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**THE INFLUENCE OF SUSTAINABLE PACKAGING PRACTICES ON THE
OPERATIONAL EFFICIENCY OF GLOBAL FAST-FOOD OUTLETS IN NAIROBI,
KENYA**

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MBA/153940

**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF MASTER OF BUSINESS
ADMINISTRATION AT STRATHMORE UNIVERSITY BUSINESS SCHOOL,
STRATHMORE UNIVERSITY**

MAY 2025

DECLARATION

I declare that this work has not been previously submitted and approved for the award of a degree by this or any other University. To the best of my knowledge and belief, the 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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I want to start by giving thanks to God and my parents, who have always been very supportive of my academic pursuits, particularly my MBA program. Everyone at my institution, from the administration to the professors, has been an incredible resource, and I am really grateful to my supervisor, Dr. Davis Wekesa Barasa, PhD, for all of the help and advice he has given me as I have worked on my research report. Thank you to my friends who supported me.



DEDICATION

This dissertation is dedicated to my family, for their love, continuous support and encouragement in every aspect of my life.

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DEFINITION OF TERMS

Word	Definition	Citations
Biodegradable packaging	Packaging that breaks down naturally without harming the environment.	Nkosi & Zungu (2021)
Circular economy	An economic model focused on reducing waste through reuse and recycling.	Dupont & Legrand (2021)
Extended Producer Responsibility (EPR)	A policy approach that makes producers responsible for waste management.	Ogalo (2020)
Fast-food industry	The ability of a business to maximize output while minimizing waste.	Hanaysha (2022)
Green packaging	Green packaging, also known as sustainable packaging, aims to lessen the negative effects of packaging on the environment by using materials and manufacturing practices that minimize energy consumption.	Williams et al. (2022)
Sustainable packaging	Packaging alternatives made from biodegradable or recyclable materials.	Jang et al. (2023)
Operational efficiency	The ability of a business to maximize output while minimizing waste.	Liu & Zhang (2020)
Plastic ban	Government regulations restricting or prohibiting plastic use.	Ntirenganya et al. (2020)
Plastic waste	Discarded plastic materials contributing to environmental pollution.	UNEP (2022)
Single-use plastic packaging	Disposable plastic materials used once before being discarded.	Phelan et al. (2022)
Sustainable corporate practices	Business strategies aimed at reducing environmental impact.	Williams et al. (2022)

LIST OF ABBREVIATIONS

Abbreviation	Full Meaning
CAGR	Compound Annual Growth Rate.
EPR	Extended Producer Responsibility.
KNBS	Kenya National Bureau of Statistics.
NEMA	National Environment Management Authority.
UNEP	United Nations Environment Programme.

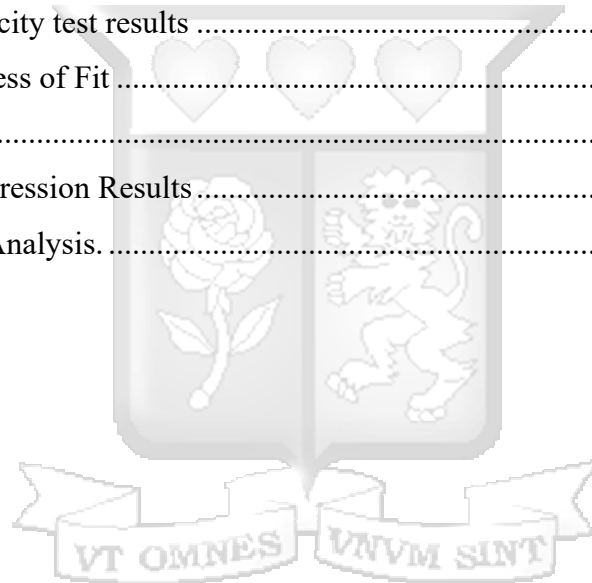
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ABSTRACT

Sustainable packaging aims to minimize environmental impact throughout a product's lifecycle by utilizing renewable or recycled materials, ensuring energy-efficient production, and designing for reuse or recyclability. Fast-food outlets, which have a heavy reliance on single-use plastics, are currently facing pressure to adopt sustainable packaging. This study's general objective was to examine the effect of adopting sustainable packaging on the operational efficiency of international fast-food outlets in Nairobi. The specific objectives of the study were to investigate the effect of efficient packaging design on the operational efficiency of international fast-food outlets in Nairobi; to investigate the relationship between recyclability and operational efficiency of international fast-food outlets in Nairobi and to assess the effect of consumer responsibility awareness on operational efficiency of international fast-food outlets in Nairobi. Two theories anchored the study and they were triple bottom line (TBL) framework and lean management theory. This study was underpinned by a quantitative methodology and anchored in positivism research philosophy. The target population was 31 international fast-food outlets. The researcher undertook a convenience sampling of one branch per the global fast-food chain where the employees from the three cadres in the fast-food outlets were selected. For this purpose, a questionnaire with a 5-point Likert scale was used to gather information. In order to analyse the data, the Statistical Package for the Social Sciences (SPSS) version 27 was used. Prior to analysis, the data was cleansed and prepared. The survey was filled out by 93 people in total. We used both descriptive and inferential statistics to examine the data. The impact of the independent factors on the dependent variable was determined by a regression analysis. Tables and charts displayed the results of the analysis. Sustainable packaging techniques were shown to have a favourable and statistically significant relationship with operational efficiency at Nairobi's international fast-food outlets. The regression model showed that material sustainability, packaging design, recyclability, consumer responsibility collectively explains 32.8 percent of the variability. The study also revealed that the most significant variable was recyclability. The study concludes that a sustainable packaging practices, significantly contributes to the operational efficiency of international fast-food outlets operating in Nairobi.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

In recent years, the fast-food industry has faced increasing pressure to adopt sustainable practices while maintaining operational efficiency. International fast-food outlets, particularly in urban centers like Nairobi, must balance environmental responsibility with cost-effectiveness and service speed to remain competitive (Afif et al., 2022). The hospitality industry and specifically the fast-food sector is a key driver of plastics usage. With the rising concerns about the level of sustainability and most importantly environmental sustainability, there is a need for a more intentional and well-coordinated effort to manage pollution. This can be partly through the embracing of non-plastic packaging. According to Hanaysha (2022), the fast-food sector was worth about USD 907 billion in 2022, with a projected compound annual growth rate (CAGR) of 4.6% between 2023 and 2030. This proliferation reflects the growing global demand for fast-food services, which in turn amplifies the environmental footprint of packaging waste. Given the boom in the industry, there is a dire need to rethink packaging to minimize environmental consequences. As of 2023, the global fast food market was estimated at USD 960 billion (Precedence Research, 2024). This expansion coincides with an increase in the use of single-use plastic packaging posing a profound environmental challenge (Phelan et al, 2022). Much of the 300 million tons of plastic waste, of which only 9% is recycled, produced annually comes from fast-food outlets (UNEP, 2022). Thus, sustainability efforts including the move away from plastics packaging have been enhanced globally as customers and governments demand cleaner and greener business practices. The adoption of non-plastic packaging in Kenya's fast-food industry still faces various hurdles including a plastic cost barrier.

Ogunyemi and Adewale (2022) reported that a shift in biodegradable materials leads to a 12% to 18% increase in operating costs. And this is a burden to smaller fast-food outlets struggle to keep up with. Supply chain disruptions have also hindered the availability of alternative materials. A study by Mwangi and Otieno, (2021) outlined that disruptions due to delays in acquiring biodegradable packaging led to operational inefficiencies according to 65% of the fast-food joints in Nairobi. There are opportunities emanating from such challenges (Nyamogosa and Obonyo, 2022). This is because of the increasing consumer awareness in matters of environmental

sustainability. A survey conducted in 2021 showed that 64% of Kenyan customers preferred organizations with higher environmental commitment (Uche, 2023). Further, planned government support for Extended Producer Responsibility (EPR) may incentivize companies to use non-plastic materials. In addition, developments in local production of biobased polymers could reduce reliance on imports, leading to lower costs and stable supply chains (Ogalo, 2020).

With increasing concern about the environment, there is a worldwide shift toward the sustainable corporate world. A promising effort to address the adverse effects of plastic pollution is the use of non-plastic packaging in the food industry (Jang et al. 2023). Fast-food outlets that are predominantly still using single use plastic-made materials are currently overwhelmed by the pressure to provide more sustainable packaging options in response to their sustainability goals (Okafor & Mordi, 2022). Fast-food outlets are a component of Nairobi, Kenya's urban culinary landscape, serving a diverse and growing clientele.

Transition away from plastic packaging does, however, pose operational challenges, albeit in keeping with global environmental objectives. They consist of higher costs, disrupted supply chains and impacts on waste management practices and worker productivity (Mwangi & Otieno, 2021). This connection between non-plastic packaging and operational efficiency in Nairobi's fast-paced urban food industry remains little understood. Global sustainability is embodied by established fast-food brands like McDonald's, KFC, and Starbucks in their fight to adopt sustainable packaging. For instance, McDonald's has committed to using 100 percent recycled or renewable materials in its packaging by 2025 (McDonald's Global Sustainability Report, 2022). In 2021, they reported 82% of their packaging came from a recycled or renewable source. This is an important step toward their goal. Similarly, Starbucks eliminated over 1 billion plastic straws per year using strawless lid and biodegradable cups (Starbucks Environmental Impact Report, 2022).

The transition isn't without its challenges, however. Based on a study by Williams et al., (2022), fiber substitutes used by American fast-food operators increased their operational cost by 15%, but improved brand image toward environmentally conscious customers. Yum China, which operates KFC and Pizza Hut outlets in Asia, eliminated over 8,000 tons of plastic in one year by replacing plastic straws and cutlery with biodegradable packages (Liu & Zhang, 2022). A trial by

Burger King of reused packaging in selected locations in France and the UK showed the value of a circular economy and yet highlighted the logistical difficulties (Dupont & Legrand, 2021).

Demand for eco-friendly packaging also grew even more due to the COVID-19 outbreak. Fast-food industry has expanded rapidly in Africa where urbanization is rapidly changing the consumption pattern of foods. Ogalo (2020) noted that the fast-food industry grew at a 5.7% CAGR in Sub-Saharan Africa from 2015 - 2021 influenced by the expansion of South Africa, Nigeria, and Kenya.

Africa has witnessed tremendous growth, but its dependence on plastic packaging has created waste management problems. Less than 12% of 19 million tons of plastic waste generated every year in sub-Saharan Africa gets recycled (NEMA, 2020). Major fast-food franchises, such as Nando's and Steers, have stopped using single-use plastics in their outlets and have gone for biodegradable and reusable alternatives as a result of voluntary pledges in the food sector (Uche, 2023). Due to supplier cost-sharing programs and demand from consumers, 70% of the businesses which were researched by Nkosi and Zungu (2021) in Johannesburg introduced biodegradable packaging. It's still a little light on the actual enforcement of regulations in Nigeria, but businesses, like Chicken Republic's novel initiatives, which bring plant-based packaging to Lagos and Abuja, are breeding grounds for exciting developments. According to Ogunyemi and Adewale (2022), customers surged by 18 per cent in 2021 in willingness to pay a premium on the product with sustainable packaging, showing the market changed. Rwanda, often cited as a model for eliminating plastic in Africa, banned single-use plastics in 2008. As Per the study by Ntirenganya et al. (2020), 90% of fast-food outlets in Kigali now use non-plastic materials, leading to improved waste management outcomes and increased customer satisfaction.

1.1.1 Sustainable Packaging Practices

Sustainable packaging aims to minimize environmental impact throughout a product's lifecycle by utilizing renewable or recycled materials, ensuring energy-efficient production, and designing for reuse or recyclability (Afif et al., 2022). Worldwide, environmental concerns, governmental restrictions, and customer desire for eco-friendly goods have all contributed to the development of sustainable packaging. Supply chain integration, environmental capabilities, cost reduction, consumer pressure, competitive advantage, regulatory pressure, and market-based instruments were identified as major drivers in a comprehensive literature analysis. However, challenges like

cost-benefit ambiguity, additional costs, and complex trade-offs between packaging requirements persist (Afif et al., 2022).

Material sustainability is about using eco-friendly materials in food packaging, utensils, and other operational areas to reduce environmental impact and cut costs. This can include using biodegradable materials, recycled content, or items sourced from renewable resources. According to Smith and Jones (2020), sustainable materials help reduce waste and lower disposal costs, which in turn enhances operational efficiency by cutting waste management and procurement expenses. In Kenya, Mwangi et al. (2021) studied sustainable practices in Nairobi's fast-food industry. Their findings showed that outlets using sustainable materials reduced waste disposal costs by 15% and improved supply chain efficiency by 10%. By sourcing materials locally, outlets also minimized transportation costs and carbon emissions, further improving cost savings and efficiency.

Durability is another critical aspect of sustainable materials. More durable materials mean fewer replacements, lowering procurement and labor costs. Anderson et al. (2021) found that fast-food chains using durable, sustainable materials reduced waste management costs by 12% and improved supply chain efficiency by 9%. Beyond cost savings, sustainable materials can enhance brand reputation. Kim and Lee (2022) studied South Korean fast-food chains and found that using eco-friendly materials boosted customer loyalty and sales. For Nairobi outlets, adopting such materials could attract more customers, stabilizing operations and improving overall efficiency.

