SUPPLY CHAIN COST OPTIMIZATION, INFORMATION SHARING AND COMPETITIVENESS OF FOOD AND BEVERAGE MANUFACTURING FIRMS IN UASIN GISHU COUNTY, KENYA

RACHEL JEROTICH KIPTOO

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DECLARATION

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RACHEL JEROTICH KIPTOO

SBUS/BBM/011/21

Signature ---------- Date----------

This thesis has been submitted with our approval as university supervisors

Dr. Pauline Keitany

University of Kabianga Signature----------Date--------

Dr. Emmanuel Tanui

University of Eldoret Signature---------- Date----------

DEDICATION

I would like to dedicate this thesis to my family members especially my mother who nurtured me to work hard and have been my greatest supporters. She had given me the inspiration to pursue my education to the highest level. I appreciate all their efforts.

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ABSTRACT

The food and beverage processing sector in Kenya are vital to the national economy due to its role in job creation and its contribution to GDP. However, its competitiveness has faced challenges stemming from high operational costs and inefficient supply chain processes. This study examined the moderating effect of information sharing on the relationship between supply chain cost optimization and the competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Specifically, the study investigated how inventory management, strategic sourcing, adoption of technology, and logistics costs influence firm competitiveness, and how information sharing moderates these relationships. The study was guided by the Resource-Based View Theory, Lean Manufacturing Theory and Information Sharing Theory. An explanatory research design was adopted, targeting 924 departmental staff across 22 food and beverage firms. A sample of 279 respondents was selected using Yamane's formula and simple random sampling employed. Data was collected through structured, closed-ended questionnaires, and a pilot study in Nakuru County was conducted to validate the research instrument. Data analysis was performed using SPSS version 25, incorporating both descriptive and inferential statistics, including correlation and hierarchical regression analyses. Findings revealed that inventory management ($\beta_1 = 0.152$, $p = 0.004$), strategic sourcing ($\beta_2 = 0.173$, $p = 0.001$), adoption of technology ($\beta_3 = 0.232$, $p = 0.001$), and logistics cost ($\beta_4 = 0.300$, $p = 0.000$) significantly and positively influenced competitiveness. Furthermore, information sharing significantly moderated the relationships between inventory management ($\beta = -0.103$, $p = 0.002$), strategic sourcing ($\beta = 0.059$, $p = 0.010$), technology adoption ($\beta = 0.087$, $p = 0.009$), and logistics cost ($\beta = -0.182$, $p = 0.002$) and competitiveness. The study concluded that effective supply chain practices, enhanced by robust information sharing mechanisms, play a critical role in strengthening firm competitiveness. The study recommends that food and beverage firms adopt modern inventory systems, invest in advanced technologies with adequate employee training, foster long-term supplier relationships, and optimize logistics through lean practices. Importantly, firms should institutionalize information sharing to enhance coordination, responsiveness, and strategic alignment across supply chain functions, ultimately boosting competitiveness and performance. The study's findings would be valuable to food and beverage manufacturing firms by informing managers on optimizing limited resources for competitive advantage through supply chain cost efficiency, guiding the Ministry of Trade in policy formulation within Kenyan borders, and contributing to the broader academic discourse in supply chain management.

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LIST OF ABBREVIATIONS AND ACRONYMS

3PL	Third-Party Logistics
AI	Artificial Intelligence
CRM	Customer Relationship Management
ERP	Enterprise Resource Planning
ESG	Environmental and Social Governance
GDP	Gross Domestic Product
IoT	Internet of Things
IT	Information Technology
JIT	Just-In-Time
KNBS	Kenya National Bureau of Statistics
KPIs	Key Performance Indicators
RBV	Resource-Based View
RFID	Radio Frequency Identification
SPSS	Statistical Package for Social Scientists
SRM	Supplier Relationship Management
TCE	Transaction Cost Economics
TMS	Transportation Management Systems
TPS	Toyota Production System
VIF	Variance Inflation Factor
VMI	Vendor-Managed Inventory
VRIN	Value, Rarity, Inimitability, and Non-substitutability
WB	World Bank

OPERATIONAL DEFINITION OF TERMS

Adoption of Technology is the successful integration and use of new technology within an organization (Gurgun, Koc & Kunkcu, 2024).

Beverage Manufacturing: Beverage manufacturing involves the production of liquid consumables such as juices, sodas, and alcoholic drinks through formulation, processing, and packaging (Saryatmo & Sukhotu, 2021; Chikán et al., 2022).

Competitiveness refers to the ability of a person, company, or country to compete successfully against others (Chikán et al., 2022).

Food Manufacturing: Food manufacturing is the industrial process of transforming raw agricultural materials into edible food products through processing, packaging, and preservation (FAO, 2021; Adeleye et al., 2022).

Information sharing refers to the voluntary exchange of data and information between different entities, such as individuals, organizations, or government agencies (Alzoubi & Yanamandra, 2020).

Inventory management is a critical business process that encompasses the procurement, storage, utilization, and sale of a company's inventory, including raw materials, components, and finished products (Becerra, Mula & Sanchis, 2022).

Logistics costs encompass all the expenses associated with moving and storing products, from sourcing raw materials to delivering customer orders (Pratap, Gupta & Pohit, 2020).

Strategic sourcing is a comprehensive approach to supply chain management that formalizes the way an organization gathers and uses information to align its purchasing strategy with its business goals and secure the best possible value in the marketplace (Yildiz Çankaya, 2020).

Supply chain cost optimization is the process of managing and reducing costs across all aspects of the supply chain, from sourcing raw materials to delivering finished products to customers (Dubey et al., 2020).

CHAPTER ONE

INTRODUCTION

1.1 Overview

The description of the study introductory chapter is presented in this section. This chapter covers background of the study, statement of the problem, objectives of the study, hypotheses of the study, significance of the study and scope of the study.

1.2 Background to the Study

In an increasingly volatile and globalized market, competitiveness has emerged as a critical priority for firms striving to remain viable and thrive in dynamic business environments. It is no longer sufficient for organizations to simply produce goods or deliver services; they must do so efficiently, innovatively, and with agility in response to changing market demands. Competitiveness enables firms to outperform rivals, retain customers, and achieve long-term growth. It is typically reflected in indicators such as profitability, market share, operational efficiency, innovation capacity, and adaptability to both internal and external changes. As such, firms that enhance their competitiveness are better positioned to survive amidst rapid technological advances, evolving consumer preferences, and global economic shocks.

Globally, the drive to remain competitive has pushed organizations to re-evaluate both their internal operations and external linkages, especially within supply chains. A growing body of literature highlights the pivotal roles of information sharing and supply chain cost optimization as key levers that strengthen firm competitiveness. Information sharing supports transparency, real-time responsiveness, and informed decision-making crucial for improving supply chain coordination. Simultaneously, cost optimization ensures the efficient use of resources, minimization of waste, and

protection of profit margins, all of which contribute directly to a firm's competitive position. Studies emphasize that firms must understand consumer needs, build effective distribution networks, and manage operations efficiently to remain competitive (Chygryn et al., 2020). Conversely, supply chain inefficiencies such as disruptions, poor inventory management, and outdated systems significantly undermine a firm's ability to compete effectively (Kanike, 2023).

Cost optimization is increasingly seen as a strategic imperative rather than a routine tactical function. It involves not just cost-cutting but also the strategic alignment of sourcing, inventory control, logistics, and digital integration. Strategic sourcing enhances supply chain resilience and reduces input costs (Biazzin, 2019), while effective inventory management helps reduce holding costs and ensures availability of stock (Teplická & Čulková, 2020). Technological adoption facilitates real-time visibility, predictive analytics, and supply chain integration (Van Hoang, 2024). Efficient logistics cost management ensures timely deliveries and optimizes warehousing and transportation (Madhani, 2019). Together, these elements improve cash flow, reduce operational expenses, and boost competitiveness.

Information sharing underpins these cost-optimization efforts by enabling coordination, trust, and strategic partnerships. Firms that share accurate, timely, and relevant data across the supply chain can better forecast demand, adjust production plans, manage inventory, and optimize logistics (Ahmad & Karim, 2019). This improves delivery reliability, customer satisfaction, and production agility, while fostering strategic partnerships (Alzoubi & Yanamandra, 2020). Metrics such as data quality, use of IT tools, collaboration intensity, and supply chain performance are often used to assess the effectiveness of information sharing (Chou & Shao, 2023;

Maskey & Nguyen, 2020). Additional success factors include data security, feedback systems, and commitment to continuous improvement (Islami, 2023).

Empirical evidence from developing regions affirms the value of these practices. In countries such as South Africa, Nigeria, Ghana, Tanzania, and Ethiopia, studies reveal that information sharing enhances collaboration, supply chain responsiveness, and overall firm performance (Baah et al., 2021; Lee et al., 2022; Kumar et al., 2020; Sundram et al., 2020; Sharma & Joshi, 2023). Real-time sharing of forecasts, inventory levels, and logistics data has been found to reduce operational delays, cut costs, and improve market responsiveness (Jiang, 2019).

Locally, in Kenya, research on information sharing and organizational performance has primarily focused on public institutions and humanitarian organizations. Karungani (2019) analyzed buyer-supplier relationships in state corporations, while Muga and Abuya (2022) investigated information flow in the Red Cross supply chain. However, these studies do not sufficiently address the relationship between information sharing, supply chain cost optimization, and firm competitiveness in the private sector, particularly in manufacturing. Emerging research (Mwangi & Osoro, 2024; Ogoye, 2021) points to a significant gap in exploring how information sharing may moderate the relationship between supply chain practices and competitiveness in Kenya’s manufacturing sector.

The underperformance of Kenya’s manufacturing sector, despite its historical importance, makes this an urgent concern. Historically contributing about 10% of GDP, the sector's share had declined to 7.6% by 2020 well below the government's 15% target by 2022 (KNBS, 2021). The COVID-19 pandemic further weakened the sector by disrupting production and supply chains. Long-term productivity has also

been on a downward trend, with value-added per worker declining since the 1970s (Grossman & Oberfield, 2022).

Within this sector, the food and beverage industry stand out due to its high potential for contributing to economic growth, job creation, and poverty alleviation. It encompasses a wide array of products including bottled water, juices, soft drinks, and alcoholic beverages (Scoppola, 2021). The sub-sector serves both domestic and regional markets, contributing to industrial development and export growth. Its relevance is further heightened by its alignment with several Sustainable Development Goals, such as ending poverty and hunger and fostering industry and innovation (Akuriba, et al ,2021). Given these dynamics, the food and beverage manufacturing industry present a timely and important case for examining how supply chain innovations can drive competitiveness.

This study is significant on multiple fronts. First, it contributes to the academic literature by bridging a critical gap in understanding the moderating role of information sharing on the relationship between supply chain cost optimization and firm competitiveness in Kenya's manufacturing sector. Second, the study provides practical insights for managers and policymakers seeking to strengthen the food and beverage sub-sector a vital engine of Kenya's industrial and economic transformation. Third, by highlighting the strategic role of information flow in supply chain management, the study supports efforts to promote digital transformation, resilience, and innovation in local industries. Ultimately, the findings will inform more effective supply chain strategies that enable Kenyan manufacturing firms not just to survive but to compete successfully in regional and global markets.

