Less than 100 employees [ ]

   101- 200 employees [ ]

   201-300 employees [ ]

   Over 300 employees [ ]

Section B: Green Supply Chain Management Practices

Part a: Green Purchasing

7. Kindly indicate your level of agree or disagreement with the following statements on green purchasing. Use the following scale as appropriate, 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly agree

Statement	**1**	**2**	**3**	**4**	**5**
My organisation possesses a comprehensive comprehension of environmental consciousness in its procurement processes.					
My organisation engages in collaborative efforts with its suppliers to promote the use of cleaner technology practices.					
My organisation adheres to a strategy of exclusively procuring goods and services from suppliers who comply					

with environmental rules and uphold high environmental quality standards.					
My organisation has a policy that prioritises the reuse and recycling of resources whenever feasible.					
Implementing green purchasing practices can enhance a company's financial standing.					

Part b: Green Manufacturing

8. Kindly indicate your level of agree or disagreement with the following statements on green manufacturing. Use the following scale as appropriate, 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly agree

Statement	**1**	**2**	**3**	**4**	**5**
My organization utilizes environmentally sustainable energy sources for its production processes.					
The implementation of advanced manufacturing technology in the organisation minimises material waste and enhances efficiency.					

The manufacturing process employed by my organisation minimises environmental pollution.					
Long-term waste management solutions are implemented to guarantee the safety of the product and its components for users over its entire existence.					
Every member of the organisation actively participates in quality and environmental management within the organisation.					
Measures are implemented to eliminate any expense that does not provide value to customers.					

Part c: Green Distribution

9. Kindly indicate your level of agree or disagreement with the following statements on green distribution. Use the following scale as appropriate, 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly agree

Statement	**1**	**2**	**3**	**4**	**5**
My organisation retrieves its packaging materials from consumers in cases when non-biodegradable packaging materials have been utilised.					

My organisation employs transportation techniques that have minimal adverse effects on the environment.					
In my organistaion, Biofuel is argued to be more environmentally friendly.					
My organisation strategically places its storage facilities to minimise transportation expenses.					
The design of the storage facilities is focused on achieving optimal utilisation of available space.					
The layout of the storage facilities is designed to minimise accidents and material damage.					

Part d: Green Marketing

10. Kindly indicate your level of agree or disagreement with the following statements on green marketing. Use the following scale as appropriate, 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly agree

Statement	**1**	**2**	**3**	**4**	**5**
My organisation provides comprehensive information and instructions regarding the items and their applications.					

My organisation provides accurate information regarding their items.					
Procedures have been implemented to address clients' complaints regarding the quality and environmental impact of their products and to provide an appropriate response.					
It is imperative for governments to implement essential measures and promote the production of environmentally friendly products.					
The use of Green Marketing has resulted in the establishment of novel connections throughout the supply chain.					
Green marketing boosts revenue by targeting client demands and preferences.					

Section C: Sustainability Performance

11. Kindly indicate your level of agree or disagreement with the following statements on sustainability performance from an environmental, Economic and social performance point of view. Use the following scale as appropriate, 1-Strongly disagree, 2-Disagree, 3-Neutral, 4-Agree and 5-Strongly agree.

	1	**2**	**3**	**4**	**5**

My company's operations and products have a negligible amount of environmental hazards.					
The number of complaints regarding the environmental impact of your organization's actions and goods has decreased.					
My organisation ensures that its operations have minimal adverse impacts on personnel, the community, and the environment.					
The organisation experiences minimal expenses in adhering to environmental norms and regulations.					
The company is currently operating at maximum capacity.					
The expenses related to the management and elimination of trash are kept to a minimum.					
Customers express contentment with the superior quality and impeccable safety standards of the company's products.					
Customers are content with the fact that their interests are being attended					