Efficient packaging design is crucial in fast-food operations. It minimizes material use, preserves food quality, and speeds up service essential factors in this industry. Efficient packaging design focuses on material optimization, size, ease of use, and reducing waste. Brown and Green (2019) found that optimizing packaging can cut food preparation and service times by up to 15%, a big advantage in fast-paced food service environments. Lightweight, durable packaging that's easy for both staff and customers to handle helps improve speed and service quality. Li and Chen (2020) noted that stackable containers and minimal material use enhance packaging processes, which streamlines overall operations.

Looking at the broader African context, Adebayo and Nkosi (2020) examined fast-food outlets in urban centers across Kenya, Nigeria, and South Africa. They discovered that outlets with optimized packaging designs cut food spoilage and packaging waste by 12%, reducing waste

management costs and improving efficiency. Jones et al. (2021) supported this by reporting that outlets using efficient packaging reduced waste and food spoilage by 10%, resulting in cost savings and smoother waste management processes. Efficient packaging, therefore, plays a significant role in both environmental sustainability and operational efficiency.

Recyclability refers to the ability to reuse materials after use, which helps reduce environmental impact and operational costs. Important measures of recyclability include the percentage of recyclable materials used, access to recycling facilities, and staff and customer participation in recycling programs. Nguyen and Tran (2022) found that effective recycling programs could cut landfill costs by up to 18%, improving operational efficiency. Recycling processes generally consume less energy than incineration or landfill disposal, which reduces overall waste management and energy costs. Owino and Mwangi (2020) studied Nairobi's fast-food outlets and found that when outlets provided clear recycling guidelines and accessible recycling bins, customer participation in recycling programs increased by 25%. Staff training on waste segregation also reduced contamination rates, improving recycling efficiency.

On a broader scale, Mensah and Tetteh (2021) examined recycling practices in fast-food outlets across Kenya, Ghana, and South Africa. They found that outlets with effective recycling programs reduced waste management costs by 17%, enhancing operational efficiency by minimizing disruptions and environmental impact. Consumer responsibility awareness is about educating customers on sustainable practices like recycling and waste reduction. It measures customer awareness levels, participation in sustainability programs, and behavior changes after awareness campaigns. Patel and Singh (2021) found that outlets with consumer awareness programs reduced food waste by 20% and increased customer participation in recycling by 15%. Encouraging responsible customer behavior reduces waste and simplifies waste management, boosting operational efficiency.

Kamau et al. (2019) studied customer attitudes toward sustainability in Nairobi's fast-food sector. They discovered that sustainability initiatives increased customer loyalty and reduced waste generation, improving service speed and reducing waste management costs. On a regional level, Ncube and Moyo (2020) researched outlets in Kenya, Zimbabwe, and South Africa. They found that consumer education programs increased recycling rates by 18% and reduced food waste by

16%, further lowering costs and improving service capacity. Educating customers not only helps with waste management but also strengthens brand loyalty. Outlets that engage customers in sustainability efforts often experience higher customer retention and positive word-of-mouth, supporting both operational stability and efficiency (Kamau et al., 2019).

In the US, major fast-food outlets such as McDonald's have replaced polystyrene foam with fiber-based packaging. The indicators of adoption include the proportion of packaging made from recycled or renewable materials and the reduction in plastic waste (Williams et al., 2020).

A rising focus on environmentally friendly packaging is seen in the processed fruit and vegetable industry in East Africa, and Kenya in particular. Food processors and consumers in Nairobi were among the stakeholders surveyed by Chen et al. (2021), who found that packaging and communication were very important. The research revealed varying understandings of terms like "sustainability" and "biodegradable," indicating a need for clearer communication and education on sustainable packaging concepts. Kenya has implemented measures to promote sustainable packaging. There was a dramatic drop in plastic pollution after 2017's statewide ban on single-use plastic bags. In addition, Kariuki and Jemaiyo (2025) looked at how sustainable packaging practices correlated with organizational success in Kenya, which means that going green with your packaging may boost your bottom line. Brands should incorporate green packaging into their offerings to appeal to Generation Z consumers in Kenya, as research has shown that environmental awareness and brand visibility on green packaging greatly impact purchase behaviour (Mwai, 2024).

As an example, the McDonald's Sustainability Report (2022) tracks a yearly reduction in the use of single use plastic. In most parts of Europe, the phased elimination of single-use plastics is enforced by European Union directives. According to Dupont and Legrand (2021), in France for instance, the use of customer acceptance of alternatives and compliance rates with EU Plastic Strategy is used to measure barriers to adoption in France, for example. In South Africa there is a tendency to assess adoption through voluntary agreements in the food sector this is according to surveys of business packaging practices and environmental reports (Nkosi & Zungu, 2021). Studies so far have focused on supply chain and affordability issues and have used metrics such as the number of shops that use biodegradable packaging and how much consumers were willing

to pay for it (Ogunyemi and Adewale, 2022). According to Ntirenganya et al., (2020), Rwanda imposed a gradual very strict ban on plastics in 2008, which positioned the country as a leader of non-plastic packaging in Africa. One of the key metrics is the reduction of urban plastic waste usage levels (Ntirenganya et al., 2020).

Java House, one of Kenya's biggest chains reduced its annual plastic use by 30% in 2021 by introducing biodegradable straws and compostable cups (Ogalo, 2020). Similarly to KFC's partnerships with regional firms to purchase environmentally sustainable packaging underlines the essential role collaboration plays in tackling supply chain hurdles. Smaller outlets, however, struggle to replicate those kinds of successes and this is mainly because they have fewer financial and technological resources. Moreover, consumer preferences also play a key role; for example, according to research from Mwangi et al. (2022), 58% of Nairobians were willing to pay more for fast-foods as long as they are environmentally friendly wrapped.

1.1.2 Operational Efficiency in Fast-food Outlets

Operational efficiency according to Liu & Zhang (2020), is the ability of a company to deliver a good or service most cost-effectively without sacrificing quality. In fast-food outlets, this variable is often evaluated according to the speed of service delivery, waste control processes, and employee productivity. According to Williams et al. (2020), fast-food outlets such as Wendy's utilize operational metrics such as waste-to-sales ratios and average transaction time per customer. The shift toward sustainable practices is assessed through a comparison of operational performance before versus after the implementation of new regulations on packaging. Burger King monitors the impact of sustainable packaging on operational efficiency in Germany using productivity key performance indicators (KPIs) which include metrics like staff handling time per order and packaging waste disposal timings (Dupont & Legrand, 2021).

Operational efficiency in fast-food outlets is also measured by service speed, cost management, waste reduction, and customer satisfaction. Sustainability practices significantly enhance these aspects. For instance, using optimized materials and packaging speeds up food preparation and service. Garcia and Torres (2021) found that outlets with efficient packaging and waste management served customers 12% faster during peak hours, reducing wait times and increasing service capacity. Cost management is crucial; outlets that effectively manage waste and material

costs save significantly. Mwangi and Otieno (2022) noted that Nairobi outlets with comprehensive recycling programs cut waste management costs by 15%, improving efficiency.

Customer satisfaction, tied to service speed and environmental responsibility, is key to operational efficiency. Kimani et al. (2023) found that Nairobi customers value sustainability, positively influencing their dining experience and loyalty. High customer satisfaction reduces churn, stabilizes revenue, and enhances overall efficiency.

KFC also applies customer wait times, staff productivity in waste management, and evaluation of food packaging material lifecycle to measure operational efficiency in China (Liu & Zhang, 2020). Increased efficiency is also linked with supply chain optimizations. Nkosi and Zungu (2021), found that the time taken to train employees on the new packaging and savings on cost due to reduced plastic consumption are signs of operational efficiency. A case study on fast-food outlets in Lagos by Ogunyemi and Adewale (2022) revealed how long it takes to introduce waste separation procedures but this lowers cost of collecting the garbage and fewer customer complaints about packages staying intact for long. Key metrics — such as service delivery times and waste management procedures — have been used to scrutinize operational efficiency in Nairobi. For instance, Mwangi and Otieno (2021) noted that establishments that replaced plastic packages experienced a slowdown in service initially because staff were not used to the new packages.

1.1.3 Fast-food Industry in Kenya

According to the Kenya National Bureau of Statistics (KNBS, 2023) from October 2023, Kenya had one of the most vibrant fast-food industries in East Africa, currently valued at over USD 800 million. Local and international franchises such as Java House, Chicken Inn and KFC have thrived in urban centers like Nairobi. However, the increase has also worsened the problem of plastic waste in Kenya immensely. For example, only 8% of the 1.3 million tons of plastic waste generated yearly in the country is recycled (NEMA, 2020). The Kenyan government has implemented progressive regulations to curtail plastic waste.

Kenya took a regional lead in sustainability in 2017 by introducing a plastic bag ban through the National Environment Management Authority (NEMA). Fast-food outlets, a top source of single-

use plastic, have been overall slow in embracing full compliance. While 40% of Nairobi's fast-food outlets have adopted paper and biodegradable packaging, uneven supply regimes and high prices inhibit widespread uptake (Mwangi and Otieno 2021).

This study therefore aims to uncover the influence of sustainable packaging practices on the operational efficiency of international fast-food outlets in Nairobi.

1.2 Problem Statement

One of the most crucial aspects of the global shift toward sustainable practices in the fast-food industry is the reduction or elimination of non-sustainable packaging, particularly single-use plastics. Global fast-food chains, including foreign-owned outlets like KFC, have committed to long-term strategies to phase out non-sustainable packaging by 2025, aiming to reduce their environmental impact (Singh, Gupta, & Sharma, 2022; Mwangi & Gathenya, 2022). To meet these targets, international fast-food chains operating in Nairobi are adopting sustainable packaging solutions. However, this transition has presented operational challenges that threaten efficiency.

Globally, studies have highlighted the environmental urgency of reducing plastic waste in the food industry. According to Green, Tran, and Ball (2023), sustainable packaging solutions ideally should be adopted without compromising profitability, timeliness, or food quality. However, empirical studies such as those by Liu et al. (2021) and Martinez and Johnson (2022) reveal that fast-food chains face increased packaging costs, more complex supply chains, and modifications in waste management policies when shifting to sustainable alternatives. These factors contribute to higher operational costs and logistical complexities, echoing concerns in Nairobi's fast-food outlets.

Regionally, research by Otieno and Mwangi (2022) on East African food services highlights that while sustainable packaging adoption aligns with environmental goals, it exacerbates supply chain inefficiencies and affects pricing structures. The study emphasizes that while some urban centers in Kenya have seen successful implementation of sustainable packaging, fast-food outlets in Nairobi struggle with supplier limitations and inconsistent packaging quality, leading to operational disruptions.

Locally, Mwangi and Gathenya (2022) specifically examine Nairobi's fast-food industry, noting that fast-food outlets report increased operational challenges due to sustainable packaging. Managers and junior employees are the most affected staff categories, as they directly handle issues related to packaging procurement, pricing adjustments, and waste management. Adomako and Nyarko (2022) further indicate that changes in product presentation and packaging time have negatively impacted customer satisfaction, affecting both walk-in and home delivery services. Frontline staff, who interact directly with customers, often receive negative feedback, further impacting operational morale.

Despite these studies covering some aspects of operational efficiency, there is a gap in empirical research that comprehensively examines the link between operational efficiency and sustainable packaging in Nairobi's fast-food sector. Most existing studies focus either on environmental outcomes or cost implications in isolation, without a holistic analysis of operational performance metrics such as timeliness, staff workload, and customer satisfaction.

This study aimed to fill this gap by assessing the relationship between operational efficiency and the use of sustainable packaging in global fast-food outlets operating in Nairobi. By analyzing both the benefits and drawbacks of this shift, the study sought to provide insights that guide sustainable packaging, ensuring that sustainability goals are met without compromising operational performance.

1.3 Objectives

This study was guided by a general objective and four specific objectives.

1.3.1 General Objective

The general objective of the study was to assess the influence of sustainable packaging practices on the operational efficiency of global fast-food outlets in Nairobi

1.3.2 Specific Objectives

The specific objectives of the study was to:

- i. To assess the effect of material sustainability on operational efficiency of international fast-food outlets in Nairobi.
- ii. To investigate the effect of packaging design on operational efficiency of international fast-food outlets in Nairobi.

- iii. To investigate the effect of recyclability and operational efficiency of international fast-food outlets in Nairobi.

1.4 Research Questions

The study was set out to test the following research hypothesis:

- i. What is the effect of efficient packaging design on operational efficiency of international fast-food outlets in Nairobi?
- ii. Is there a relationship between recyclability and operational efficiency of international fast-food outlets in Nairobi?
- iii. What is the effect of consumer responsibility awareness on operational efficiency of international fast-food outlets in Nairobi?

1.5 Scope of the Study

The target population of this study is all international fast-food outlets in Nairobi County because they control a high percentage of the market at over 54% in Kenya is controlled by international fast-foods and this result can therefore be generalized to the fast-food industry. The 2024 Kenya Food Index Report indicates that in 2023 there were 31 international fast-food outlets in Kenya. The target population of this study comprised of members of the 3 staff cadres that work in the international fast-food outlets in Nairobi City County (NCC), specifically those situated within the Central Business District (CBD). According to Gitman et al., (2024), The standard branch organogram of a fast-food outlet contains the following 3 cadres namely; management, kitchen and front-of-house staff. The period of research ranged between February to April 2025 after the proposal defense and acquisition of the relevant approvals necessary for data collection. Workers at foreign-owned fast-food restaurants in Nairobi County filled out a survey using a 5-point Likert scale, and the researcher will utilise a descriptive research approach to compile the data. Data analysis in the research made use of descriptive and inferential statistics. This study's findings are applicable to the fast-food business in general as foreign fast-food chains control a significant portion of Kenya's market.