1.3 Statement of the Problem

In an ideal setting, food and beverage manufacturing firms in Uasin Gishu County should demonstrate high competitiveness, sustained profitability, and strong market positioning through efficient production and pricing strategies (Gitari, 2023). However, this is far from reality. These firms face significant challenges such as high operational costs, inefficient supply chain processes, and intense competition from foreign manufacturers (Chepkole & Deya, 2019). According to the Kenya National Bureau of Statistics (2024), the manufacturing sector contributed 7.6% to Kenya's GDP in 2023, with the food, beverages, and tobacco sub-sector valued at Ksh 629.7 billion and recording a marginal growth of only 0.5% compared to 2022. This disconnects between the anticipated industrial growth and the sector's actual performance underscores a pressing concern for both industry stakeholders and policymakers.

Theoretically, supply chain cost optimization is recognized as a fundamental driver of competitiveness. Streamlining operations, automating processes, and managing logistics efficiently can lead to significant cost savings and improved market responsiveness. However, firms in the region continue to grapple with fragmented and inefficient supply chains, making it difficult to achieve these gains (Bor, 2021; Onyango, 2020). In such a dynamic and unpredictable environment, access to accurate and timely information becomes essential. Studies by Baba and Nwuche (2021) emphasize that information sharing improves supply chain responsiveness, allowing firms to adapt to shifting customer demands and operational uncertainties. Thus, information sharing is increasingly viewed as a potential moderator that could strengthen the relationship between cost optimization and firm competitiveness.

Despite the growing body of research on supply chain management, a specific gap remains in understanding how information sharing moderates the link between cost optimization and competitiveness, particularly within the Kenyan food and beverage sector. While studies such as those by Shin and Zeevi (2024) have highlighted the challenges of disjointed supply chains, the combined influence of cost optimization and information sharing on firm performance remains underexplored. This study seeks to fill this gap by examining the moderating role of information sharing, thereby offering critical insights to support strategy development and policy formulation aimed at revitalizing the competitiveness of Kenya's food and beverage manufacturing industry.

1.4 Study Objectives

The study was guided by the following objectives;

1.4.1 General Objective of the Study

To examine the moderating effect of information sharing on the relationship between supply chain cost optimization and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

1.4.2 Specific Objectives of the Study

i. To determine the effect of inventory management on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
ii. To establish the effect of strategic sourcing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
iii. To identify the effect of adoption of technology on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

iv. To establish the effect of logistic cost on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

v. To determine the effect of information sharing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

vi. To evaluate the moderating effect of information sharing on relationship between:

a) Inventory management and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
b) Strategic sourcing and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
c) Adoption of technology and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
d) Logistic cost and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

1.5 Hypotheses of the Study

H_{01}: There is no significant effect of inventory management on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

H_{02}: There is no significant effect of strategic sourcing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

H_{03}: There is no significant effect of adoption of technology on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

H_{04}: There is no significant effect of logistic cost on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

H_{05}: There is no significant effect of Information sharing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

H_{06}: Information sharing has no moderating effect on the relationship between:

a) Inventory management and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
b) Strategic sourcing and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
c) Adoption of technology and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya
d) Logistic cost and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya

1.6 Significance of the Study

This study was of great significance to various stakeholders within the manufacturing sector. Specifically, managers in manufacturing firms benefited from the findings, as they were able to apply the recommended strategies to optimize supply chain costs. As firms continued to face resource constraints and increased market competition, the insights from this research helped managers make informed decisions that promoted operational efficiency, reduced unnecessary expenditures, and ultimately strengthened their firms' competitive advantage.

Furthermore, the Ministry of Trade and other governmental agencies used the findings of this study to guide future policy formulation related to supply chain cost optimization. By relying on empirical evidence generated through this research, policymakers were better positioned to design and implement effective policies that supported the sustainability and growth of manufacturing firms operating within Kenya's borders. These policies aimed to create an enabling environment that fostered innovation, accountability, and efficiency within the supply chain systems of manufacturing firms.

In addition, this study contributed to the existing body of knowledge in the field of supply chain management. Future researchers and scholars used this research as a foundation for further investigations into cost optimization strategies, particularly in emerging markets like Kenya. The study also stimulated academic discussions and inspired new lines of inquiry in related areas such as logistics, procurement, supplier relationship management, and technological integration in supply chains.

1.7 Scope of the Study

The study was carried out in Kenya among the food and beverage manufacturing firms in Uasin Gishu County, Kenya. It determined the moderating effect of information sharing on the relationship between supply chain cost optimization and competitiveness of food and beverage manufacturing firms. The supply chain cost optimization comprises of inventory management, strategic sourcing, technology adoption and logistics. This study was guided by the resourced- based view, lean manufacturing theory, transaction cost economic and Porter's Five Forces theory. The study employed explanatory design. The target population was 924 departmental staff. Stratified random sampling was used to select the sample of 279 respondents. The study was carried out between January and March 2025.

CHAPTER TWO

LITEREATURE REVIEW

2.1 Overview

This chapter provides an extensive review of the existing literature relevant to the study. It includes theoretical frameworks, concepts of the study, an empirical literature review of the variables, a summary of the reviewed literature, identification of research gaps, and the conceptual framework.

2.2 Theoretical Review

This study is grounded in three main theories: The Resource-Based View Theory (RBVT), Lean Manufacturing Theory, and Information Sharing Theory. Each theory provides a lens through which one or more of the study variables; competitiveness, supply chain cost optimization, and information sharing are examined.

2.2.1 Resource-Based View Theory (RBVT)

The Resource-Based View Theory (RBVT) was formally articulated by Jay Barney in 1991, building upon foundational work by Edith Penrose in 1959. The theory posits that a firm's competitive advantage is primarily derived from its internal resources and capabilities. According to Barney, 1991), these resources must be valuable, rare, inimitable, and non-substitutable (VRIN) to contribute effectively to sustained competitive advantage. The central idea is that firms are heterogeneous entities possessing unique bundles of resources, and that these differences can be a source of long-term strategic advantage (Barney, 2021).

The RBVT operates on several core assumptions. First, it assumes resource heterogeneity, meaning that firms possess different resources that are not easily transferable or replicable by competitors. Second, it assumes resource immobility,

which implies that some strategic resources cannot be easily moved or acquired by other firms (Wernerfelt, B 2020). These assumptions collectively support the notion that internal resources, rather than external market conditions, determine a firm's ability to outperform rivals.

In the context of this study, the RBVT is applied to explain the dependent variable competitiveness of food and beverage manufacturing firms. The theory justifies why firms with superior internal capabilities in inventory management, logistics, technology adoption, and strategic sourcing are more likely to develop a competitive edge. These resources, if aligned with the VRIN criteria, can enable firms to offer better-quality products, reduce costs, and adapt swiftly to market changes, all of which strengthen their market position (Laguir et al., 2021).

Despite its relevance, the RBVT faces several criticisms. Scholars argue that the theory is somewhat static, as it does not adequately address how resources should evolve in dynamic market environments (Hunt & Madhavaram, 2020). Moreover, identifying and measuring VRIN resources in practice can be subjective and methodologically challenging (Cuthbertson & Furseth, 2022). Another key limitation is its lack of emphasis on external factors such as industry competition and regulatory changes, which also significantly affect firm performance.

2.2.2 Lean Manufacturing Theory

Lean Manufacturing Theory, was developed by (Becker, R. M. (1998). Lean manufacturing and the Toyota production system. The theory advocates for the elimination of waste (referred to as *muda*) in manufacturing systems and emphasizes continuous improvement, just-in-time (JIT) production, and the pursuit of value from the customer's perspective (Womack & Jones, 1996). According to Goshime et al.

2019), lean manufacturing enhances productivity and quality while reducing operational costs.

The main assumptions of Lean Manufacturing Theory include: any activity not adding value to the customer is waste and should be eliminated, employees at all levels must participate in continuous improvement, and reducing waste leads to cost savings and improved competitiveness (Palange & Dhatrak, 2021). These assumptions suggest that a lean approach to production can transform supply chain processes into more efficient, responsive systems.

In this study, lean manufacturing theory explains the independent variable supply chain cost optimization. Practices such as efficient inventory management, strategic sourcing, logistics cost reduction, and adoption of automation and technology are all aligned with lean principles. By implementing lean systems, food and beverage manufacturing firms can reduce waste, cut down unnecessary costs, and improve responsiveness, thus becoming more competitive (Utama & Abirfatin, 2023). For instance, adopting JIT systems minimizes holding costs, while automation enhances production speed and consistency.

However, lean manufacturing theory is not without criticisms. One major critique is that overemphasis on waste reduction can lead to excessive cost-cutting, potentially compromising product quality and employee well-being (Malavolti, 2019). Additionally, the implementation of lean systems often requires significant cultural and organizational change, which can be difficult to sustain over time (Anderson, 2020). Furthermore, lean practices may be less effective in industries with unpredictable demand patterns or where high inventory buffers are essential for risk mitigation.

2.2.3 Information Sharing Theory

Information Sharing Theory was proposed by Salancik and Pfeffer in 1978 as part of their broader work on social information processing. The theory suggests that individuals and organizations rely on the information in their social and operational environments to shape behaviors and make decisions. In the context of supply chains, the theory has evolved to emphasize the importance of voluntary, accurate, and timely exchange of information among stakeholders for improved performance (Ghouri & Mani, 2019).

This theory operates on the assumption that organizations are social systems where decision-making is heavily influenced by the quality and flow of information. It assumes that shared information fosters coordination, reduces uncertainty, and builds mutual trust among partners (Colicchia et al., 2019). The absence of adequate information flow leads to poor forecasting, planning errors, and operational inefficiencies, which undermine performance.

In the current study, Information Sharing Theory is used to explain the moderating variable information sharing. The theory illustrates how information sharing strengthens the relationship between supply chain cost optimization practices and firm competitiveness. For example, when firms share real-time data on inventory, demand forecasts, and logistics with suppliers and partners, they can coordinate better, respond faster to changes, and minimize unnecessary costs (Alzoubi & Yanamandra, 2020; Xiao, J., & Bao, Y. (2022). Hence, information sharing not only improves supply chain responsiveness but also acts as a catalyst that enhances the impact of other operational strategies on competitiveness.

Nevertheless, Information Sharing Theory has limitations. A key criticism is its limited treatment of contextual variables such as power imbalances, technological disparities, and competitive secrecy, all of which may constrain the willingness or ability to share information (Jira, 2021). Additionally, concerns over data privacy, trust, and the risk of opportunistic behavior often inhibit open information flows in practice (Dobilas, 2023). Finally, the theory may overstate the positive effects of information sharing, as it does not always guarantee improved outcomes, particularly in misaligned or adversarial partnerships.

