EFFECT OF SUSTAINABLE GREEN LOGISTICS PRACTICES ON COMPETITIVE ADVANTAGE IN AIRLINE CATERING SERVICES FIRMS IN KENYA

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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 dissertation contains no material previously published or written by another person except where due reference is made in the dissertation itself.

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DEDICATION

This thesis is dedicated to family whose unwavering support, sacrifices an encouragement have greatly inspired me throughout my research journey.

To my Father Dr. Francis Gichuru, your love, support and belief in my abilities has shaped my academic journey. To my dearest mother Joyce Wambui, without their constant love and unceasing prayer, I would not have been able to conquer this milestone.

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LIST OF ABBREVIATIONS

APA American Psychological Association

CATI Computer-Assisted Telephone Interviewing

GDP Gross Domestic Product

IRB Institutional Review Board

JKIA Jomo Kenyatta International Airport

LSG Lufthansa Service Holding

NACOSTI National Council for Science and Technology

RBT Resource-Based Theory

SCM Supply Chain Management

SGL Sustainable Green Logistics

SMEs Small and Medium-sized Enterprises

SPSS Statistical Package for Social Sciences

SSCM Sustainable Supply Chain Management

UK United Kingdom

DEFINITION OF OPERATIONAL TERMS

Competitive Advantage: It is a business strategy that enables the company to achieve superior margins over its competitors, often through cost efficiency, quality, and enhanced service presentation.

Eco-friendly Packaging: Refers to the use of packaging solutions that minimize environmental impact, often through recyclability and biodegradability, enhancing the sustainability of the product life cycle.

Energy Efficiency: This is the use of techniques and practices that reduce energy consumption in business operations, including transportation and on-board services, contributing to environmental sustainability.

Green procurement: This refers to the practice of procuring goods and services in a way that aligns with environmental stewardship and social responsibility, often involving local sourcing and strategic supplier collaborations

Waste Management: Waste Management is a strategy aimed at minimizing waste generation in business operations, including practices like donating excess food and implementing systematic waste tracking and measurement.

ABSTRACT

With global environmental concerns reaching critical levels, there is an urgent call for industries, including airline catering, to adopt Sustainable Green Logistics (SGL) practices. Despite growing awareness of the need for sustainability, many industries, including airline catering, still struggle with effective implementation of green logistics, hindering their ability to improve both environmental and competitive performance. Understanding how sustainable green logistics practices affect competitive advantage is crucial as sustainability plays a bigger role in company plans, especially in the context of emerging economies like Kenya. This study investigated the effects of Sustainable Green Logistics practices on competitive advantage in airline catering services firms in Kenya. The study looked at eco-friendly packaging, green procurement, waste management and energy efficiency as the four main facets of SGL and their effects on competitive advantage in airline catering services firms in Kenya. This research was grounded on resource based theory and industry organization theory, together providing a holistic view on how these internal resources can become a source of competitive advantage. The study was fitted under the positivism research philosophy. The research adopted a descriptive research design. The target population of this study encompassed all managers from the four airline catering firms operating in Kenya. The population size was 72 individuals composed of the managers and assistant managers of the departments in each of the four airline catering firms in Kenya. With only 72 individuals in the population, the study was a census survey. Questionnaire was used to gather data, which was then statistically examined using techniques like inferential and descriptive analysis. Statistical package for Social Science software (SPSS) version 28 was used to analyze the data, and tables were utilized to display the results. Descriptive analysis provided a summary of the data. A multiple regression analysis was employed to investigate the strength and nature of the relationship between sustainable green logistics practices and competitive advantage. It is anticipated that the study will make a substantial contribution to policy, academia and theoretical contribution. The study found that eco-friendly packaging is a crucial driver of competitive advantage in the airline catering services industry in Kenya. Green procurement significantly contributes to the competitive advantage of airline catering services firms in Kenya. Effective waste reduction and management practices play a critical role in enhancing the competitive advantage of airline catering services firms in Kenya. Energy efficiency practices are a critical factor in enhancing the competitive advantage of airline catering services firms in Kenya. The study recommends that the airline catering firms should continue to invest in eco-friendly packaging materials and explore innovative packaging solutions that further reduce their environmental impact. Firms should prioritize sourcing ingredients locally to reduce logistics costs, improve product freshness and quality, and reduce the environmental impact associated with long-distance transportation. Firms should continue and expand their food donation programs to reduce food waste, enhance their public image, and contribute to the community. Increased collaboration with local charities or organizations could further improve the effects of these donations. Firms should also consider further investments in renewable energy sources for both transportation and catering services.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

The global logistics and supply chain industry has come under increasing scrutiny due to its significant environmental footprint. Logistics operations contribute substantially to global carbon emissions, with transportation alone accounting for nearly 14% of worldwide greenhouse gas emissions (Lamb et al., 2021). Among the sectors most impacted by this issue is the aviation industry, including airline catering, which continues to rely heavily on non-sustainable practices. These include plastic packaging, energy-intensive production methods, and inefficient logistics, all of which exacerbate its environmental impact. As global environmental concerns reach critical levels, there is a growing urgency for industries to adopt Sustainable Green Logistics (SGL) practices (Najam, 2020).

Sustainable Green Logistics (SGL) practices involve a variety of eco-friendly measures such as the use of eco-friendly packaging, improved waste management, optimized energy consumption, and reduced carbon emissions (Vienazindiene et al., 2021). These efforts are: evolving globally, driven by regulatory frameworks, corporate responsibility, and technological innovations. However, despite the growing awareness of the need for sustainability, many industries, including airline catering, continue to struggle with the effective implementation of green logistics. This struggle not only hinders their ability to improve environmental performance but also limits their competitive edge in an increasingly eco-conscious market (Li et al., 2020).

In the United States (U.S), logistics companies like UPS, FedEx, and Amazon are investing in electric trucks, drones, and last-mile delivery vehicles to reduce carbon emissions (Oliveira, 2023). Other companies are implementing energy-efficient warehouse systems powered by renewable energy sources. Walmart, for example, has committed to powering its global operations with 100% renewable energy. Large retailers like Walmart, Target, and Home Depot are pushing suppliers to adopt sustainable packaging, reducing plastic waste, and encouraging the use of recyclable or biodegradable materials. Moreover, carbon offset programs are becoming more common to neutralize emissions from logistics operations (Strauss-Wieder, 2023).

As one of the largest manufacturers and consumers of goods, China is focusing on green logistics by promoting electric vehicles (EVs) in delivery fleets and automating logistics to reduce energy consumption. Additionally, China's push for a circular economy supports efforts in recycling, waste reduction, and sustainable packaging (Ye, He, & Chen, 2022). Japan has been a leader in promoting energy-efficient transport solutions. Major companies like Toyota and Panasonic are working on autonomous vehicles, battery-electric vehicles (EVs), and hydrogen-powered vehicles for transportation and logistics (Maciuk et al., 2024). In India, logistics companies like Blue Dart and Mahindra are embracing electric vehicles, while the government promotes the National Electric Mobility Mission Plan. The focus is on reducing urban air pollution, and large companies like Flipkart and Amazon are committing to green delivery options (Chhabra & Kr Singh, 2024).

In Africa, the situation is even more alarming. The continent faces significant environmental challenges, including deforestation, pollution, and water scarcity, which are exacerbated by unsustainable industrial practices (Saliu et al., 2023; Berebon & Amadi, 2024). The logistics and aviation sectors in Africa are growing rapidly, driven by increasing trade, tourism, and the expansion of airline networks (Samunderu, 2023). However, these sectors are also major contributors to environmental degradation (Erdogan et al., 2024). African countries are under increasing pressure to align with international environmental agreements, such as the Paris Agreement, which mandates that industries adopt sustainable practices to curb their carbon footprints (Meinshausen et al., 2022). While there has been some progress in integrating green logistics in industries such as manufacturing and retail, the airline catering sector across the continent has lagged behind. Many African airline catering firms still rely on traditional, environmentally harmful practices like plastic packaging, inefficient waste management, and non-renewable energy sources. The lack of effective regulatory frameworks and the slow adoption of SGL practices in Africa's airline catering industry highlights a critical gap in ensuring environmental sustainability and securing long-term competitiveness (Samunderu, 2023).

In Kenya, the airline catering industry plays a key role in supporting the country's growing aviation sector, which is a hub for both domestic and international flights. With major players such as Kenya Airways Catering Services, and SkyChef Kenya, the sector is pivotal in ensuring passenger satisfaction and the smooth operation of airlines. However, like many African countries, Kenya is struggling with the effects of climate change, pollution, and resource depletion. In the aviation sector, which is one of the fastest-growing industries in Kenya, sustainability remains a critical

challenge. Airline catering firms in Kenya are facing mounting pressure from both government regulations and customers to adopt more sustainable practices. While the Kenyan government has made strides in promoting environmental sustainability, the airline catering sector still relies on wasteful packaging, energy-inefficient cooking methods, and transportation practices that contribute significantly to carbon emissions. Kenya's environmental regulatory framework is evolving, but it is not yet fully equipped to enforce green practices in niche sectors like airline catering. The lack of sufficient research on Sustainable Green Logistics (SGL) in Kenya's airline catering industry limits the understanding of how firms can use sustainability to enhance their competitive advantage in an increasingly eco-conscious market.

Additionally, Kenya's Vision 2030 recognizes the role of logistics in economic development and underscores the importance of sustainable infrastructure. Thus, for logistics companies and associated businesses, the adoption of SGL practices can contribute to the nation's sustainable development goals while also providing a tangible competitive advantage in a market that is increasingly valuing sustainability.

1.1.1 Sustainable Green Logistics

Sustainable green logistics denotes the adoption of environmentally friendly techniques in logistics operations, with the objective of minimizing the ecological footprint (Dzwigol et al., 2021). According to Nikseresht et al. (2024), sustainable green logistics is the practice of optimizing logistics operations to enhance resource efficiency while simultaneously reducing the environmental footprint. Sustainable green logistics refers to a strategic approach where companies incorporate environmental concerns into their logistics functions (Trivellas, Malindretos & Reklitis, 2020). Rodrigue et al. (2017) defines sustainable green logistics as the management of supply chains in a manner that minimizes the adverse effects on the environment. The study defined sustainable green logistics as the integration of environmentally sustainable practices within the logistics and supply chain processes in airline catering firms. The aim is to reduce the environmental footprint of logistics activities, enhance operational efficiency and support sustainability goals. SGL focuses on integrating eco-friendly practices into the transportation, storage, packaging, and distribution of goods. The key is balancing economic objectives with environmental and social responsibility.

Sustainable Green Logistics encompasses several key dimensions. The study adopts indicators of green logistics as conceptualized by Gelmez et al. (2024), which include green Procurement, waste management/recycling eco-friendly packaging and energy efficiency. These are adopted due to their relevance in enhancing sustainability and operational efficiency in service-based logistics such as airline catering. These dimensions not only focus on reducing environmental impacts but also aim to improve operational performance and contribute to a firm's strategic advantage (Nikseresht et al. 2024).

The eco-friendly packaging dimension focuses on the use of sustainable, recyclable, biodegradable, or reusable packaging materials that minimize waste and environmental damage. In the airline catering industry, packaging is critical as it directly affects waste generation. Using eco-friendly packaging reduces plastic waste and supports environmental sustainability. Adopting innovative packaging solutions can differentiate the firm, particularly as consumers and partners become more environmentally conscious (Chen et al., 2021). From a theoretical standpoint, this practice aligns with the Resource-Based View (RBV), which posits that firms can achieve a competitive advantage by leveraging unique resources and capabilities. Eco-friendly packaging solutions can be considered a valuable resource that firms can utilize to differentiate themselves in the marketplace. By adopting innovative and sustainable packaging solutions, airline catering firms can not only reduce their environmental footprint but also enhance their brand image as environmentally responsible. Eco-friendly packaging in airline catering services was examined through two key indicators: recyclable packaging and compostable packaging. Recyclable packaging refers to materials that can be collected, processed, and reused, thereby reducing environmental waste and promoting circular economy practices. Compostable packaging, on the other hand, involves materials that naturally decompose without harming the environment, often contributing to soil health when disposed of properly. These indicators provide measurable dimensions of sustainable packaging efforts and their potential impact on a firm’s competitive advantage (Salesa et al., 2023).

Green procurement involves sourcing products and services that are environmentally friendly, which include the use of sustainable materials, renewable energy sources, and ethical suppliers (Masudin et al., 2022). From an I/O Theory perspective, green procurement aligns with the external pressures and market demands for sustainable practices. Airline catering firms that prioritize eco-friendly suppliers and sustainable sourcing can reduce their environmental footprint

and ensure that sustainability principles are embedded throughout the supply chain. On the other hand, from the RBV perspective, green procurement can be viewed as a valuable resource that enhances a firm's reputation and operational efficiency. Firms that practice green procurement can enhance their reputation among customers who value sustainability and corporate responsibility. Green procurement helps ensure long-term sustainability by encouraging ethical practices, reducing dependency on non-renewable resources, and supporting circular economy practices. Green procurement was analyzed using the indicators of local sourcing and collaboration with suppliers. Local sourcing entails procuring goods and services from nearby suppliers, which not only reduces transportation-related emissions but also supports the local economy. Collaboration with suppliers focuses on building strategic partnerships to co-develop sustainable solutions, ensure compliance with environmental standards, and innovate around eco-friendly alternatives.

Effective waste management involves minimizing waste generation, maximizing recycling, and disposing of waste in an environmentally responsible manner (Abidin et al., 2023). Waste management is crucial in the airline catering industry, where large quantities of food and packaging waste are generated. Proper waste segregation, recycling, and composting can reduce operational costs and environmental impact. A strong waste management program enhances a firm's corporate image and meets the increasing demand for sustainable business practices from both customers and regulators. Effective waste management ensures compliance with environmental regulations and prevents penalties or reputational damage due to improper disposal practices (Mabrouk & Ibrahim, 2021). Furthermore, from an I/O Theory perspective, effective waste management is a strategic response to external pressures such as regulatory compliance and customer demand for environmentally responsible businesses. With increasing regulatory frameworks and consumer expectations for green practices, waste management becomes a critical factor for firms seeking to maintain a competitive advantage in a resource-constrained market. Waste management was assessed using the indicators of food donations and tracking and measuring waste. Food donations refer to structured initiatives where surplus food is redirected to charitable organizations instead of being discarded, thus reducing waste and contributing to social responsibility. Tracking and measuring waste involves implementing systems that monitor the quantity and types of waste generated, providing critical data for identifying inefficiencies and developing waste reduction strategies.

The energy efficiency dimension focuses on reducing energy consumption across logistics operations, from production and transportation to storage and distribution (Tariq et al., 2022). The Resource-Based View (RBV) underscores that energy-efficient operations are valuable, rare, and difficult to replicate, thus providing a potential competitive advantage. By reducing energy consumption, firms can significantly cut costs, which directly improves profitability and operational performance. Moreover, energy-efficient practices reduce the environmental footprint of a firm, aligning it with global sustainability goals. In an industry like airline catering, energy-intensive processes, such as food preparation, refrigeration, and transportation, contribute to high operational costs. Implementing energy-efficient practices helps reduce costs and improve profitability. Energy efficiency is directly linked to a firm's ability to reduce its carbon footprint and support global efforts to mitigate climate change. Using renewable energy sources, efficient machinery, and optimized logistics can enhance environmental sustainability. Firms that adopt energy-efficient practices can position themselves as industry leaders in sustainability, gaining a competitive edge among customers and stakeholders (Wehner et al., 2022). Energy efficiency was evaluated based on transportation methods and on-board services. Transportation methods focus on the use of fuel-efficient or alternative-energy vehicles to minimize carbon emissions during the logistics and delivery processes. On-board services relate to the implementation of energy-saving practices in food preparation, storage, and serving systems during flights.

The integration of sustainable green logistics practices such as eco-friendly packaging, green procurement, waste management, and energy efficiency can significantly enhance the competitive advantage of airline catering firms in Kenya. As discussed, these practices not only reduce the environmental impact but also improve operational efficiency, customer satisfaction, and brand image, contributing to the firm's strategic positioning in the market (Javaid et al., 2022). From a theoretical perspective, the integration of these practices can be framed through RBV, as they represent valuable, unique, and inimitable resources that can create sustainable competitive advantages. The Resource-Based View (RBV) helps explain how these sustainable practices can be internalized as valuable, rare, inimitable resources that contribute to the firm's long-term success. These practices are not just operational adjustments but strategic resources that enhance the firm's efficiency, reputation, and customer loyalty, leading to a competitive advantage (Trivellas et al., 2020). On the other hand, I/O Theory highlights the role of external pressures, such as regulatory demands and market competition, in shaping firms' strategies. As sustainability

becomes a central concern for stakeholders, adopting SGL practices allows firms to align themselves with market trends, fulfill regulatory requirements, and meet customer demands. The combination of these external factors with internal resources makes sustainable green logistics an essential aspect of competitive advantage in the airline catering industry.

The airline catering industry, like many others, faces challenges such as resource depletion and increasing operational costs. By adopting sustainable logistics practices, firms can ensure their long-term sustainability, making them more resilient to market changes, regulatory pressures, and environmental challenges. In the context of the study on the airline catering services industry in Kenya, incorporating SGL practices can have significant implications for the competitive advantage of firms. The implementation of SGL in this sector can involve changes in packaging, procurement, waste management, and energy efficiency, which contribute directly to a firm's operational success, customer satisfaction, and long-term sustainability.

1.1.2 Competitive Advantage

Porter defines competitive advantage as the ability of a firm to perform in one or more ways that competitors cannot easily duplicate. Porter emphasizes two key types, cost leadership and differentiation (Porter, 1985). Barney argues that competitive advantage arises from the possession of valuable, rare, inimitable, and non-substitutable resources (Barney, 1991). Competitive advantage refers to the ability of a firm to outperform its competitors by offering unique value to customers, typically through the delivery of superior products, services, or operational efficiencies (Farida & Setiawan, 2022). According to Tu and Wu (2021), competitive advantage refers to the factors that allow a firm to outperform its rivals in the marketplace. It arises from a firm’s ability to deliver superior value to customers, whether through better quality, lower cost, unique products, or specialized services that competitors are unable to replicate easily. In essence, competitive advantage enables a firm to gain a dominant position in the market and sustain long-term profitability. The concept is fundamental to strategic management and helps organizations navigate complex business environments by leveraging their strengths and minimizing their weaknesses relative to competitors (Azeem et al., 2021).

For this study, competitive advantage is defined as the ability of airline catering firms to outperform their competitors through the adoption of sustainable green logistics practices, which reduce costs, enhance operational efficiency, improve environmental performance, and

differentiate the firm in the marketplace. There are several key dimensions through which competitive advantage can be analyzed including cost advantage, differentiation advantage, innovation and technology advantage, customer loyalty and reputation.

A firm achieves a cost advantage when it can produce goods or services at a lower cost than its competitors, often due to economies of scale, efficient processes, or cost-effective resource use. (Knudsen et al., 2021). In the airline catering industry, SGL practices such as energy efficiency, waste management, and transportation optimization can help firms reduce operational costs, leading to a cost advantage over competitors.