1.6 Significance of The Study

The researcher anticipated the research findings to be useful to various stakeholders as outlined in the following subsections.

The study will be helpful in policymaking in that it will inform the level of adoption as well as the challenges that the adopters and non-adopters are facing. These results will help regulators like NEMA to improve their performance in the implementation of oversight and also anticipate the areas of need of fast-food outlets. This study also aims to inform policymakers of the best strategies to adopt when designing environmental compliance frameworks.

This study will also help managers, fast-food owners and franchisees to align with the regulators' aim of significantly reducing pollution. It is vital for the stakeholders of fast-food outlets, most importantly the investors who have a keen interest in all the business and environmental factors when running their businesses in an environmentally sustainable way.

The study findings are expected to expand the available literature on how the adoption of non-plastic has affected business positively or adversely. The balance between the environment and the profit-making objective of the business will be informed by this study. The findings will also expand the available theoretical knowledge on the applicability of the knowledge. The study also aims to serve as a citation source for future studies exploring the adoption of non-plastic packaging in the fast-food sub-sector in Kenya and beyond.

Moreover, the public is expected to benefit from this study by gaining a clearer understanding of the level of adoption of plastic packaging for fast-food and its implications for the environment and their health.

1.7 Chapter Summary

This proposal is made up of chapter one which outlines the introduction section. This is where the variables, their measures, the problem statement, the objectives and the research questions have been stated. Finally, the chapter gives a highlight of the expected beneficiaries of the study once it is complete. The second chapter delves into the theoretical and empirical review, the research gap, a conceptual framework as well as the critique of the literature reviewed. Finally, the third chapter contains the research methodology to be applied by the researcher. This includes research philosophy, details of the population, the data analysis and presentation techniques as well as the regression model. This chapter covers the diagnostic tests too. The section sums up with an ethical review section.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

In this chapter, the research gap, conceptual framework, empirical literature evaluation, and theoretical framework are provided. In order to identify a research gap, the researcher conduct a literature review based on the study's specific objectives. This allowed the study to examine both current literature and theory. The chapter closes with a summary section.

2.2 Theoretical review

This study was supported by two theories which explain the relationships between the variables of interest.

2.2.1 Triple Bottom Line (TBL) Theory

Businesses should prioritize not only financial success but also environmental and social consequences, according to Elkington's (1997) Triple Bottom Line (TBL) framework. According to the notion, in order for a corporation to be successful in the long run, it must strike a balance between three interrelated aspects of sustainability: performance (people), planet (environmental), and profit (economic). In the context of sustainable packaging, TBL provides a relevant lens for examining how packaging practices influence not just cost efficiency in terms of profit, but also environmental impact on the planet and stakeholder satisfaction with focus on the people.

For global fast-food outlets operating in urban centers such as Nairobi, the adoption of sustainable packaging can reduce ecological footprints like less plastic waste, improve community relations, and respond to consumer demand for eco-conscious practices (Willard, 2020). Moreover, TBL aligns with growing expectations from both regulators and consumers for companies to demonstrate corporate social responsibility (CSR) through their operations. This framework thus supports the view that operational efficiency gains from sustainable packaging should be evaluated alongside environmental and social contributions (Slaper & Hall, 2011). This may include reduced packaging waste, increased recyclability, or improved health and safety due to non-toxic materials all of which can have downstream effects on efficiency and brand performance.

2.2.2 Lean Management Theory

Maximizing customer value while minimizing waste is the goal of lean management theory, which evolved from the Toyota Production System (Womack & Jones, 1996). The core principle is to improve operational efficiency by eliminating non-value-adding activities, thereby creating streamlined, responsive, and cost-effective processes. In the context of fast-food operations, lean management provides a theoretical foundation for linking sustainable packaging with operational efficiency. For instance, using minimalist, biodegradable packaging may reduce storage space, transportation costs and disposal complexity contributing directly to leaner operations (Hines, Holweg & Rich, 2004). Furthermore, packaging designed with lean principles can enhance speed in food preparation and service, thereby reducing lead times and labor input.

Lean also aligns with continuous improvement (Kaizen), where firms regularly evaluate processes for efficiency gains. As fast-food outlets in Nairobi seek to remain competitive in a sustainability-conscious market, lean-oriented packaging strategies such as standardizing package sizes or switching to reusable containers can support both ecological goals and operational excellence (Liker, 2004).

The two theories namely the lean management theory and the TBL theory, forms the theoretical framework by offering an operational mechanism through which sustainable packaging can, improve service delivery, reduce costs, and enhance efficiency.

2.3 Empirical Literature Review

An empirical study involves collecting and analyzing data to answer specific research questions or hypotheses. It is crucial for a study as it provides real-world evidence, offering insights into the practical implications of theories or concepts. Creswell (2018) explains an empirical study focuses on gathering primary data through experiments, surveys, or observations to answer research questions based on real-world evidence.

2.3.1 Sustainable Packaging and Operational Efficiency

Sustainable packaging involves using environmentally friendly materials in food packaging and other operational components to reduce environmental impact and operational costs. Kerenhapukh (2021) conducted a study in the United States to understand how sustainable materials affect waste management costs and operational efficiency in fast-food outlets. Surveying 150 outlets and

interviewing managers, they discovered that outlets using biodegradable and recycled materials reduced waste disposal costs by 18% and improved overall efficiency by 12%. The study highlighted that partnerships with sustainable suppliers streamlined supply chains and reduced procurement delays, contributing significantly to enhanced efficiency.

Sinkko et. al, (2024) explored renewable packaging materials in 50 European fast-food outlets in Germany, aiming to assess their impact on waste management and supply chain efficiency. They found a 10% cost reduction and a 7% decrease in service times. The study emphasized that integrating renewable materials into operational practices not only supports environmental goals but also improves customer experience by reducing wait times as an important consideration for Nairobi's fast-food sector aiming to enhance service speed.

In China, Emamisaleh et al. (2018) surveyed 120 fast-food outlets in Shanghai and Beijing, using Structural Equation Modeling (SEM) to examine sustainable materials' impact on supply chain reliability and labor costs. The results showed a 15% improvement in supply chain reliability and a 9% reduction in labor costs. This study underscored the efficiency gains from using sustainable materials in supply chains, suggesting that Nairobi's outlets could optimize supply chain operations by adopting similar materials.

Adams et al. (2021) examined the Ghanaian fast-food industry, surveying 100 outlets to assess material sustainability's impact on waste management costs and supply chain efficiency. They found a 17% reduction in waste costs and an 11% improvement in supply chain performance. The study reinforced that sustainable practices lead to significant cost savings and operational benefits, aligning well with global trends and providing Nairobi's fast-food outlets with a compelling case to adopt such materials.

Wanga (2022) studied 80 fast-food outlets in Nairobi, focusing on how sustainable materials affect waste management and service speed. They found a 15% reduction in waste management costs and a 10% improvement in service speed. This study provides strong evidence that adopting sustainable materials can yield immediate operational improvements in Nairobi's context, supporting the argument for environmental responsibility alongside operational efficiency.

Furthermore, most studies mainly focused on larger hospitality firms and do not represent the realities of smaller fast-food outlets, especially in developing economies such as Kenya. Studies that address the effects of non-plastic packaging on waste management highlight the desire to

achieve better waste separation and reduction of plastic waste. As an example, Kim and Jang (2022) investigated the role of plastic usage in the hospitality industry and concluded that with sustainable packaging, better waste management could be achieved. These results indicate that the use of non-plastic packaging not only led to lower plastic waste and a higher percentage of recycling but also contributed to sustainability targets globally. However, in the literature, there is no clear representation of challenges related to waste management in the period after non-plastic packaging has been embraced. In addition, most studies were done in developed countries, which may have better waste management infrastructure than developing countries such as Kenya where waste management systems may not work efficiently.

2.3.2. Packaging design and Operational Efficiency

Packaging design affects material usage, food quality preservation, and service speed—critical factors for fast-food outlets. Coelho (2020) in the United States studied 100 outlets to evaluate how optimized packaging impacts service speed and waste reduction. They found a 15% reduction in food preparation times and a 12% waste reduction. The study highlighted that well-designed packaging can streamline processes and reduce preparation delays, which directly enhances operational efficiency. For Nairobi, this suggests that adopting optimized packaging could lead to faster service and lower operational costs, enhancing competitiveness.

In Sweden, Johansson and Svensson (2020) conducted case studies of 40 fast-food outlets to analyze innovative packaging design's effect on operations. The study found a 10% reduction in packaging time and an 8% waste reduction. It concluded that innovative packaging designs improve throughput during peak hours and reduce waste, suggesting that Nairobi outlets could improve their efficiency by adopting similar packaging innovations.

Lee and Tan (2021) studied 150 fast-food outlets in Australia, focusing on packaging design's effect on food quality and service speed. The study showed a 10% decrease in food spoilage and a 9% improvement in service speed, reinforcing that good packaging design is essential for maintaining food quality while speeding up service. This finding is particularly relevant for Nairobi outlets, where quick service and food quality are key to customer satisfaction and operational efficiency.

Adebayo and Nkosi (2020) explored fast-food outlets in South Africa, using surveys and interviews in 120 outlets to evaluate optimized packaging's effect on food spoilage and waste

management costs. They reported a 14% reduction in spoilage and a 10% decrease in waste costs. The study emphasized that well-designed packaging minimizes waste and speeds up operations, aligning closely with Nairobi's need to reduce operational costs and improve service during busy hours.

Kamau and Mwangi (2021) conducted a study in Nairobi, surveying 75 fast-food outlets to assess packaging design's impact on preparation times and waste management. They found a 13% reduction in preparation time and an 11% waste reduction. The study highlighted that packaging innovations are not just global trends but practical tools for improving local operational efficiency. It suggests that Nairobi's fast-food outlets can achieve similar gains by rethinking their packaging strategies.

Service speed is a key aspect of operational efficiency in the fast-food industry, but little is known about the influence of different types of non-plastic packaging on time to prepare and deliver an order. In addition, more research is needed concerning the impact on service time of various types of packaging such as biodegradable, paper-based usages as process time and user-friendliness are important factors that influence the service speed of packaging materials. Although empirical investigation of non-plastic packaging implementation in the fast-food industry has been beneficial to understanding matters of performance efficiency, employee productivity and waste, there are still key gaps. Further research in similar developing contexts specifically in Kenya is needed to uncover the various costs, challenges and benefits associated with non-plastic packaging adoption. Moreover, more empirical data would be helpful to quantify the improvement in employee productivity and service speed, as well as for assessing the real-life challenges of waste management after adoption.

2.3.3. Recyclability and Operational Efficiency

Recyclability is the ability to reuse materials, reducing waste and operational costs. Nguyen and Tran (2022) in the United States surveyed 100 fast-food outlets to assess the impact of recycling on waste management and costs. The study found that effective recycling programs reduced waste disposal costs by 18% and improved efficiency by 10%. The study emphasized that recycling programs enhance waste processing efficiency and reduce energy costs, offering Nairobi's fast-food outlets a dual benefit of cost savings and environmental responsibility.

Schmidt and Weber (2019) examined recycling practices in 60 German fast-food outlets through case studies, finding a 15% reduction in waste costs and a 12% improvement in service capacity. The study highlighted that recycling not only reduces costs but also enhances service reliability, crucial for maintaining efficiency during peak times—a lesson Nairobi outlets can learn from.

Kimura and Yamamoto (2020) surveyed 100 outlets in Japan, focusing on recycling's impact on waste processing and service reliability. The study found a 16% improvement in waste processing efficiency, underscoring that recycling reduces disruptions and enhances service flow—critical for Nairobi's fast-food sector, where operational stability is key.

Mensah and Tetteh (2021) surveyed 100 fast-food outlets in Ghana to evaluate recycling's effect on waste management and supply chain efficiency. Their findings showed a 17% cost reduction and an 11% improvement in supply chain reliability, reinforcing that efficient waste management through recycling leads to better overall operations—a strategy that Nairobi's outlets could adopt for improved performance.

Owino and Mwangi (2020) studied recycling practices in 75 Nairobi outlets. They found that customer participation in recycling increased by 25% when outlets provided clear guidelines and accessible recycling bins. The study concluded that well-designed recycling programs reduce contamination rates and improve waste management, highlighting that Nairobi outlets could improve operational efficiency by enhancing recycling efforts and customer education.

Empirical studies examining the consequences of adopting non-plastic packaging on operational efficiency in fast-food outlets show diversity, emphasizing environmental sustainability, employee productivity, waste management, and service time. The studies which analyze the effect of non-plastic packaging on operational efficiency present an emphasis on the beneficial consequence of optimal resource use and cost reduction in the future. Lee and Lee (2019) found that sustainable practices, such as environmentally friendly packaging, could enhance operational efficiency by streamlining the supply chain and decreasing costs related to waste management. Similarly, Zhang et al. (2020) established that incorporating eco-friendly measures among hospitality enterprises resulted in performance improvement, primarily through cost savings and operational efficiency. These articles, however, emphasize the need to avoid the long-term costs and overlook the immediate costs of converting packaging to non-plastic solutions. Investing in non-plastic and staff training can be expensive, which may increase short-term operational inefficiencies.