2.3 Concept of Competitiveness of Food and Beverage Manufacturing Firms

The competitiveness of food and beverage manufacturing firms is a measure of their ability to maintain and grow their market position relative to their peers (Karaev, 2023). This competitiveness is affected by several factors, including operational efficiency, product quality, innovation, cost management, and responsiveness to market changes. Firms that excel in these areas are more likely to achieve higher profitability, greater market share, and sustainable growth. Effective inventory management and strategic sourcing play crucial roles in enhancing these competitive capabilities by ensuring efficient resource utilization and reliable supply chains (Akanmu et al., 2023).

According to the study done by Náglová and Pechrová (2021), operational efficiency is a key determinant of competitiveness in the food and beverage industry. Efficient operations reduce production costs, minimize waste, and improve turnaround times, enabling firms to offer their products at competitive prices and meet customer demand promptly. Innovations in production processes, packaging, and product development also contribute to competitiveness by differentiating products in the market and

meeting evolving consumer preferences. Maintaining high standards of product quality is essential for building brand reputation and customer loyalty (Saryatmo & Sukhotu, 2021).

Furthermore, firms must be adept at managing external factors such as regulatory changes, economic fluctuations, and shifts in consumer trends (Iriani *et al.,* (2024). This requires a proactive approach to market research, strategic planning, and risk management. Advanced technologies and data analytics can provide valuable insights into market conditions and consumer behavior, helping firms make informed decisions and stay ahead of the competition. Ultimately, the ability to adapt to changing market conditions and continuously improve operational practices is critical for sustaining competitiveness in the dynamic food and beverage industry.

2.4 Concept of Supply Chain Cost Optimization

According to the study done by Frazelle (2020), supply chain cost optimization is a continuous process that requires strategic planning, execution, and constant monitoring**.** Supply chain cost optimization involves a comprehensive approach to reducing expenses while maintaining the quality and reliability of the supply chain (Wisner et al., 2021). This strategy is crucial for businesses to improve profitability, enhance customer satisfaction, and maintain a competitive edge.

Supply chain cost optimization requires a strategic approach that balances cost reduction with service levels (Sanders, 2020). This involves evaluating all supply chain functions, including raw material sourcing, procurement, inventory management, transportation, distribution, and customer service levels (Schmidt & Wagner, 2019). The goal is to find ways to reduce expenses without compromising service quality. The total cost approach focuses on optimizing the overall cost of

ownership rather than just the lowest supply chain costs (Min et al., 2019). This approach considers all direct and indirect costs, including those borne by each function up to the service of the end customer. By adopting this holistic view, businesses can make informed decisions that optimize the entire supply chain.

The benefits of supply chain cost optimization are numerous and include efficient inventory management and reduced inventory levels can lead to better cash flow management (Kumar et al., 2019). Optimized processes and reduced waste can enhance production efficiency. According to the study done by Salari et al. (2022), better demand forecasting and inventory management can ensure timely delivery and improved customer satisfaction. Streamlined operations and reduced inefficiencies can lower overhead costs. Real-time tracking and enhanced visibility can help mitigate disruptions and improve supply chain reliability (Ivanov, 2021).

Components of supply chain cost optimization are effective inventory management is critical for reducing holding and ordering costs (Tien et al., 2019). This involves implementing systems to control inventory levels, ensuring the right quantity of products is produced and held, and reducing waste and storage costs. Strategic sourcing involves negotiating with suppliers for better pricing and delivery terms (Wang et al., 2019). This can help reduce procurement costs and improve the overall supply chain efficiency. The use of advanced analytics and technology can significantly improve supply chain cost optimization. Predictive and prescriptive analytics can enhance demand forecasting, inventory management, and logistics planning, leading to higher efficiency and cost savings (Galli et al., 2021). Optimizing logistic costs involves improving transportation methods and reducing costs associated with fuel, routing inefficiencies, and logistics hurdles (Mukhtarov, 2023).

This can be achieved through better load optimization, reducing the number of journeys, and optimizing the filling rate of trucks or containers. By focusing on inventory management, strategic sourcing, adoption of technology, and logistic cost optimization, businesses can achieve significant cost savings while maintaining high service levels (Teerasoponpong & Sopadang, 2022). This approach not only improves financial performance but also enhances customer satisfaction and overall business value.

2.5 Concept of Information Sharing

Information sharing refers to the exchange of relevant data, insights, or knowledge between individuals, teams, departments, organizations, or even government agencies (Fullwood et al., 2019). Information sharing involves conveying information in a clear, concise, and easy-to-understand manner using various communication channels such as face-to-face discussions, email, instant messaging, video conferencing, or shared databases (Farah Farzana et al., 2024). The goal of information sharing is to create a culture of collaboration and teamwork that fosters continuous improvement and promotes the well-being of the organization (Nauman et al., 2022). It helps team members learn from one another and work together to achieve common goals. Effective information sharing requires investing in knowledge management systems that enable team members to access and contribute to a centralized database of information. This helps capture and share valuable insights, best practices, and lessons learned. Information sharing thrives in an environment of trust, transparency, and openness, where team members feel comfortable sharing their ideas, feedback, and concerns without fear of judgment or reprisal (Paulus, 2023). By facilitating effective communication, collaboration, and knowledge sharing, information sharing can lead

to increased productivity, higher employee engagement, and better overall business performance.

When team members actively share information, it fosters open communication and transparency within the team (Lee & Dong, 2023). This allows for a better understanding of each person's roles, responsibilities, and progress, which facilitates smoother collaboration. By sharing knowledge, insights, and diverse perspectives, team members can tackle problems more effectively and generate innovative solutions (Tan, 2021). The pooling of information sparks new ideas and approaches that individual team members may not have considered on their own. Information sharing enables teams to stay up to date on industry trends, best practices, and lessons learned. This allows the team to adapt more quickly to changing circumstances and overcome obstacles more effectively. Team members can learn from each other's experiences.

Sharing information promotes a sense of shared ownership and accountability among team members (Abu-Rumman, 2021). When everyone has access to the same information, it creates a collaborative environment where team members feel invested in the team's success. This strengthens teamwork and collaboration. By sharing relevant data, insights, and knowledge, teams can make more informed decisions that lead to improved productivity and better business outcomes (Wu et al., 2020). Access to real-time information reduces the risk of decisions based on incomplete or outdated information.

2.6 Empirical Review

This section reviews studies done on the area of study as per the objectives.

2.6.1 Inventory Management and Competitiveness of Food and Beverage Manufacturing Firms

Inventory management plays a crucial role in the competitiveness of food and beverage manufacturing firms (Sonko & Akinlabi, 2020). Effective inventory management ensures that firms maintain optimal inventory levels, balancing the need to meet customer demand with the necessity to minimize holding costs. According to Garti (2023), well-managed inventory systems enhance a firm's responsiveness to market changes, thereby improving customer satisfaction and competitive positioning. In the context of food and beverage manufacturing, where product shelf life and quality are paramount, precise inventory control prevents overstocking and understocking, which can lead to spoilage, waste, and increased costs (Adedeji, 2020).

A study by Keith (2023) highlights that inventory management systems leveraging advanced technologies, such as Just-In-Time (JIT) and automated replenishment systems, significantly boost operational efficiency. Reducing lead times and ensuring a continuous supply of raw materials and finished products, these systems enable firms to respond swiftly to consumer preferences and market trends (Suri, 2020). This agility not only enhances customer satisfaction but also fosters a competitive edge in the rapidly evolving food and beverage sector. Furthermore, JIT inventory management minimizes storage costs and reduces the risk of inventory obsolescence, contributing to higher profitability and financial performance (Al Shukaili, Jamaluddin & Zulkifli, 2023).

Singhry and Abd Rahman (2019) argue that effective inventory management can lead to significant cost savings through better demand forecasting, improved procurement strategies, and reduced waste. For instance, adopting inventory optimization

techniques allows firms to align their production schedules more closely with actual demand, minimizing excess inventory and associated holding costs (Vaka, 2024). In the competitive landscape of the food and beverage industry, where margins can be thin, these cost savings are critical for maintaining competitiveness.

According to the study done by Adams et al. (2023), sustainable inventory management practices also contribute to the competitiveness of food and beverage firms by aligning with Environmental and Social Governance (ESG) criteria. Silva and Figueiredo (2020) emphasize that sustainability in supply chain management, including inventory practices, is increasingly important for modern businesses. Implementing practices such as reducing food waste, optimizing supply chain logistics to lower carbon footprints, and ensuring ethical sourcing of raw materials, firms can enhance their brand reputation and appeal to environmentally conscious consumers. This approach not only differentiates them from competitors but also ensures long-term viability in a market that is progressively valuing sustainability.

Effective inventory management supports innovation and product development within the food and beverage industry. Mbugi and Lutego (2022) note that firms with robust inventory systems can better manage the introduction of new products, ensure timely availability and reduce the risks associated with product launches. Facilitating smoother transitions and maintaining supply chain stability, inventory management practices enable firms to innovate continuously, meeting evolving consumer demands and staying ahead of competitors (Jaboob, Awain Ali, & Mohammed, 2024). This capability is particularly critical in an industry characterized by rapid changes in consumer preferences and regulatory requirements.

Effective inventory management also contributes to the overall strategic planning and decision-making processes within food and beverage manufacturing firms. According to Herden (2020), accurate inventory data and analytics provide crucial insights that guide executive decisions on production planning, marketing strategies, and financial management. Leveraging real-time inventory data, firms can anticipate demand fluctuations, adjust production schedules, and allocate resources more efficiently (Pereira & Frazzon, 2021). This strategic alignment ensures that companies can swiftly adapt to market changes, seize new opportunities, and mitigate risks, thereby sustaining their competitive edge in a dynamic industry (Niaz, 2022).

According to the study done by Zhao and Tu (2021), inventory management systems that integrate with other business functions, such as procurement, production, and distribution, enhance the overall supply chain performance. Kondo and Vicente (2023) argue that integrated inventory management systems enable seamless communication and coordination across different departments, reducing delays and bottlenecks. In the food and beverage industry, where timely delivery of fresh products is critical, such integration ensures that inventory levels are aligned with production schedules and customer orders, thereby improving supply chain efficiency and reliability. This holistic approach to inventory management fosters a collaborative environment that enhances overall business performance and competitiveness (Nwankwo, 2023).

The implementation of advanced inventory management technologies, such as RFID (Radio Frequency Identification) and IoT (Internet of Things), has revolutionized inventory tracking and control in the food and beverage industry. According to Tan and Sidhu (2022), these technologies provide real-time visibility into inventory levels,

locations, and conditions, enabling firms to monitor and manage their inventory more effectively. For example, RFID technology allows firms to track products throughout the supply chain, from production to retail shelves, ensuring transparency and traceability (Rahman et al., 2021). This not only enhances inventory accuracy but also reduces the risk of stockouts and overstocking, thereby improving operational efficiency and customer satisfaction (Ahamed et al., 2023).

Effective inventory management supports compliance with food safety regulations and standards, which is crucial for maintaining brand reputation and consumer trust. According to Mostofi and Jain (2021), stringent inventory control practices ensure that products meet regulatory requirements and quality standards throughout their lifecycle. This is particularly important in the food and beverage industry, where non-compliance can lead to product recalls, legal penalties, and damage to brand reputation. Implementing robust inventory management systems, firms can ensure traceability, quality control, and compliance, thereby safeguarding their market position and competitive advantage (Alrobaish, 2023).