A differentiation advantage arises when a company provides distinctive products or services that customers deem desirable, enabling it to command a premium price. Differentiation can be founded on a number of things, including brand image, technology, customer service, and quality. Firms that successfully differentiate themselves can often command higher prices or build customer loyalty, which can be particularly important in competitive industries like airline catering (Pei et al., 2020). Implementing eco-friendly packaging, green procurement, waste management and energy efficiency strategies can differentiate an airline catering firm from competitors, creating added value for customers who are increasingly environmentally conscious.

Sustainability and innovation are also increasingly becoming crucial sources of competitive advantage. Firms that leverage innovative practices, technologies, or new products often gain a competitive edge by offering superior solutions. As industries evolve and consumer preferences shift, companies that invest in continuous innovation are better positioned to adapt and remain competitive (Baia, Ferreira & Rodrigues, 2020). Sustainable technologies, such as energy-efficient kitchen equipment or green transportation methods, could provide a technological edge in the airline catering sector, improving both operational performance and sustainability.

Building strong brand loyalty and reputation through quality service and responsible business practices can also lead to a competitive advantage. SGL practices, such as transparent waste management and green procurement, help create a reputation for environmental responsibility, which can lead to greater customer loyalty and a stronger market position. Firms that build trust, reputation, and loyalty within their supply chains or customer base can create significant barriers to entry for competitors. Moreover, access to proprietary technology or exclusive distribution channels can also give a firm an edge over rivals (Goyal, 2020).

Competitive advantage is central to this study as it examines how Sustainable Green Logistics can be leveraged by airline catering firms to outperform competitors and enhance profitability. The dimensions of competitive advantage (cost reduction, differentiation, innovation, customer loyalty) are closely linked to the sustainability practices that firms adopt, and this study aims to explore how SGL can provide these benefits in the context of Kenya's airline catering sector.

1.1.3 Airline Catering Services Firms in Kenya

Airline catering service firms in Kenya play a vital role in supporting the aviation industry by providing high-quality food and beverage services for domestic and international flights. These firms are responsible for meal preparation, packaging, and timely delivery to airlines, ensuring passengers receive nutritious and safe meals during their flights (Graham, 2023). These services include the preparation, packaging, and delivery of meals, ensuring that food safety, quality, and hygiene standards are met under strict regulations. The sector is vital for enhancing passenger experience and plays a significant role in reinforcing airlines' reputations for quality and service.

Kenya, being a key regional hub for air transport in East Africa, hosts several airlines that serve a wide array of international and domestic routes. Key players in Kenya's airline catering industry include Kenya Airways Catering Services**,** Gategroup (Gategourmet Kenya), SkyChef Kenya (part of the LSG Sky Chefs group) and NAS servair Catering. These firms are essential to ensuring smooth airline operations, contributing to customer satisfaction and the overall travel experience. However, the industry faces several challenges that underscore the importance of adopting Sustainable Green Logistics (SGL) practices to enhance competitive advantage. One of the major challenges is increasing environmental concerns. As global sustainability movements gain traction, the pressure on businesses to reduce their environmental impact intensifies (Yadav & Goriet, 2022). This includes the need to reduce packaging waste, minimize carbon emissions, and adopt energy-efficient practices. Airline catering firms in Kenya are particularly affected due to the large amounts of packaging waste generated, including plastics and non-biodegradable materials. Customers, regulators, and airlines are increasingly demanding that catering services adopt eco-friendly packaging, energy-efficient practices, and waste reduction strategies. This growing demand for sustainability creates a critical opportunity for catering firms to differentiate themselves from competitors through green logistics practices. By adopting eco-friendly packaging, green procurement practices, and efficient waste management, firms can reduce their

environmental footprint, comply with regulatory standards, and position themselves as leaders in sustainability.

Another challenge is cost management and operational efficiency. Catering firms face high operational costs related to food production, packaging, transportation, and waste management. The rising costs of raw materials, energy, and labor make it increasingly difficult for firms to maintain profitability. However, implementing green logistics initiatives such as energy-efficient technologies, waste reduction strategies, and optimized transportation routes can lead to significant cost savings (Omune et al., 2021). For example, using energy-efficient equipment can reduce energy consumption in kitchens, while optimizing delivery routes can minimize fuel costs. Additionally, adopting sustainable packaging materials and waste management practices can lead to cost reductions by lowering waste disposal fees and enhancing resource efficiency. Firms that embrace SGL can reduce operational costs while simultaneously contributing to environmental preservation, creating a dual benefit that strengthens their competitive position in the market.

Waste management and packaging waste also pose significant challenges for airline catering firms in Kenya. The airline catering industry generates considerable waste, primarily from packaging materials, disposable containers, and food scraps. This waste must be handled in compliance with environmental regulations, which increasingly emphasize the reduction of single-use plastics and the promotion of recycling. Firms that fail to manage waste effectively face reputational risks and potential regulatory penalties. SGL offers a solution to this challenge by encouraging firms to adopt sustainable packaging and waste reduction strategies. By using biodegradable or recyclable materials for packaging and implementing effective waste recycling programs, catering firms can minimize their environmental impact, comply with regulations, and appeal to environmentally conscious consumers (Ochieng, 2021).

In addition, regulatory and compliance requirements are becoming more stringent. Government regulations in Kenya and internationally are increasingly mandating sustainable practices across industries, including food and beverage services (Jumi, 2019). Airline catering firms must meet these regulations to avoid fines, penalties, and reputational damage. Adopting SGL practices, such as energy-efficient operations and sustainable packaging, helps firms ensure they comply with evolving environmental standards and regulations. Compliance with such regulations also offers

the opportunity to build a positive reputation and demonstrate corporate social responsibility, which can enhance brand loyalty and attract customers who prioritize sustainability.

Customer demand for sustainability is another significant factor that drives the need for SGL. Consumers, especially environmentally conscious passengers, are increasingly choosing airlines and service providers that prioritize green practices (Askah, 2021). The trend toward sustainability is particularly relevant for airlines, as passengers are more likely to choose flights that align with their environmental values. Catering firms that adopt green logistics practices can not only meet regulatory requirements but also respond to consumer preferences by offering eco-friendly packaging and sustainable sourcing of ingredients. This can lead to increased customer loyalty, improved brand reputation, and a competitive advantage over firms that do not prioritize sustainability.

Technological innovation is another area where SGL can provide competitive advantage. The airline catering industry is increasingly turning to new technologies to improve 7-efficiency and reduce environmental impact (Ochieng'Ayodo & Deya, 2023). For example, energy-efficient cooking equipment, automated waste management systems, and green logistics software can help firms reduce energy consumption, minimize waste, and improve logistics management. These technological advancements can significantly enhance operational performance, allowing firms to deliver high-quality services while reducing costs and environmental impact.

Increased competition in the airline catering industry presents another challenge that makes the adoption of SGL practices critical. Firms are constantly vying for contracts with airlines, and being able to differentiate themselves through sustainability can give them a significant edge (Miyumo, 2022). By implementing sustainable logistics practices, catering firms can not only reduce costs and improve operational efficiency but also enhance their market positioning and build a reputation for environmental responsibility. This can attract new customers, strengthen relationships with existing clients, and create long-term business opportunities.

Kenyan airline catering firms face significant environmental challenges that necessitate the adoption of sustainable green logistics practices. A major issue is the substantial waste generated during in-flight catering operations. For instance, over the past three years, NAS Airport Services, Kenya Airways' inflight catering provider, has recycled approximately 321.5 tonnes of waste,

accounting for about 70% of its total recycling efforts. This indicates a high volume of waste that still requires effective management and reduction strategies (Kenya Airways, 2021).

Thus, Airline catering services in Kenya face environmental challenges due to excessive use of single-use packaging, food waste, and inefficient energy use. Limited recycling infrastructure and unsustainable procurement practices further worsen the problem. To remain competitive and environmentally compliant, the sector urgently needs to adopt green logistics practices such as eco-friendly packaging, green procurement, efficient waste management, and energy-saving initiatives.

1.2 Problem Statement

The airline catering firms in Kenya plays a crucial role in supporting the aviation sector by ensuring the timely provision of food and beverage services to airlines (Samunderu, 2023). However, despite its significance, the industry faces several challenges that affects its operational efficiency, profitability, and sustainability. These challenges include increasing environmental concerns, rising operational costs, waste management issues, and growing competition (Ayieko, 2015). As the demand for environmentally sustainable practices intensifies, there is a pressing need for airline catering firms to adopt Sustainable Green Logistics (SGL) practices to improve their operational efficiency and gain a competitive advantage. However, there is limited empirical research on how SGL practices can enhance competitive advantage in the airline catering sector.

SGL is recognized as an important strategy for enhancing operational efficiency and decreasing cost. Yet, its practical implementation and effects on specific competitive advantage metrics such as cost savings, operational effectiveness, and corporate reputation are still somewhat unclear and variably articulated in the literature, especially for service industries like airline catering (Evangelista et al., 2017).

Several studies such as Nikitaeva (2021), explored the influence of green packaging on consumer purchasing decisions, particularly in the context of the dry packaged food industry in Helsinki, Finland, Caniato et al., (2012) investigated how sustainable sourcing practices impact the competitive advantage of companies in the apparel industry. Renukappa et al., (2021) investigated the role of procurement in enhancing sustainability within the UK construction sector. While green logistics has been widely discussed in global contexts, the adoption of such practices in Kenya's aviation and catering industry remains under-researched. Although several global studies have

examined green logistics across various industries, few have focused on its implementation and impact within Kenya's aircraft catering industry, which operates in a resource-constrained, environmentally sensitive, and rapidly evolving aviation environment. This reflects a contextual gap in the literature.

Local studies, such as Gikonyo (2023), examined the green logistics and performance of manufacturing companies in Kenya, Bor, (2021) investigated the impact of green supply chain management practices on the performance of Kenya's food and beverage processing sector while Rop et al., (2021) assessed the impact of green purchasing practices on the performance of state corporations in Kenya. However, conceptual gaps exist since the concept of Sustainable Green Logistics (SGL) itself remains broad and often underexplored in the context of its implementation. The local studies do not address the unique challenges and opportunities present in specialized service industries like airline catering.

Moreover, methodological discrepancies such as the frequent reliance on qualitative or single-method strategies, a concentration on the manufacturing or retail industries, and the absence of sector-specific quantitative evaluations restrict the ability to apply findings to airline catering services in Kenya (Maziriri's, 2020; Rop et al., 2021; Renukappa et al., 2021; Mumbi et al., 2021; Lindén and Melin, 2022; Gąsior et al., 2022). Although these studies provide important insights into green logistics practices, many of these studies rely heavily on qualitative or single-method approaches and lack quantitative assessments tailored to service sector dynamics. This limits the applicability of their findings to airline catering services. As a result, this study sought to fill these gaps by assessing the effects of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya. The study aimed to do so by adopting a quantitative research methodology that specifically examines the relationship between SGL practices and key competitive advantage metrics such as operational efficiency, cost savings, and corporate image.

1.3 Research Objectives

1.3.1 Broad Objective

To assess the effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.

1.3.2 Research Objectives

i. To assess the effect of eco-friendly packaging on competitive advantage in the airline catering services firms in Kenya.
ii. To analyse the effect of green procurement on competitive advantage in the airline catering services firms in Kenya.
iii. To determine the effect of waste management on competitive advantage in the airline catering services firms in Kenya.
iv. To establish the effect of energy efficiency initiatives on competitive advantage in the airline catering services firms in Kenya.

1.5 Research Questions

i. What is the effect of eco-friendly packaging on the competitive advantage of the airline catering services firms in Kenya?
ii. What is the effect of green procurement on the competitive advantage of the airline catering services firms in Kenya?
iii. To what extent does waste management affect the competitive advantage of the airline catering services firms in Kenya?
iv. What is the effect of energy efficiency on the competitive advantage of the airline catering services firms in Kenya?

1.6 Scope of the Study

The study focused on Sustainable Green Logistics Practices and Competitive Advantage in the airline catering services firms in Kenya. The study initially identified six variables; however, it was centered around four distinct objectives, each aiming to evaluate the effect of different sustainable practice on competitive advantage in airline catering services in Kenya. These included the effect of eco-friendly packaging, green procurement, waste management and energy efficiency. The study specifically focused on the airline catering services firms in Kenya. This focus provides a clear boundary for the research, allowing for an in-depth analysis of sustainability practices within this specific organizational context. This investigation used a descriptive research design. This approach is well-suited for exploring the multi-faceted effects of sustainability practices on competitive advantage.

1.7 Significance of the Study

The study may provide valuable insights into how sustainable green logistics practices, such as eco-friendly packaging, green procurement, waste management, and energy efficiency initiatives, can contribute to the competitive advantage of airline catering service firms in Kenya. By identifying these practices, policymakers can design regulations and incentives to encourage the adoption of green logistics strategies. This can help foster an environment where sustainable practices are not only promoted but also institutionalized within the aviation industry. Policymakers can use the findings to create policies that support sustainability, such as tax breaks for firms adopting green practices or mandating environmentally friendly logistics standards in the catering sector.

For airline catering service firms in Kenya, the study may provide actionable recommendations for leveraging sustainable green logistics practices to gain a competitive advantage. The findings may help firms understand the practical benefits of adopting eco-friendly packaging, efficient waste management systems, and energy-saving technologies. By integrating green procurement and waste reduction strategies into their operations, firms can not only enhance their market position but also meet the growing demand for environmentally responsible services. Additionally, the study can assist managers in making informed decisions on where to focus their resources to maximize both environmental impact and profitability.

The study may contribute to the academic literature by advancing our understanding of the link between sustainable green logistics practices and competitive advantage in the context of airline catering services. It may extend existing theories on competitive advantage by introducing a sustainability dimension, exploring how green practices can be a source of differentiation and value creation. The research may enrich theoretical frameworks such as the Resource-Based Theory and the Industry Organization (I/O) Theory, offering a deeper understanding of how sustainable logistics practices can provide both environmental and strategic benefits in service industries.

1.8 Chapter Summary

This chapter provided the background of the study where the variables have been clearly outlined and articulated, the problem statement, the research objectives and questions, the scope of the study and the significance of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter covers the literature review of the study. It covers the empirical review, the research gaps, knowledge gaps and the conceptual framework that guided the study.

2.2 Theoretical Foundation

A strategic management theory is a set of assumptions, a statement, or a set of ideas that try to explain where strategic management came from, how it has changed over time, and how it can be used. The main ideas behind strategic management come from the systems viewpoint, the backup approach, and the information technology method to running a business (Omalaja & Eruola, 2011). The theories underpinning this study are the resource-based theory by (Barney, 1995) and the industry organization (I/O) theory by (Porter, 1981). The Resource-Based Theory was the anchoring theory since it is most directly connected to the core of the study, which evaluates how internal practices like eco-friendly packaging, waste management, green procurement, and energy efficiency contribute to competitive advantage. These green logistics practices can be viewed as strategic resources that, when effectively implemented, differentiate a firm in the marketplace and create long-term value.

While the Resource-Based View (RBV) and Industrial Organization (I/O) Theory emphasize different sources of competitive advantage internal resources and external industry forces, they are complementary in understanding the dynamics of competitive advantage in the airline catering sector. RBV focuses on the firm's internal resources, suggesting that distinctive capabilities, such as sustainable green logistics practices, can offer a unique competitive edge by enhancing operational efficiency and brand reputation. On the other hand, I/O theory emphasizes the role of external market forces, industry trends, and regulatory pressures, which influence how firms adopt sustainable practices to remain competitive. By integrating both theories, this study captures the complex interaction between the internal capabilities of airline catering firms, such as energy-efficient logistics or eco-friendly packaging, and the external forces driving the adoption of sustainable green logistics practices, such as market demand for sustainability and regulatory pressures. Combining insights from both RBV and I/O theory provides a comprehensive

framework for understanding how Kenyan airline catering enterprises can leverage sustainable green logistics to enhance their competitive advantage, thereby aligning their internal strategies with the broader industry context.

2.2.1 The Resource Based Theory

The management belief that a firm's competitive advantage stems from its internal resources rather than its external positioning is the foundation of Barney's (1995) resource-based theory. According to the resource-based view of the business, some resources that organizations own and manage can give them a competitive edge and eventually improve firm performance (Ainuddin et al., 2007). Moreover, opponents said that the logic of resource-based theory is ironically laden with paradoxes and ambiguities. Their argument posits that its logic has had seemingly contradictory consequences for management research and practice (Priem and Butler, 2001). The underlying reasoning indicates that the capacity to quantify a resource diminishes its potential as a source of enduring competitive advantage. Further research is necessary to broaden the resource-based approach beyond only examining the attributes of resources (Peteraf and Barney, 2003; Rodriguez and Rodriguez, 2005). This study must examine the correlation between these resources and other pertinent factors to get a competitive advantage (Armstrong and Shimizu, 2007).

One major criticism of the Resource-Based Theory (RBT) is its focus on internal resources as the primary source of competitive advantage. The theory tends to downplay the importance of external factors such as market conditions, competition, and broader industry dynamics (Barney, Ketchen & Wright, 2021). In industries like airline catering services, external forces such as changing regulations, consumer preferences, and economic fluctuations can significantly impact a firm's competitive advantage, but RBT does not adequately address these elements.

Various studies support this application of RBT in sustainability and logistics. For example, Hart and Dowel (2011) extended RBT by emphasizing the importance of environmental resources and "natural-resource-based" strategies in gaining competitive advantage. Chang (2020) found that green innovation capabilities contribute significantly to firm performance when aligned with RBT principles. Similarly, Wu and Pagell (2011) demonstrated that green supply chain capabilities can serve as strategic resources under RBT, particularly in resource-constrained industries.

The Resource-Based Theory posits that for a resource to contribute to sustainable competitive advantage, it must be rare, valuable, inimitable, and non-substitutable (Barney, 1995). However,

in reality, resources can be imitated over time, especially in competitive industries where technological advances or knowledge sharing occurs rapidly (Chen, Michel & Lin, 2021). The idea that resources can remain uniquely valuable indefinitely is often unrealistic, particularly in fast-evolving sectors like airline catering. Another critique is that RBT does not provide clear guidelines on how to identify which resources are truly valuable or capable of providing a competitive advantage. While firms may possess many resources, determining which ones are rare and difficult to imitate requires a deep and often subjective analysis. This makes the practical application of RBT in real-world settings challenging, especially in dynamic environments where resources evolve continuously (Hitt, Carnes & Xu, 2016).

Resource-Based Theory (RBT) posits that firms gain a competitive advantage by acquiring and managing valuable, rare, inimitable, and non-substitutable resources (Barney, 1995). Energy efficiency, as examined in Objective four, is conceptualized as one such strategic resource which enhances operational performance by reducing fuel and electricity consumption during food production, storage, and transportation processes in airline catering services. These efficiencies translate into lower operating costs and a smaller carbon footprint, offering both economic and reputational benefits. When implemented strategically, energy-saving technologies and practices become difficult to replicate and thus serve as a valuable and inimitable resource.

Eco-friendly packaging, as examined in Objective One, is conceptualized as one such strategic resource. In the context of airline catering services, eco-friendly packaging reduces environmental impact, enhances brand image, and meets growing consumer demand for sustainability—all of which contribute to operational efficiency and differentiation in a competitive market. When effectively implemented, eco-friendly packaging not only minimizes waste and regulatory risks but also becomes a unique capability that is difficult for competitors to replicate, thereby serving as a source of sustained competitive advantage.