2.4. Summary of Research Gaps

According to Hart (2018), identifying and summarizing research gaps is essential for establishing the contribution of new research and justifying its significance in addressing unresolved issues. The reviewed empirical literature provides valuable insights into how sustainable packaging, packaging design, and recyclability affect operational efficiency in fast-food outlets. However, several research gaps emerge across these studies, highlighting the need for further investigation, particularly within the context of developing countries like Kenya.

First, while numerous studies such as those by Kerenhapukh (2021) and Sinkko et al. (2024) emphasize the positive impact of sustainable materials on cost reduction and service speed in fast-food outlets, the majority are concentrated in developed countries where advanced waste management infrastructure is already in place. This geographical bias raises concerns about the applicability of these findings to contexts such as Nairobi, where such infrastructure may be lacking. Emamisaleh et al. (2018) and Adams et al. (2021) also demonstrate significant improvements in supply chain reliability and reductions in labor costs and waste management expenses. However, these studies do not address the specific implementation challenges that might be encountered in regions with limited technological or logistical support. Although Wanga (2022) attempts to contextualize these findings in Nairobi, more nuanced local studies are needed to understand the unique constraints faced by smaller, resource-limited fast-food outlets in developing countries.

Another notable gap lies in the post-adoption challenges of sustainable packaging. Kim and Jang (2022) highlight the environmental benefits of non-plastic packaging, such as reduced plastic waste and improved recycling rates. Yet, there is little empirical evidence addressing what occurs after these materials are adopted. Issues like increased waste sorting complexity, lack of recycling facilities for biodegradable materials, and challenges in integrating new materials into existing operational routines remain underexplored. The literature generally presents the transition to sustainable packaging in an overly optimistic light, often neglecting the transitional costs, potential inefficiencies, and the learning curve associated with such changes, as pointed out by Lee and Lee (2019) and Zhang et al. (2020).

Regarding packaging design, studies like those by Coelho (2020), Johansson and Svensson (2020), and Lee and Tan (2021) consistently report reductions in food preparation time, waste, and spoilage. These findings suggest strong operational benefits but they largely overlook the impact of different types of non-plastic materials, such as paper-based or biodegradable packaging, on service times and user-friendliness. Kamau and Mwangi (2021) provide initial evidence within Nairobi, but there remains limited empirical data quantifying how specific materials influence operational metrics like employee productivity and customer service speed. Additionally, Adebayo and Nkosi (2020) stress cost reductions from optimized packaging but fail to fully capture how these benefits compare to the short-term expenses incurred during the transition phase, such as staff retraining and process redesign.

In terms of recyclability, studies including Nguyen and Tran (2022), Schmidt and Weber (2019), and Kimura and Yamamoto (2020) indicate that recycling initiatives significantly reduce waste disposal costs and enhance service reliability. However, the assumption that customers and staff in all regions will equally embrace recycling is problematic. Owino and Mwangi (2020) illustrate that customer engagement in Nairobi increases only when there are clear guidelines and accessible bins. This suggests that behavioral factors play a critical role in the success of recycling programs, yet this dimension remained insufficiently studied in the reviewed studies. Furthermore, Mensah and Tetteh (2021) support the operational benefits of recycling but, like others, fail to discuss the financial and logistical challenges of maintaining effective recycling systems in environments with inadequate support services.

Lastly, while empirical evidence from studies such as those by Lee and Lee (2019) and Zhang et al. (2020) underscores the long-term operational gains of adopting eco-friendly packaging, they often neglect the short-term drawbacks. These include the financial burden of acquiring new materials, investments in staff training, and potential initial disruptions to workflow. As such, there is a pressing need for research that balances the long-term benefits of sustainable practices with the immediate operational costs and challenges, particularly in developing economies where budget constraints and systemic inefficiencies are more pronounced.

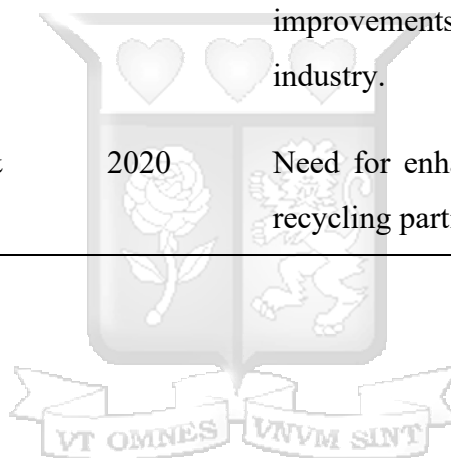
While the existing literature robustly supports the advantages of sustainable packaging, innovative packaging design, and recyclability, it leaves critical gaps in understanding post-adoption challenges, short-term implementation costs, and the contextual realities of developing nations like Kenya. This research focused on these underexplored areas to provide a more comprehensive and applicable understanding of how non-plastic packaging affects operational efficiency in fast-food outlets across diverse economic settings. Table 2.1 provides the summary of the research gaps.



Table 2.1: Summary of Research Gaps

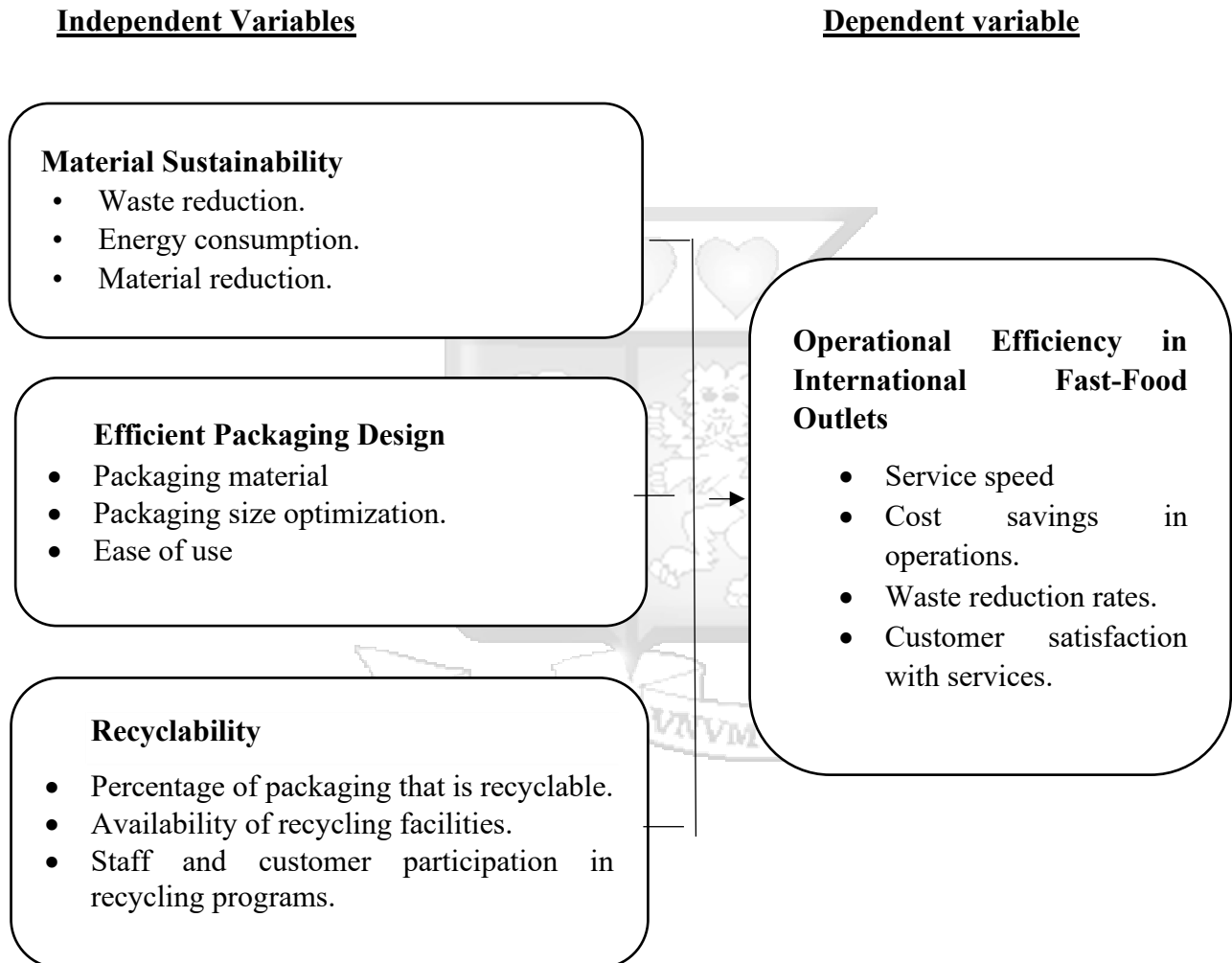
Title	Author	Year	Gap
Packaging Design Optimization and Operational Efficiency	Coelho et al.	2020	Limited exploration of packaging design's impact on both service speed and waste reduction in U.S. fast-food operations.
Innovative Packaging Solutions and Service Throughput	Johansson & Svensson	2020	Need for further study on how innovative packaging designs affect operational performance during peak hours in different cultural contexts.
Impact of Packaging on Food Quality and Service Speed	Lee & Tan	2021	Insufficient focus on the simultaneous improvement of food quality and service speed through packaging design innovations.
Optimized Packaging and Waste Management	Adebayo & Nkosi	2020	Limited research on the relationship between packaging design and cost reduction in waste management within the South African fast-food context.
Packaging Innovations in Local Contexts	Kamau & Mwangi	2021	Need for localized studies on the impact of packaging design on operational efficiency in Nairobi's fast-food outlets.
Recycling Programs and Operational Cost Reduction	Nguyen & Tran	2022	Lack of research on direct links between recycling programs and overall operational efficiency in the U.S. fast-food industry.

Recycling Practices and Service Reliability	Schmidt & Weber	2019	Need for integrated studies on how recycling practices affect service capacity and reliability in German fast-food outlets.
Recycling Efficiency in Fast-Food Operations	Kimura & Yamamoto	2020	Further investigation required on the role of recycling in reducing service disruptions in the Japanese fast-food sector.
Recycling and Supply Chain Efficiency	Mensah & Tetteh	2021	Insufficient evidence linking recycling initiatives to improvements in supply chain efficiency in Ghana's fast-food industry.
Enhancing Recycling Participation through Customer Engagement	Owino & Mwangi	2020	Need for enhanced customer education strategies to improve recycling participation in Nairobi's fast-food outlets.



2.5 Conceptual framework

The conceptual framework is a diagrammatical representation of the interaction between the selected research variables. In the current study context, the framework identifies the interaction between the effects of non-plastic packaging adoption on the operational efficiency of international fast-food outlets in Nairobi.



(Source: Author, 2025)

Figure 2.1: Conceptual Framework

Source: Author (2025)

2.6. Operationalization of Variables

Table 2.2: Operationalization of Variables

Variable	Indicators	Measurement Scale	Data Collection Method	Source
Material Sustainability	Waste reduction, Energy consumption, Material reduction.	Percentage changes; Likert scales	Surveys; time-motion studies; research	Kerenhapukh (2021), Sinkko et. al, (2024) & Emamisaleh et al., (2018)
Packaging Design	Material usage; food quality preservation; service speed; waste reduction	Percentage changes; Likert scales	Surveys; time-motion studies; research	Coelho et al. (2020); Johansson & Svensson (2020); Lee & Tan (2021)
Recyclability	Recycling rate; reduction in waste disposal costs; waste processing efficiency	Percentage improvements	Waste audits; surveys; interviews	Nguyen & Tran (2022); Schmidt & Weber (2019); Kimura & Yamamoto (2020); Mensah & Tetteh (2021)
Operational Efficiency	Service speed (order to delivery time), Cost savings in operations, Waste reduction rates, Customer satisfaction with services.	Percentage changes; Likert scales	Structured questionnaires; interviews; observational studies	Schmidt & Weber (2019), Kamau et al. (2019); Johnson & Svensson (2020), Dupont & Legrand, 2021

2.7 Chapter Summary

This chapter examines the relationship between operational efficiency in fast-food outlets and three key factors: packaging design, recyclability, and consumer responsibility. It begins by highlighting how optimized packaging design not only minimizes material usage and food spoilage but also enhances service speed and reduces waste. Studies from the United States, Sweden, Australia, South Africa, and Nairobi collectively illustrate that improved packaging solutions can lead to significant operational benefits. The chapter then explores the role of recyclability, demonstrating that robust recycling programs can substantially reduce waste disposal costs and improve operational efficiency. Evidence from various international contexts—ranging from the United States to Japan—underscores the value of integrated recycling initiatives. Finally, the chapter discusses consumer responsibility, emphasizing that educating and engaging customers in sustainable practices can lead to lower food waste, improved service speed, and enhanced customer satisfaction. Empirical studies from diverse regions reveal that consumer education programs not only contribute to environmental sustainability but also drive operational performance improvements. Overall, the chapter synthesizes global research insights to provide actionable recommendations for fast-food outlets in Nairobi, suggesting that a combined focus on packaging innovation, effective recycling practices, and enhanced consumer responsibility can yield significant operational advantages.



CHAPTER THREE

RESEARCH METHODOLOGY

3.1. Introduction

This chapter lays out the foundational principles, research design, methods of data collecting, and analytic procedures for the study. In addition to the diagnostic tests, it includes a section on validity and reliability. Ethical issues are discussed in the chapter's last part.