Inventory management practices that focus on demand forecasting and inventory optimization can significantly enhance the profitability of food and beverage firms. According to Tadayonrad and Ndiaye (2023), accurate demand forecasting enables firms to predict customer demand more precisely, reducing the risk of stockouts and excess inventory. The use of sophisticated forecasting models and inventory optimization techniques, firms can align their inventory levels with actual demand, minimizing holding costs and maximizing sales (Mittal, 2024). This strategic approach to inventory management not only improves financial performance but also

enhances the firm's ability to meet customer needs and preferences, thereby strengthening its competitive position in the market (Accarrino, 2019).

The adoption of lean inventory management principles, such as the Lean Six Sigma methodology, can drive continuous improvement and operational excellence in food and beverage manufacturing firms (Utama & Abirfatin, 2023). Lean Six Sigma combines the principles of lean manufacturing and Six Sigma to eliminate waste, reduce variability, and improve process efficiency. Applying these principles to inventory management, firms can streamline their operations, reduce lead times, and enhance product quality (Boopathi, 2024). This commitment to continuous improvement not only boosts operational efficiency but also fosters a culture of innovation and excellence, which is essential for maintaining competitiveness in a rapidly evolving industry (Juliani & De Oliveira, 2020).

2.6.2 Strategic Sourcing and Competitiveness of Food and Beverage Manufacturing Firms

Strategic sourcing plays a pivotal role in enhancing the competitiveness of food and beverage manufacturing firms by optimizing procurement processes and ensuring a reliable supply of high-quality raw materials (Wanjiku, 2019). Effective strategic sourcing involves a comprehensive analysis of the supply market, selection of suppliers that align with the firm’s strategic goals, and the establishment of long-term partnerships that promote mutual growth and efficiency (Yildiz Çankaya, 2020). According to Tarigan and Siagian (2021), strategic sourcing allows firms to leverage their purchasing power to obtain better pricing, improved quality, and favorable terms, which directly contribute to cost savings and competitive advantage.

The integration of strategic sourcing with the firm's overall business strategy is crucial for achieving competitive differentiation (Jääskeläinen & Heikkilä, 2019). Aligning sourcing decisions with the company's strategic objectives, such as sustainability goals, innovation, and market expansion, firms can enhance their market position. Jermsittiparsert and Rungsrisawat (2019) emphasize that strategic sourcing is not merely about cost reduction but also about creating value through supplier collaboration, innovation, and risk management. In the food and beverage industry, where product quality and safety are paramount, strategic sourcing ensures that raw materials meet stringent quality standards, thereby enhancing the firm's reputation and customer satisfaction.

Supplier relationship management is a core component of strategic sourcing that significantly impacts competitiveness (Schmelzle & Mukandwal, 2023). Developing strong, collaborative relationships with key suppliers can lead to joint innovation, improved product quality, and more reliable supply chains. According to Ma and Ozer (2024), strategic sourcing fosters partnerships where suppliers are seen as strategic allies rather than mere transaction partners. This collaborative approach enables the sharing of information, technology, and best practices, which can lead to co-developed products, process improvements, and cost efficiencies. In the competitive food and beverage sector, such synergies are crucial for maintaining a competitive edge.

Risk management is another critical aspect of strategic sourcing that contributes to the resilience and competitiveness of food and beverage manufacturing firms (Mogaka, 2023). Diversifying the supplier base and developing contingency plans, firms can mitigate risks associated with supply chain disruptions, such as raw material

shortages, geopolitical issues, or natural disasters. (Van Hoek and Dobrzykowski (2021) notes that strategic sourcing involves identifying potential risks and implementing strategies to minimize their impact, such as sourcing from multiple suppliers or geographic regions. This proactive risk management ensures continuity in production and supply, safeguarding the firm's ability to meet customer demands and maintain market presence even in adverse conditions (Um & Han, 2021).

Sustainability initiatives in strategic sourcing are increasingly important for food and beverage manufacturing firms aiming to enhance their competitive position (Wanjiku, 2019). Sustainable sourcing practices, such as selecting suppliers based on their environmental and social performance, contribute to the firm's overall sustainability goals and appeal to environmentally conscious consumers. (Miemczyk and Luzzini (2019) argue that sustainable sourcing is integral to achieving a triple bottom line approach, which balances economic, environmental, and social considerations. Prioritizing suppliers that adhere to sustainable practices, firms can reduce their environmental footprint, support fair labor practices, and build a positive brand image, all of which enhance their competitiveness in a market that values corporate social responsibility (Camilleri, 2022).

Strategic sourcing also supports innovation and product development by facilitating access to new technologies, materials, and processes (Zhu & Kouhizadeh, 2019). Suppliers often serve as valuable sources of innovation, providing insights and capabilities that can drive product differentiation and market growth. According to Schmelzle and Tate (2022), strategic sourcing involves selecting suppliers with strong innovation capabilities and fostering collaborative development efforts. In the food and beverage industry, where consumer preferences are constantly evolving, strategic

sourcing enables firms to introduce new products that meet emerging trends and demands, thereby maintaining their competitive edge (Ali & Aboelmaged, 2022).

Cost management is a direct benefit of strategic sourcing that significantly impacts the competitiveness of food and beverage manufacturing firms. Negotiating favorable terms, optimizing procurement processes, and leveraging economies of scale, firms can achieve substantial cost savings. (Gray et al. (2020) highlight that strategic sourcing focuses on total cost of ownership rather than just the purchase price, considering factors such as transportation, storage, and quality control. Effective cost management through strategic sourcing allows firms to price their products competitively while maintaining healthy profit margins, enhancing their ability to compete in the market (Anderson, 2020).

The strategic sourcing process involves thorough market analysis and supplier evaluation, which provide firms with a deep understanding of market dynamics and supplier capabilities (Vörösmarty & Dobos, 2020). This knowledge enables firms to make informed sourcing decisions that align with their strategic goals and competitive strategies. Konys (2019) note that comprehensive supplier assessments, including financial stability, technological capabilities, and compliance with industry standards, are essential for selecting the right partners. In the food and beverage industry, where product quality and safety are critical, rigorous supplier evaluation ensures that the raw materials and components sourced meet the required standards, thereby maintaining the firm's competitive position.

Long-term partnerships with key suppliers established through strategic sourcing can lead to continuous improvements in quality, cost, and delivery performance (Fernie, 2023). These partnerships are built on trust, transparency, and mutual benefit,

fostering a collaborative environment where both parties work together to achieve common goals. (Oloitiptip, 2023) emphasizes that strategic sourcing focuses on developing strategic alliances with suppliers, leading to joint problem-solving and continuous improvement initiatives. In the competitive food and beverage sector, such partnerships enhance supply chain efficiency, reduce lead times, and improve overall service levels, contributing to the firm's competitiveness.

According to the study done by (Bal and Erkan (2019), technological advancements in strategic sourcing further amplify its impact on competitiveness. The adoption of digital tools, such as e-procurement platforms, supplier relationship management (SRM) systems, and advanced analytics, streamlines the sourcing process and enhances decision-making. (Oliveira and Handfield (2019) argue that these technologies provide real-time insights into supplier performance, market trends, and cost structures, enabling more informed and strategic sourcing decisions. In the food and beverage industry, where precision and speed are vital, digital tools facilitate more efficient procurement processes, reduce administrative burdens, and improve overall supply chain visibility, all of which contribute to a stronger competitive position (Srai & Lorentz, 2019).

2.6.3 Adoption of Technology and Competitiveness of Food and Beverage Manufacturing Firms

The adoption of technology plays a pivotal role in enhancing the competitiveness of food and beverage manufacturing firms by driving operational efficiency, innovation, and responsiveness to market demands (Saryatmo & Sukhotu, 2021). Technology enables firms to streamline production processes, improve product quality, and optimize resource utilization, leading to cost savings and enhanced competitiveness.

According to Pramod (2022) indicated that technology adoption allows firms to automate repetitive tasks, reduce errors, and increase throughput, thereby improving overall operational efficiency and productivity.

One of the key areas where technology adoption impacts competitiveness is in production automation and optimization (Götz & Jankowska, 2020). Advanced technologies such as robotics, automation systems, and artificial intelligence (AI) enable firms to automate various tasks in the production process, from ingredient handling to packaging. This automation not only reduces labor costs but also improves consistency, accuracy, and speed, resulting in higher-quality products and faster time-to-market. (Javaid et al. (2021) note that automation also enables firms to scale production more efficiently in response to changing demand, thereby enhancing their competitiveness in dynamic markets.

The use of technology facilitates data-driven decision-making and process optimization within food and beverage manufacturing firms (Irfan & Wang, 2019). By leveraging technologies such as big data analytics, machine learning, and predictive modeling, firms can analyze vast amounts of data generated throughout the supply chain to identify patterns, trends, and opportunities for improvement. According to Kolasani (2023), data-driven insights enable firms to optimize production schedules, minimize waste, and improve resource allocation, leading to cost reductions and improved competitiveness. Real-time monitoring and analysis of key performance indicators (KPIs) also enable firms to quickly identify and address issues before they escalate, ensuring continuous improvement and agility in operations (Muthukalyani, 2024).

Supply chain management is another area where technology contributes to competitiveness in the food and beverage industry (Mukherjee & Chittipaka, 2022). Advanced technologies such as cloud-based inventory management systems, RFID tracking, and blockchain enable firms to optimize inventory levels, improve traceability, and enhance supply chain visibility. (Dey (2023) note that real-time visibility into inventory levels, supplier performance, and transportation status enables firms to make informed decisions and respond quickly to changes in demand or supply chain disruptions. This agility and responsiveness are critical for maintaining customer satisfaction and competitiveness in a fast-paced market (Muthu & Thangavelu, 2019).

Quality control and compliance are paramount in the food and beverage industry, and technology adoption plays a crucial role in ensuring product safety and regulatory compliance (Uzoigwe & Kongolo, 2024). Technologies such as sensor-based monitoring, quality management software, and traceability systems enable firms to monitor and control product quality throughout the production process. Alrae (2024) emphasizes that real-time monitoring and automated quality control systems detect deviations from quality standards early, allowing firms to take corrective action and prevent defective products from reaching consumers. Compliance management software also helps firms track and adhere to regulatory requirements, reducing the risk of recalls, fines, and damage to brand reputation (Borit & Olsen, 2020).

Innovation is a key driver of competitiveness in the food and beverage industry, and technology adoption enables firms to develop new products, processes, and business models (Bivona & Cruz, 2021). Advanced technologies such as 3D printing, nanotechnology, and biotechnology enable firms to create innovative products that

meet changing consumer preferences and market trends. Lee et al. (2019) note that technology-enabled innovation allows firms to differentiate themselves in the market, attract new customers, and command premium prices. Moreover, digital technologies such as e-commerce platforms, mobile apps, and social media enable firms to reach and engage with consumers more effectively, driving sales and brand loyalty (Purnomo, 2023).