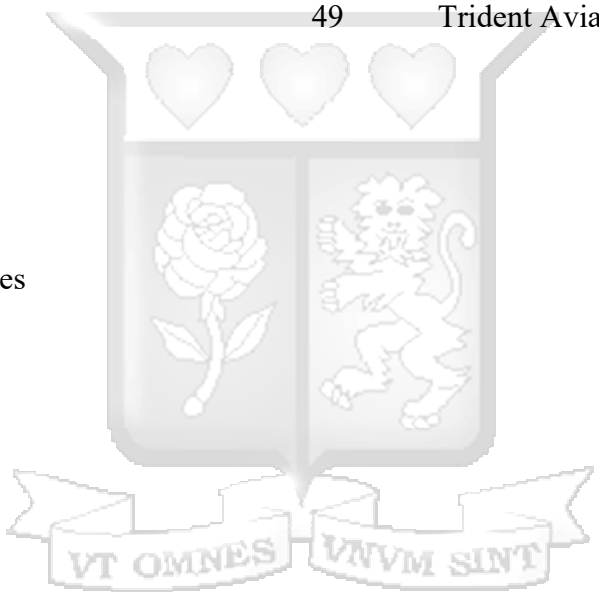
to in the company's products and activities.					
The public is content with the organization's shown care for the environmental impact of its activities and its stakeholders.					
The company's management is committed to environmental regulation and oversight.					
The company's management is committed to the well-being of its employees.					
The organisation is dedicated to the ongoing management of quality and the environment by including employees in their development and engaging stakeholders.					

Thank you for your time

Appendix II: List of Airline Firms

S. No	Airline Name	S. No	Airline Name
1	748 Air Services	27	Jubba Airways (Kenya)
2	Aberdair Aviation	28	KASAS
3	Aero-Pioneer Group	29	Kenya Airways PLC
4	Acariza Aviation	30	Silverstone Air
5	AD Aviation Air charters	31	Timbis Air
6	Aeronav Air Services	32	Tubania Aviation Group
7	AeroSpace Consortium	33	Knight Aviation
8	African Express Airways	34	LadyLori
9	Air Direct-Connect	35	Mombasa Air Safari
10	Airkenya Express	36	Pan African Airways
11	Airlink (Kenya)	37	Phoenix Aviation (Kenya)
12	AirTraffic Africa	38	Queensway Air Services
13	ALS - Aircraft Leasing Services	39	Reliance Air Charters
14	Astral Aviation	40	Ribway Cargo Airlines
15	Avro Express	41	Safari Express Cargo
16	Blue Bird Aviation (Kenya)	42	Safarilink Aviation

17	Blue Sky Aviation Services	43	Safe Air (Kenya)
18	Capital Airlines (Kenya)	44	Skytrail Air Safaris
19	DAC Aviation	45	Skyward International Aviation
20	Fly540	46	Solenta Aviation Kenya
21	Eastafrican.com	47	Tamarind Air
22	Freedom Airline Express	48	Transworld Safaris
23	Global Airlift	49	Trident Aviation
24	Great Airways		
25	Jambojet		
26	Jetways Airlines		



Appendix III: NACOSTI Approval Letter

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **927705**

Date of Issue: **14/February/2025**

RESEARCH LICENSE

This is to Certify that Mr.. Nicholas Mutaiti Kariuki of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Nairobi on the topic: EFFECTS OF GREEN SUPPLY CHAIN MANAGEMENT PRACTICES ON SUSTAINABILITY PERFORMANCE OF KENYAN OWNED AIRLINES. for the period ending : 14/February/2026.

License No: **NACOSTI/P/25/415961**

927705

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

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See overleaf for conditions

Appendix IV: Ethics Approval Letter

Strathmore UNIVERSITY

4th February 2025

Mr Kariuki Nicholas,
nicholas.kariuki@strathmore.edu

Dear Mr Kariuki,

RE: Effects of Green Supply Chain Management Practices on Sustainability Performance of Kenyan Owned Airlines

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** proposal. Your application reference number is **SU-ISERC2502/24.** The approval period is from **4th February 2025 to 3rd February 2026.**

This approval is subject to compliance with the following requirements:

i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 72 hours.
v. Clearance for the export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) https://research-portal.nacosti.go.ke/ and obtain other clearances needed.

Yours sincerely,

Mr Ambrose Rachier,
Chairperson; SU-ISERC

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