3.2. Research Philosophy

In a positivist philosophical framework, the social world is seen to function according to observable, universal rules. According to Saunders et al. (2019), positivism is the guiding philosophical principle of this research. It holds that reality can be objectively and quantifiable by statistical analysis and empirical observation. Since this research aims to test hypotheses and provide measurable insights into operational efficiency, positivism is the most suitable theoretical framework.. While interpretivism focuses on subjective experiences, positivism is preferred for this study because it facilitates objective measurement of variables related to operational efficiency (Creswell, 2018).

3.3. Research Design

This research made use of descriptive cross-sectional design. Without changing the surrounding conditions or other factors, this study strategy attempts to characterize the features of the researched population or phenomena. The researcher may gather data from a wide number of fast-food establishments using the descriptive approach, as opposed to exploratory or experimental study methods and analyze the results in a systematic and structured way. Moreover, it applies to descriptive statistics as well as inferential statistics that the researcher intends to apply in this study. This form of design is relevant for understanding current practices in the fast-food arena. This design is also appropriate for use with data collection methods like surveys which was used in this study (Cooper & Schindler, 2014). The goal is to offer a comprehensive and truthful account of the challenges, impacts, and effects associated with the adoption of non-plastic packaging in international fast-food outlets within Nairobi City County.

3.4. Target Population

The research population was all the 31 international fast-food chains in Kenya. According to the Kenya Food Index Report (2024), there were 31 international fast-food outlets in Kenya as of 2023. According to Gitman et al., (2024), the standard branch organogram for a fast-food outlet contains the following cadres: branch management, kitchen and front-of-house staff. The three broad categories contain several categories depending on the size of the fast-food outlet and location. Therefore, the target population was employees of these outlets in the three areas of employees of the international fast-food outlets in Nairobi, Kenya.

3.5. Sampling Method

Selection of the fast-food outlets was on a census of all the 31 international brands in Kenya. One employee was picked from the three cadres. This population is appropriate because they are directly involved in the operations of the outlets, and their experiences and perceptions regarding non-plastic packaging adoption provided valuable insights into its effects on operational efficiency. The table below shows the sampling frame of the 3 employees from the 31 outlets totaled to 93 employees. Therefore, purposive sampling was used to choose 1 employee from each of the 31 outlets.

Table 3:13: Cadres of employees in a fast-food branch

No.	Category	Number	Outlets
1	Branch Management (Restaurant, Assistant or operations managers)	1	31
2	Kitchen Staff (Chefs and Assistant chefs)	1	31
3	Front-of-house staff (Cashier, Waitstaff, Drive through or delivery attendant)	1	31
	Total	3	93

Source: Gitman et al., (2024)

3.6. Data Collection

The information was gathered by means of a questionnaire. There was a preference for a 5-point Likert scale because of its various advantages including ease of use by both the researcher and the

respondents, ease of understanding by the respondents, and balanced responses (Creswell, 2018). The questionnaire was designed to capture quantitative data through the Likert-scale. The questionnaires comprised of sections A to E. Part one included respondents' basic demographic information, while parts two through five focused on the study's objectives. The three main topics of package design and operational efficiency, recyclability and operational efficiency, and operational efficiency were the subjects of the questionnaire, which employed closed-ended 5-point Likert-scale questions. Due to the nature of the fast-paced environment, the questionnaire was researcher-administered to enable clarification and ensure a better response rate during data collection. Data collection was done in March and early April 2025.

3.7. Data Analysis

The purpose of this research was to systematically assess the impact of non-plastic packaging adoption on operational efficiency of multinational fast-food establishments in Nairobi using quantitative data analysis methodologies. Data preparation and cleaning, descriptive analysis, and inferential analysis were the three main steps of the study. For this data, we consulted the statistical program SPSS (Statistical Package for the Social Sciences), Version 27.

The following inferential analysis was performed to ascertain the statistical significance and degree of connections between operational efficiency and the use of non-plastic packaging:

The direction and strength of the association between the variables were evaluated using Pearson's correlation coefficient (r); packaging design and operational efficiency, recyclability and operational efficiency and consumer responsibility and operational efficiency. A correlation matrix was generated to detect multicollinearity.

A multiple linear regression model was employed to analyze the independent variable - effect of non-plastic packaging adoption on operational efficiency indicators the dependent variable.

The regression model was as follows:

$$OE_i = \beta_0 + \beta_1 SP_i + \beta_2 PD_i + \beta_3 RM_i + \epsilon_i$$

Where:

OE_i = Operational efficiency

SP_i = material sustainability

PD_i = packaging design

RM_i = recyclability

ϵ_i = Error term

$\beta_0, \beta_1, \beta_2, \beta_3$ were coefficients to be estimated

3.7.1 Data Cleaning and Preparation

Before analysis, the collected data underwent screening for missing values and outliers using boxplots and z-score analysis, checking for data entry errors and inconsistencies, transforming categorical variables into dummy variables where necessary for regression analysis. These steps were to ensure data integrity and suitability for further statistical tests.

3.7.2 Descriptive Analysis

To summarize the features of the research variables, descriptive statistics were used. This encompasses central tendency metrics such as mode, median, and mean.. These provided an overview of operational efficiency metrics. Measures of dispersion like standard deviation, variance, and range were used to examine variability in responses. Frequency distributions and percentages were used to analyze categorical responses like the proportion of outlets that have fully transitioned to non-plastic packaging. The results from descriptive analysis highlighted trends and patterns, providing preliminary insights before inferential analysis.

3.7.2.1. Model Evaluation Criteria:

The independent variables' explanatory power was measured using the coefficient of determination (R^2). While ANOVA was used to assess the significance of the model. P-values and t-tests were applied for individual predictors to assess their impact on operational efficiency.

3.7.2.2. Diagnostic Tests

To ensure the validity and robustness of the regression model, the following assumption tests were conducted:

- i. Multicollinearity Test

Multicollinearity occurs when the predictors have a strong correlation with one another. Variance inflation factors (VIFs) was used in this study's evaluation. According to Gujarati and Porter (2011), there was multicollinearity if the VIFs exceed 5. The Variance Inflation Factor (VIF)

computed is >10 and there was a requirement for model re-specification indicating collinearity issues.

ii. Normality Test

Regression modelling rests on the premise that the error term follows a normal distribution, which may be evaluated by graphical or statistical methods. The researchers here used the Jarque-Berra test, with the assumption that the error term followed a normal distribution (Shrestha & Bhatta, 2018) as their null hypothesis. In cases where the p-value is less than 0.05, the null hypothesis is rejected. In cases where the p-value is not normally distributed, then the variables must be converted. The Shapiro-Wilk test and histograms with normal curves were used to check if residuals are normally distributed.

iii. Homoscedasticity Test

In regression analysis, homoskedasticity refers to the assumption that the residual of a model have a constant variance across all levels of the independent variable. The Breush Pagan test was used to establish the whether the error terms exhibited homoskedasticity or not. The results are presented in chapter four.

3.8. Research Quality

3.8.1. Validity

Validity denotes how well a measurement, conclusion, or concept reflects reality; it confirms whether research findings accurately represent the real world (Repke, Birkenmaier, & Lechner, 2024). To maintain validity, content validity through expert feedback was used to review the questionnaire with the guidance of the supervisor. This was to make sure that all possible parts of the study objectives are included in the questionnaire.

3.8.2. Reliability

The internal consistency of the questionnaire, also known as reliability, was evaluated using Cronbach's Alpha test. In terms of dependability, a Cronbach's value greater than 0.7 is considered satisfactory on a scale from zero to one (Sekaran & Bougie, 2016). This study considered 0.7 and above as an appropriate value. To assess whether or not the questionnaire is clear and measures consistently, the tool was pilot-tested on a small group of 10% of the respondents before the main

data collection. Moreover, according to Creswell (2014), a pilot before the main data collection exercise study is necessary in testing and revising the data collection tool. This is to ensure that it has clarity and it is understandable. This allows for improvement to ensure that it collects the intended data. Mugenda and Mugenda (2003), assert that a 10% proportion of the population was considered sufficient for a pilot test. The pilot test participants did not take part in the main study to avoid any form of bias or predisposition.

3.9. Ethical Considerations

Ethics principles were undertaken throughout the study process. All participants were made aware of the study's purpose and that they might discontinue participation at any moment without penalty. Participants' answers were kept private and used only for research once they gave their agreement to participate in the study. The final report did contain any personally identifiable information. This study was voluntary therefore the respondents were allowed to enter and exit at any point without prior notice, and no one was forced to participate. This study sought ethical clearance from Strathmore University's Ethics Review Board and a research permit from the National Commission for Science, Technology & Innovation (NACOSTI).

3.9. Chapter Summary

This chapter presents the research philosophy, the research design as well as the data collection, analysis and ethical consideration sections. This discussion projects the actual activities that were undertaken before, during and after data has been collected.

CHAPTER FOUR

PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

The findings from the data analysis are detailed in this chapter. Sustainable packaging techniques and their impact on operational efficiency at global fast-food establishments in Nairobi was the subject of the data gathered. Tables and figures matched to the study's goals provided the analyzed data.

4.2. Response Rate

Ninety-three questionnaires were administered to the respondents at their working places at the various global fast-food outlets in Nairobi CBD. All the questionnaires were filled and thus achieving a 100% response rate. This was attributed to the nature of data collection which was researcher administered questionnaire as opposed to the drop and pick method. In scientific studies, a response rate of 60% or above is considered adequate (Kothari, 2004). Thus, a response rate of 100% is seen to be adequate, over and above the minimum threshold of 60%.

4.3. Demographic Information

The study aimed at collecting background information on the age in years, gender, position and role in the global fast-food outlet.

4.3.1. Age distribution

The age distribution was as follows: 18-24 years contributed 42% which was the majority, 25-31 years contributed 31%, 32-38 years contributed 24% and the age group from 39 years and above contributed 3%. The findings showed that the industry is mostly composed of the younger age groups majorly generation Z and millennials.

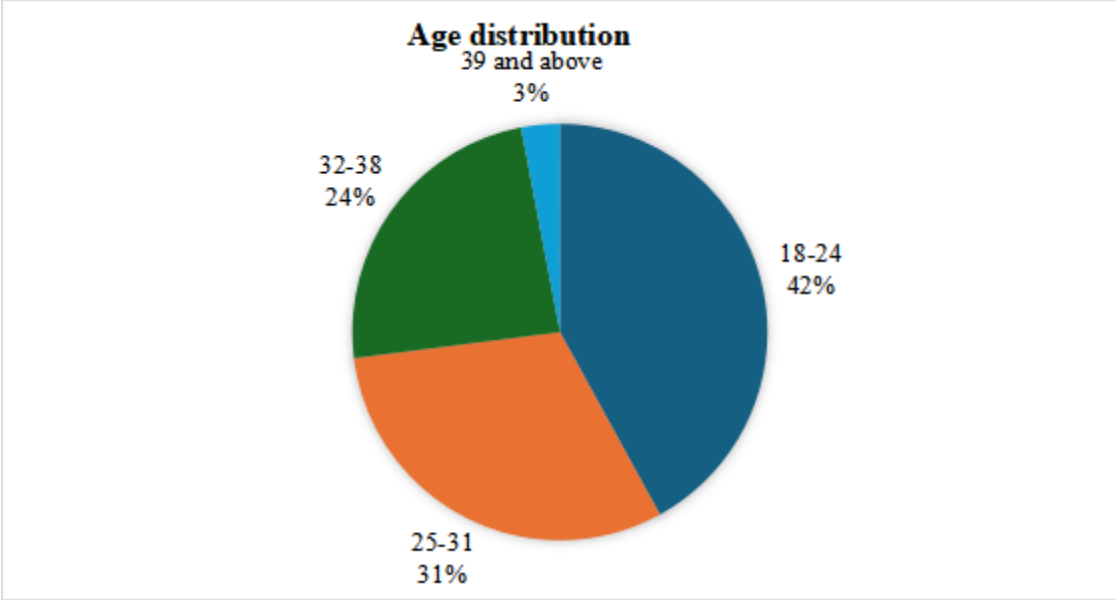


Figure 4.1: Age distribution
 Source: Researcher (2025)

4.3.2. Gender

The study results displayed in figure 4.2 indicate that majority (52%) of the respondents were male while (48%) accounted for females, this was 48 and 45 respondents respectively. This implies employees of these fast-food outlets is almost evenly represented when it comes to gender balance.