Customer engagement and experience are critical for maintaining competitiveness in the food and beverage industry, and technology integrations enables firms to personalize and enhance the customer experience (Nuseir & Elrefae, 2022). Technologies such as customer relationship management (CRM) systems, loyalty programs, and digital marketing platforms enable firms to collect and analyze customer data, tailor marketing messages, and offer personalized promotions and discounts. Kini et al. (2024) note that technology-enabled customer engagement fosters loyalty, repeat purchases, and positive word-of-mouth, all of which contribute to a firm's competitiveness and market share.

Digital transformation supports sustainability initiatives within food and beverage manufacturing firms, enhancing their appeal to environmentally conscious consumers and stakeholders (Yacob et al., 2019). Technologies such as energy-efficient equipment, waste reduction systems, and renewable energy sources enable firms to reduce their environmental footprint and operate more sustainably. Alam and Islam (2021) emphasize that sustainability is increasingly important for consumers and investors, and firms that demonstrate a commitment to environmental stewardship and social responsibility can gain a competitive advantage. Technology-enabled sustainability initiatives not only reduce costs but also enhance brand reputation and

customer loyalty, contributing to long-term competitiveness and profitability (Khatter, 2025).

2.6.4 Logistic Cost and Competitiveness of Food and Beverage Manufacturing Firms

Logistics costs play a pivotal role in determining the competitiveness of food and beverage manufacturing firms. These costs directly influence a firm's ability to deliver products promptly, maintain profit margins, and meet evolving customer expectations. As noted by Mogaka (2023), effectively managing logistics costs can significantly enhance operational efficiency and strengthen a firm’s position in the market. Chen (2019) further underscores that a clear understanding of the connection between logistics costs and competitiveness is essential for firms seeking to streamline their supply chain activities and sustain market relevance.

Broadly, logistics costs refer to the cumulative expenses incurred in the movement, handling, storage, and coordination of goods across the supply chain (Frazelle, 2020). These costs typically include transportation, inventory holding, warehousing, packaging, and administrative expenses. Bor (2021) observes that for firms operating in the food and beverage sector, logistics costs constitute a substantial share of overall operational expenditure, highlighting their critical role in achieving cost leadership and market competitiveness.

Among these, transportation costs are often the most significant, especially for firms with wide-reaching distribution channels. Efficient transport management is essential not only for cost containment but also for ensuring timely deliveries. As Sethanan and Jamrus (2020) explain, variables such as fuel prices, transport mode selection, and route optimization have a direct impact on these costs. Engebrethsen and Dauzère-

Pérès (2019) also emphasize the importance of strategic carrier selection and logistics planning. By adopting cost-saving practices such as route consolidation, shipment grouping, and leveraging advanced tools like Transportation Management Systems (TMS), firms can substantially lower transportation expenses and improve delivery performance (Kern, 2021).

Inventory holding costs are another vital aspect influencing logistics efficiency and firm competitiveness. According to Mbugi and Lutego (2022), maintaining the right inventory levels is crucial to balancing service levels with financial prudence. High inventory levels can lead to increased costs related to storage, obsolescence, and capital lock-up, while inadequate stock can cause stockouts and lost sales. Aldhaheri (2019) highlights that excessive inventory burdens warehousing space and resources. To mitigate these challenges, firms are increasingly adopting inventory optimization techniques such as just-in-time (JIT) practices, advanced demand forecasting, and vendor-managed inventory (VMI), all of which help reduce holding costs while maintaining service reliability (Raman & Dubey, 2019).

Warehousing and distribution costs also represent a significant portion of logistics expenses, particularly for firms managing complex or multi-layered supply chains. Alesiuniene et al. (2021) stress the importance of warehouse efficiency in reducing operational burdens without compromising order accuracy or product quality. Factors such as warehouse location, layout efficiency, and labor productivity play crucial roles in determining warehousing costs. Yener and Yazgan (2019) suggest that strategies like automation, space optimization, and cross-docking can drastically improve warehouse operations, leading to reduced costs and enhanced performance.

Packaging, though often overlooked, constitutes another important logistics cost component. In the food and beverage industry, packaging must preserve product integrity and support brand visibility while remaining cost-effective. Custodio and Machado (2020) point out that overinvestment in packaging can inflate costs without necessarily adding value. Firms can minimize packaging costs by using sustainable, cost-efficient materials, reducing waste, and purchasing in bulk. Further notes that environmentally sustainable packaging not only reduces expenses but also aligns with consumer preferences for eco-friendly products, thus enhancing brand image and competitiveness.

Lastly, administrative and overhead expenses linked to logistics processes also contribute to total logistics costs. These include staff salaries, technology investment, and other indirect operational costs. Ismaeil (2024) suggests that firms can reduce these costs by streamlining logistics workflows and adopting integrated digital tools such as Enterprise Resource Planning (ERP) and Supply Chain Management (SCM) systems. Outsourcing logistics functions to specialized third-party logistics (3PL) providers is another strategy that can improve efficiency and allow firms to focus on core operations. Namadi (2023) adds that by optimizing administrative processes and leveraging technological solutions, firms can reduce overhead, increase productivity, and ultimately enhance their competitive position.

2.6.5 Information Sharing and Competitiveness of Food and Beverage Manufacturing Firms

Information sharing within supply chains especially the timely, accurate, and relevant exchange of data has emerged as a critical driver of operational efficiency and competitive performance (Baah et al., 2022). In the food and beverage (F&B)

manufacturing sector, which is characterized by perishable products, volatile consumer demand, and stringent regulatory requirements, effective information exchange among suppliers, producers, and retailers improves forecasting, reduces waste, accelerates responsiveness, and enhances market positioning. However, much of the existing literature addresses manufacturing firms in general, with limited emphasis on the unique needs and challenges of the F&B sector. There is also insufficient evidence from African contexts, especially Kenya, where supply chain dynamics may differ due to infrastructural and institutional constraints.

Baah et al., (2022) conducted a cross-sectoral study that demonstrated how information sharing significantly enhances supply chain visibility, collaboration, agility, and overall performance. These interconnected elements were shown to collectively strengthen a firm's competitive advantage by allowing faster decision-making and better alignment with market needs. Their findings underscore the strategic importance of information exchange in increasingly dynamic business environments.

In the Indonesian food manufacturing industry, Pintuma et al. (2020) surveyed 500 managers and found that information sharing positively moderates the relationship between supply chain management capabilities and business performance. The study emphasized that firms that systematically exchanged demand, inventory, and supplier information were more agile, productive, and profitable than those with limited communication structures.

Similarly, a study published in *ScienceDirect* (2023) found that information sharing plays a mediating role between information quality and supply chain performance in industrial manufacturing. The authors noted that while high-quality information

(accurate, timely, and relevant) improves supply chain outcomes, these benefits materialize only when the data is effectively shared across internal and external stakeholders. Thus, firms that integrate structured information sharing systems into their supply chains gain a measurable competitive edge.

Obonyo et al., (2025) conducted a systematic review of African agri-food supply chains and revealed that information sharing remains nascent across the continent. Most firms still rely on traditional methods for exchanging price and market data, with limited adoption of digital technologies. This lack of structured and real-time communication reduces supply chain visibility, increases inefficiencies, and undermines firms' competitiveness in both local and export markets.

A study by Kabelele and Musabila (2020) in Tanzania focused on beverage manufacturing firms and found that IT infrastructure, organizational trust, and a competitive market environment are significant enablers of information sharing. Firms with well-developed communication systems and strong inter-organizational relationships showed marked improvements in order fulfillment, responsiveness, and overall performance. The study concluded that information sharing is essential for building resilience and adaptability in African food and beverage supply chains.

Otieno et al. (2022) investigated supplier integration among Kenyan manufacturing firms and found that information sharing particularly through shared forecasts and collaborative planning had a strong positive effect on competitive advantage. Firms that actively engaged their suppliers in data-driven coordination were more responsive to market demands and operational disruptions.

Wakoli et al. (2025) examined the effect of supply chain management practices on the performance of manufacturing firms in Nairobi County. The study identified information sharing as a significant factor contributing to operational efficiency. Firms that routinely exchanged data on demand trends, production schedules, and stock levels experienced fewer delays and improved delivery reliability.

Dulo (2021) explored supply chain visibility and performance among food and beverage firms in Nairobi City County. Their findings confirmed that improved visibility enabled through systematic information sharing enhanced responsiveness, customer satisfaction, and ultimately, competitive positioning. The study highlighted the importance of investing in ICT infrastructure to facilitate real-time data exchange.

Karani (2022) analyzed supply chain practices in the F&B sector in Nairobi and found that information sharing helped align procurement and production with market needs. However, the study also noted that many firms lacked the technological capabilities to fully realize the benefits of digital integration, indicating room for improvement in infrastructure and staff training

2.6.6 Moderating Effect of Information Sharing on the Relationship Between Supply Chain Cost Optimization and Competitiveness of Food and Beverage Manufacturing Firms

In the context of food and beverage manufacturing firms, the relationship between supply chain cost optimization and competitiveness is affected by the extent of information sharing among supply chain partners. Information sharing acts as a moderating factor that either strengthens or weakens the relationship between cost optimization initiatives and the firm's competitive position (Xiao & Bao, 2022). Supply chain cost optimization initiatives aim to reduce expenses associated with

procurement, production, distribution, and logistics operations. These initiatives may include strategies such as lean manufacturing, just-in-time inventory management, transportation optimization, and vendor-managed inventory programs. The successful implementation of these initiatives can lead to cost savings, improved operational efficiency, and enhanced profitability for food and beverage firms.

Competitiveness in the food and beverage industry is determined by factors such as product quality, pricing, delivery performance, innovation, and customer service. Cost optimization plays a critical role in enhancing competitiveness by enabling firms to offer competitive pricing while maintaining product quality and service levels (Oteri et al., 2023). However, the effectiveness of cost optimization initiatives in driving competitiveness is contingent upon the availability and quality of information shared among supply chain partners.

Information sharing among supply chain partners facilitates coordination, collaboration, and alignment of goals and processes across the supply chain. By sharing timely and accurate information related to demand forecasts, inventory levels, production schedules, and market trends, firms can make informed decisions and respond quickly to changes in the market environment. This enhanced visibility and transparency enable supply chain partners to synchronize their activities, minimize disruptions, and optimize resource allocation (Wolniak, 2024).

2.7 Summary of the Reviewed Literature

The reviewed literature provides a comprehensive understanding of the critical components that effect the competitiveness of food and beverage manufacturing firms: inventory management, strategic sourcing, and technology adoption. Most of the studies focus on the food and beverage manufacturing industry, with limited

research in developed countries. Expanding the geographical context of undeveloped countries like Kenya could provide understanding the effect of inventory management practices and their impact on competitiveness (Mogaka, 2023). While several studies highlight the importance of inventory management for firm competitiveness, there is a lack of research on the specific mechanisms through which inventory management effects competitiveness in food and beverage manufacturing industry (Sonko & Akinlabi, 2020). Further conceptual development is needed to establish clearer linkages between inventory management practices and competitive advantages. There is limited research on the impact of emerging technologies, such as artificial intelligence and blockchain, on inventory management practices and their effect on competitiveness in the food and beverage industry. Exploring these areas could yield valuable insights.