Green procurement reflects internal resource optimization and capability-building through strategic supplier partnerships and sustainable sourcing. RBT views such practices as core capabilities that can differentiate a firm and improve performance over time. Effective waste management can be a firm-specific capability that reduces costs, improves efficiency, and enhances reputation—qualities consistent with RBT's VRIN criteria. Thus, RBT is pertinent to the study as it explains how firms can leverage unique and valuable resources such as sustainable

logistics practices to outperform competitors. The theory helps explain how sustainable practices can be utilized as strategic assets of the firms in the sector.

2.2.2 Industry Organization (I/O) Theory

The industry organization (I/O) theory proposed by Porter (1981) posits that an organization's external market positioning is the essential determinant for achieving and maintaining competitive advantage. Both internal and external resources drive environmental management activities that are both beneficial towards an organization and their target market. Strict government regulations towards sustainability and environmental conservation are one of the external resources that drive sustainable green logistics and those that are keen to adhere to it end up gaining a competitive advantage towards their competitors. Internal resources are mainly the initiatives that the organization takes, in this case the airline industry to ensure that the practice addresses the optimization of logistics and supply chain operations with a focus on reducing carbon footprints, enhancing energy efficiency, and minimizing waste (Vienazindiene et al., 2021).

The I/O theory has been widely used to explain how external industry pressures such as regulation and market competition—influence firm-level strategies (Porter, 1980; Spulber, 2009). However, it has been critiqued for underemphasizing internal capabilities, which may also shape strategic decisions (Barney, 1991; Boso et al., 2013). Ahmad et al. (2017) criticizes the I/O Theory since it focuses heavily on external factors, such as market structure, competition, and industry conditions, as the primary determinants of competitive advantage. While this is important, it can neglect the role of internal factors like a firm's unique resources, capabilities, and management practices. In practice, a firm's ability to adapt to or influence industry conditions can be just as critical as external factors. The I/O theory often assumes that firms within an industry operate under conditions for perfect competition, where resources and information are freely available. This assumption is rarely true in real-world markets, particularly in specialized sectors like airline catering. Many firms have unique advantages, such as brand reputation or proprietary technologies, which are not accounted for by the I/O framework. Additionally, I/O theory largely ignores the role of innovation and firm-level differentiation in gaining a competitive edge. It emphasizes static industry structures, assuming that firms simply adapt to existing competitive conditions (Grassi, 2017). However, many industries, including airline catering, thrive through innovation, which allows firms to shape their environment rather than reacting to it. This narrow

view limits the theory's applicability in industries that are rapidly evolving due to technological or market-driven changes.

The industry organization (I/O) theory is relevant because it highlights how external forces in the industry influence firm behavior and strategy. Airline catering services in Kenya face competitive pressure from both local and global firms. To remain competitive, firms must adapt to external pressures, including sustainability expectations from governments, airlines, and consumers. The adoption of green logistics can be seen as a response to these forces, helping firms meet industry standards and differentiate themselves. In addition, the industry organization theory underscores how external factors like governmental regulations drive competition.

In Kenya, increasing environmental regulations and global trends toward sustainability are forcing airline catering firms to adapt their logistics practices or face penalties and loss of market share. The I/O theory explains how external industry pressures (e.g., environmental regulations, market expectations) may drive firms to adopt eco-friendly packaging. Industry forces may shape the decision to integrate sustainability into packaging to respond to buyer power or threat of substitutes. From an I/O perspective, adopting such packaging practices enables firms to comply with market expectations, reduce regulatory risks, and improve brand reputation, thus enhancing competitive advantage. Effective waste management responds to growing environmental concerns, stricter waste disposal regulations, and rising operational costs. Within the I/O framework, firms that manage waste efficiently align better with industry expectations and environmental standards, which can reduce costs, avoid penalties, and strengthen their market position.

From the I/O perspective, green procurement may be a strategic response to competitive forces, such as supplier power or industry rivalry. Firms may adopt sustainable sourcing to comply with external standards or gain a market edge in a competitive industry landscape. External industry conditions such as fuel prices, carbon regulations, or stakeholder pressure drive energy efficiency adoption. I/O theory explains how firms respond to these pressures to retain their position in the market.

2.3 Empirical Review

Empirical studies on green logistics have predominantly focused on manufacturing, retail, and large-scale supply chain environments, with limited attention given to the airline catering service

sector, particularly within developing countries like Kenya. While there is growing global interest in sustainable practices, existing literature has not adequately examined how specific green logistics practices contribute to competitive advantage in the unique and highly regulated context of airline catering. The following review explores existing studies under four key green logistics themes and identifies empirical gaps that this study seeks to address.

2.3.1 Eco-friendly Packaging and Competitive Advantage

Eco-friendly packaging refers to packaging solutions characterized by biodegradability, recyclability, reusability, or construction from sustainable materials, all aimed at reducing environmental impact. In the context of airline catering services, eco-friendly packaging includes practices such as using recyclable materials (e.g., biodegradable containers, reusable trays) and compostable packaging that can decompose naturally without polluting the environment. These practices are designed not only to meet environmental regulations but also to align with growing consumer demand for sustainable travel experiences.

While Nikitaeva (2021) explored the influence of green packaging on consumer purchasing decisions in Helsinki's dry packaged food industry, her findings revealed that bio-packaging had limited appeal among consumers, with traditional packaging and eco-friendly cartons being more effective. This suggests that not all eco-packaging strategies resonate equally with consumers. Maziriri (2020) similarly explored the impact of green packaging on competitiveness in SMEs but found that green packaging broadly enhanced competitiveness, particularly through its marketing and promotional benefits. While both studies focus on eco-packaging, they highlight that its effectiveness can vary significantly based on the type of packaging used and the specific market context. Nikitaeva's study emphasizes the limited effectiveness of bio-packaging, whereas Maziriri's research showcases the broader role of green packaging in boosting competitiveness, albeit in a different geographical and industrial context (South African SMEs).

Similarly, Gikonyo (2023) examined the impact of green logistics on the performance of manufacturing companies in Kenya, specifically in the construction industry. His findings indicated that green packaging contributed positively to reducing costs and enhancing environmental impact, which improved overall company performance. However, the context of the study differs significantly from the current research, which focuses on the airline catering

service sector. The differences in industry and sustainability challenges between the construction and catering sectors may yield different implications for how green logistics, including packaging, is applied and its effects on performance.

Further, Mumbi, Karanja, and Kiarie (2021) conducted research on the impact of sustainable supply chain management (SSCM) on the competitive advantage of horticultural firms in Kenya. Their study highlighted the positive influence of green packaging and green distribution on competitive advantage, a finding that aligns with the broader trend of green logistics practices enhancing operational efficiency. However, the horticultural industry, with its focus on agriculture and physical products, has a distinctly different supply chain and logistical infrastructure compared to the service-based logistics of airline catering firms. The study's findings may not fully translate to the airline catering context, where logistics involves more perishable goods, regulatory requirements, and specialized service dynamics.

While several studies have examined eco-friendly packaging in relation to competitive advantage, most have focused on product-based industries and regions outside the airline service sector in Kenya. Much of the existing research explores consumer behavior in retail or manufacturing settings, often in developed countries, limiting its applicability to the service-oriented logistics of airline catering. Other studies conducted in Africa primarily address small and medium-sized manufacturing enterprises or agricultural value chains, which differ significantly from the highly regulated, fast-paced, and quality-sensitive operations of airline catering services. Additionally, previous studies often emphasize marketing outcomes rather than internal operational efficiencies. As a result, there is a lack of sector-specific evidence on how eco-friendly packaging contributes to competitive advantage in Kenya’s airline catering industry, revealing a clear contextual and empirical gap that this study aimed to address.

2.3.2 Green Procurement and Competitive Advantage

Green procurement refers to the process of purchasing goods and services that are environmentally friendly, ethically produced, and resource-efficient throughout their lifecycle. In airline catering services, green procurement involves practices such as local sourcing acquiring ingredients and materials from nearby suppliers to reduce transport emissions and collaboration with suppliers to ensure sustainable standards are upheld across the supply chain.

Caniato et al. (2012) examined sustainable sourcing practices across the apparel industry in Europe, North America, and Asia, finding that sourcing organic materials and ensuring ethical labor conditions contributed significantly to brand differentiation and customer loyalty. While their study underscored the strategic benefits of sustainable sourcing such as regulatory compliance and global risk reduction it fell short of explicitly linking these practices to specific competitive advantage metrics like cost reduction or market share. In contrast, Renukappa et al. (2021) investigated sustainable procurement within the UK construction sector and found a growing adoption of such practices due to competitive and regulatory pressures. Their mixed-methods study highlighted real-world implementation challenges, particularly the difficulty of embedding sustainable procurement into existing business models. However, both studies were conducted in developed country contexts and within industries structurally different from airline catering, thus offering limited insight into the operational and regulatory challenges faced by aviation catering firms in Kenya.

Similarly, Lindén and Melin Schalnén (2022) explored strategic sourcing in Swedish SMEs and emphasized supplier performance and resource capabilities as core contributors to competitive advantage. Their qualitative study adds depth to the discussion of sourcing strategies but is limited in its transferability to the Kenyan airline catering industry due to differences in scale, market maturity, and industry-specific regulations. Unlike these global studies, Bor (2021) provides a more contextually relevant perspective by investigating green supply chain management in Kenya's food and beverage processing sector. His findings showed that green procurement and reverse logistics significantly enhance firm performance. While the food processing sector shares similarities with airline catering in terms of handling perishable products, it lacks the complex, service-oriented logistics of in-flight catering—such as time-sensitive delivery, aviation security requirements, and high service customization.

Although prior research has extensively examined green procurement within manufacturing, construction, and SME contexts across Europe, Asia, and parts of Africa, there remains a notable gap in understanding its role within service-oriented industries like airline catering in Kenya. Much of the existing literature focuses on product-based supply chains where tangible goods and raw materials dominate sourcing decisions. In contrast, airline catering involves complex logistics tied to perishable goods, strict hygiene standards, and high operational turnaround, which pose unique procurement challenges. Furthermore, studies conducted in Western economies emphasize

regulatory compliance and strategic sourcing, which may differ significantly from the institutional and economic environment in Kenya. Local studies in Kenya have primarily addressed green procurement within food processing and manufacturing sectors, overlooking the distinctive demands of the airline service industry. As such, there is limited empirical evidence on how green procurement contributes to competitive advantage in Kenya's airline catering sector, revealing a critical contextual and sector-specific gap that this study seeks to address.

2.3.3 Waste Reduction and Competitive Advantage

Waste management refers to the systematic handling of waste generation, reduction, reuse, recycling, and disposal in a manner that minimizes environmental impact. In airline catering, key practices include food donations redirecting surplus food to charitable causes and tracking and measuring waste through monitoring systems that help identify inefficiencies and improve waste reduction strategies.

Wang and Cheng (2022) investigated the relationship between sustainable waste management practices and competitive advantage in Japan's hospitality industry, finding that methods such as composting and energy recovery not only reduced operational costs but also attracted environmentally conscious customers, thereby strengthening market positioning. While these findings underscore the value of sustainable waste management for service-oriented sectors, their applicability to airline catering is constrained by contextual differences. Unlike hotels and restaurants, airline catering firms face stricter aviation regulations and logistical limitations that influence how waste is managed onboard and post-flight.

In a related but more manufacturing-centric context, Garcia and Lopez (2021) studied the impact of lean manufacturing and waste reduction in Spain's automotive sector. Their findings highlighted that lean practices can reduce waste, speed up production, and enhance quality, ultimately improving competitiveness. However, the manufacturing-specific nature of their study limits its direct transferability to service industries like airline catering, where waste arises not from overproduction or inventory inefficiencies, but from packaging, food preparation, and post-consumption handling under aviation constraints.

Similarly, Nguyen and Le (2019) found that waste reduction strategies such as recycling and lean operations significantly improved cost-efficiency and competitiveness among Chinese manufacturing firms. While these findings reinforce the strategic value of waste management, they again emphasize manufacturing contexts. In contrast, waste reduction in airline catering involves managing perishable food waste, packaging materials, and onboard disposal under time-sensitive and space-limited conditions requiring distinct operational approaches.

Rop et al. (2021) examined green purchasing practices in Kenyan state enterprises and found that using environmentally friendly raw materials and supplier collaboration enhanced organizational performance. Although their study addressed procurement, it did not delve into sector-specific waste management practices, especially those unique to aviation logistics, such as in-flight waste sorting or strict handling protocols. Mutie et al. (2020), meanwhile, explored green logistics in Kenyan logistics firms and identified a strong link between green practices and firm performance. However, they focused broadly on logistics companies and did not examine nuanced elements like food waste, packaging, and airline waste recovery systems.

Existing studies have linked waste reduction practices to improved operational efficiency and competitive advantage, primarily in manufacturing, automotive, hospitality, and logistics sectors across various global and regional contexts. These studies emphasize cost savings, improved product or service quality, and enhanced brand image resulting from sustainable waste management strategies such as lean production, recycling, and energy recovery. However, most of this research is centered on industries with standardized production environments, where waste streams are more predictable and easier to control. In contrast, the airline catering sector operates under highly dynamic, time-sensitive, and hygiene-critical conditions, with waste streams that include both organic and non-organic materials. Moreover, although some studies in Kenya address green logistics and procurement in state-owned and logistics firms, there is limited empirical research specifically exploring how waste reduction practices impact competitive advantage within the airline catering services sector. This presents a clear gap in sector-specific evidence, particularly within the Kenyan context, which this study aimed to fill.

2.3.4 Energy Efficiency and Competitive Advantage

Energy efficiency refers to the use of less energy to perform the same tasks, thereby reducing energy waste and environmental harm. In airline catering services, energy efficiency initiatives

may include sustainable transportation methods (e.g., electric delivery vehicles or route optimization) and on-board energy-saving practices such as efficient food warming and refrigeration systems.

Munguia et al. (2019) examined how energy-efficient policies and strategic energy management contribute to competitiveness in Mexican manufacturing contexts, particularly within two maquiladoras specializing in electronics and electrical goods. While these findings highlight the benefits of structured energy management systems, the study's focus on electricity-powered manufacturing environments limits its direct applicability to airline catering, where energy consumption spans food preparation, refrigeration, and transportation, often under time-sensitive and mobile conditions. Expanding on the role of innovation in energy efficiency, Gąsior et al. (2022) investigated the link between eco-innovation and energy efficiency in Polish micro and small enterprises (SMEs). Their findings showed a positive correlation between a firm's competitive positioning and its adoption of eco-innovative practices, particularly those aimed at improving energy use. However, the influence of owner attitudes and decision-making styles was found to significantly affect the success of these innovations. While the study adds depth to the understanding of how energy-related innovation drives competitiveness, its relevance is greater for static production environments than for service-intensive sectors like airline catering, which face unique logistical constraints and energy usage patterns across multiple operational nodes.

In the Kenyan context, Mutie et al. (2023) explored green logistics practices and performance in logistics firms, revealing a strong positive link between energy-efficient logistics operations and overall firm success. The study underscores the potential of energy efficiency as a strategic lever for competitive advantage in the local market. However, airline catering firms though logistically intensive operate within more regulated, high-risk environments (such as aviation safety and food hygiene), which necessitate tailored approaches to energy optimization. Unlike standard logistics firms, energy decisions in airline catering intersect with regulatory requirements, customer safety, and real-time service delivery, factors that were not fully captured in Mutie's study.

While previous research has explored the relationship between energy efficiency and competitive advantage in manufacturing, small businesses, and logistics firms, a significant gap remains in understanding its impact within the airline catering sector. Studies in countries like Mexico and Poland highlight the positive correlation between energy-efficient practices and improved

competitiveness, primarily within industries such as manufacturing and SMEs. These studies often focus on larger firms with access to advanced energy management systems or innovations, where the implementation of energy-saving technologies is more feasible. However, the airline catering industry operates in a unique environment where time sensitivity, perishable goods, and strict regulatory standards create specific challenges for energy efficiency. Additionally, research in Kenya has predominantly centered on logistics companies and broader green logistics practices, with limited exploration of energy efficiency's direct influence on the operational success and competitive positioning of airline catering firms. This gap underscores the need for a sector-specific examination, particularly within the Kenyan context, which this study aimed to address.

2.4 Research Gap

Gikonyo (2023), examined the green logistics and performance of manufacturing companies in Kenya, Bor, (2021) investigated the impact of green supply chain management practices on the performance of Kenya's food and beverage processing sector while Rop et al., (2021) assessed the impact of green purchasing practices on the performance of state corporations in Kenya. However, conceptual gaps exist since the concept of Sustainable Green Logistics (SGL) itself remains broad and often underexplored in the context of its implementation. The existing literature does not adequately highlight the specific dimensions of SGL such as eco-friendly packaging, green procurement, waste management, and energy efficiency in relation to their impact on competitive advantage in the airline catering service firms but have focused on the effect on organizational performance. Nikitaeva (2021) explored the influence of green packaging on consumer purchasing decisions, particularly in the context of the dry packaged food industry in Helsinki, Finland, Caniato et al., (2012) investigated how sustainable sourcing practices impact the competitive advantage of companies in the apparel industry. Renukappa et al., (2021) investigated the role of procurement in enhancing sustainability within the UK construction sector. While green logistics has been widely discussed in global contexts, the adoption of such practices in Kenya's aviation and catering industry remains under-researched. Thus, there exists contextual gaps since in the Kenyan context, there is limited research on how Sustainable Green Logistics (SGL) practices influence the competitive advantage of firms in the airline catering sector. The airline catering firms in Kenya are facing unique challenges, such as regulatory pressures, cost constraints, and customer demand for sustainability, which are not adequately addressed in the current body of literature.

Methodologically, most studies on SGL and competitive advantage rely on specific target groups, and different sampling methods with diverse limitations. For instance, Maziriri's (2020) looked into how green packing and promotion affect the business success and competitive edge of manufacturing Small and Medium-sized Enterprises (SMEs) in South Africa focusing only on the marketing departments and adopting a simple random sampling procedure. Rop et al., (2021) assessed the impact of green purchasing practices on the performance of state corporations in Kenya through stratified sampling. Much of the existing literature focuses on larger, more developed markets, different sectors and methodologies. There is also a huge knowledge gap as there is limited evidence on how sustainable green logistics practices affect competitive advantage in the airline catering service firms in the Kenyan context.

While these studies examine firm performance, the specific link between green logistics practices and competitive advantage in the airline catering context is not directly explored. The studies provide general insights into green logistics practices but lack a detailed analysis of specific practices like eco-friendly packaging, green procurement, waste management, and energy efficiency in the context of airline catering services. While some studies focus on Kenyan firms, the nuances and particularities of green logistics practices within the Kenyan airline catering services sector were not deeply investigated.

Table 2.1: Summary of Knowledge Gap

Author	Tittle	Methods	Findings	Gaps	Focus of this study
Nikitaeva (2021)	Influence of green packaging on consumer purchasing decisions, particularly in the context of the dry packaged food industry in Finland	A survey was conducted involving 201 participants	Bio packaging did not generate a high level of interest among respondents. The bio label alone proved to be a weak factor in influencing purchasing decisions within the dry packaged food industry	The study was conducted in Helsinki while the current study was conducted in the airline catering service firms in Kenya, so there was a geographical difference. The study targeted the dry packaged food	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.

				industry while the current study targeted the airline catering industry. Limited to the packaging of Pasta while the current study targeted the overall packaging strategies within the airline catering firms in Kenya	
Maziriri (2020)	Impact of green packing and promotion affect the business success and competitive edge of manufacturing Small and Medium-sized Enterprises (SMEs) in South Africa	Quantitative research approach and a simple random sampling procedure. The target population consisted of heads of marketing departments	Green packaging and green advertising positively influence competitive advantage and business performance	The study Was conducted within the small and medium sized enterprises while the current study was conducted at the airline catering firms in Kenya Limited to the marketing department while the current study targets all the departments	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.
Bor (2021)	Impact of green supply chain management practices on the performance of Kenya's food and beverage processing sector	. Data from 187 firms affiliated with the Kenya Association of Manufacturers was collected via a census survey using structured questionnaires.	Effective green supply chain management practices enhance performance in these firms.	Focused on manufacturing sector as opposed to airline catering	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.