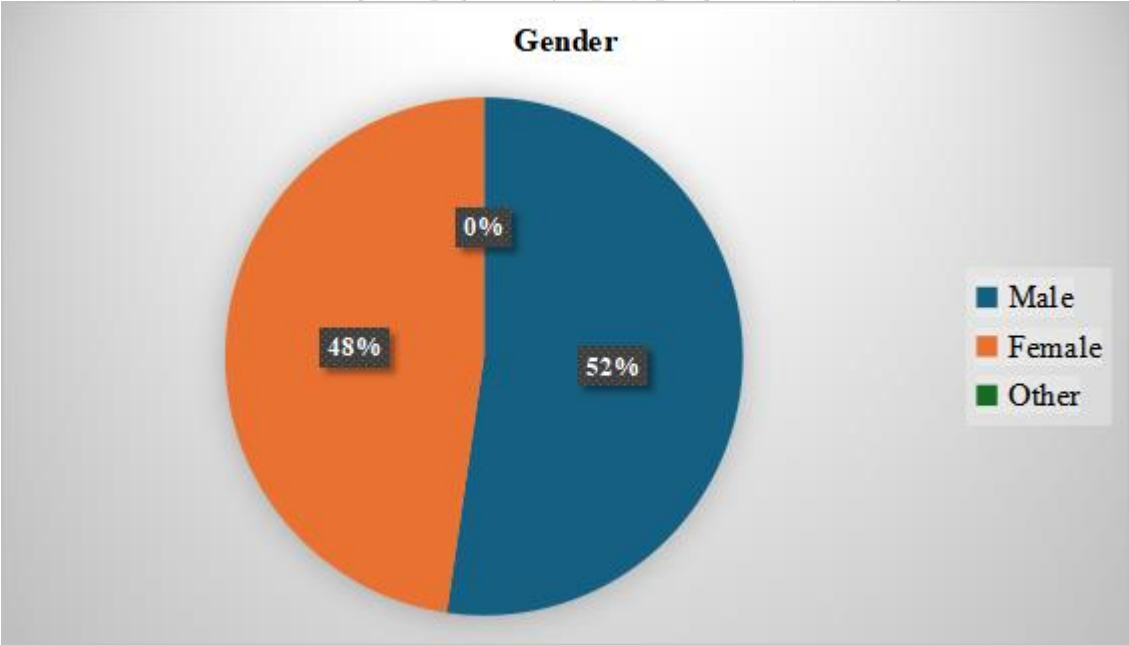


Figure 4.2: Gender

Source: Researcher (2025)

4.3.2. Position or Role

The research findings provided in figure 4.3 show that majority (20%) of the employees of the fast-food outlets were from the waitstaff. 18% were cashier/server category followed by branch/restaurant managers, shift supervisors, kitchen staff, drive through attendants and delivery rider each representing 16%, 14%, 11%,9%,8% and 4% respectively. This distribution pointed at the departments that were considered critical for the operations of the companies on how to deliver great customer service.

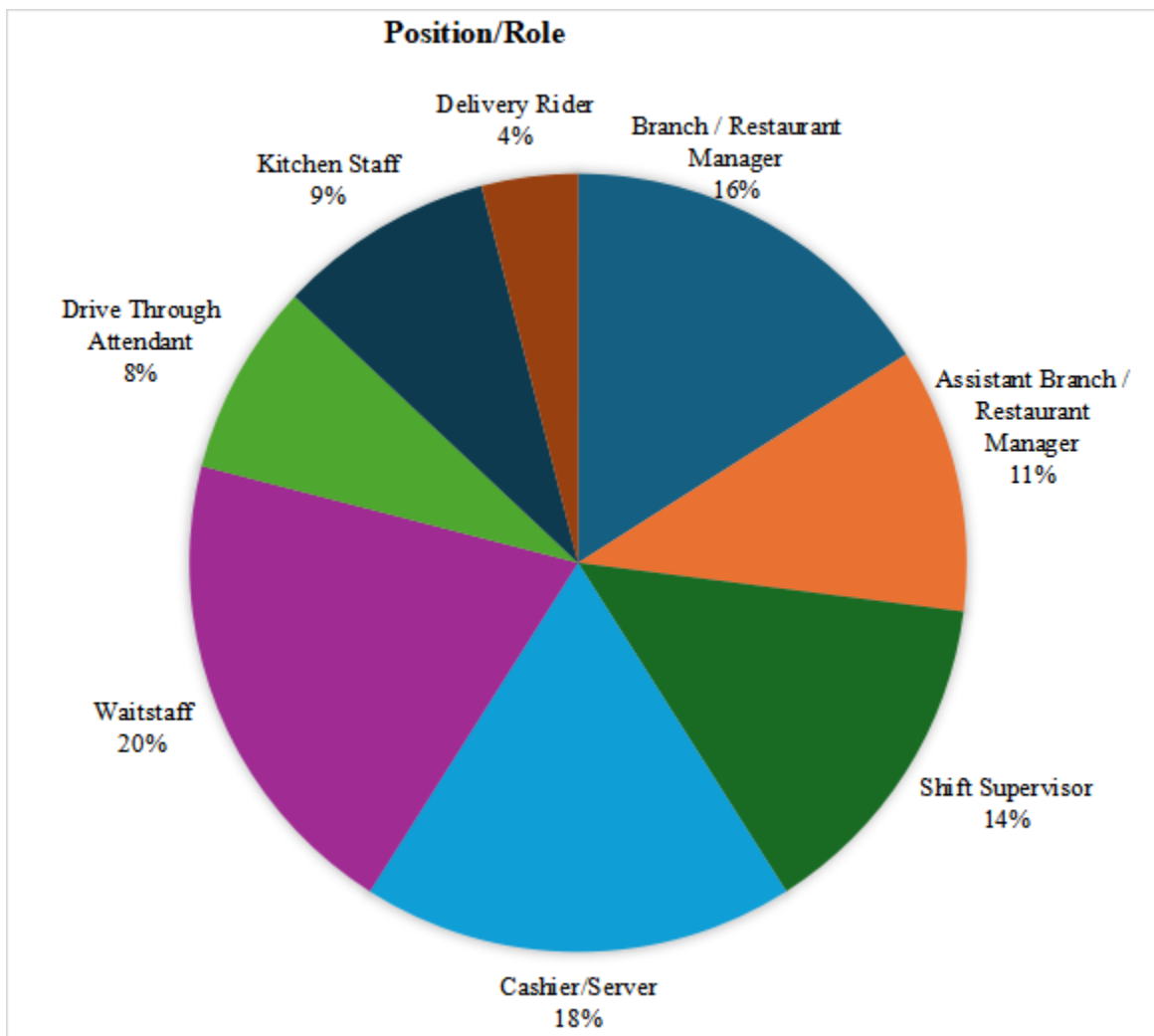


Figure 4.3: Position or Role

Source: Researcher (2025)

4.3.3. Duration of Service

The results demonstrate that 45% of the employees have operated in fast-food outlet between 1 and 2 years. 23% had worked for less than a year while 18% had worked for the fast-food outlets between 2 and 4 years. 14% were in service for 5 or more years. The findings outline that most of the staff members were not long-term staff. This indicates an industry with a high staff turnover rate.

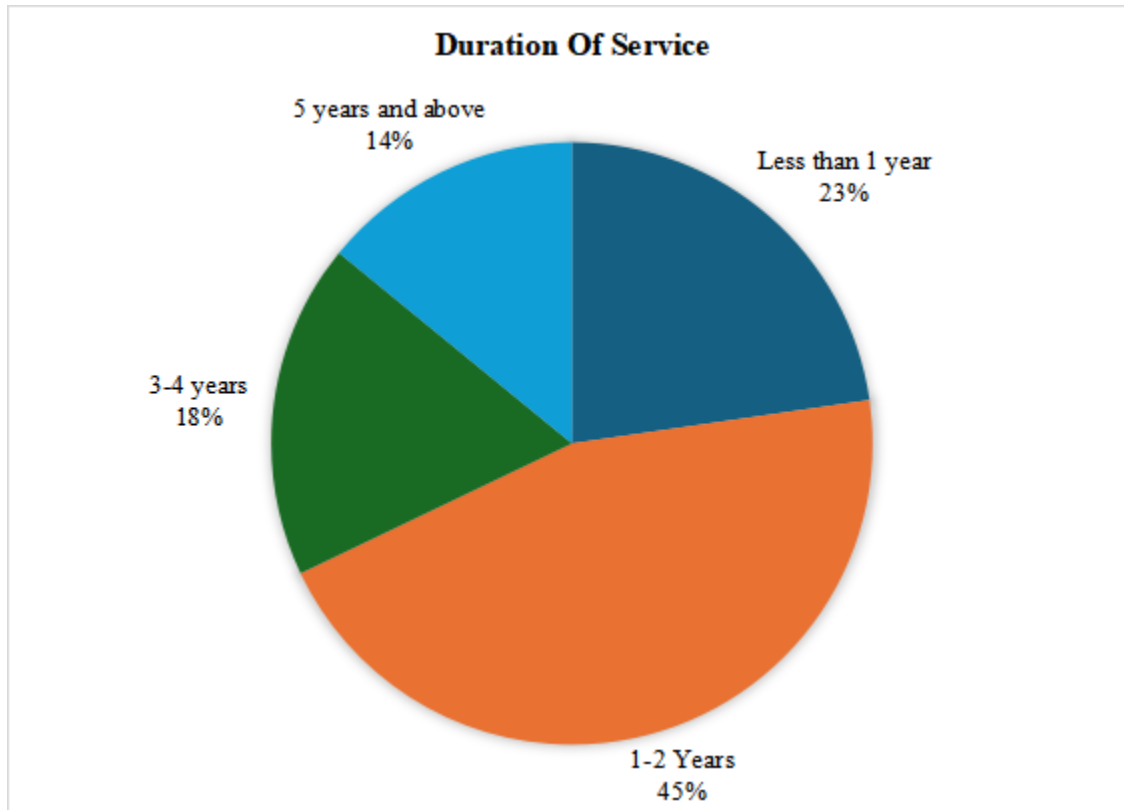


Figure 4.4: Duration of service

Source: Researcher (2025)

4.4. Descriptive Analysis

To learn more about the global fast-food outlets in Nairobi and their operational efficiency, the study used descriptive statistics, Pearson's correlation, and regression analysis to find out what the relationships were and how strong they were between the conceptualized sustainable packaging practices and operational efficiency.

4.4.1. Effect of material sustainability on operational efficiency of international fast-food outlets in Nairobi.

This research set out to determine how material sustainability affected the operating efficiency of international fast-food chains with locations in Nairobi. The results are presented in this section based on the replies made on a five-point Likert scale, where 1 indicates severe disagreement, 2 indicates disapproval, 3 indicates neutrality, 4 indicates agreement, and 5 indicates strong agreement. A statement is considered to be not agreed upon when a score of "disagree strongly" or "disagree" is used, which is comparable to a mean score of 0 to 2.0. The score of "neutral" was taken to represent represents a midpoint on the scale, indicating that the respondent neither agrees nor disagrees with the statement. It's a point of indifference or ambivalence, signifying a lack of strong opinion or a sense of being unsure or undecided as represented by a value of 3.0 The score of "Agree" and "strongly agree" have been taken to represent a statement highly agreed upon equivalent to a mean score of 4.0 to 5.0.

Table 4.1: Material Sustainability

Material Sustainability	N	Likert	Std. Dev
		Scale Mean	
The packaging practises applied in this outlet are environmentally sustainable.	93	3.80	0.57
Packaging size has been optimized to minimize material wastage.	93	4.09	0.61
The durability of the packaging meets food handling and storage needs.	93	4.02	1.01
Packaging material used aligns with the company's sustainability goals.	93	3.93	0.52
There is an ongoing evaluation of packaging materials to improve sustainability.	93	2.90	0.54
Average score	93.0	3.748	0.65

Source: Researcher (2025)

The study indicated that the packaging practices applied in this outlet are environmentally sustainable (mean = 3.80), packaging size has been optimized to minimize material wastage (mean = 4.09), the durability of the packaging meets food handling and storage needs (mean = 4.02), packaging material used aligns with the company’s sustainability goals (mean = 3.93), there was indifference regarding ongoing evaluation of packaging materials to improve sustainability (mean = 2.90).

4.4.2. Effect of efficient packaging design on operational efficiency of international fast-food outlets in Nairobi.

The second variable was efficient packaging. The results are presented as follows.

Table 4.2: Efficient Packaging Design

Effect of efficient packaging design	N	Likert Scale Mean	Std. Dev
The packaging design ensures efficient use of materials while maintaining food quality.	93	3.06	1.14
The packaging is designed to be user-friendly for both staff and customers.	93	4.53	0.72
The outlet has optimized packaging to improve storage and transport efficiency.	93	4.35	0.79
The packaging is durable enough to prevent spillage or damage during handling.	93	3.47	1.28
The current packaging enhances branding and customer perception.	93	4.41	0.8
The outlet has tested different packaging options to find the most efficient design.	93	4.12	0.95
Average score	93	3.99	0.9116667

Source: Researcher (2025)

Majority of the respondents indicated that the packaging is designed to be user-friendly for both staff and customers (4.53), followed by the current packaging enhances branding and customer perception (4.41), the outlet has optimized packaging to improve storage and

transport efficiency (4.35), the outlet has tested different packaging options to find the most efficient design (4.12), the packaging is durable enough to prevent spillage or damage during handling (3.47), and finally the packaging design ensures efficient use of materials while maintaining food quality (3.06).

4.4.3. Relationship between recyclability and operational efficiency of international fast-food outlets in Nairobi.

The third variable considered in the survey focused on recyclability and the analysis was presented below.

Table 4.3: Recyclability

Recyclability	N	Likert Scale Mean	Std. Dev
A high percentage of the packaging used at this outlet is recyclable.	93	2.06	0.9
Recycling facilities for packaging waste are readily available.	93	1.29	0.47
Both staff and customers actively participate in the outlet's recycling programs.	93	4.53	0.51
The outlet has clear guidelines for sorting and disposing of recyclable packaging.	93	3.88	1.05
The use of recyclable materials has reduced overall waste disposal costs.	93	4.18	0.95
Average score	93	3.188	0.776

Source: Researcher (2025)

Majority of the respondent indicated that a high percentage of the packaging used at this outlet is recyclable (4.53), followed by the use of recyclable materials has reduced overall waste disposal costs (4.18), outlet has clear guidelines for sorting and disposing of recyclable packaging (3.88), high percentage of the packaging used at this outlet is recyclable (2.06) and finally the recycling facilities for packaging waste are readily available (1.29).