The existing literature primarily focuses on the direct relationship between inventory management and competitiveness (Pham et al., 2019). Investigating the potential moderating variables, such as supply chain integration, sustainability practices, or innovation capabilities, could provide a more nuanced understanding of this relationship. While some studies mention the importance of inventory management for strategic planning and decision-making, there is a lack of in-depth exploration information sharing on the relationship between supply chain cost optimization and competitiveness of food and beverage manufacturing firms (Ghasemi et al., 2023). Further research in this area could yield valuable insights for practitioners.

Table 2.1 Summary of Literature Reviewed and Research Gaps

Author	Topic	Methodological Approach	Findings	Gaps
Sonko & Akinlabi (2020)	Inventory Management and Profitability of Food and Beverage Manufacturing Companies in Lagos State, Nigeria.	Literature Review, Case Studies	Effective inventory management enhances responsiveness, reduces costs.	Contextual: Lack of specific industry contexts. Methodological: Limited to case studies, lacks empirical data. Conceptual: How competitiveness is defined and measured.
Garti (2023)	Examining the Effects of Inventory Management on Store Performance: A Case of Building Materials Manufacturing Firms in Ghana	Literature Review	Precise inventory control prevents waste, improves customer satisfaction.	Methodological: Relies on literature review, lacks empirical validation. Conceptual: Need for quantification of customer satisfaction impact.
Keith (2023)	Optimizing Inventory Management Through Advanced Forecasting Techniques in Supply Chains.	Case Studies, Comparative Analysis	JIT and automated systems improve efficiency, reduce storage costs.	Methodological: Limited to case studies, lacks generalizability. Conceptual: How efficiency and cost savings translate to competitiveness.
Singhry & Abd Rahman (2019)	Enhancing Supply Chain Performance Through Collaborative Planning, Forecasting, And Replenishment.	Case Studies, Quantitative Analysis	Effective inventory practices lead to significant cost reductions.	Conceptual: Need for longitudinal studies to assess sustainability of cost reductions.

Adams et al. (2023)	Sustainability in Large Food and Beverage Companies and Their Supply Chains: An Investigation into Key Drivers and Barriers Affecting Sustainability Strategies	Mixed Methods	Sustainable practices enhance brand reputation, appeal to consumers.	Contextual: Industry-specific implications of sustainability practices. Conceptual: How brand reputation translates into competitiveness.
Mbugi & Lutego (2022)	Effects of Inventory Control Management Systems on Organization Performance in Tanzania Manufacturing Industry-A Case Study of Food and Beverage Manufacturing Company in Mwanza City	Case Studies, Qualitative Analysis	Robust inventory systems facilitate smoother product innovation.	Methodological: Limited to qualitative insights, lacks quantitative validation. Conceptual: How innovation leads to sustained competitive advantage.
Herden (2020)	Explaining the Competitive Advantage Generated from Analytics with The Knowledge-Based View: The Example of Logistics and Supply Chain Management	Quantitative Analysis, Surveys	Accurate data enhances decision-making, improves adaptability.	Conceptual: Longitudinal studies needed to assess long-term adaptability and strategic advantage.
Zhao & Tu (2021)	Research and Development of Inventory Management and Human Resource Management In ERP	Case Studies, Comparative Analysis	Integration enhances supply chain performance, reduces delays.	Methodological: Limited to specific case studies, lacks broader industry application. Conceptual: How integration leads to overall supply chain efficiency.
Tan & Sidhu (2022)	Review of RFID And Iot Integration in Supply Chain Management.	Experimental Research, Case Studies	Real-time tracking improves accuracy, reduces stockouts.	Conceptual: How accuracy and reduced stockouts contribute to overall business competitiveness.

Mostofi & Jain (2021)	Inventory Management and Control of Deteriorating Pharmaceutical Products Sing Industry 4.0	Case Studies, Legal Analysis	Compliance enhances brand trust, mitigates risks.	Contextual: Industry-specific implications of compliance practices. Conceptual: Quantifying impact of compliance on brand trust and market position.
Tadayonrad & Ndiaye (2023)	A New Key Performance Indicator Model for Demand Forecasting in Inventory Management Considering Supply Chain Reliability and Seasonality	Quantitative Analysis, Financial Modeling	Accurate forecasting reduces costs, improves profitability.	Methodological: Need for longitudinal studies to assess sustained profitability improvements. Conceptual: How profitability ties to broader competitiveness.
Utama & Abirfatin (2023)	Sustainable Lean Six-Sigma: A New Framework for Improve Sustainable Manufacturing Performance	Qualitative Analysis, Case Studies	Lean principles improve efficiency, reduce variability.	Methodological: Lacks quantitative validation across diverse organizational contexts. Conceptual: How efficiency improvements lead to competitive advantage.

2.8 Conceptual Framework

The conceptual framework hypothesizes the interaction between supply chain cost optimization and competitiveness of food and beverage manufacturing firms.

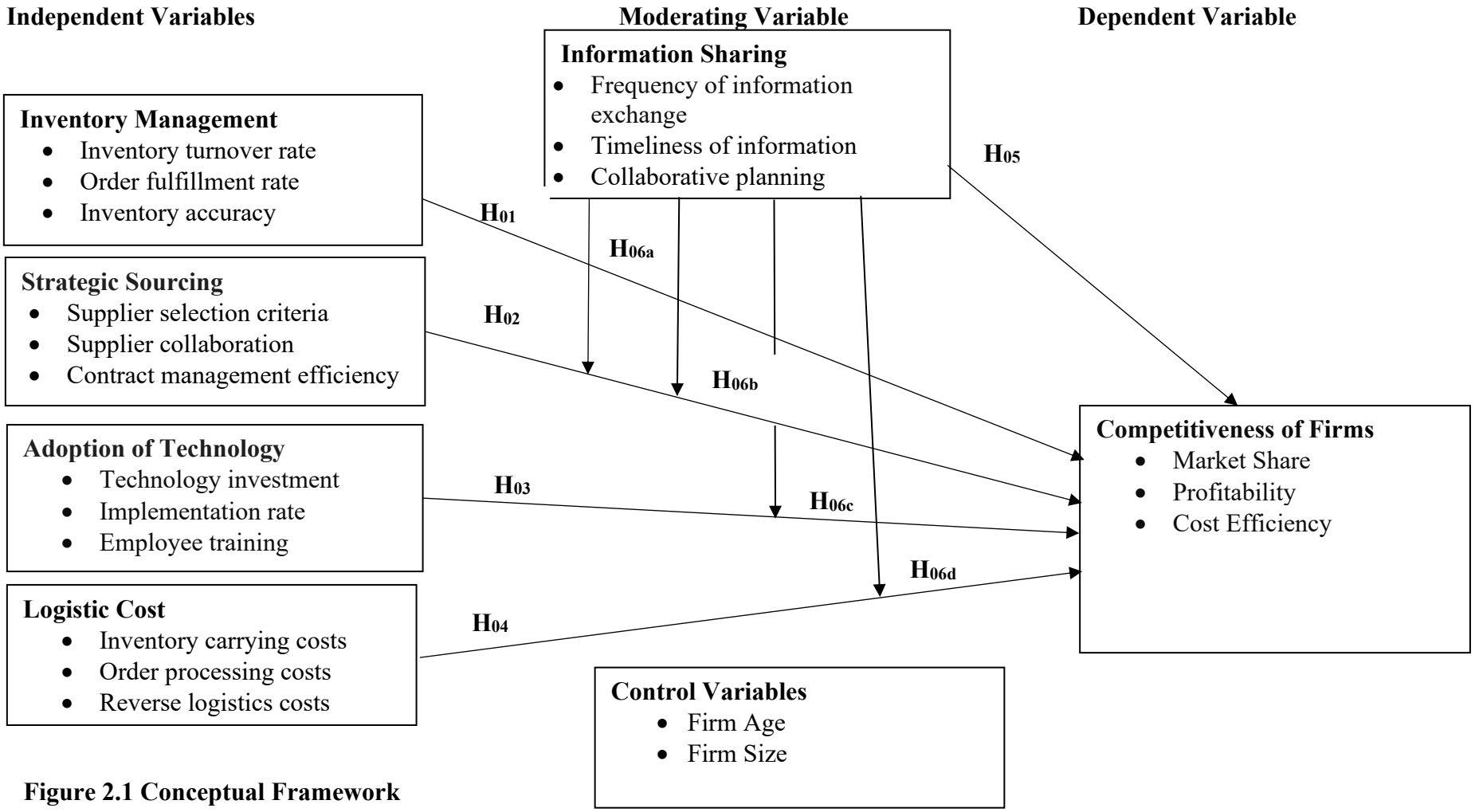

Figure 2.1 Conceptual Framework

The conceptual framework of this study illustrates how supply chain cost optimization influences the competitiveness of food and beverage manufacturing firms, with information sharing acting as a moderating factor. Supply chain cost optimization is examined through four dimensions: inventory management, strategic sourcing, adoption of technology, and logistics cost management. These practices are expected to enhance a firm's competitiveness by improving efficiency, reducing operational costs, and increasing responsiveness. Competitiveness is viewed in terms of market performance, profitability, and the ability to meet customer demands. Information sharing is introduced as a moderating variable that strengthens or weakens the relationship between supply chain cost optimization and competitiveness. When firms engage in timely, accurate, and collaborative information exchange with supply chain partners, the benefits of cost optimization are likely to be more pronounced. Thus, the framework suggests that both effective supply chain practices and strong information flows are essential for achieving and sustaining competitive advantage.

CHAPTER THREE

METHODOLOGY

3.1 Overview

This chapter describes the methodology that was used in conducting the study. It includes research design, study area, target population, sample size, sampling techniques, data collection instruments, measurements of variables, validity and reliability of the instruments, data collection procedures, data analysis and presentation, assumptions of regression model and ethical considerations.

3.2 Research Design

According to Hill et al. (2022), a research design is not only a plan for collecting and analyzing data to answer research questions but also a comprehensive blueprint that integrates various components of the study in a coherent and logical manner. This integration ensures that the research problem is effectively addressed by detailing the procedures necessary for obtaining the information needed, thus providing a structured approach to the research process. This research employed explanatory research design to examine how information sharing moderates the effect of supply chain cost optimization practices (inventory management, strategic sourcing, technology adoption, and logistics cost) on the competitiveness of food and beverage firms in Kenya (Um & Kim, 2019). This design allows researcher to establish cause-and-effect relationships between information sharing, cost optimization practices, and competitiveness. The researcher collected data through surveys and analysed it using regression techniques to determine the moderating effect of information sharing.

3.3 Study Area

According to Schoch (2020), the study area is the particular geographic location or context where the research is carried out, selected for its significance to the research objectives and its potential to provide relevant data for analysis. The study was conducted among food and beverage manufacturing firms located in Uasin Gishu County, Kenya. The county is the economic hub of Kenya and hosts a significant number of the country's manufacturing firms.