Mutie et al., 2020	Relationship between green logistics practices and firm performance, emphasizing the mediating role of economic performance in Kenyan logistics firms.	Cross-sectional survey design on a sample of 300 out of 892 logistics firms	A strong link between green logistics practices and success of the logistics companies	Focused on green logistics in logistic sector while current study is on the airline catering services industry, a sector with distinct operational dynamics	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.
Rop et al., 2021	Impact of green purchasing practices on the performance of state corporations in Kenya	Descriptive design and a sample of 175 respondents,	Performance improved after they started using environmentally friendly raw materials, recycled more, and bought from suppliers who also used environmentally friendly purchasing methods	Focused on performance while the current study is on competitive advantage	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.
Gikonyo, (2023)	Green logistics and performance of building and constriction manufacturing firms in Kenya.	Cross-sectional research design	Green packaging, reverse logistics, green distribution and logistics innovation systems meaningfully enhanced performance	Focused on building construction while current study is on the airline catering services sector, which could have different sustainability challenges and opportunities in logistics	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.
Mutie et al., (2023)	The influence that environmentally responsible logistics techniques have on the efficiency of Kenyan logistics businesses	Using structured questionnaires	There is a significant correlation between the implementation of environmentally friendly logistics methods and	Focused on performance of firms while current study seeks to emphasis on competitive advantage.	Effect of sustainable green logistics practices on competitive advantage in the airline catering service firms in Kenya.

			the enhancement of performance in these logistics companies.	The study was exclusive on logistics business while current study is on the specific context of airline catering services or the particular competitive factors	

Source; Researcher, (2025)

2.5 Conceptual Framework

The research framework illustrates the relationship between the study variables. The independent variables are eco-friendly packaging, green procurement, waste management and energy efficiency. The dependent variable was competitive advantage in the airline catering services firms in Kenya. The framework is constructed based on the Resource-Based Theory (RBT) and the Industry Organization (I/O) Theory, which jointly explain how both internal capabilities and external environmental pressures influence competitive advantage. According to Barney (1991), firms gain and sustain competitive advantage when they possess resources and capabilities that are valuable, rare, inimitable, and non-substitutable. On the other hand I/O Theory, as posited by Porter (1980), argues that a firm's strategic behavior is shaped by external market forces such as industry competition, regulatory environments, and customer expectations.

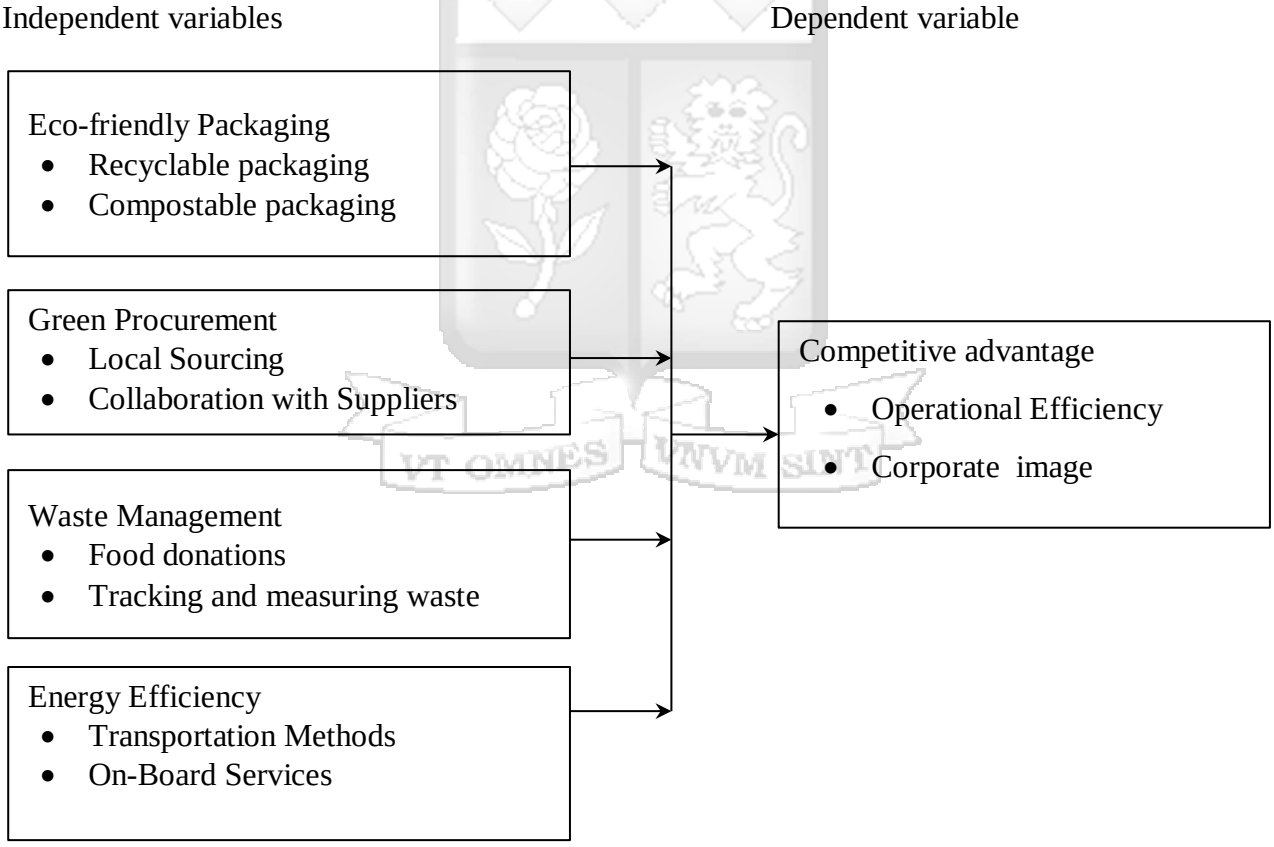

Figure 2.1: Conceptual framework

(Researcher, 2025)

2.6 Operationalization of Study Variables

Operationalization of Study Variables refers to the process of defining and measuring the variables that are part of a research study in a way that allows them to be empirically tested. In other words, it involves specifying exactly how variables were observed, measured, or manipulated in the context of a study.

Table 2.2: Operationalization of Study Variables

Variable	Construct	Adopted Definition	Indicators	Measurement	Supporting Literature
Eco-friendly Packaging	Recyclable packaging Compostable packaging	Refers to the use of packaging solutions that minimize environmental impact, often through recyclability and biodegradability, enhancing the sustainability of the product lifecycle	Use of biodegradable materials Utilization of recycled content in packaging.	Five-point Liker scale; 1-Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree	Nikitaeva (2021)
Green procurement	Local Sourcing Collaboration with Suppliers	Green procurement refers to the practice of procuring goods and services in a way that aligns with environmental stewardship and social responsibility, often involving local sourcing and strategic supplier collaborations	Preference for local suppliers Sustainability collaborative initiatives	Five-point Liker scale; 1-Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree	Caniato et al., (2012)

Waste Management	Food donations Tracking and measuring waste	Waste Mnagement is a strategy aimed at minimizing waste generation in business operations, including practices like donating excess food and implementing systematic waste tracking and measurement.	Frequency of food donations Waste Reporting mechanisms	Five-point Liker scale; 1-Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree	Wang and Cheng (2022)
Energy Efficiency	Transportation Methods On-Board Services	Energy Efficiency is the use of techniques and practices that reduce energy consumption in business operations, including transportation and on-board services, contributing to environmental sustainability	Type of transportation used Design of on-board service equipments	Five-point Liker scale; 1-Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree	Gąsior et al., (2022)

Competitive Advantage	Operational efficiency Reducing cost Enhancing corporate image	A business strategy that enables a company to achieve superior margins over its competitors, often through cost efficiency, quality, and enhanced service presentation	Time management cost-saving Brans awareness	Five-point Liker scale; 1-Strongly Disagree 2- Disagree 3- Neutral 4- Agree 5- Strongly Agree	Mumbi, Karanja and Kiarie (2021)

2.7 Chapter Summary

This chapter lays the foundation for understanding the theoretical underpinnings of the study and empirical evidence related to green logistics practices and competitive advantage. The chapter describes the relationship between the study variables in the conceptual framework and also shows the operationalization of the study variables, setting the stage for the subsequent chapter of the study on methodology.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapters provide the study methodology that was applied in carrying out the study. The methodology includes philosophy, design, population and sampling, data collection methods, data analysis and ethical considerations.

3.2 Research Philosophy

The study was best fitted under the positivism research philosophy. Positivism is a philosophical approach to research that emphasizes the use of empirical observation, measurement, and the application of the scientific method to gain objective knowledge about the world (Park et al., 2020). It is often associated with quantitative research methods and seeks to uncover regularities, patterns, and cause-and-effect relationships in data. Positivism places a strong emphasis on empirical observation, which means that researchers collect data through systematic and objective means. In this study, the research objectives involve evaluating the effects of sustainable practices (e.g., eco-friendly packaging, green procurement, waste management, energy efficiency) on competitive advantage. This requires collecting empirical data, such as performance metrics and other measurable indicators related to these sustainable practices and competitive advantage. Positivism often relies on quantitative data collection methods, such as surveys, questionnaires, and statistical analysis of numerical data (Kirongo & Odoyo, 2020). The researcher used questionnaires to collect quantitative data from participants or analyze existing quantitative data from the airline catering services firms to measure the effects.

3.3 Research Design

The research adopted a descriptive cross-sectional research design. Scientists use a descriptive study design to observe and describe a subject's behavior without altering it. It is used to determine the present state of phenomena and describe "what exists" about variables or situations. This type of research is often used when the researcher wants to gather information about people's behaviors, attitudes, or characteristics (Deckert & Wilson, 2023). The study was a cross-sectional study since it collected data at a single point in time, providing a snapshot of the variables being

studied. Cross-sectional studies are used to describe the characteristics of a population or phenomenon at one specific moment.

3.4 Population of the Study

Target population is the universe of units or groups of interest that have the qualities the researcher wishes to understand (Creswell & Creswell, 2017). The target population of this study encompassed all managers and assistant managers from the four airline catering firms operating in Kenya. Specifically, it includes all the managers and assistant managers who oversee or influence sustainable green logistics practices within these firms. The unit of analysis was the individual airline catering firms which including Kenya Airways Catering Services (KQ Catering Services), Gategroup (Gategourmet Kenya), SkyChef Kenya. (part of the LSG Sky Chefs group) and NAS servair Catering. The population size was 72 individuals composed of the managers and assistant managers of the departments in each of the four airline catering firms in Kenya, the number of managers and assistant managers varied at each firm based on the level of authority. The decision to involve managers from multiple departments was strategic and aligned with the complex nature of green logistics practices. Each of the four green logistics dimensions under study (eco-friendly packaging, green procurement, waste management, and energy efficiency) cuts across several operational areas.

3.5 Sample Technique and Design

Sampling is the technique of selecting a subset of individuals from the target population to represent the entire population (Stratton, 2023). A sample is likely to represent the complete target population if the sample is large and if a random sampling technique is used. The study identified 72 key individuals composed of the managers and assistant managers of the departments in each of the four airline catering firms in Kenya from the Human resource department records. These were deemed to have the knowledge on sustainable green logistics practices on the firms and on competitive advantage in the airline catering service firms.

The study initially identified the managers and assistant managers with relevant knowledge and experience in the airline catering service firms through purposive sampling. Given the specific focus on these individuals, the study included all 72 managers and assistant managers, which constituted a census of the purposively defined population. This census approach was considered

appropriate due to the small and manageable size of the target population, which comprised a total of 72 individuals. As a result, every individual within this population was selected. Since the entire population is involved, the data obtained was more comprehensive and representative of the population as a whole. In addition, the population is relatively homogeneous and thus census survey provided detailed data that accurately reflects the characteristics of the entire group. While a census approach is ideal for small populations, it may limit the generalizability of the findings beyond the specific context of these four airline catering firms in Kenya. This limitation arises because the sample represents only a small, localized group, and the results may not be directly applicable to larger or different populations within the broader airline catering industry. The sample size distribution was as shown in Table 3.1

Table 3.1: Sampling Size

Department	**Population(N)**
Catering and Food Production Department	11
Logistics and Supply Chain Management	8
Quality Assurance and Safety	6
Customer Service and Account Management	8
Human Resources	7
Finance and Accounting	10
Procurement	8
Operations and Dispatch	8
Information Technology (IT)	6
Total	72

Source: Human Resource departments, (2024)

3.6 Data Collection Methods

Primary data was collected through questionnaires. The questionnaire was used since as reported by Krosnick (2018) questionnaires allow for the collection of data from a large number of people in a relatively short period. In addition, in a questionnaire, questions are pre-determined, ensuring consistency in data collection and analysis. The questionnaire was developed based on the literature review and contained closed-ended, 5-point Likert scale questions. The questionnaire allowed for the collection of standardized data from multiple respondents, making it easier to compare responses and identify trends across different departments. By using closed-ended questions, the questionnaire generated quantitative data that was statistically analyzed. The questionnaire consisted of sections that align with the study's objectives, focusing on green

logistics practices (eco-friendly packaging, green procurement, waste management, and energy efficiency) and their effect on competitive advantage.

The researcher conducted an initial visit to the four firms to introduce the study and establish rapport with the managers. This visit was crucial for gaining organizational support, addressing any concerns, and ensuring smooth data collection. The questionnaire was then distributed via the Google Forms platform and physical administration. A set time frame of 3 weeks was allocated for respondents to complete the questionnaires. Google Forms is chosen due to its user-friendly interface, accessibility, and ability to streamline data collection and management. Follow-up reminders ensured a higher response rate. For those who had not filled the forms, the researcher shared questionnaires for people who preferred physical form due to challenges in the process.

3.7 Data Analysis

Once data collection was complete, the responses were exported to the Statistical Package for Social Sciences (SPSS) version 28 to analyze the data (Abu-Bader, 2021). Statistical methods, such as descriptive and regression analysis, were used. Descriptive analysis provided a summary of the data, including measures of central tendency (mean) and variability (standard deviation). This helped to understand the general distribution of responses and the basic characteristics of the data. A multiple regression analysis was employed to investigate the strength and nature of the relationship between sustainable green logistics practices and competitive advantage. The regression model was specified as follows:

$$CA = \beta_0 + \beta_1 EP + \beta_2 GP + \beta_3 WM + \beta_4 EF + \varepsilon$$

Where; β_0 is the constant

$\beta_{1\text{-}4}$ are the coefficients

CA is Competitive Advantage

SP is Eco-friendly Packaging

SS is Green Procurement

WR is Waste Management

EF is Energy Efficiency

3.8 Research Quality

Research quality refers to the overall integrity, reliability, and validity of the research process and its outcomes (Soderberg et al., 2021). Research quality encompasses various dimensions, including the appropriateness of the research design, the rigor of data collection and analysis methods, and the ethical standards upheld throughout the study (Feeley, 2020).

3.8.1 Validity

The researcher assessed content validity to ensure that the instrument covers all relevant parts of the subject it aims to measure. To ensure content validity, the scope and dimensions of the constructs were clearly outlined. In addition, experts like the Research supervisor reviewed the instrument to evaluate whether the items adequately cover the content domain. These experts provided feedback, which was used to modify the instrument to better align with the content domain.

3.8.2 Reliability

Reliability, which refers to the consistency of a research instrument or measurement, was assessed to ensure that the questionnaire would yield the same results under consistent conditions. Internal Consistency was assessed using Cronbach's alpha. For this study, any variable's reliability coefficient (Cronbach alpha) of 0.7 or above was considered adequate.

Table 3.2: Reliability test

Variable	Items	Cronbach alpha
Eco-friendly Packaging	8	0.76
Green Procurement	8	0.842
Waste Management	8	0.755
Energy Efficiency	8	0.825
Competitive advantage	12	0.752

Table 3.2 presents the results of the reliability test using Cronbach's alpha for each construct. In a reliability test, values above 0.70 are considered acceptable for social science research (George & Mallery, 2018). All variables demonstrated acceptable internal consistency, with Cronbach's alpha values ranging from 0.752 (Competitive Advantage) to 0.842 (Green Procurement). These values exceed the commonly accepted threshold of 0.70, indicating that the items reliably measured the underlying constructs. Notably, Green Procurement and Energy Efficiency showed particularly strong reliability, suggesting consistent responses across their respective items. The differences in item count across constructs, particularly the 12 items used for Competitive Advantage, reflect the multidimensional nature of the concept and were validated through expert review and pilot testing.

3.8.3 Diagnostic Test

The study performed diagnostic tests to ensure that the regression model assumptions remain intact. These included normality test, linearity test and Multicollinearity. The assumption of normality in regression analysis suggests that the residuals should follow a normal distribution (Yazici & Yolacan, 2007). This assumption was tested through Shapiro-Wilk Test in SPSS. A p-value greater than 0.05 suggests that the residuals do not significantly deviate from normality, and the assumption is met. If the p-value is less than 0.05, it indicates that the residuals deviate significantly from normality, violating the assumption.

Table 3.3: Tests of Normality

	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
Competitive Advantage	.212	63	.200	.894	63	.101
Eco-friendly Packaging	.210	63	.200	.901	63	.109
Waste Management	.163	63	.300	.932	63	.202
Energy Efficiency	.143	63	.303	.957	63	.229
Green Procurement	.175	63	.200	.964	63	.265
a. Lilliefors Significance Correction						

In the results, the Shapiro-Wilk statistic for each variable is accompanied by a p-value (Sig.). If the p-value is greater than 0.05, we conclude that there is no significant departure from normality, meaning the data is normally distributed. In the findings, the p-values for all variables (CA, EP, WM, EF, and GP) are all greater than 0.05, indicating that none of these variables significantly deviate from normality. Therefore, we can confidently say that the data for each variable follows a normal distribution, and it is appropriate to apply the regression analysis.

The assumption of no multicollinearity means that independent variables should not be highly correlated with each other. High multicollinearity can cause instability in the coefficient estimates, making it difficult to determine the individual effect of each predictor (Daoud, 2017). To test for multicollinearity using the Variance Inflation Factor (VIF was used. A common rule of thumb is that a VIF value greater than 10 suggests a high level of multicollinearity, indicating that the predictor is highly correlated with other predictors. In this case, the researcher might have considered removing or combining predictors or using techniques like principal component analysis (PCA) to address multicollinearity.