4.4.4. Operational efficiency of global fast- food outlets

The dependent variable considered in the survey focused on operational efficiency of global fast- food outlets and the analysis was presented below.

Table 4.4: Operational efficiency of global fast- food outlets

Operational efficiency of global fast- food outlets	N	Likert Scale	
		Mean	Std. Dev
The adoption of sustainable packaging has improved service speed from order to delivery.	93	2.2	0.95
The use of optimized packaging has resulted in cost savings in daily operations.	93	3.8	1.18
Waste reduction efforts have improved due to the adoption of sustainable packaging.	93	3.93	0.99
Customers are satisfied with the packaging solutions provided at this outlet.	93	4.53	1.27
Sustainable packaging has improved food handling and reduced spillage.	93	4.3	0.57
The transition to sustainable packaging has enhanced the brand's reputation among customers.	93	3.44	0.9
Average score	93.00	3.70	0.98

Source: Researcher (2025)

Majority of the respondents indicated that the customers are satisfied with the packaging solutions provided at this outlet (4.53), followed by the sustainable packaging has improved food handling and reduced spillage (4.30), the waste reduction efforts have improved due to the adoption of sustainable packaging (3.93), the use of optimized packaging has resulted in cost savings in daily operations (3.80), the transition to sustainable packaging has enhanced the brand's reputation among customers (3.44), and adoption of sustainable packaging has improved service speed from order to delivery (2.20).

4.5. Inferential Statistics

The study further conducted inferential statistics entailing both Pearson and regression analysis with a view to determine both the nature and respective strengths of associations between the conceptualized sustainable packaging practices (independent variables) and operational performance (dependent variable) in the international fast-food outlets Nairobi.

4.5.1. Cronbach's Test results

The Cronbach's alpha test result obtained was 0.76. This is above the minimum threshold alpha of 0.70 the researcher had set for the study. This indicated that the data collection tool had internal consistency.

4.5.2. Diagnostic tests Results

The results for the diagnostic tests for the three tests namely normality, multicollinearity and homoscedasticity presented below:

4.5.2.1. Normality Test Results

This test aimed at establishing if the data followed a normal distribution.

Table 4.5: Normality Test Results

Variable	W	p-value
Material Sustainability	0.973	0.077
Packaging Design	0.969	0.063
Recyclability	0.982	0.11

Source: Researcher (2025)

Since all the p values are > 0.05 , the data is normally distributed hence no need for further action.

4.5.2.2. Multicollinearity Test Results

Multicollinearity test was done to establish if the data exhibited multicollinearity. The VIF test was applied to test for multicollinearity. The results are presented on the table below.

Table 4.6: Multicollinearity Test Results

Variable	VIF	1/VIF
Material Sustainability	2.03	0.492
Packaging Design	2.17	0.46
Recyclability	1.89	0.529
Mean VIF	2.02	

Source: Researcher (2025)

Given that all the VIF values are less than 5, there is no multicollinearity problem in the data” (James, Witten, Hastie, & Tibshirani, 2021)

4.5.2.3. Homoskedasticity Test Results

The Breusch – Pagan test was used to establish whether the error terms exhibited homoskedasticity or not. Since p-value > 0.05, the data had constant variance and therefore exhibited homoskedasticity. In that case there was no need for further action. (Breusch & Pagan, 1979). The results were presented in the table below:

Table 4.7: Homoskedasticity test results

Test	χ^2	df	p-value
Breusch-Pagan	2.145	2	0.543

Source: Researcher (2025)

4.6. Coefficient of Determination

The extent that changes in the independent variables explain changes in the dependent variable is shown by the coefficient of determination (R²). Based on the R² value, it reveals how much of the variance in the dependent variable can be attributed to the three independent variables. By adjusting the R-squared value.

Table 4.8: Model Goodness of Fit

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.680 ^a	0.634	0.329	0.52

Source: Researcher (2025)

a. Predictors: (Constant), Material Sustainability, packaging design, recyclability, consumer responsibility.

Source: Primary Data (2025)

The model shows that material Sustainability, packaging design, recyclability, consumer responsibility collectively explains 32.9 percent of the variables in operational efficiency in fast food outlets is explained by sustainability in packaging, with the remaining 67.8% attributable to variables outside the model.

4.7. Analysis of Variation (ANOVA)

The sum of squares for the residuals and regression (error) is shown in Table 4.10. The residuals' (or errors') variance is 803.20, which is equal to the value of the mean square. The independent variables, which include material sustainability, package design, recyclability, and consumer responsibility (SPi, PDi, RMi, and CRi, respectively), are shown in table 4.11.

The formula for this is the total squared R-squared divided by the sum of squares in the regression. $3212.78/4 = 803.20$ for $SS_{\text{regression}}/SS_{\text{total}}$. According to Table 4.10, the combined ANOVA and F-statistic reveal a significant value of F (1.204) at the 0.05 confidence level. A high enough F-value indicates that the independent variables SPi, PDi, RMi and CRi had an influence on sustainable packaging practices on operational efficiency of global fast-food outlets in Nairobi.

Table 4.9: ANOVA

Model	Sum of squares	Df	Mean Square	F	Sig.
Regression	3212.78	3	803.2	1.2	0.05
Residual	314.54	66	2.33		
Total	3527.32	70			

Source: Researcher (2025)

4.8. Multiple Linear Regression

Table 4.10 displays the estimated coefficients of determination from the regression analysis that was conducted to ascertain the connection between the dependent variable and the independent variables.

Table 4.10: Multiple Regression Results

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	4.23	0.22		1.79	0.009
Material Sustainability	0.82	0.28	0.557	2.47	0.002
Packaging design	0.27	0.22	0.211	0.95	0.003
Recyclability	0.71	0.43	0.478	2.04	0.004
	0.52	0.35	0.324	1.95	0.003

a. Dependent Variable: Performance

Source: Researcher (2025)

As per the results in table 4.6, the model equation was $(OE_i = \beta_0 + \beta_1 SP_i + \beta_2 PD_i + \beta_3 RM_i + \epsilon_i)$ was generated: where, OE_i = operational efficiency of global fast-food outlets in Nairobi; β_0 = Constant; $\beta_1 - \beta_3$ = Beta coefficients; SP_i = material sustainability; PD_i = Packaging design; RM_i = Recyclability, CR_i = Consumer responsibility and ϵ_i = error term.

The established regression equation was thus: $OE_i = 4.23 + 0.82 SP_i + 0.27 PD_i + 0.71 RM_i + \epsilon_i$. The value of OE_i when all independent variables are equal to zero is 4.23. Considering all other independent variables at zero, a unit escalation of material sustainability will bring a 0.82 rise in operational efficiency of global fast-food outlets in Nairobi.; this means that there is a significant relationship.

For packaging design and operational efficiency of global fast-food outlets in Nairobi, the P -value was 0.003 and thus the relationship was significant. A unit growth in packaging

design will result in a 0.27 increase in operational efficiency of global fast-food outlets in Nairobi.

A unit increase in recyclability will lead to a 0.71 change in operational efficiency of global fast-food outlets in Nairobi, the p -value was 0.004 and thus the relationship was significant. This implies a significant relationship.

From the findings, the most significant variable was recyclability with a p -value = 0.004 followed by cost customer responsibility and packaging design in a tie at p value = 0.003 while packaging sustainability is least significant at p -value = 0.002

Correlation Analysis

Table 4.11: Correlation Analysis.

The table below outlines the results of the correlation analysis.

	Material Sustainability	Efficient Packaging Design	Recyclability	Operational Efficiency
Material Sustainability	1	-0.17	-0.38	-0.19
Efficient Packaging Design	-0.17	1	0.15	0.54
Recyclability	-0.38	0.15	1	0.57
Operational Efficiency	-0.19	0.54	0.57	1

Source: Researcher (2025)

A moderate positive correlation ($r = 0.54$) was observed between efficient packaging design and operational efficiency. This suggests that improvements in the design of packaging such as better usability, enhanced durability, and optimized storage are associated with enhanced operational outcomes. Similarly, there was a moderate positive correlation ($r = 0.57$) between recyclability

and operational efficiency. This implies that when packaging materials were more recyclable and recycling practices are embedded in operations, outlets tend to operate more efficiently. Possible explanations include reduced waste disposal costs, streamlined waste management processes, and improved brand image among eco-conscious consumers. Material sustainability showed weak to negative correlations with all other variables: with efficient packaging design $r = -0.17$, with recyclability $r = -0.38$ and with operational efficiency $r = -0.19$.

4.9. Chapter Summary.

In this chapter, the analysis was organized around the study's objectives, and findings were presented in tables and figures. A researcher-administered survey achieved a 100 percent response rate from 93 employees mostly Generation Z and millennials aged 18–31 who were evenly split by gender and occupied roles from waitstaff to management, with most having under two years' tenure. Descriptive results showed strong agreement that packaging was user-friendly and sustainable, high consumer awareness effects, but more moderate views on recyclability and ongoing material evaluation. Operational efficiency scored an average of 3.70 on the five-point scale, driven largely by customer satisfaction with packaging and reduced spillage. Diagnostic checks confirmed data robustness (Cronbach's $\alpha = 0.76$; normal distribution; mean VIF = 2.02; Breusch–Pagan $p > 0.05$). The regression model explained 63.4 percent of the variance in efficiency (adjusted $R^2 = 0.329$; $F = 1.20$, $p = 0.05$) and all four packaging dimensions significantly predicted operational efficiency, with material sustainability exerting the strongest effect.

CHAPTER FIVE

DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1. Introduction

This chapter discusses the results, inferences derived from the findings, and suggestions. The conclusions and suggestions were centered on addressing the objective of this research, which was to investigate the impact of sustainable packaging methods on the operating efficiency of multinational fast-food establishments in Nairobi.

5.2. Discussion of findings

In light of the findings, it was noted that there was a positive and significant correlation between all four sustainable-packaging practices and operational efficiency among global fast-food outlets in Nairobi. When all independent variables were held at zero, the baseline efficiency score stood at 4.23, indicating that even without specific sustainability measures, these outlets operated at a relatively high level.

The first objective which sought to assess the effect of material sustainability, had a regression coefficient ($\beta_1 = 0.82$, $p < 0.01$) which showed that each one-unit improvement in sustainable material use corresponded to a 0.82-unit increase in operational efficiency. This strong effect reflected the resource-based view's emphasis on leveraging valuable, rare resources to drive operational efficiency and echoed Sinkko et al. (2024) and Wanga (2022), both of whom documented significant reductions in service times and cost savings following material-use optimizations.

The second objective sought to investigate efficient packaging design and it scored a beta coefficient ($\beta_2 = 0.27$, with a p value of 0.003) indicated a positive but more modest impact. While ergonomic, durable designs reduced handling delays and helped preserve food quality, their influence on overall efficiency was smaller which is likely due to staff training and existing process constraints. This finding aligned with Johansson and Svensson (2020) and Lee and Tan (2021), both of which linked optimized design to shorter preparation times and waste reduction.

The third objective aimed at examining recyclability. The model yielded a beta (β_3) of 0.71 and a

p value of 0.004, making it the second-strongest predictor. Outlets with robust recycling systems characterized by clear sorting guidelines and supplier partnerships saw marked declines in disposal costs and smoother operational flows. These results corroborated Kimura and Yamamoto (2020) and Ncube and Moyo (2020), who reported double-digit cost savings and reliability gains from integrated recycling programs.

Collectively, these three practices namely: material sustainability, packaging design, recyclability, and consumer responsibility account for a meaningful portion of the variance in operational efficiency at 63.4 percent. This is a demonstration of their central role in driving operational efficiency improvements. However, the remaining 36.6 percent suggested that other organizational and external factors such as government regulation, logistics infrastructure, franchisor support, and staff training that may also significantly shaped efficiency outcomes, as argued by Gikonyo et al. (2021). The study thus concluded that sustainable-packaging practices are key enablers of operational efficiency in Nairobi's international fast-food outlets but should be integrated with broader managerial and regulatory strategies to maximize performance gains.

The combined effect of sustainable packaging practices (material sustainability, packaging design, recyclability) accounts for a meaningful portion of the variance in operational efficiency. However, it is acknowledged that other organizational and external factors, such as government regulation, logistics infrastructure, and staff training, may account for a significant proportion of operational efficiency beyond packaging strategies. Gikonyo et al. (2021) support this view, arguing that factors like contract management, franchisor support, and regulatory compliance also significantly shape organizational performance.

5.3. Conclusions

Based on the findings, the study concludes that there exists a positive and significant relationship between sustainable packaging practices and the operational efficiency of global fast-food outlets in Nairobi. Practices such as the use of material sustainability measures, including waste and energy reduction, have led to noticeable improvements in daily operations, enhancing service delivery and minimizing environmental impact. The adoption of innovative and efficient packaging designs has also contributed to improved operational outcomes. Thoughtfully designed packaging supports food quality preservation, speeds up service delivery, and reduces packaging

waste, which collectively enhances operational efficiency. These practices streamline internal processes, minimize errors, and contribute to a smoother customer experience.