Uasin Gishu County was chosen as the location for this study due to its status as a major economic hub and manufacturing center in Kenya. The county is home to a significant number of food and beverage manufacturing firms, making it an ideal setting to investigate the effects of occupational health management practices on employee productivity in this industry (Okita, Akuku, Musau & Onyango, 2021). Uasin Gishu County has a thriving food and beverage manufacturing sector, with many companies operating in the region. This is likely due to the county's strategic location, well-developed infrastructure, and access to key resources and markets. However, Wanjiku (2019) indicated that firms in this industry within Uasin Gishu County face challenges related to occupational health and safety that can impact employee productivity.

Ambuga (2022) found that food and beverage manufacturing firms in Uasin Gishu County often lack robust occupational health management practices, such as inadequate safety training, ineffective hazard control, and poor workplace safety inspections. These deficiencies have been linked to reduced employee productivity, as workers may face increased risks of accidents, injuries, and health issues. Addressing these challenges through improved occupational health management practices could

yield significant benefits for the productivity and competitiveness of the food and beverage manufacturing sector in Uasin Gishu County.

3.4 Target Population

According to Casteel and Bridier (2021), the target population encompasses all the individuals or objects that possess the characteristics necessary for the research study, forming the basis from which a sample is drawn. The target population was all the departmental staff of food and beverage manufacturing firms operating in Uasin Gishu County, Kenya. According to Uasin Gishu County Ministry of Industrialization, Trade and Enterprise Development, (2024), there are approximately 22 food and beverage manufacturing firms in Uasin Gishu County (Appendix V). The target population for the study was 924 departmental staff from these firms as distributed in Table 3.1.

Table 3.1 Target Population

Department	Target population
Supply chain staff	88
Inventory staff	66
Logistics staff	44
Warehousing staff	110
Transport staff	132
Production staff	198
Sales and marketing staff	242
ICT staff	44
Total	924

Source: Uasin Gishu County Ministry of Industrialization, Trade and Enterprise Development, (2024)

3.5 Sample Size and Sampling Techniques

Sample size refers to the number of observations or data points selected from a larger population for the purpose of conducting a study (Lakens, 2022). The sample size for departmental staff of food and beverage manufacturing firms was drawn using the Yamane Formula (1967) for determining the sample size, which is given by:

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

Where,

n= corrected sample size,

N = population size,

e = Margin of error (MoE), e = 0.05 based on the research condition.

Therefore n = 924/ (1 + 924*0.05^2)

n = 279

Therefore, the sample size was 279 respondents

According to Lohr (2021), sampling techniques are essential methodologies for selecting a subset from a larger population, ensuring that the chosen sample accurately reflects the characteristics of the entire population, thus allowing for reliable and valid research outcomes. Stratified random sampling technique was used to select the sample. The departments were stratified to ensure proportionate representation. Within each stratum, simple random sampling was used to select the respondents to be included in the study as distributed in Table 3.2. The use of stratified random sampling in research is a robust method designed to enhance the representativeness and accuracy of the sample drawn from a population. This technique involves dividing the population into distinct subgroups, known as strata, based on specific characteristics relevant to the study. The stratification process helps

reduce human bias in selecting participants. By ensuring that every stratum is represented, researchers can draw more accurate conclusions about the entire population. The use of random number generators (lottery tickets, computers, and calculators) for participant selection further enhances this objectivity, ensuring that every individual within each stratum has an equal chance of being included.

The population was divided into distinct strata based on departmental roles, ensuring that each department is represented proportionately. This includes departments like supply chain, inventory, logistics, warehousing, transport, production, sales and marketing, and ICT. The total sample size was calculated based on the proportionate representation of each department. Once the strata are established and the sample sizes determined, simple random sampling was applied within each stratum. This means that participants were randomly selected from each department without bias, ensuring that every individual within the stratum has an equal chance of being included in the sample. The actual selection of participants was done using random number generators, ensuring that the process is unbiased and representative of the overall population.

Table 3.2 Sample Size

Department	Proportionate	Sample Size
Supply chain staff	88/924*279	27
Inventory staff	66/924*279	20
Logistics staff	44/924*279	13
Warehousing staff	110/924*279	33
Transport staff	132/924*279	40
Production staff	198/924*279	60

Sales and marketing staff	242/924*279	73
ICT staff	44/924*279	13
Total	**924/924*279**	**279**

3.6 Data Collection Instruments

According to Jain (2021), data collection instruments are crucial tools used to gather information from participants in a study, tailored to align with the research objectives. Data was collected using a structured questionnaire. According to Vomberg and Klarmann (2021), a questionnaire is a systematic tool for collecting data in which respondents provide answers to predetermined questions. It is designed to gather specific information relevant to the research study, ensuring consistency and facilitating quantitative or qualitative analysis of the response (Bihu, 2021). The questionnaire was designed to capture information on demographics, supply chain cost optimization (inventory management, strategic sourcing, adoption of technology, logistics cost), information sharing, and competitiveness of the firms. The closed questionnaire is formulated in form of a 5-point Likert scale where strongly agree (SA) was assigned a value of 5 being the highest on the scale while strongly disagree (SD) being the smallest at 1.

3.6.1 Measurements of Variables

According to Delmar (2019) measurements of variables involve the systematic assignment of numbers or labels to represent the properties of variables, ensuring that the data collected is both reliable and valid. The variables were measured as follows; Supply chain cost optimization: Measured using a 5-point Likert scale on the extent of implementation of inventory management, strategic sourcing, adoption of technology, and logistics cost reduction strategies. Information sharing: Measured using a 5-point

Likert scale on the extent of information sharing among supply chain partners. Competitiveness: Measured using a 5-point Likert scale on the firm's market share, profitability, and customer satisfaction relative to competitors. This is tabulated as per the objectives under the methods of data collection in Table 3.4.

Table 3.4 Measurement of variables

Variable	**No.**	**Measurement scale**	**Sources**
Competitiveness (Dependent variable)	7	5-point likert scale	Chikán et al. (2022)
Inventory Management (1st Independent variable)	7	5-point likert scale	Becerra et al., (2022).
Strategic Sourcing (2nd Independent variable)	7	5-point likert scale	Yildiz Çankaya, (2020).
Adoption of Technology (3rd Independent variable)	7	5-point likert scale	Gurgun, Koc and Kunkcu (2024).
Logistic Cost (4th Independent variable)	7	5-point likert scale	Pratap, Gupta & Pohit (2020).
Information Sharing (Moderating variable)	7	5-point likert scale	Alzoubi et., (2020).
Firm age (1st control)		Number of years	
Firm size (2nd control)		No. of employees	

3.7 Pilot Study

A pilot study is a small-scale preliminary investigation designed to test the feasibility, validity, and reliability of research instruments before launching a full-scale study

(Lowe, 2019). To this end, a pilot study was conducted in Nakuru County, which shares similar economic and operational characteristics with Uasin Gishu County in terms of the presence and structure of food and beverage manufacturing firms. This similarity made Nakuru County an appropriate proxy for pre-testing the data collection tools intended for the main study.

According to Lowe (2019), an ideal pilot sample should constitute approximately 10% of the total sample size for the main study. Accordingly, 28 respondents, representing 10% of the target sample, were purposively selected to participate in the pilot. The pilot study aimed at assessing the clarity, relevance, and reliability of the questionnaire items and the effectiveness of the data collection procedures.

The results of the pilot study demonstrated that the research instrument yielded consistent and interpretable responses, indicating acceptable levels of internal reliability. Based on participant feedback and initial data analysis, minor revisions were made to improve the clarity and precision of some questionnaire items. This process enhanced the overall reliability and validity of the research tools for use in the main study. Therefore, the pilot study in Nakuru County was instrumental in refining the research methodology and ensuring the robustness of the instruments for data collection in the larger study.

3.7.1 Validity of the Instruments

Validity refers to how accurately a measurement method measures what it is intended to measure (Sürücü & Maslakci, 2020). There are four main types of validity such construct validity which evaluates whether the measurement tool represents the intended construct or concept. To test construct validity factor analysis was used. Content validity assesses whether the measurement tool fully covers all relevant

aspects of the construct. Supervisors and expert were used to evaluate content validity. Face validity which considers how appropriate the content of the measurement tool appears on the surface. Face validity was assessed using supervisors and expert. Criterion validity which examines how well the measurement tool's results correlate with an established external criterion. This was tested using correlation. Establishing the validity of a research instrument is crucial to ensure the quality and accuracy of the data collected and the conclusions drawn from the research.

3.7.2 Reliability of the Instruments

Reliability refers to the consistency of a research instrument in measuring what it is intended to measure (Norhayati & Nawi, 2021). There are three main ways to test the reliability of a research instrument. Test-retest reliability where the same instrument is administered to the same group at two different times. The correlation between the two sets of scores indicates the test-retest reliability. A high correlation suggests the instrument produces consistent results over time. Equivalent-form reliability where two versions of the same instrument are administered to the same group. The correlation between the scores on the two forms indicates the equivalent-form reliability. This measures consistency between different test forms. Internal consistency reliability which measures the consistency within the instrument itself. Methods like Split-Half, Kuder-Richardson Formula 20 (K-R 20), and Cronbach's Alpha are used to calculate internal consistency. Internal Consistency Reliability was used and it measures the consistency within the instrument itself. The reliability of the instrument was tested using Cronbach's alpha coefficient, with a threshold of 0.7 or above considered acceptable.

3.8 Data Collection Procedures

Data collection is the systematic process of gathering and measuring information from various sources to get a complete and accurate picture to answer research questions (Higgins & Deeks, 2019). The researcher obtained a letter of introduction from the University. The researcher seek consent from the respective food and beverage manufacturing firms to conduct the study and once the consent is granted the researcher visited the firm to make appointments for the data collection, informing the organization the kind of information that she needed and the reason for conducting the study. The questionnaires were administered to departmental staff in the selected firms. The researcher makes prior appointments and follows up to ensure a high response rate.

3.9 Data Analysis and Presentation

The data was analyzed using both descriptive and inferential statistics using Statistical Package for Social Scientists (SPSS) version 25. Descriptive statistics, such as means, standard deviations, and frequencies, was used to summarize the data (Cooksey & Cooksey, 2020). Inferential statistics, such as correlation and hierarchical regression analysis, was used to examine the effect of the variables and the moderating effect of information sharing (Essam et al., 2020). The results were presented using tables, figures, and narratives.

Correlation analysis is used to examine the relationship between two or more variables (Essam et al., 2020). In this context, it is used to assess the relationship between supply chain cost optimization practices and competitiveness. The correlation coefficient measures the strength and direction of the relationship between the variables. A positive correlation indicates that as one variable increases, the other

variable also tends to increase. A negative correlation indicates that as one variable increases, the other variable tends to decrease.

Multiple linear regression was used in this study for direct effect to model the relationship between one dependent variable and four independent variables. Hierarchical regression analysis is a statistical technique used to examine the relationship between multiple predictor variables and a single outcome variable. In this study, hierarchical regression analysis is used to examine the relationship between supply chain cost optimization practices and competitiveness. The hierarchical regression model is structured as follows: The first step includes the main effects of the supply chain cost optimization practices (inventory management, strategic sourcing, technology adoption, and logistics cost). The second step includes the interaction terms between the supply chain cost optimization practices and information sharing. The hierarchical regression analysis helps to identify which supply chain cost optimization practices have the most significant impact on competitiveness, both individually and in combination with information sharing (Baqleh & Alateeq, 2023).