Table 3.4: Multicollinearity Test

	Tolerance	VIF
Eco-friendly Packaging	.448	2.233
Green Procurement	.400	2.503
Waste Management	.549	1.822
Energy Efficiency	.427	2.341

The results indicate that none of the predictor variables exhibit high multicollinearity. Specifically, the VIF for Eco-friendly packaging is 2.233, which falls within the acceptable range (VIF < 10) and suggests moderate multicollinearity, but not problematic. Green procurement has a VIF of 2.503, which is well below the critical threshold of 10, suggesting that green procurement does not suffer from high multicollinearity Waste management has a VIF of 1.822, indicating low multicollinearity with other predictors, and is also within the acceptable range. Similarly, energy efficiency has a VIF of 2.341, which is well within the acceptable threshold, showing no significant multicollinearity issues. Overall, the analysis shows that multicollinearity is not a major concern in this model. While the VIF values in this study fall within the acceptable range and indicate that

multicollinearity is not a major concern, a VIF value greater than 5 indicates moderate multicollinearity, while values above 10 suggest severe multicollinearity.

The assumption of linearity in regression analysis states that the relationship between the predictors and the dependent variable should be linear (Steyerberg & Steyerberg, 2019). If this assumption is violated, the regression model may not appropriately capture the relationship between variables. Linearity was tested using residual plots in SPSS. In the residual plot, if the residuals display a random scatter (no discernible pattern), it suggests the relationship is linear. However, if there is a curved or systematic pattern (e.g., a U-shape), it suggests a non-linear relationship, violating the linearity assumption.

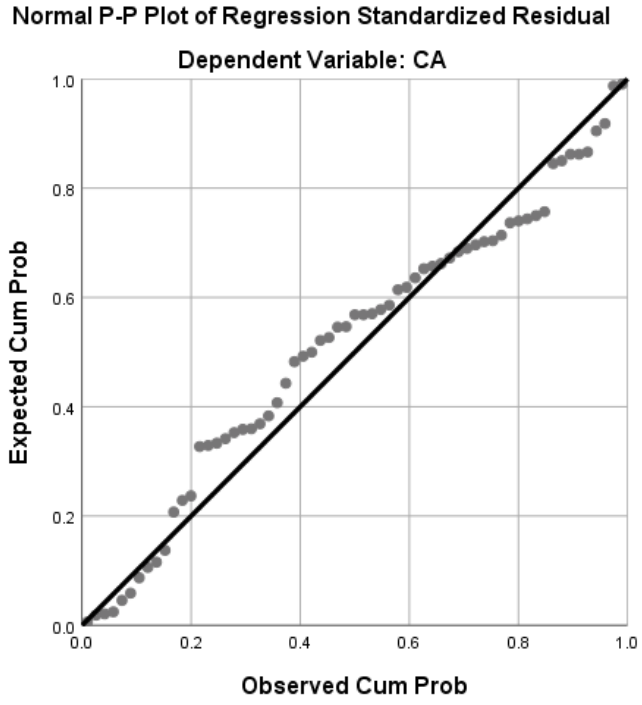

Figure 3.1: Residual plot

The data points fall close to or on the line and display a random scatter thus, the linearity assumption has been met.

3.9 Ethical Considerations

To ensure ethical considerations in the study, the researcher adhered to the guidelines set by Strathmore University's Institutional Review Board (SU- IRB), the American Psychological Association (APA) principles, and the National Council for Science and Technology

(NACOSTI). This includes obtaining informed consent from participants, maintaining confidentiality of their data, minimizing potential risks, and ensuring the well-being of all individuals involved. By following these ethical standards, the researcher aimed to conduct the study in a responsible and respectful manner.

3.10 Chapter Summary

The study adopted the positivism research philosophy, with a descriptive research design mainly focusing on the quantitative descriptive research which involves numerical data, statistical analysis, and objective measures. Primary data was collected through questionnaires based on the literature review. Descriptive and regression analysis was used. Finally, all research activities was conducted with ethical considerations in mind.

CHAPTER FOUR

FINDINGS AND INTERPRETATIONS

4.1 Introduction

In this chapter, the results of the study on the effect of sustainable green logistics practices on competitive advantage in airline catering services firms in Kenya are presented. The study gathered primary data on the effect of eco-friendly packaging, green procurement, waste management and energy efficiency initiatives on competitive advantage in the airline catering services firms in Kenya from a sample of employees working in the relevant firms, airline catering services firms operating in Kenya. This section details the response rate, demographic characteristics of the respondents, and provides the interpretation of the findings.

4.1.1 Response Rate

The response rate indicates how many respondents provided usable data for the study. The response rate is presented in Table 4.1.

Table 4.1: Response Rate

Response rate	Frequency	Percent
Complete	63	87.5
Incomplete	9	12.5
Total	72	100.0

The data was collected using a questionnaire which was distributed via the Google Forms platform and physical administration. Table 4.1 presents the response rate of the study. Out of the 72 questionnaires distributed, 63 were returned fully completed, representing a response rate of 87.5%, while 9 were incomplete (12.5%). This response rate exceeds the commonly accepted threshold for survey research (typically 70%), indicating a high level of engagement from participants. The strong response supports the reliability and generalizability of the study findings.

4.2 Demographic information

The demographic data collected includes respondents' age categories, highest level of education, experience and department. Demographic information of respondents helps in understanding the profile of the sample and provides insights into how different groups responded to the survey.

4.2.1 Age category

Table 4.2: Age category

Age category	Frequency	Percent
18-24 Years	5	7.9
25-34 Years	20	31.7
35-44 Years	23	36.5
45-54 Years	13	20.6
55 Years and above	2	3.2
Total	63	100.0

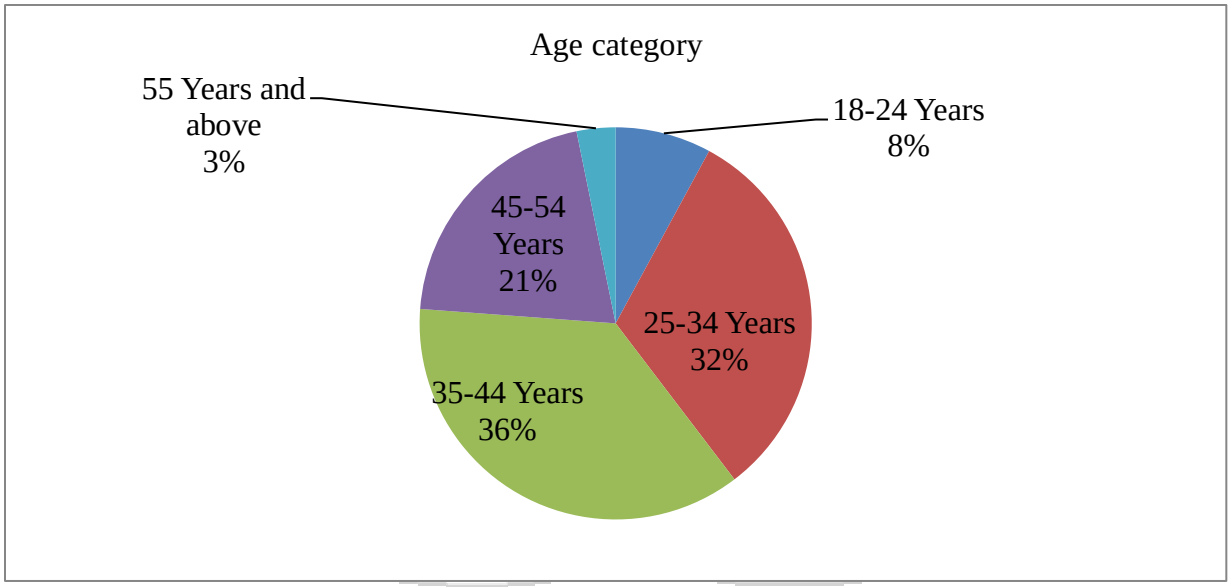

Figure 4.2: Age category

Table 4.2 and figure 4.2 summarizes the age distribution of the respondents. The majority of participants (36.5%) were aged between 35–44 years, followed closely by those aged 25–34 years (31.7%). Combined, these two categories make up nearly 70% of the sample, suggesting that the workforce is predominantly composed of mid-career professionals. This age distribution may imply a concentration of employees with a balanced mix of operational experience and adaptability, which could positively influence the adoption of sustainable green logistics practices. Research shows that mid-career professionals tend to possess both technical proficiency and openness to innovation, making them pivotal in supporting organizational sustainability transitions (De Medeiros et al., 2014; Jabbour et al., 2015). Notably, the youngest (18–24) and oldest (55+)

groups are underrepresented, which may reflect broader hiring patterns in the industry or the nature of roles typically associated with green logistics functions.

4.2.2 Highest Level of Education

The educational qualifications of the respondents are presented in Table 4.3:

Table 4.3: Highest Level of Education

Education Level	Frequency	Percent
Diploma	5	7.9
Degree	42	66.7
Masters	16	25.4
Total	63	100.0

The majority of the respondents (42, or 66.7%) held a degree, 16 respondents (or 25.4%) held a Master's degree and 5 respondents (or 7.9%) held a Diploma. The high proportion of respondents with degree and master's qualifications suggest that the workforce is well-equipped with the educational background necessary to understand and engage with complex concepts such as sustainable green logistics. This could be a contributing factor to the implementation of green practices, as these employees may have better knowledge of contemporary sustainable strategies and innovations. Higher levels of education among respondents signify a skilled and knowledgeable workforce, which enhances an organization's capacity for innovation, adaptation, and implementation of sustainable practices. Educated employees can better interpret environmental regulations, drive sustainable procurement, and develop eco-efficient operational strategies further supporting the RBV's idea that internal knowledge and skills are strategic assets.

4.2.3 Years of Experience in Airline Catering Services

The years of experience of respondents can provide an understanding of how knowledgeable and experienced they are in the airline catering services sector, which might influence their perspective on the implementation of sustainable green logistics practices. The distribution of respondents based on their years of experience is as in Table 4.4:

Table 4.4: Years of Experience in Airline Catering Services

Years	Frequency	Percent
Less than 1 year	2	3.2
1-3 years	9	14.3
4-6 years	23	36.5

7-10 years	18	28.6
More than 10 years	11	17.5
Total	63	100.0

The distribution of work experience among respondents reveals a workforce with a strong foundation in the airline catering services sector, which enhances the credibility of the insights gathered regarding the implementation of sustainable green logistics practices. The largest group of respondents (23, or 36.5%) had between 4-6 years of experience in airline catering services. This indicates that most of the respondents were relatively experienced in the industry, which could provide valuable perceptions into the practical implementation of green logistics practices. The next largest group (18, or 28.6%) had between 7-10 years of experience, which suggests a well-seasoned segment of the workforce. In addition, 11 respondents (or 17.5%) had more than 10 years of experience, indicating a significant proportion of employees with extensive experience in the sector. However, 9 respondents (or 14.3%) had 1-3 years of experience, and 2 respondents (or 3.2%) had less than 1 year of experience, reflecting the presence of newer entrants to the field. This diverse range of experience levels enriches the study by offering a composite view that blends operational insight, strategic foresight, and evolving perspectives on sustainability. It ensures that the findings are grounded in both practical experience and current industry trends, thereby enhancing the study's relevance and robustness. Employees with more industry experience can better interpret competitive forces such as the threat of substitutes or bargaining power of eco-conscious customers. This aligns with I/O theory's focus on how external pressures shape strategic choices.

4.2.4 Department

The distribution of respondents across various departments within airline catering services is presented in Table 4.5.

Table 4.5: Department

Department	Frequency	Percent
Catering and Food Production Department	8	12.7
Logistics and Supply Chain Management	8	12.7
Quality Assurance and Safety	5	7.9
Customer Service and Account Management	7	11.1
Human Resources	6	9.5
Finance and Accounting	8	12.7

Procurement	7	11.1
Operations and Dispatch	8	12.7
IT	6	9.5
Total	63	100.0

The largest group of respondents (8, or 12.7%) came from Catering and Food Production, Logistics and Supply Chain Management, Finance and Accounting, and Operations and Dispatch in each case. These departments are crucial in implementing sustainable practices, particularly in green logistics, as they directly deal with the supply chain, procurement, food production, and operational processes. Additionally, 7 respondents (or 11.1%) were from the Customer Service and Account Management and Procurement departments in each case, 6 respondents (9.5%) from the human resources and the IT departments and 5 respondents (or 7.9%) from Quality Assurance and Safety department. The strong representation from core logistics-related departments underscores the study's validity in assessing the practical application of sustainable green logistics strategies. It also highlights the interdepartmental nature of sustainability implementation, where collaborative efforts across procurement, operations, and supply chain management are essential for achieving meaningful and lasting environmental impact. The diversity in departmental representation reflects the firm's multi-functional capabilities. The combination of logistics, procurement, food production, and quality assurance brings together a blend of competencies necessary to implement green logistics practices. According to the RBV, this cross-functional expertise contributes to a complex resource bundle that can be strategically harnessed to gain and sustain a competitive edge.

4.3 Descriptive Statistics

4.3.1 Eco-friendly Packaging and Competitive advantage

The following section seeks to evaluate the effect of eco-friendly packaging on the competitive advantage of airline catering services firms in Kenya. In this section, respondents were asked to assess various statements regarding the role of eco-friendly packaging in the airline catering sector. These statements explore various aspects of eco-friendly packaging. The responses to the statements were recorded using a Likert scale to gauge the extent of agreement or disagreement with each statement. (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Table 4.6: Statements on eco-friendly packaging

	N	Mean	Std. Deviation
Our firm uses recyclable packaging in all catering services.	63	3.41	.82
Customers appreciate the use of recyclable packaging by our firm.	63	4.17	.55
The company uses biodegradable packaging materials in its catering services.	63	4.24	.76
The use of recyclable packaging reduces the environmental footprint of our firm.	63	3.79	.65
Compostable packaging is regularly used in our catering operations.	63	3.92	.33
Our transition to compostable packaging has improved our brand image.	63	3.95	.38
Using compostable packaging has reduced waste disposal costs for our firm.	63	3.89	.41
The firm has invested significantly in recyclable packaging.	63	3.90	.39
Composite		3.91	.54

The findings revealed that the overall mean was 3.91 and at a 0.54 standard deviation. A mean of 3.91 suggests that, on average, respondents agreed on the use of ecofriendly packaging within their firms. The findings indicate that the statement regarding the use of recyclable packaging in all catering services had a mean of 3.41 with a standard deviation of 0.82, suggesting moderate agreement with some variation in responses. This indicates that while most respondents agreed that recyclable packaging is used, there was some difference in opinions. According to Maziriri (2020), sustainable packaging, including recyclable materials, is an essential component in establishing a competitive advantage for SMEs.

Regarding customer appreciation for recyclable packaging, the mean was 4.17 with a standard deviation of 0.55, showing overwhelming agreement that customers value this practice. The relatively low standard deviation implies that there was little variation in how respondents viewed this aspect. When it comes to the use of biodegradable packaging, the mean was 4.24 with a standard deviation of 0.76. This indicates strong agreement, though the slightly higher standard deviation suggests that there was a bit more variation in respondents' views on how extensively biodegradable materials are used.

Respondents agreed that the use of recyclable packaging reduces the environmental footprint of the firm, with a mean of 3.79 and a standard deviation of 0.65. While there was moderate agreement, the variability in responses suggests some respondents were less certain about the environmental impact. For the regular use of compostable packaging, the mean was 3.92 with a very low standard deviation of 0.33. This shows a strong consensus that compostable packaging is regularly used, with little variability in the responses.

The statement that the transition to compostable packaging has improved the firm's brand image had a mean of 3.95 and a standard deviation of 0.38. This suggests strong agreement, with minimal variability, indicating that respondents generally perceive an improvement in the brand image due to this transition. Regarding the reduction of waste disposal costs, the mean was 3.89 with a standard deviation of 0.41, implying that compostable packaging has helped reduce costs, with slightly more variation compared to other factors.

Lastly, when asked about the firm's investment in recyclable packaging, the mean was 3.90 with a standard deviation of 0.39. This demonstrates that the firm has made significant investments in recyclable packaging, with minimal variation in responses. Investment in sustainable packaging is aligned with Porter's cost leadership strategy, where companies reduce costs by investing in efficient materials and waste reduction processes. Nikseresht et al. (2024) also suggest that companies that invest in sustainable innovations not only reduce waste but also enhance operational efficiency, leading to long-term cost savings.

The descriptive statistics presented in this study offer meaningful insights into the extent to which eco-friendly packaging practices are adopted by airline catering service firms in Kenya. The overall mean reflects a generally positive attitude toward the use of sustainable packaging, suggesting that most firms recognize its importance in driving competitive advantage. However, the observed variability particularly in areas such as the use of recyclable and biodegradable packaging indicates that while the commitment to sustainability exists, the level of implementation varies across firms. This could be attributed to differences in operational capacity, cost considerations, or supply chain access.

4.3.2 Green Procurement and Competitive advantage

The following section seeks to evaluate the effect of green procurement on the competitive advantage of airline catering services firms in Kenya. In this section, respondents were asked to

assess various statements regarding the role of green procurement in the airline catering sector. These statements explore various aspects of green procurement. The responses to the statements were recorded using a Likert scale to gauge the extent of agreement or disagreement with each statement. (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Table 4.7: Statements on green procurement

	N	Mean	Std. Deviation
The company prefers sourcing ingredients locally to reduce environmental impacts.	63	3.92	.45
Local sourcing supports the company's goal to reduce logistics costs.	63	3.89	.41
Local sourcing improves the freshness and quality of ingredients used in catering services.	63	3.95	.63
The firm prioritizes local suppliers who have strong sustainability practices.	63	4.19	.59
Our suppliers are committed to environmentally friendly practices in production and packaging.	63	4.16	.65
We collaborate closely with suppliers to meet sustainability goals.	63	4.05	.49
Collaboration with suppliers has resulted in cost-saving innovations.	63	3.92	.55
Long-term supplier relationships improve our competitive advantage by promoting green initiatives.	63	4.10	.50
Composite		4.02	.53

The findings indicated that the overall mean was 4.02 at a 0.53 standard deviation. A mean of 4.02 indicated that respondents agreed on the use of green procurement practices within their firms. The respondents generally agreed that sourcing ingredients locally helps reduce environmental impacts, with a mean of 3.92 and a standard deviation of 0.45, indicating agreement with minimal variation in responses. Similarly, local sourcing was seen as effective in reducing logistics costs, with a mean of 3.89 and a standard deviation of 0.41, suggesting consensus among respondents with very little variation in their views.

There was also consistent opinion that local sourcing improves the freshness and quality of ingredients, reflected in a mean of 3.95 and a standard deviation of 0.63. The higher standard deviation here suggests slightly more variation in how respondents perceived this benefit

compared to other factors. Additionally, respondents agreed that the firm prioritizes suppliers with strong sustainability practices, with a mean of 4.19 and a standard deviation of 0.59, showing solid agreement with moderate variation in their responses. Respondents further supported the idea that suppliers are committed to environmentally friendly practices in both production and packaging, as indicated by a mean of 4.16 and a standard deviation of 0.65. While there was overwhelming agreement, the higher standard deviation suggests some differing opinions on this aspect.

When asked about the company's collaboration with suppliers to meet sustainability goals, the mean was 4.05 with a standard deviation of 0.49, indicating that most respondents agreed with some slight variation in their responses. The collaboration between suppliers and the firm has also led to cost-saving innovations, as indicated by a mean of 3.92 and a standard deviation of 0.55, reflecting overwhelming agreement with moderate variability. Finally, the respondents agreed that long-term supplier relationships improve the company's competitive advantage through green initiatives, with a mean of 4.10 and a standard deviation of 0.50, suggesting solid support with minimal variation in responses.