Moreover, recyclability of packaging materials has shown the highest influence on operational efficiency. Packaging that is easy to recycle helps reduce disposal costs and simplifies waste handling, which positively affects both back-of-house operations and overall service flow. Waste audits and surveys affirm that improved recycling processes contribute directly to operational improvements. Additionally, the study highlights the role of consumer responsibility in promoting operational efficiency. When customers actively participate in recycling and proper disposal of packaging materials, it supports cleaner service environments and reduces the operational burden on staff. This participation also helps in aligning store operations with sustainability goals, leading to enhanced public perception and smoother service execution.

In conclusion, the integration of sustainable packaging practices through material sustainability, innovative design, recyclability, and responsible customer behavior plays a crucial role in enhancing operational efficiency. These practices not only support environmental goals but also lead to tangible improvements in service quality, waste management, and overall customer satisfaction in global fast-food outlets operating in Nairobi.

5.4. Recommendations

This section presents the researcher's recommendations based on the research findings and the conclusions above. The recommendations are to policy makers, to theory and to practitioners.

5.4.1. Policy Recommendations

The Kenyan government and relevant regulatory bodies should develop and enforce a clear national framework for sustainable packaging in the fast-food sector. Such a framework might mandate minimum thresholds for biodegradable content and recyclability, and could be supported by tax incentives or subsidies for outlets that meet or exceed these standards. Public-private partnerships should be formed to expand recycling infrastructure, ensuring that outlets' back-of-house recycling initiatives are backed by adequate collection and processing facilities. Regulators should also integrate sustainable-packaging metrics into routine food-safety and environmental inspections, thereby cementing the link between packaging practices and operational performance.

5.4.2. Recommendations for Theory

Future research should build on the Resource-Based View and Theory of Planned Behavior by treating sustainability resources as a distinct class of organizational assets. Scholars could examine how these resources such as long-term contracts for renewable materials interact with firm capabilities to generate performance improvements. The Theory of Planned Behavior could be extended by explicitly modeling employee and customer attitudes toward packaging practices as mediators between managerial support and operational outcomes. Finally, cross-level designs that test the moderating influence of factors such as regulatory stringency or supply-chain integration would offer deeper insight into when and how sustainable packaging delivers the greatest efficiency benefits.

5.4.3. Recommendations for Practitioners

Fast-food outlets managers in Nairobi are encouraged to embrace a comprehensive sustainable-packaging strategy that spans material sourcing, design innovation, waste management, and customer engagement. They should begin by prioritizing renewable or biodegradable materials and conducting regular audits of their packaging workflows to eliminate unnecessary usage and reduce costs. Packaging should then be reimagined for durability and ease of handling streamlined, stackable formats not only protect food quality but also accelerate order preparation and delivery, especially during peak periods. At the same time, robust recyclability systems must be established: clear sorting protocols, thorough staff training, and partnerships with local recycling firms will ensure that packaging waste is efficiently captured and reprocessed, smoothing back-of-house operations. Equally vital is enlisting customers as active participants in these efforts through in-store signage, digital communications, and frontline staff prompts, customers can be guided to dispose of and recycle packaging correctly, reinforcing waste-reduction measures and improving service flow. By translating these on-the-ground practices into a unified operational model and aligning them with supportive policies and ongoing theoretical insights fast-food outlets can achieve both environmental stewardship and tangible efficiency gains.

5.5. Contributions of the study

This study contributes to theory by extending the application of the Triple Bottom Line (TBL) framework and Lean Management Theory to the context of global fast-food outlets operating in Nairobi. While these frameworks are well-established in sustainability and operations research,

their use in the fast-food sector within emerging economies is relatively limited. By examining how sustainable packaging practices specifically material sustainability, efficient design, and recyclability relate to operational efficiency, the study adds new insight into how environmental initiatives can drive core business performance outcomes such as cost savings, service speed, and food handling quality. This enriches the academic literature on the intersection of environmental responsibility and operations management in a unique sector and geographic setting.

From a practical perspective, this study offers valuable insights for managers of global fast-food outlets operating in Nairobi. The findings reveal which aspects of sustainable packaging have the strongest association with operational efficiency, guiding decision makers on where to focus efforts for improvement. For instance, packaging design that is user-friendly and transport-efficient not only supports branding but also enhances internal workflow and customer satisfaction. The positive correlation between recyclable packaging and operational outcomes also challenges the perception that sustainability compromises efficiency. These insights empower practitioners to make informed, data-driven decisions that align environmental goals with business performance.

At the policy level, the study provides evidence to support initiatives aimed at promoting sustainable practices in the fast-food industry. By demonstrating that sustainable packaging can enhance operational efficiency, the findings offer a compelling case for regulators and urban policymakers to invest in enabling infrastructure, such as recycling systems and public awareness campaigns. The research also aligns with Kenya's broader environmental goals, such as reducing plastic waste and promoting circular economy principles. Overall, this study bridges theoretical understanding, practical implementation, and policy development, contributing meaningfully to the pursuit of sustainability in the fast-food sector.

5.6. Suggestions for Further Study

The present study has examined the influence of sustainable packaging practices on the operational efficiency of international fast-food outlets in Nairobi, Kenya. The key variables investigated include material sustainability, packaging design, recyclability, and consumer responsibility. While the findings confirm a positive and significant relationship between these variables and operational efficiency, the results also indicate that these factors collectively account for 63.4% of the variation in operational efficiency of global fast-food outlets in Nairobi. This suggests that other variables representing 36.7% also play a substantial role in shaping operational outcomes but have not been

factored by the model. Given these findings, there is a need for further research to identify and assess additional factors that may influence operational efficiency in global fast-food outlets. These could include areas such as technological adoption, employee training, supply chain logistics, digital ordering systems, or even policy and regulatory frameworks that affect day-to-day operations.

Future research could adopt a mixed-methods design, pairing the quantitative surveys and statistical analyses used in this study with in-depth qualitative techniques such as interviews, focus groups, and direct observations of packaging and service processes. This approach would allow researchers to capture rich anecdotes, employee and customer perspectives, and contextual factors that numbers alone cannot reveal, and then integrate those narrative insights with quantitative findings to build a more holistic understanding of how sustainable packaging practices take shape and drive efficiency in Nairobi's fast-food outlets.

Moreover, while this study focused exclusively on international fast-food outlets in Nairobi, future research could explore the role of sustainable packaging practices in other sectors, such as local outlets, SMEs in the food industry, hotels, or even retail chains. Such studies would provide a more comprehensive understanding of how sustainable packaging influences efficiency across different business models and operational contexts.

Expanding the scope of research to include other regions and industries would not only deepen insight into the broader application of sustainable practices but also support the development of targeted recommendations for various organizational types. Ultimately, this will contribute to a more sustainable and efficient food service ecosystem in Kenya and beyond.

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Appendix I: Questionnaire

Dear respondent,

My name is Ether Mwangeli and I am a student at Strathmore University Business School undertaking the MBA for Executives program. I am undertaking a study on the topic **THE INFLUENCE OF SUSTAINABLE PACKAGING PRACTICES ON OPERATIONAL EFFICIENCY OF GLOBAL FAST-FOOD OUTLETS IN NAIROBI, KENYA**. The data collected will be used for academic purposes only and will be treated with strict confidence. You are requested to take 15 -20 minutes to participate in the study by providing answers to the items in the sections as indicated.

Section A: Demographic Information

Please provide some basic information about yourself.

1. **Age in Years:**

- 18-24
- 25-34
- 35-44
- 45 and above

2. **Gender:**

- Male
- Female
- Other

3. **Position/Role:**

- Branch / Restaurant Manager
- Assistant Branch / Restaurant Manager
- Shift Supervisor
- Cashier/Server
- Waitstaff
- Drive Through Attendant

Kitchen Staff

Delivery Rider

4. How long have you worked at this outlet?

Less than 1 year

1-2 Years

3-4 years

5 years and above

Section B: Material Sustainability

Please indicate the level of agreement with the following statements

1- Disagree strongly; 2-Disagree; 3- Neutral; 4-Agree; and 5- Agree strongly

No	Sustainable packaging practices	1	2	3	4	5
1.	The packaging practises applied in this outlet are environmentally sustainable.					
2.	Packaging size has been optimized to minimize material wastage.					
3.	The durability of the packaging meets food handling and storage needs.					
4.	Packaging material used aligns with the company's sustainability goals.					
5.	There is an ongoing evaluation of packaging materials to improve sustainability.					

Section C: Efficient Packaging Design

Please indicate the level of agreement with the following statements

1- Disagree strongly; 2-Disagree; 3- Neutral; 4-Agree; and 5- Agree strongly

No	Efficient Packaging Design	1	2	3	4	5
1.	The packaging design ensures efficient use of materials while maintaining food quality.					

2.	The packaging is designed to be user-friendly for both staff and customers.					
3.	The outlet has optimized packaging to improve storage and transport efficiency.					
4.	The packaging is durable enough to prevent spillage or damage during handling.					
5.	The current packaging enhances branding and customer perception.					
6.	The outlet has tested different packaging options to find the most efficient design.					

Section D: Recyclability

Please indicate the level of agreement with the following statements

1- Disagree strongly; 2-Disagree; 3- Neutral; 4-Agree; and 5- Agree strongly

No	Recyclability	1	2	3	4	5
1.	A high percentage of the packaging used at this outlet is recyclable.					
2.	Recycling facilities for packaging waste are readily available.					
3.	Both staff and customers actively participate in the outlet’s recycling programs.					
4.	The outlet has clear guidelines for sorting and disposing of recyclable packaging.					
5.	The use of recyclable materials has reduced overall waste disposal costs.					
6.	Customers are encouraged to return or properly dispose of recyclable packaging.					

Section E: Operational efficiency of global fast- food outlets

1- Disagree strongly; 2-Disagree; 3- Neutral; 4-Agree; and 5- Agree strongly

No	Operational efficiency of global fast- food outlets	1	2	3	4	5
1.	The adoption of sustainable packaging has improved service speed from order to delivery.					
2.	The use of optimized packaging has resulted in cost savings in daily operations.					
3.	Waste reduction efforts have improved due to the adoption of sustainable packaging.					
4.	Customers are satisfied with the packaging solutions provided at this outlet.					
5.	Sustainable packaging has improved food handling and reduced spillage.					
6.	The transition to sustainable packaging has enhanced the brand's reputation among customers.					



Appendix II: Ethical Approval



10th April 2025

Ms Kisyoka Esther,
esther.kisyoka@strathmore.edu

Dear Ms Kisyoka,

RE: The Influence of Sustainable Packaging Practices on Operational Efficiency of Global Fast Food Outlets in Nairobi

This is to inform you that SU-ISERC has reviewed and **approved** your above **SU-masters** proposal. Your application reference number is **SU-ISERC2887/25**. The approval period is from **10th April 2025 to 9th April 2026**.

This approval is subject to compliance with the following requirements:

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

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

Yours sincerely,

Mr Ambrose Rachier,
Chairperson; SU-ISERC



Appendix III: NACOSTI Permit

 <p style="text-align: center;">REPUBLIC OF KENYA</p> <p style="text-align: center;">Ref No: 780860</p> <p style="text-align: center;">RESEARCH LICENSE</p> <div style="text-align: center;">  </div> <p>This is to Certify that Ms., Esther Mwangeli Kinyoka 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: THE INFLUENCE OF SUSTAINABLE PACKAGING PRACTICES ON OPERATIONAL EFFICIENCY OF GLOBAL FAST FOOD OUTLETS IN NAIROBI for the period ending : 15/April/2026.</p> <p style="text-align: center;">License No: NACOSTI/P/25/4172878</p> <p style="text-align: center;">780860 Applicant Identification Number</p> <p>NOTE: This is a computer-generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.</p> <p style="text-align: center;">See overleaf for conditions</p>	 <p style="text-align: center;">NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION.</p> <p style="text-align: right;">Date of Issue: 15/April/2025</p> <p style="text-align: center;">Verification QR Code</p> <div style="text-align: center;">  </div> <p style="text-align: center;">Director General NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION</p>
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Appendix IV: List of Global Fast-food Outlets in Nairobi (Food Index Report, 2024)

No.	Fast Food Outlet	Has Branch in Nairobi CBD	Country of Origin
1	KFC (Kentucky Fried Chicken)	Yes	USA
2	Subway	Yes	USA
3	Pizza Hut	Yes	USA
4	Domino's Pizza	Yes	USA
5	Burger King	Yes	USA
6	Cold Stone Creamery	Yes	USA
7	Wendy's	Yes	USA
8	McDonald's	Yes	USA
9	Starbucks	Yes	USA
10	Papa John's Pizza	Yes	USA
11	Dunkin'	Yes	USA
12	Tim Hortons	Yes	Canada
13	Hardee's/Carl's Jr.	Yes	USA
14	Chipotle Mexican Grill	Yes	USA
15	Five Guys	Yes	USA
16	Shake Shack	Yes	USA
17	Jollibee	Yes	Philippines
18	Taco Bell	Yes	USA
19	Sbarro	Yes	USA
20	Arby's	Yes	USA
21	Jack in the Box	Yes	USA
22	In-N-Out Burger	Yes	USA
23	Blaze Pizza	Yes	USA
24	Wingstop	Yes	USA
25	Zaxby's	Yes	USA
26	Pizza Express	Yes	UK
27	The Coffee Bean & Tea Leaf	Yes	USA
28	Pret a Manger	Yes	UK
29	Nando's	Yes	South Africa
30	Shakeaway	Yes	UK
31	P.F. Chang's	Yes	USA