The findings on green procurement practices clearly reflect a strong organizational commitment to sustainability within the airline catering services firms in Kenya. The overall mean underscores widespread agreement among respondents that their firms actively implement green procurement strategies. From a researcher's standpoint, this high level of agreement is both encouraging and indicative of a sector that recognizes the strategic value of sustainable sourcing. Notably, practices such as local sourcing not only contribute to reduced environmental impact and logistics costs but are also seen to enhance ingredient quality an important factor in food-related service industries. Overally, these results offer compelling empirical evidence in favor of the claim that green procurement is a strategic advantage as well as an ethical or legal necessity. According to the Resource-Based View (RBV) and Sustainable Supply Chain Management (SSCM) theories, these practices can spur innovation, cut expenses, and produce a long-term competitive advantage when incorporated into procurement policy. According to the RBV, businesses can use distinctive, priceless, and inimitable resources like a sustainable supply chain to gain a long-term competitive edge (Barney, 1991).Similar to this, the SSCM framework stresses how procurement procedures can incorporate social and environmental sustainability practices, which can have positive effects on the environment and operations (Carter & Rogers, 2008). These results highlight the fact that

green procurement methods are not only good for the environment but also strategically advantageous for businesses looking to stand out in a market that is becoming more and more competitive.

4.3.3 Waste Management and Competitive advantage

The following section seeks to evaluate the effect of waste management on the competitive advantage of airline catering services firms in Kenya. In this section, respondents were asked to assess various statements regarding the role of waste management in the airline catering sector. These statements explore various aspects of waste management. The responses to the statements were recorded using a Likert scale to gauge the extent of agreement or disagreement with each statement. (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Table 4.8: Statements on Waste Management

	N	Mean	Std. Deviation
Donating excess food helps reduce food waste in the airline catering industry.	63	3.75	.54
The company regularly donates excess food to local communities.	63	3.43	.71
Donating excess food reduces waste disposal costs for the company.	63	3.71	.68
Food donations contribute to the company's positive public image.	63	3.87	.61
The company actively tracks and measures waste generated in catering services.	63	3.79	.45
Regular waste audits help improve the efficiency of the waste management system.	63	3.95	.46
Tracking waste supports the company's competitive advantage by optimizing resource use.	63	4.29	.61
Waste reduction strategies are integrated into the company's logistics and catering operations.	63	3.95	.42
Composite		3.84	.56

The findings indicate that the overall mean was 3.84 at a 0.56 standard deviation. A mean of 3.84 suggests that, on average, the respondents agreed on the use of waste management practices in

their firms. Respondents strongly agreed that donating excess food helps reduce food waste in the airline catering industry, with a mean of 3.75 and a standard deviation of 0.54, indicating a solid consensus with moderate variation in responses. This aligns with broader sustainability goals and signals that employees see value in such practices from a resource optimization perspective. Similarly, while the company's practice of regularly donating excess food to local communities was agreed upon (mean = 3.43, standard deviation = 0.71), there is slightly more variability in how strongly respondents feel about this practice.

Regarding the financial benefits of donating excess food, the mean was 3.71 with a standard deviation of 0.68, indicating moderate agreement that food donations help reduce waste disposal costs, with a moderate amount of variability in responses. Respondents also agreed that food donations contribute to the company's positive public image, with a mean of 3.87 and a standard deviation of 0.61, suggesting strong agreement with some variability in how this contributes to the company's image. When it comes to tracking and measuring waste, respondents showed moderate agreement that the company actively tracks and measures waste generated in catering services (mean = 3.79, standard deviation = 0.45). Regular waste audits were also seen as beneficial, with respondents strongly agreeing (mean = 3.95, standard deviation = 0.46) that they help improve the efficiency of the waste management system.

Tracking waste was seen as a factor that supports the company's competitive advantage by optimizing resource use, with a mean of 4.29 and a standard deviation of 0.61. Lastly, respondents agreed that waste reduction strategies are integrated into the company's logistics and catering operations (mean = 3.95, standard deviation = 0.42), reflecting strong consensus and minimal variation in responses. These practices help improve efficiency and ensure accountability, which is consistent with both RBV and I/O theories. From an RBV lens, data systems and analytics represent valuable capabilities, while from an I/O standpoint, these efforts allow the company to adapt to environmental regulations and industry standards more effectively.

Recent studies have highlighted the positive correlation between green procurement and firm performance in Kenya's food and beverage manufacturing sector, with green procurement accounting for 48.7% of performance variation (Wallace & Omachar, 2016). Additionally, research on Kenya Airways indicates that green procurement practices enhance operational efficiency, leading to cost reductions and improved service delivery. These findings underscore

that integrating green procurement into corporate strategy not only benefits the environment but also bolsters organizational competitiveness.

4.3.4 Energy Efficiency and Competitive advantage

The following section seeks to evaluate the effect of energy efficiency on the competitive advantage of airline catering services firms in Kenya. Respondents were asked to assess various statements concerning the role of energy efficiency in the airline catering sector. The Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree) was used to record their responses. The data is analyzed in the following section, along with theoretical connections and recommendations for further interpretation.

Table 4.9: Statements on energy efficiency

	N	Mean	Std. Deviation
The company uses energy-efficient vehicles to transport catering supplies.	63	3.78	.52
The use of eco-friendly transportation methods helps reduce the company's carbon footprint.	63	4.06	.56
The company has adopted renewable energy sources for transportation wherever possible.	63	3.79	.54
The use of energy-efficient transportation gives the company a competitive edge in the market.	63	4.00	.65
The company invests in innovative technologies to improve energy efficiency in on-board services.	63	3.95	.66
The company has implemented energy-saving practices in its airline catering services.	63	3.87	.46
The use of energy-efficient onboard catering equipment improves service delivery.	63	3.89	.60
Onboard energy efficiency contributes to reducing the airline's overall environmental impact.	63	4.00	.31
Composite		3.92	.54

The findings indicate that the overall mean was 3.92 at a 0.54 standard deviation. A mean of 3.92 suggests that, on average, the respondents agreed on the use of energy efficient vehicles and innovation technologies. Respondents were of the opinion that the company uses energy-efficient vehicles to transport catering supplies (mean = 3.78, SD = 0.52). This suggests that energy-efficient transportation is a well-established practice within the company. However, there is slight

variability in respondents' views. There was a strong consensus (mean = 4.06, SD = 0.56) that the use of eco-friendly transportation methods helps reduce the company's carbon footprint. This indicates that respondents view the company's environmental efforts as a significant factor in reducing its overall impact on the environment. This aligns with the concept of corporate social responsibility (CSR), where sustainable practices contribute not only to environmental stewardship but also to a positive corporate image, which can be a valuable intangible resource (RBV).

The respondents agreed (mean = 3.79, standard deviation = 0.54) that The company has adopted renewable energy sources for transportation wherever possible On the adoption of renewable energy sources for transportation, respondents showed moderate agreement, indicating that while the practice is recognized, there is some variability in how respondents perceive its implementation. Similarly, respondents agreed that the use of energy-efficient transportation gives the company a competitive edge in the market, with a mean of 4.00 and a standard deviation of 0.65, suggesting strong agreement, though with some variation in opinions. Regarding energy efficiency in on-board services, the company's investment in innovative technologies to improve energy efficiency was also well supported, with a mean of 3.95 and a standard deviation of 0.66. This indicates that respondents view the company's efforts in energy-saving technologies positively, though with some variation in the strength of their agreement. The implementation of energy-saving practices in the airline's catering services was similarly supported, with a mean of 3.87 and a standard deviation of 0.46, reflecting strong agreement and low variability.

Respondents also agreed that the use of energy-efficient onboard catering equipment improves service delivery, with a mean of 3.89 and a standard deviation of 0.60, suggesting that respondents view energy-efficient equipment as contributing to better service, although with moderate variability in responses. The statement that onboard energy efficiency contributes to reducing the airline's overall environmental impact had the highest mean (4.00, SD = 0.31), with very low variability. This suggests unanimous agreement that energy efficiency efforts in catering services play a crucial role in reducing the airline's environmental footprint.

By adopting energy-efficient vehicles and innovative technologies for onboard services, the airline catering firms are investing in valuable resources that support both cost leadership and differentiation strategies. These practices help reduce operational costs, improve service delivery,

and enhance the company's environmental reputation, all of which contribute to a sustainable competitive advantage. From an RBV perspective, energy-efficient initiatives represent valuable, rare, and inimitable resources that, when properly implemented, can offer the company a long-term strategic edge. From an I/O perspective, these practices position the company as a market leader in sustainability, responding to external market demands for environmentally conscious services, which is increasingly becoming a critical factor in consumer decision-making.

4.3.5 Competitive advantage

The following section seeks to evaluate the competitive advantage of airline catering services firms in Kenya. In this section, respondents were asked to assess various statements regarding competitive advantage in the airline catering sector. These statements explore various aspects of competitive advantage. The responses to the statements were recorded using a Likert scale to gauge the extent of agreement or disagreement with each statement. (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

Table 4.10: Statements on Competitive advantage

	N	Mean	Std. Deviation
The company continuously improves operational efficiency through sustainable logistics.	63	4.08	.49
Operational efficiency is a key driver of the company's competitive advantage.	63	3.86	.40
The company's focus on operational efficiency has strengthened its position in the market.	63	4.10	.50
Sustainable green practices have led to a reduction in overall operating costs.	63	4.00	.51
Cost savings from green practices improve the company's pricing flexibility.	63	3.92	.41
Reducing costs through sustainability enhances the company's profitability in the competitive market.	63	4.02	.42
Sustainable cost-saving strategies are integrated into all our operations.	63	3.92	.52

Our sustainability efforts have enhanced our corporate image.	63	4.03	.44
The company's commitment to sustainability strengthens its brand identity.	63	4.16	.45
Sustainability is a key part of our firm's branding and public relations efforts.	63	4.05	.55
The company's sustainable logistics practices differentiate it from competitors in the airline catering industry.	63	4.22	.52
Green logistics practices help the company attract environmentally conscious customers.	63	4.23	.53
Composite		4.05	.32

The findings indicate that the overall mean was 4.05 at a 0.32 standard deviation. A mean of 4.05 suggests that, on average, the respondents agreed on the aspects regarding competitive advantage. The results of the survey reveal that respondents perceive sustainable logistics practices as critical in enhancing operational efficiency and, consequently, competitive advantage. The company's continuous improvement of operational efficiency through sustainable logistics scored a mean of 4.08 (SD = 0.49), suggesting a strong agreement that such efforts significantly contribute to the company's competitive positioning. This aligns with the literature, which emphasizes the importance of operational efficiency as a driver of competitive advantage (Lindén & Melin Schalnén, 2022).

Operational efficiency was also seen as a key driver of competitive advantage, with a mean of 3.86 and a standard deviation of 0.40, reflecting consistent agreement with slight variation in responses. The airline catering firm's focus on improving operational efficiency was identified as a key driver of competitive advantage (mean = 3.86, SD = 0.40), further solidifying the role of streamlined operations in market positioning. Respondents agreed that sustainable green practices have led to a reduction in overall operating costs, with a mean of 4.00 and a standard deviation of 0.51, indicating a solid consensus. Similarly, cost savings from green practices were believed to improve the company's pricing flexibility, reflected by a mean of 3.92 and a standard deviation of 0.41, suggesting that most respondents agree with some slight variation in their views.

There was also agreement that reducing costs through sustainability enhances the company's profitability in the competitive market, as shown by a mean of 4.02 and a standard deviation of 0.42. This indicates that respondents perceive sustainability as beneficial to the company's profitability, with low variability in opinions. Furthermore, sustainable cost-saving strategies are integrated into all operations, with a mean of 3.92 and a standard deviation of 0.52, showing strong agreement with moderate variability in responses. In terms of corporate image, respondents generally agreed that sustainability efforts have enhanced the company's public image, with a mean of 4.03 and a standard deviation of 0.44, indicating a strong consensus. The company's commitment to sustainability was also seen as strengthening its brand identity, reflected by a mean of 4.16 and a standard deviation of 0.45, showing widespread agreement with minimal variation.

Sustainability was also identified as a central component of the company's branding and public relations efforts, with a mean of 4.05 (SD = 0.55). The importance of sustainability as a branding tool is underscored by Caniato et al. (2012) who highlight how companies can differentiate themselves through sustainable practices, which are increasingly valued by customers. Additionally, respondents agreed that the company's sustainable logistics practices provide a competitive differentiation (mean = 4.22, SD = 0.52), and help attract environmentally conscious customers (mean = 4.23, SD = 0.53). These findings align with Liu et al. (2020), who suggest that green logistics practices not only differentiate firms from competitors but also appeal to an increasingly environmentally aware consumer base.

4.4 Inferential Statistics

4.4.1 Regression between Eco-friendly Packaging and Competitive Advantage

A simple linear regression analysis was conducted between Eco-friendly Packaging and Competitive Advantage and the results are summarized in Table 4.11.

Table 4.11: Regression between Eco-friendly Packaging and Competitive Advantage

Model summary				
Model	R	R square	Adjusted r square	Std. Error of the estimate
1	.422[a]	.178	.164	.21746
A. Predictors: (constant), eco-friendly packaging				
Anova[a]				

Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	.624	1	.624	13.197	.001[b]
	Residual	2.885	61	.047		
	Total	3.509	62			
A. Dependent variable: competitive advantage						
B. Predictors: (constant), eco-friendly packaging						
Coefficients[a]						
Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. Error	Beta		
1	(constant)	2.903	.317		9.165	.000
	Eco-friendly packaging	.295	.081	.422	3.633	.001
A. Dependent variable: competitive advantage						

The model summary indicates that eco-friendly packaging explains 17.8% of the variance in competitive advantage, as shown by an R Square value of 0.178. The Adjusted R Square of 0.164 further confirms that the model has a modest explanatory power when adjusted for the number of predictors. The ANOVA results show that the regression model is statistically significant ($F = 13.197$, $p = 0.001$), indicating that eco-friendly packaging has a meaningful influence on competitive advantage.

Furthermore, the coefficients table reveals that eco-friendly packaging has a positive and statistically significant effect on competitive advantage ($B = 0.295$, $p = 0.001$). This means that for every one-unit increase in the adoption of eco-friendly packaging practices, there is an associated 0.295 unit increase in competitive advantage, holding other factors constant. The standardized beta coefficient of 0.422 indicates a moderate positive relationship, and the t-value of 3.633 reinforces the statistical significance of this predictor. These findings suggest that implementing eco-friendly packaging practices significantly contributes to enhancing the competitive edge of airline catering firms in Kenya.

4.4.2 Regression between Green procurement and Competitive Advantage

A simple linear regression analysis was conducted between green procurement and Competitive Advantage and the results are summarized in Table 4.12.

Table 4.12: Regression between Green procurement and Competitive Advantage

Model summary

Model	R	R square	Adjusted r square	Std. Error of the estimate
1	.612[a]	.375	.363	.20005

A. Predictors: (constant), green procurement

Anova[a]

Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	1.068	1	1.068	26.677	.000[b]
	Residual	2.441	61	.040		
	Total	3.509	62			

A. Dependent variable: competitive advantage

B. Predictors: (constant), green procurement

Coefficients[a]

Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. Error	Beta		
1	(constant)	2.630	.276		9.535	.000
	Green procurement	.353	.068	.552	5.165	.000

A. Dependent variable: competitive advantage

The study examined the influence of green procurement on competitive advantage in airline catering service firms in Kenya. The regression analysis revealed that green procurement significantly predicts competitive advantage. The model summary shows an R Square of 0.375, indicating that approximately 37.5% of the variation in competitive advantage can be explained by green procurement practices. The Adjusted R Square of 0.263 confirms a strong explanatory power of the model even after accounting for the predictor variable. The ANOVA results further support this relationship, with the model being statistically significant ($F = 26.677$, $p < 0.001$), implying that green procurement has a strong and significant impact on competitive advantage.

The coefficients table shows that green procurement has a positive and statistically significant effect on competitive advantage ($B = 0.353$, $p < 0.001$). This means that a one-unit increase in green procurement practices is associated with a 0.353 unit increase in competitive advantage, holding all other factors constant. The standardized beta coefficient of 0.552 suggests a strong positive relationship, and the t-value of 5.165 indicates that this predictor is highly significant. These findings highlight that strategic implementation of green procurement such as local sourcing

and supplier collaboration plays a critical role in enhancing the competitiveness of airline catering firms in Kenya.

4.4.3 Regression between Waste Management and Competitive Advantage

A simple linear regression analysis was conducted between waste management and Competitive Advantage and the results are summarized in Table 4.13.

Table 4.13: Regression between Waste Management and Competitive Advantage

Model summary					
Model	R	R square	Adjusted r square	Std. Error of the estimate	
1	.457[a]	.209	.196	.21336	
A. Predictors: (constant), waste management					
Anova[a]					
Model		Sum of squares	Df	Mean square	F	Sig.
1	Regression	.732	1	.732	16.079	.000[b]
	Residual	2.777	61	.046		
	Total	3.509	62			
A. Dependent variable: competitive advantage						
B. Predictors: (constant), waste management						
Coefficients[a]						
Model		Unstandardized coefficients		Standardized coefficients	T	Sig.
		B	Std. Error	Beta		
1	(constant)	2.631	.355		7.415	.000
	Waste management	.369	.092	.457	4.010	.000
A. Dependent variable: competitive advantage						

The study further investigated the extent to which waste management contributes to competitive advantage among airline catering service firms in Kenya. The model summary reveals an R Square of 0.209, indicating that waste management practices account for 20.9% of the variation in competitive advantage. The Adjusted R Square of 0.196 confirms that the model has a reasonably good fit, even after adjusting for the single predictor variable. The ANOVA results demonstrate that the regression model is statistically significant ($F = 16.079$, $p < 0.001$), suggesting that waste management has a notable effect on competitive advantage.

The coefficients output shows that waste management is a positive and statistically significant predictor of competitive advantage (B = 0.369, p < 0.001). This implies that a one-unit increase in effective waste management practices, such as food donation and systematic waste tracking, leads to a 0.369 unit increase in competitive advantage. These results suggest that implementing structured waste management strategies not only supports environmental sustainability but also enhances the competitiveness of airline catering firms by improving operational efficiency and brand reputation.

4.4.4 Regression between Energy Efficiency and Competitive Advantage

A simple linear regression analysis was conducted between energy efficiency and Competitive Advantage and the results are summarized in Table 4.14.

Table 4.14: Regression between Energy Efficiency and Competitive Advantage

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.653[a]	.427	.417	.18158

a. Predictors: (Constant), energy efficiency

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.498	1	1.498	45.418	.000[b]
	Residual	2.011	61	.033		
	Total	3.509	62			

a. Dependent Variable: Competitive Advantage

b. Predictors: (Constant), energy efficiency

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.392	.247		9.691	.000
	energy efficiency	.423	.063	.653	6.739	.000

a. Dependent Variable: Competitive Advantage

The study examined the relationship between energy efficiency initiatives and competitive advantage within airline catering service firms in Kenya. The model summary shows that energy

efficiency has a strong explanatory power, with an R Square value of 0.427, meaning that 42.7% of the variation in competitive advantage can be explained by energy efficiency practices. The Adjusted R Square of 0.417 further confirms that this predictor retains a high level of accuracy even after accounting for potential variance. The ANOVA results indicate that the regression model is statistically significant ($F = 45.418$, $p < 0.001$), confirming that energy efficiency is a key factor influencing competitive advantage.

The coefficients table indicates that energy efficiency has a positive and highly significant effect on competitive advantage ($B = 0.423$, $p < 0.001$). This means that for every one-unit increase in energy efficiency practices such as optimizing transportation methods and onboard service energy use there is an expected 0.423 unit increase in competitive advantage, all other factors held constant. These findings suggest that energy efficiency is not only an environmental imperative but also a strategic asset, enabling airline catering firms to enhance operational performance, reduce costs, and achieve a more sustainable competitive position.

4.4.5 Multiple Regression Analysis

This section presents the results of the Multiple Regression Analysis conducted to assess the effect of various sustainable green logistics practices specifically eco-friendly packaging, green procurement, waste management, and energy efficiency on the competitive advantage of airline catering services firms in Kenya.

Table 4.15: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.673[a]	.453	.415	.18193

a. Predictors: (Constant), Eco-Friendly Packaging, Green Procurement, Waste Management, Energy Efficiency

The correlation coefficient of 0.673 suggests a moderate to strong relationship between the independent variables (eco-friendly packaging, green procurement, waste management, energy efficiency) and the dependent variable (competitive advantage). The R Square value of 0.453 indicates that 45.3% of the variation in competitive advantage can be explained by the four independent variables in the model. This shows a moderately strong explanatory power.

Table 4.16: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1.589	4	.397	12.004	.000[b]
	Residual	1.920	58	.033		
	Total	3.509	62			
a. Dependent Variable: Competitive Advantage						
b. Predictors: (Constant), Eco-Friendly Packaging, Green Procurement, Waste Management, Energy Efficiency						

The F-statistic of 12.004 with a p-value of 0.000 indicates that the regression model as a whole is statistically significant. This suggests that the independent variables (eco-friendly packaging, green procurement, waste management, and energy efficiency) together significantly explain the variation in the dependent variable, competitive advantage.

Table 4.17: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.231	.324		6.887	.000
	Eco-Friendly Packaging	.108	.039	.093	2.769	.003
	Green Procurement	.336	.118	.313	2.845	.017
	Waste Management	.206	.076	.176	2.711	.002
	Energy Efficiency	.349	.096	.541	3.633	.001
a. Dependent Variable: Competitive Advantage						

The Variance Inflation Factors (VIFs) were within acceptable limits, indicating no significant multicollinearity among predictors. The Constant value is 2.231, which represents the baseline competitive advantage when all the independent variables are set to zero. The unstandardized coefficient for eco-friendly packaging is 0.108, indicating that for each unit increase in eco-friendly packaging, the competitive advantage increases by 0.108 units. This effect is statistically significant ($p = 0.003$), indicating a positive effect of eco-friendly packaging on competitive advantage. The unstandardized coefficient for green procurement is 0.336, meaning that for each unit increase in green procurement, the competitive advantage increases by 0.336 units. This effect is statistically significant ($p = 0.017$), demonstrating that green procurement practices positively contribute to competitive advantage. The unstandardized coefficient for waste management is 0.206, which suggests that improvements in waste management practices lead to a 0.206 unit

increase in competitive advantage. This variable is statistically significant (p = 0.002), showing that waste management has a positive effect on competitive advantage. The unstandardized coefficient for energy efficiency is 0.349, meaning that energy efficiency practices contribute to an increase of 0.349 units in competitive advantage. This effect is highly significant (p = 0.001), indicating that energy efficiency has the strongest positive effect on competitive advantage among the four predictors.

4.5 Chapter Summary

Chapter Four presents the data analysis, results, and interpretations based on the objectives of the study. The chapter begins with the response rate and demographic profile of respondents, covering age, education, experience, and departmental affiliation. The chapter then explores descriptive statistics for the four main variables. This is followed by inferential statistical analysis, including simple and multiple regression models.

CHAPTER FIVE

SUMMARY, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides a summary of the research findings, discussions, conclusions drawn, followed by practical recommendations for airline catering service firms seeking to enhance their competitiveness by integrating sustainability practices. Additionally, the limitations of the study and areas for further studies are also provided in this chapter.

5.2 Summary of Findings

5.2.1 Eco-friendly Packaging and Competitive Advantage

The findings of the study demonstrate a significant positive effect of eco-friendly packaging on the competitive advantage of airline catering services firms in Kenya (coefficient of 0.108, P Value of 0.003). The respondents generally agreed with the use of eco-friendly packaging in airline catering services, with the statements regarding recyclable and biodegradable packaging receiving strong support. For instance, the statement that customers appreciate recyclable packaging indicate strong agreement among respondents. Additionally, the use of biodegradable packaging also garnered positive feedback further confirming the significance of sustainability practices in the sector. The findings also highlighted that eco-friendly packaging practices help reduce the environmental footprint of the firms and contribute to cost savings. Furthermore, respondents strongly agreed that the transition to compostable packaging has improved the firm's brand image. This indicates that not only does eco-friendly packaging enhance environmental sustainability, but it also contributes to improving the public perception of the firm, which is an important element of competitive advantage.

5.2.2 Green procurement and Competitive Advantage

The findings indicate strong support for green procurement practices, particularly with regard to local sourcing and supplier collaboration. Respondents generally agree that sourcing ingredients locally helps reduce environmental impacts and logistics costs. There is also strong consensus that local sourcing improves the freshness and quality of ingredients used in catering services. The firm's focus on partnering with suppliers who demonstrate strong sustainability practices is also

well supported, with respondents viewing it as an important factor in the company's green procurement strategy.

Additionally, there is a clear belief that suppliers are committed to environmentally friendly practices in both production and packaging, though there is a moderate level of variability in responses. Respondents also agreed that close collaboration with suppliers plays a significant role in meeting sustainability goals, and that such partnerships have led to innovations that save costs. Furthermore, the importance of long-term relationships with suppliers in enhancing the company's competitive advantage through green initiatives was strongly affirmed. The data suggests that respondents see green procurement practices as crucial for reducing environmental impact, improving product quality, driving cost savings, and gaining a competitive edge in the market. The relatively low to moderate variability in the responses indicates a general consensus, with some differences in how strongly respondents feel about the specific aspects of these practices. Green procurement practices positively contribute to competitive advantage Kenya (coefficient of 0.336, P Value of 0.017).

5.2.3 Waste Reduction and Competitive Advantage

The study found that waste management practices positively contribute to the competitive advantage of airline catering services firms in Kenya (coefficient of 0.206, P Value of 0.002). Respondents strongly agreed that donating excess food helps reduce food waste and contributes positively to the company's public image. While respondents generally agreed that food donations reduce waste disposal costs, there was moderate variability in how strongly they felt about this financial impact. Respondents showed strong support for waste tracking practices, with regular waste audits seen as beneficial in improving the efficiency of waste management systems and supporting the company's competitive advantage. There was strong agreement that waste reduction strategies are integrated into the company's catering and logistics operations, which helps in optimizing resources and enhancing operational efficiencies. Waste management practices, such as food donations, waste tracking, and resource optimization, contribute positively to competitive advantage by reducing costs, enhancing operational efficiency, and improving the company's image.

5.2.4 Energy Efficiency and Competitive Advantage

The study found that energy efficiency practices play a significant role in enhancing the competitive advantage of airline catering services firms in Kenya (coefficient of 0.349, P Value of 0.001). Respondents strongly agreed that using energy-efficient vehicles and eco-friendly transportation methods, including renewable energy sources, contributes to the company's positive environmental impact and competitive positioning. The adoption of energy-efficient technologies in both transportation and onboard catering services was viewed positively, with respondents agreeing that these technologies contribute to better service delivery and reduced environmental impact. Respondents agreed that energy-efficient practices, particularly in transportation and onboard catering services, provide the company with a competitive edge in the market by improving service delivery and reducing the environmental footprint. Respondents widely agreed that energy efficiency contributes to reducing the airline's overall environmental impact, which positively affects the company's public image and competitive standing.

5.3 Discussion of Findings

5.3.1 Eco-friendly Packaging and Competitive Advantage

The study sought to establish the effect of eco-friendly packaging on the competitive advantage of the airline catering services firms in Kenya. The findings of the study indicate a statistically significant positive relationship between eco-friendly packaging and the competitive advantage of airline catering services firms in Kenya. The unstandardized coefficient for eco-friendly packaging was found to be 0.295, indicating that for every unit increase in eco-friendly packaging practices, the competitive advantage of the firm increases by 0.295 units. This result highlights the importance of sustainable packaging choices in enhancing the competitive edge of firms operating within this industry. From the Resource-Based Theory (RBT), competitive advantage arises from the firm's ability to exploit valuable, rare, inimitable, and non-substitutable resources. Eco-friendly packaging serves as a unique resource that can differentiate firms in the competitive airline catering industry. In particular, eco-friendly packaging provides a sustainable resource that aligns with the growing consumer demand for environmentally responsible practices. This resource is valuable because it improves a firm's reputation and market positioning, as consumers are increasingly prioritizing sustainability.

The moderate agreement regarding recyclable packaging indicates that while it is seen as important, the adoption of recyclable packaging may not be as widespread or consistently implemented across all firms. This aligns with Nikitaeva (2021), who found that while bio-based packaging had some appeal, other sustainable packaging elements, such as recyclable materials, had a stronger impact on consumers. The variation in responses could reflect the challenge faced by firms in the airline catering industry in balancing the cost of sustainable packaging with its perceived benefits.

There was a higher agreement that customers appreciate the use of recyclable packaging. This finding aligns with Maziriri's (2020) study, which highlighted that green packaging has a significant influence on the competitive advantage of SMEs in South Africa. While SMEs in South Africa and airline catering firms in Kenya operate in different sectors, they share common ground in that both are service-oriented and increasingly subject to consumer-driven sustainability demands. In both contexts, customer-facing operations make sustainable practices more visible, thereby influencing brand image and perceived value. This visibility may explain why recyclable packaging is strongly appreciated by customers in both studies. In the current study, the strong agreement with the statement that customers value recyclable packaging further supports the argument that sustainable practices are increasingly shaping consumer perceptions. The low standard deviation suggests that respondents from different backgrounds agree on the importance of recyclable packaging in appealing to customers, which could be linked to a broader trend of environmentally-conscious consumer behavior.

The mean for the use of biodegradable packaging was 4.24 with a standard deviation of 0.76, indicating strong agreement, although with a higher level of variation compared to recyclable packaging. Biodegradable packaging has emerged as a significant trend within green logistics, particularly in the food service and catering industries. The findings suggest that while biodegradable packaging is viewed positively, there is some divergence in how extensively it is utilized within the airline catering sector. This result resonates with Gikonyo (2023), who found that green logistics practices, including packaging innovations, significantly improve the performance of firms in Kenya. However, the slight variation in responses may reflect differences in how firms implement biodegradable packaging solutions, especially considering the additional costs and challenges associated with sourcing and using biodegradable materials.

The statement regarding the regular use of compostable packaging scored a mean of 3.92 with a very low standard deviation of 0.33, suggesting strong agreement with minimal variability. The strong consensus on the use of compostable packaging, combined with a low standard deviation, indicates that firms in the airline catering industry in Kenya are likely consistent in adopting compostable packaging solutions. This finding is supported by Mumbi, Karanja, and Kiarie (2021), who found that green practices such as green packaging positively influence competitive advantage in the Kenyan horticultural industry. The results suggest that compostable packaging is seen as a sustainable alternative, and firms adopting this practice are likely gaining a competitive advantage through enhanced brand image and consumer trust.

The agreement that recyclable packaging reduces the environmental footprint is consistent with findings from Maziriri (2020), which emphasized the role of green packaging in enhancing the environmental responsibility of firms. While most respondents agreed on the environmental benefits, the variation in responses suggests that some firms may not fully understand or communicate the extent of these benefits. This could indicate a gap in how the environmental impact of packaging is conveyed to both consumers and stakeholders.

The respondents agreed that the transition to compostable packaging has improved the firm's brand image" scored 3.95 with a very low standard deviation of 0.38, reflecting strong agreement and minimal variation. This finding supports previous studies, including Maziriri (2020), which argued that the use of green marketing, such as eco-friendly packaging, enhances a firm's brand image and market positioning. The airline catering firms in Kenya that have adopted compostable packaging are seen as more environmentally responsible, which not only appeals to consumers but also positions the firm as a leader in sustainable practices. The minimal variation in responses suggests that this perception is widely shared among respondents, indicating that the adoption of sustainable packaging practices has become a key strategy for improving brand image.

5.3.2 Green procurement and Competitive Advantage

The study explored the influence of green procurement on competitive advantage within the context of airline catering services firms in Kenya. In this study, green procurement was found to significantly affect the competitive advantage of the firms, with an unstandardized coefficient of 0.353, indicating that for each unit increase in green procurement practices, the competitive advantage increases by 0.353 units. The effect of green procurement on competitive advantage

was statistically significant (p = 0.000), demonstrating that green procurement positively influences the firm's ability to maintain a competitive edge.

This positive relationship between green procurement and competitive advantage can be interpreted and understood through Resource-Based Theory (RBT) and Industry Organization (I/O) Theory, two theories that offer distinct yet complementary perspectives on how firms can gain and sustain competitive advantages. According to Resource-Based Theory (RBT), firms gain a competitive advantage by utilizing valuable, rare, inimitable, and non-substitutable resources. In the case of green procurement, the practice of sourcing sustainable materials, products, and services can be seen as a strategic resource that enhances a firm's competitive edge. From the perspective of Industry Organization (I/O) Theory, firms gain a competitive advantage by effectively positioning themselves within their industry relative to competitors, considering both external market forces and industry dynamics. Green procurement is influenced by external market demands, including evolving regulations, consumer preferences, and industry standards.

From the respondents' perspectives, green procurement had a notable effect on their firms' competitive advantage. The respondents generally agreed on the importance of sourcing ingredients locally, which not only reduces logistics costs but also positively influences the quality and freshness of the products. For example, the statement about local sourcing reducing environmental impacts had a mean of 3.92 with a standard deviation of 0.45, suggesting strong consensus and minimal variation in responses. Similarly, the sourcing of local ingredients was also viewed as beneficial in reducing logistics costs (mean = 3.89, standard deviation = 0.41).Furthermore, respondents strongly agreed that sourcing from suppliers with strong sustainability practices could contribute to the firm's competitive advantage. Furthermore, the firm's collaboration with suppliers to meet sustainability goals was seen positively, suggesting agreement that such partnerships foster long-term value and improve the firm's market position. A similar pattern of agreement was observed regarding suppliers' commitment to environmentally friendly practices in both production and packaging (mean = 4.16, standard deviation = 0.65). These results highlight the importance of building supplier relationships that prioritize sustainability. Green procurement practices are not limited to purchasing environmentally friendly products but extend to ensuring that suppliers follow sustainable production and packaging practices, which in turn enhance the competitive advantage of the airline catering services firms.

The findings of this study resonate with existing research that highlights the importance of green procurement in enhancing competitive advantage. For instance, Caniato et al. (2012) found that sustainable sourcing practices, including sourcing organic materials and ensuring fair labor practices, helped companies in the apparel industry to differentiate their brand and build customer loyalty. Similarly, Renukappa et al. (2021) emphasized the growing importance of sustainable procurement practices in the UK construction sector, noting that sustainable procurement is integral to gaining a competitive edge, especially as firms navigate increasingly complex and environmentally-conscious market conditions.

The study also aligns with findings from Lindén and Melin Schalnén (2022), who highlighted the role of strategic sourcing in enhancing the competitive advantage of SMEs. By aligning procurement practices with sustainable development goals, firms can improve their market position and operational efficiency. Bor (2021) supported this notion, noting that green supply chain management, including green procurement, significantly improved performance in Kenya's food and beverage sector. These studies further validate the notion that adopting green procurement strategies can enhance a firm's competitiveness across various industries.

5.3.3 Waste Management and Competitive Advantage

The sought to determine the extent to which waste management contribute to the competitive advantage of the airline catering services firms in Kenya. The findings of this study reveal that waste management practices significantly affects the competitive advantage of airline catering services firms in Kenya. The unstandardized coefficient for waste management is 0.369, indicating that improvements in waste management lead to a 0.369 unit increase in competitive advantage. The statistical significance of this variable ($p = 0.000$) highlights that waste management is a crucial factor in enhancing the competitive edge of these firms. Under Resource-Based Theory (RBT), competitive advantage is achieved by leveraging valuable, rare, inimitable, and non-substitutable resources. Waste management, particularly effective waste reduction, recycling, and resource recovery, can be viewed as a strategic resource that contributes to the firm's competitive advantage. From the Industry Organization (I/O) Theory perspective, firms gain a competitive advantage by responding to external market forces and industry dynamics. The adoption of waste management practices in response to regulatory pressures, consumer demand for sustainability, and competition from other firms can be understood through this theoretical lens.

Respondents showed strong agreement on the positive effect of donating excess food to local communities, with a mean of 3.75 and a standard deviation of 0.54, suggesting that food donations not only reduce food waste but also improve the company's public image and operational efficiencies. The practice of donating excess food was further supported by the finding that respondents agreed that this practice helps to reduce food disposal costs, as indicated by the mean of 3.71 (standard deviation = 0.68). Additionally, the company's involvement in waste tracking and regular audits received strong support (mean = 3.95, standard deviation = 0.46), highlighting the importance of monitoring waste to improve waste management processes and optimize resource utilization. The study's results are consistent with past research, which emphasizes the importance of waste management in enhancing competitive advantage across industries. For example, Wang and Cheng (2022) found that hospitality firms in Japan that implemented sustainable waste management practices, such as composting and energy recovery, not only reduced operational costs but also attracted environmentally conscious customers, ultimately strengthening their competitive position. Similarly, Nguyen and Le (2019) discovered that waste reduction practices such as recycling programs contributed to significant cost savings and operational efficiencies in Chinese firms, ultimately boosting their competitive advantage.

Additionally, Garcia and Lopez (2021) showed that in the automotive industry, waste reduction practices aligned with lean manufacturing principles led to improvements in process efficiency, lower costs, and higher product quality, which directly enhanced the competitive edge of automotive firms. These findings are directly aligned with the current study's results, reinforcing the idea that waste management and reduction are integral components of a firm's competitive strategy.

Interestingly, while the majority of respondents agreed on the positive effects of waste reduction strategies, some variability in their views suggests that not all participants perceive waste management initiatives in the same light. For instance, the practice of regularly donating food to communities received a slightly lower mean score (3.43, standard deviation = 0.71), indicating some differences in opinions on how effectively this practice is implemented or how impactful it is.

5.3.4 Energy Efficiency and Competitive Advantage

The study sought to evaluate the contribution of energy efficiency to the competitive advantage of the airline catering services firms in Kenya. The findings of this study indicate that energy efficiency practices have a significant positive influence on the competitive advantage of airline catering services firms in Kenya. The unstandardized coefficient for energy efficiency is 0.423, showing that energy-efficient practices contribute to a 0.423 unit increase in competitive advantage. According to Resource-Based Theory, firms achieve competitive advantage by developing and leveraging internal capabilities that are valuable, rare, inimitable, and non-substitutable. Energy-efficient technologies and processes directly reduce operating costs a critical component of competitiveness in the airline catering industry, which is energy-intensive (e.g., refrigeration, heating, lighting, and transport). Lower energy costs improve profit margins, making energy efficiency a valuable operational strategy. While energy efficiency is increasingly pursued, well-integrated, firm-specific energy management systems (e.g., automated energy use tracking, energy-efficient kitchens, smart appliances) remain relatively rare, especially in Kenya's service sector. Firms that successfully adopt such systems position themselves ahead of competitors.

Respondents strongly agreed that the use of energy-efficient vehicles to transport catering supplies contributes to the company's environmental efforts. Additionally, there was a strong consensus that eco-friendly transportation methods help reduce the company's carbon footprint, indicating that respondents perceive this as a key factor in the company's environmental sustainability initiatives. When respondents were asked about the adoption of renewable energy sources for transportation, the mean score of 3.79 (standard deviation = 0.54) indicated moderate agreement, suggesting that while renewable energy adoption is acknowledged, its implementation might vary in perception among respondents. Similarly, there was strong agreement (mean = 4.00, standard deviation = 0.65) that the use of energy-efficient transportation methods gives the company a competitive edge, although with some variability in responses.

Regarding energy efficiency in onboard services, respondents positively evaluated the company's investment in energy-efficient technologies. This suggests that respondents appreciate the company's efforts to implement energy-saving innovations, though some variation in the strength of agreement exists. Moreover, the use of energy-efficient catering equipment was also supported, with a mean of 3.89 (standard deviation = 0.60), indicating that respondents perceive energy-

efficient equipment as a contributing factor to improved service delivery, though there is moderate variability in opinions. In terms of reducing the airline's environmental impact, respondents strongly agreed that energy efficiency practices contribute positively, showing a high level of consensus on this issue.

These findings align with past research that underscores the importance of energy-efficient practices in enhancing competitive advantage across various industries. For example, Munguia et al. (2019) demonstrated that energy-efficient policies and practices contribute to maintaining and improving competitiveness in the manufacturing sector in Mexico. The study highlighted the role of energy audits and efficient energy management in creating competitive advantages, which parallels the findings of this study in the context of airline catering services.

Similarly, Gąsior et al. (2022) found a positive relationship between eco-innovation, including energy-efficient practices, and competitive positioning in the Polish SME sector. Companies that engaged in eco-innovations, such as adopting energy-efficient technologies, enhanced their market competitiveness, which directly correlates with the findings that energy-efficient practices in airline catering improve competitive advantage.

Mutie et al. (2023) also observed a positive correlation between green logistics practices and performance in Kenyan logistics companies. This suggests that energy-efficient practices in transportation and logistics not only enhance environmental sustainability but also contribute to improved performance and competitiveness, which is consistent with the findings in this study regarding the positive role of energy-efficient transportation in gaining a competitive edge.

5.4 Conclusion

In light of the findings, it can be concluded that eco-friendly packaging is a crucial driver of competitive advantage in the airline catering services industry in Kenya. The use of recyclable, biodegradable, and compostable packaging not only contributes positively to environmental sustainability but also enhances the firm’s brand image, reduces operational costs, and appeals to environmentally conscious consumers. Furthermore, the significant statistical relationship between eco-friendly packaging and competitive advantage reinforces the importance of integrating sustainable practices into business strategies. As consumers become more environmentally aware, firms that prioritize sustainability in their operations are likely to gain a competitive edge in the marketplace.

The study concludes that green procurement significantly contributes to the competitive advantage of airline catering services firms in Kenya. The integration of sustainable sourcing practices, including local sourcing and collaboration with suppliers that prioritize environmentally friendly production and packaging, plays a vital role in enhancing the firms' operational efficiency, reducing costs, and improving product quality. The use of green procurement practices also strengthens the firm's brand image and increases its appeal to environmentally conscious customers. The positive effect of green procurement on competitive advantage is clear, as firms that adopt these practices are likely to gain a stronger position in the market.

The study concludes that effective waste reduction and management practices play a critical role in enhancing the competitive advantage of airline catering services firms in Kenya. Waste management strategies, such as donating excess food, tracking waste, and implementing regular waste audits, are important not only for reducing operational costs but also for improving the firm's public image and customer loyalty. These practices help firms in optimizing resource use, reducing waste disposal costs, and improving their environmental footprint, which collectively lead to a stronger competitive position in the market.

The study concludes that energy efficiency practices are a critical factor in enhancing the competitive advantage of airline catering services firms in Kenya. These practices not only help reduce operational costs but also enhance the company's environmental sustainability, which is increasingly valued by consumers and stakeholders. The significant effect of energy efficiency on competitive advantage underscores the importance of adopting sustainable practices in business operations, particularly in industries with high resource consumption, such as airline catering.

5.5 Recommendations for the Study

5.5.1 Policy Recommendations

Policymakers and regulatory bodies such as the Kenya Civil Aviation Authority (KCAA) and the National Environment Management Authority (NEMA) should develop guidelines and incentives for the adoption of eco-friendly packaging in the airline catering sector. This includes setting minimum standards for recyclable and compostable materials.

Government agencies should establish frameworks that encourage and possibly subsidize green procurement initiatives, particularly local sourcing, which reduces carbon footprints and supports local economies. Tax incentives or certifications for compliant firms could be considered.

To institutionalize food donation and reduce waste, national policy should clearly define and support safe and legal frameworks for surplus food distribution from catering firms to local communities, minimizing regulatory bottlenecks.

There is a need for policies that promote investment in renewable energy and energy-efficient technologies within service industries. Access to green financing or government-backed sustainability grants can accelerate adoption.

5.5.2 Managerial Recommendations

Airline catering firms should continue investing in and innovating sustainable packaging solutions. The study highlights that eco-packaging significantly enhances competitive advantage, particularly when paired with supplier collaboration to ensure material quality and supply chain consistency.

Managers should prioritize local sourcing to cut down on transport emissions and improve freshness. Establishing long-term partnerships with sustainable suppliers will not only enhance resilience but also align the supply chain with global sustainability goals, strengthening customer trust.

Firms should expand food donation partnerships and invest in digital waste tracking systems. This will promote transparency, reduce environmental impact, and build a stronger brand reputation through community engagement.

Investment in energy-efficient logistics operations and on-board systems is vital. This includes upgrading kitchen equipment, optimizing delivery routes, and incorporating low-emission vehicles. Such initiatives drive down costs and directly influence competitive performance.

5.5.3 Theoretical Contributions

The findings reinforce the RBV theory, suggesting that internal resources and capabilities like sustainable logistics practices can serve as unique assets that contribute to sustained competitive advantage in service sectors.

The study supports the Industrial Organization (I/O) theory, showing that external pressures such as environmental regulations and stakeholder expectations influence firms' strategic responses. Adoption of green practices can thus serve as a market differentiation strategy, reshaping competitive dynamics.

The study contributes empirical evidence to the growing literature on green logistics and performance, especially in the under-researched context of Kenya's airline catering industry by demonstrating quantifiable links between sustainability practices and competitive advantage.

5.6 Limitations of the Study

The study had several limitations; one limitation of the study is that it relied on a relatively small and localized sample of respondents from airline catering services firms in Kenya. As such, the findings may not be easily generalized to all firms within the airline catering industry in Kenya or to firms in other regions. A broader, more diverse sample could provide a more comprehensive understanding of the relationship between green practices and competitive advantage.

The study relied on self-reported data from respondents, which may be subject to biases such as social desirability bias, where respondents may report behaviors or opinions they believe are more socially acceptable or favorable. This could lead to an overestimation of the actual implementation of green practices and their effect on competitive advantage.

Lastly, the study focused primarily on internal perceptions of employees or key personnel within the firms, which might not fully capture the perspectives of other stakeholders, such as customers, suppliers, or regulatory bodies. Understanding the views of these external groups would provide a more holistic understanding of how green practices influence competitive advantage. The combination of self-reported data and internal perspectives may lead to conclusions that are more optimistic about the effect of green practices on competitive advantage than the actual reality.

5.7 Areas for Further Studies

The suggestions for further research were guided by the limitations of the current study, the nature of the research design, the scope of the data collected, and emerging trends in green logistics and sustainability. While this study specifically examined the effect of sustainable green logistics practices on competitive advantage within airline catering service firms in Kenya, several areas remain underexplored and warrant further academic attention:

This study focused exclusively on the airline catering services sector, a highly specialized segment within the broader service industry. Future research could examine the effect of eco-friendly packaging, green procurement, waste management, and energy efficiency on competitive advantage in other sectors such as hospitality, logistics, food processing, or manufacturing. Exploring cross-sectoral applicability would provide insights into the generalizability of these green practices and how different industry dynamics shape their implementation and outcomes.

While this study captured internal (managerial) perspectives, it did not assess how customers perceive green logistics initiatives or whether such perceptions influence purchasing decisions and brand loyalty. Future studies could examine the role of consumer perception and willingness to pay a premium for sustainable services, thereby offering a demand-side perspective on competitive advantage. This would be particularly useful in understanding market-based motivations for adopting sustainability practices.

This study employed a quantitative approach, which, while effective in measuring relationships, may have limited the depth of insights into how and why certain practices influence competitive advantage. Future research should consider a mixed-methods design combining surveys with interviews or case studies to explore the underlying mechanisms, cultural drivers, or organizational processes influencing sustainability implementation. This approach could help uncover nuances in how green practices are perceived and operationalized at different organizational levels.

5.8 Chapter Summary

Chapter Five synthesizes the findings from Chapter Four, providing a summary of results, discussion of key insights, conclusions, recommendations, and suggestions for further research. The chapter provides policy, managerial, and theoretical recommendations. The study's limitations are acknowledged, and finally, several areas for further research are proposed.

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APPENDICES

APPENDIX 1: LETTER OF INTRODUCTION

Ole Sangale Rd, Madaraka Estate,
P.O Box 59857 00200, Nairobi, Kenya.
Cell: +254 703 414/6/7, Twitter: @SBSKenya

Email: info@sbs.ac.ke or vist www.sbs.strathmore.edu

Strathmore UNIVERSITY BUSINESS SCHOOL

3rd February 2025

To Whom It May Concern,

RE: FACILITATION OF RESEARCH – GATHUNDIA, NANCY

This is to introduce Gathundia, Nancy who is a Master of Commerce (MCOM) Student at Strathmore University Business School, admission number MCOM/168996. As part of our MCOM Programme, Nancy is expected to do applied research and undertake a project. This is in partial fulfilment of the requirements of the MCOM course. To this effect, Nancy would like to request appropriate data from your organization.

Nancy is undertaking a research paper on "**IMPACT OF SUSTAINABLE GREEN LOGISTICS PRACTICES ON COMPETITIVE ADVANTAGE IN AIRLINE CATERING SERVICES FIRMS IN KENYA.**" The information obtained shall be treated confidentially and shall be used for academic purposes only.

Our MCOM Programme seeks to establish links with industry, and one of these ways is by directing our research to areas that would be of direct use to industry. We would be glad to share our findings with you after the research, and we trust that you will find them of great interest and of practical value to your organization.

We appreciate your support and shall be willing to provide any further information if required.

Yours sincerely,

Njoki Kiagiri
Manager – Graduate Programmes
Strathmore University Business School.

Strathmore Business School is a Proud member of;

Association of African Business Schools AABS EFMD AACSB

APPENDIX 2: QUESTIONNAIRE

Section A: Demographic Questions

1. Which is your age category?

   18–24 years ( )

   25–34 years ( )

   35–44 years ( )

   45–54 years ( )

   55 years and above ( )

2. What is your highest Level of Education?

   Diploma/Certificate ( )

   Bachelor's Degree ( )

   Master's Degree ( )

   Doctorate/Ph.D. ( )

   Other (Please specify)……

3. Years of Experience in Airline Catering Services?

   Less than 1 year ( )

   1–3 years ( )

   4–6 years ( )

   7–10 years ( )

   More than 10 years ( )

4. Specify your department?

   Catering and Food Production Department ( )

   Logistics and Supply Chain Management ( )

   Quality Assurance and Safety ( )

Customer Service and Account Management ( )

Human Resources ( )

Finance and Accounting ( )

Procurement ( )

Operations and Dispatch ( )

Information Technology (IT) ( )

In the following sections, indicate the extent to which you agree with the statements described in each part. Scale; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 Agree, 5= Strongly Agree.

Section B: Eco-friendly Packaging

5. To what extent do you agree with the following statements on Eco-friendly packaging in your firm?

Scale; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 Agree, 5= Strongly Agree.

	1	2	3	4	5
Our firm uses recyclable packaging in all catering services.					
Customers appreciate the use of recyclable packaging by our firm.					
The company uses biodegradable packaging materials in its catering services.					
The use of recyclable packaging reduces the environmental footprint of our firm.					
Compostable packaging is regularly used in our catering operations.					
Our transition to compostable packaging has improved our brand image.					
Using compostable packaging has reduced waste disposal costs for our firm.					
The firm has invested significantly in recyclable packaging.					

Section C: Green Procurement

6. To what extent do you agree with the following statements on green procurement in your firm?

Scale; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 Agree, 5= Strongly Agree.

	1	2	3	4	5
The company prefers sourcing ingredients locally to reduce environmental impacts.					
Local sourcing supports the company's goal to reduce logistics costs.					
Local sourcing improves the freshness and quality of ingredients used in catering services.					
The firm prioritizes local suppliers who have strong sustainability practices.					
Our suppliers are committed to environmentally friendly practices in production and packaging.					
We collaborate closely with suppliers to meet sustainability goals.					
Collaboration with suppliers has resulted in cost-saving innovations.					
Long-term supplier relationships improve our competitive advantage by promoting green initiatives.					

Section D: Waste Management

7. To what extent do you agree with the following statements on waste management in your firm?

Scale; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 Agree, 5= Strongly Agree.

	1	2	3	4	5
Donating excess food helps reduce food waste in the airline catering industry.					
The company regularly donates excess food to local communities.					
Donating excess food reduces waste disposal costs for the company.					
Food donations contribute to the company's positive public image.					
The company actively tracks and measures waste generated in catering services.					
Regular waste audits help improve the efficiency of the waste management system.					
Tracking waste supports the company's competitive advantage by optimizing resource use.					
Waste reduction strategies are integrated into the company's logistics and catering operations.					

Section E: Energy Efficiency

8. To what extent do you agree with the following statements on energy efficiency in your catering firm?

Scale; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 Agree, 5= Strongly Agree.

	1	2	3	4	5
The company uses energy-efficient vehicles to transport catering supplies.					
The use of eco-friendly transportation methods helps reduce the company's carbon footprint.					
The company has adopted renewable energy sources for transportation wherever possible.					
The use of energy-efficient transportation gives the company a competitive edge in the market.					
The company invests in innovative technologies to improve energy efficiency in on-board services.					
The company has implemented energy-saving practices in its airline catering services.					
The use of energy-efficient onboard catering equipment improves service delivery.					
Onboard energy efficiency contributes to reducing the airline's overall environmental impact.					

Section F: Competitive Advantage

9. To what extent do you agree with the following statements on competitive advantage in your firm?

Scale; 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4 Agree, 5= Strongly Agree.

	1	2	3	4	5
The company continuously improves operational efficiency through sustainable logistics.					
Operational efficiency is a key driver of the company's competitive advantage.					
The company's focus on operational efficiency has strengthened its position in the market.					
Sustainable green practices have led to a reduction in overall operating costs.					

Cost savings from green practices improve the company's pricing flexibility.					
Reducing costs through sustainability enhances the company's profitability in the competitive market.					
Sustainable cost-saving strategies are integrated into all our operations.					
Our sustainability efforts have enhanced our corporate image.					
The company's commitment to sustainability strengthens its brand identity.					
Sustainability is a key part of our firm's branding and public relations efforts.					
The company's sustainable logistics practices differentiate it from competitors in the airline catering industry.					
Green logistics practices help the company attract environmentally conscious customers.					

Thank you

APPENDIX 3: LETTER OF ETHICAL APPROVAL

4th March 2025

Strathmore UNIVERSITY

Ms Gathundia Nancy
Nancy.gathundia@strathmore.edu

Dear Ms Gathundia,

RE: The Impacts of Sustainable Green Logistics Practices on Competitive Advantage in Airline Catering Services Firms in Kenya

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** proposal. Your application reference number is **SU-ISERC2640/25.** The approval period is from **4th March 2025 to 3rd March 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 SUISERC.

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

Yours sincerely,

Mr Ambrose Rachier,
Chair person; SU - ISERC

APPENDIX 4: NACOSTI RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **735544**

Date of Issue: **11/March/2025**

RESEARCH LICENSE

This is to Certify that Miss.. Nancy Wanjiku Gathundia 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: Impacts of Sustainable Green Logistics Practices and Competitive Advantage in Airline Catering Service Firms in Kenya for the period ending : 11/March/2026.

License No: **NACOSTI/P/25/416819**

735544

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)

Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

The National Commission for Science, Technology and Innovation, hereafter referred to as the Commission, was the established under the Science, Technology and Innovation Act 2013 (Revised 2014) herein after referred to as the Act. The objective of the Commission shall be to regulate and assure quality in the science, technology and innovation sector and advise the Government in matters related thereto.

CONDITIONS OF THE RESEARCH LICENSE

1. The License is granted subject to provisions of the Constitution of Kenya, the Science, Technology and Innovation Act, and other relevant laws, policies and regulations. Accordingly, the licensee shall adhere to such procedures, standards, code of ethics and guidelines as may be prescribed by regulations made under the Act, or prescribed by provisions of International treaties of which Kenya is a signatory to.
2. The research and its related activities as well as outcomes shall be beneficial to the country and shall not in any way;
    i. Endanger national security
    ii. Adversely affect the lives of Kenyans
    iii. Be in contravention of Kenya's international obligations including Biological Weapons Convention (BWC), Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO), Chemical, Biological, Radiological and Nuclear (CBRN).
    iv. Result in exploitation of intellectual property rights of communities in Kenya
    v. Adversely affect the environment
    vi. Adversely affect the rights of communities
    vii. Endanger public safety and national cohesion
    viii. Plagiarize someone else's work
3. The License is valid for the proposed research, location and specified period.
4. Neither the license nor any rights thereunder are transferable.
5. The Commission reserves the right to cancel the research at any time during the research period if in the opinion of the Commission the research is not implemented in conformity with the provisions of the Act or any other written law.
6. The Licensee shall inform the relevant County Director of Education, County Commissioner and County Governor before commencement of the research.
7. Excavation, filming, movement, and collection of specimens are subject to further necessary clearance from relevant Government Agencies.
8. The License does not give authority to transfer research materials.
9. The Commission may monitor and evaluate the licensed research project for the purpose of assessing and evaluating compliance with the conditions of the License.
10. The Licensee shall submit one hard copy, and upload a soft copy of their final report (thesis) onto a platform designated by the Commission within one year of completion of the research.
11. The Commission reserves the right to modify the conditions of the License including cancellation without prior notice.
12. Research, findings and information regarding research systems shall be stored or disseminated, utilized or applied in such a manner as may be prescribed by the Commission from time to time.
13. The Licensee shall disclose to the Commission, the relevant Institutional Scientific and Ethical Review Committee, and the relevant national agencies any inventions and discoveries that are of National strategic importance.
14. The Commission shall have powers to acquire from any person the right in, or to, any scientific innovation, invention or patent of strategic importance to the country.
15. Relevant Institutional Scientific and Ethical Review Committee shall monitor and evaluate the research periodically, and make a report of its findings to the Commission for necessary action.

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