The moderation effect is examined by including interaction terms between the supply chain cost optimization practices and information sharing in the hierarchical regression model. The interaction terms capture the effect of information sharing on the relationship between the supply chain cost optimization practices and competitiveness. In the context of this study, the moderation effect is examined by including interaction terms between the supply chain cost optimization practices (inventory management, strategic sourcing, technology adoption, and logistics cost) and information sharing. The interaction terms capture how information sharing

moderates the relationship between the supply chain cost optimization practices and competitiveness.

3.9.1 Regression Model Specification

$CFB = \beta_0 + \beta_1 FS + \beta_2 FA + \varepsilon$……... Model 1

$CFB = \beta_0 + \beta_1 FS + \beta_1 FA + \beta_3 IM + \beta_4 SS + \beta_5 AT + \beta_6 LC + \varepsilon$……..... Model 2

$CFB = \beta_0 + \beta_1 FS + \beta_2 FA + \beta_3 IM + \beta_4 SS + \beta_5 AT + \beta_6 LC + \beta_7 IS + \varepsilon$…….. Model 3

$CFB = \beta_0 + \beta_1 FS + \beta_2 FA + \beta_3 IM + \beta_4 SS + \beta_5 AT + \beta_6 LC + \beta_7 IS + \beta_8 IS * IM + \varepsilon$…….… Model 4

$CFB = \beta_0 + \beta_1 FS + \beta_2 FA + \beta_3 IM + \beta_4 SS + \beta_5 AT + \beta_6 LC + \beta_7 IS + \beta_8 IS * IM + \beta_9 IS * SS + \varepsilon$…… Model 5

$CFB = \beta_0 + \beta_1 FS + \beta_2 FA + \beta_3 IM + \beta_4 SS + \beta_5 AT + \beta_6 LC + \beta_7 IS + \beta_8 IS * IM + \beta_9 IS * SS + \beta_{10} IS * AT + \varepsilon$…… Model 6

$CFB = \beta_0 + \beta_1 FS + \beta_2 FA + \beta_3 IM + \beta_4 SS + \beta_5 AT + \beta_6 LC + \beta_7 IS + \beta_8 IS * IM + \beta_9 IS * SS + \beta_{10} IS * AT + \beta_{11} IS * LC + \varepsilon$……. Model 7

Where:

CFB = Competitiveness of food and beverage manufacturing firms;

C= Control variables

$\boldsymbol{\beta_0}$= intercept or constant term;

From $\boldsymbol{\beta_1}$, to $\boldsymbol{\beta_{11}}$ represents the regression model's coefficients;

IM = Inventory Management

SS= Strategic Sourcing

AT= Adoption of Technology

LC= Logistic Cost

ε = error term in the model.

Z= Moderator (Information Sharing)

FS =Firm size

FA=Firm age

3.9.2 Assumptions of Regression Model

The multiple regression analysis was conducted after ensuring that the assumptions of linearity, normality, multicollinearity, and homoscedasticity are met. Diagnostic tests were performed to check for any violations of these assumptions. The following are some of the regression assumptions that was tested in this study.

Linearity in linear regression refers to the assumption that there is a straight-line relationship between the independent variables and the dependent variable (Alita et al., 2021). This implies that changes in the independent variable are associated with proportional changes in the expected value of the dependent variable. The assumption is fundamental because violations can lead to biased estimates and incorrect conclusions in regression analysis. In this study, linearity was assessed using Pearson's correlation coefficient (r). This method evaluates the strength and direction of the linear relationship between two variables. If the variables are truly linearly related, the correlation coefficient will be significantly different from zero either positively or negatively. In other words, a correlation close to 0 suggests the absence

of a linear relationship, whereas a correlation farther from 0 (in either direction) indicates increasing linear association.

Normality in linear regression refers to the assumption that the residuals are normally distributed (Knief & Forstmeier, 2021). The Kolmogorov-Smirnov (K-S) test was employed. This statistical test compares the empirical distribution of the residuals to a normal distribution. A p-value greater than 0.05 indicates that the residuals do not significantly deviate from normality, thereby supporting the assumption. Conversely, a p-value less than 0.05 suggests a statistically significant departure from normality, indicating a violation of the assumption.

Multicollinearity in linear regression refers to the condition where independent variables exhibit strong linear relationships with each other, which can undermine the reliability of coefficient estimates (Lindner, Puck & Verbeke, 2020). While simple pairwise correlations may not fully capture multicollinearity, it is more accurately assessed using diagnostic statistics such as Variance Inflation Factor (VIF) and Tolerance. In this analysis, multicollinearity was tested using both metrics. VIF quantifies how much the variance of an estimated regression coefficient increases due to multicollinearity. A VIF value exceeding 10 is generally considered indicative of problematic multicollinearity. Tolerance, calculated as the reciprocal of VIF, reflects the proportion of variance in a predictor that is not explained by the other predictors in the model; values below 0.1 suggest serious multicollinearity. These thresholds were used to determine whether the assumption of low multicollinearity was satisfied.

Homoscedasticity in linear regression refers to the assumption that the residuals exhibit constant variance across all levels of the independent variables (Đalić & Terzić, 2021). This assumption can be initially evaluated through a scatterplot of

residuals versus fitted values. If the residuals appear randomly dispersed around zero with no discernible pattern, the assumption of homoscedasticity is likely satisfied. In contrast, visible patterns such as funnel-shaped spreads may suggest heteroscedasticity. To formally test for homoscedasticity, Levene's test was conducted. Levene's test assesses whether the variance of residuals is equal across groups or conditions. A p-value greater than 0.05 indicates that the variances are not significantly different, thus supporting the assumption of homoscedasticity. Conversely, a p-value less than 0.05 signals a violation of this assumption, suggesting heteroscedasticity is present.

3.10 Ethical Considerations

The research study adhered to a comprehensive set of ethical principles and procedures to ensure the protection of participants' rights and well-being throughout the entire research process. Before commencing the study, the research team obtained the necessary approvals from the relevant institutional bodies. Obtaining an introductory letter from the university, which served as an official endorsement of the study and help facilitate access to the research site and participants. Securing a research license from the National Commission for Science, Technology and Innovation (NACOSTI), the regulatory body responsible for overseeing research activities in the country. This license ensured that the study aligns with national research guidelines and ethical standards.

The researcher provides potential participants with a detailed information sheet outlining the purpose of the study, the research procedures, any potential risks or benefits, and the voluntary nature of their participation. Obtain written consent from each participant, indicating their understanding of the study and their willingness to

participate. Participants were informed that they can withdraw from the study at any time without penalty. Emphasize that participants' decision to participate or withdraw not affect their relationship with the researchers or the institution in any way.

To protect the privacy and confidentiality of the participants, the research implemented strict measures to ensure the secure storage and handling of all data collected, including the use of password-protected digital files and the secure disposal of physical documents. Anonymize all participant information, using codes or pseudonyms instead of real names, to prevent the identification of individuals. Ensure that any published or shared findings do not contain any information that could potentially identify the participants. Obtain explicit consent from participants before using any direct quotes or personal information in the research outputs.

CHAPTER FOUR

DATA PRESENTATION, ANALYSIS AND INTERPRETATION.

4.1 Introduction

This chapter included the data analysis that was done. The data were analysed using descriptive statistics, which included mean and standard deviation as well as inferential statistics. Tables were used to present the study findings.

4.2 Response Rate

Table 4.1 presents the study results for response rate for departmental staff of food and beverage manufacturing firms operating in Uasin-Gishu County, Kenya. Out of the 279 questionnaires that were distributed, only 234 were eventually returned and taken into account for results and analysis. The response rate was 83.87%, as Table 4.1 demonstrates a particularly high level of engagement. Additionally, 45 questionnaires representing 16.13% of the total, were not returned by respondents. The study's findings were little impacted by this small number of incomplete surveys.

Table 4.1 Response Rate

Responses	**Frequency**	**Percentages**
Responded	234	83.87
Not responded	45	16.13
Total	**279**	**100.0**

Source: Field Data (2025)

4.3 Biographic Information

This study examined the biographical information of participants such as, age, gender, and educational attainment. The scrutiny of these characteristics aimed to mitigate their influence on the conclusions drawn from the research objectives and enhance understanding of the study's demographic context. Harrison, Birks, Franklin and

Mills, (2017) suggests that delineating sample characteristics establishes a foundation for a comprehensive analysis of findings in alignment with the study's objectives. The analysis specifically focused on the respondents' characteristics, including their years of education, gender, and age.

4.3.1 Gender of the Respondents

The study sought to establish the gender of the respondents. Table 4.2 showed the gender of the respondents. From the findings of the study majority representing 124(53.0%) of the respondent were male while 110(47.0%) were female. Findings indicates that both genders were represented in the study hence there was no biasness in the study.

Table 4.2 Gender of the Respondents

Gender	Frequency	Percent
Males	124	53.0
Females	110	47.0
Total	234	100.0

Source: Field Data (2025)

4.3.2 Age Bracket of the Respondents

The respondents were requested to indicate their age. From Table 4.3 the study findings revealed that majority of the respondent 83(35.5%) aged below 30 years followed by 62(25.5%) were aged between 30-39 years, 49(20.9%) were between age 40-49 years. Further, 33(14.1%) were 50-59 years of age and finally 7(3.0%) were over 60 years of age. This means that majority of the respondents were aged below 30 years followed closely with aged range between 39 to 39 years implying that the respondents were experienced enough to give the correct responses on the topic.

Table 4.3 Age Bracket of the Respondents

Age Bracket	Frequency	Percent
18- 30 Years	83	35.5
30-39 Years	62	26.5
40-49 Years	49	20.9
50-59 Years	33	14.1
Above 60 Years	7	3.0
Total	**234**	**100.0**

Source: Field Data (2025).

4.3.3 Education Level of the Respondents

The researcher however sought to determine the education level of the respondents. Table 4.4 presents the study results. Table 4.4 showed that 127(54.3%) had a diploma level of education, 67(28.6%) had a bachelor's level of education. However, 25(10.7%) had a master's level of education and finally 15(6.4%) had doctorate. This showed that most of the respondents were had certificate level.

Table 4.4 Education Level of the Respondents

Education level	Frequency	Percent
Diploma	127	54.3
Bachelor	67	28.6
Masters	25	10.7
Doctorate	15	6.4
Total	**234**	**100.0**

Source: Field Data (2025)

4.3.4 Number of Years Working in the Food and Beverage Manufacturing Firms

The study sought to determine the number of years the respondents has been working in in the food and beverage manufacturing firms. Table 4.5 showed that 89(38.0%) of

the respondent indicated that they had worked in the company for a period of less than 2 years, majority of the respondent 104(44.4%) indicated that they had worked for 3 to 5 years, 19(8.1%) had worked for 6 to 9 years and finally 22 (9.4%) indicated that they had worked over 10 years. This showed that majority of the respondent employees were less than 2 years of experience hence were well conversant with the topic.

Table 4.5 Years of Working in the Manufacturing Firm

Years of Working	Frequency	Percent
Below 2 years	89	38.0
3 – 5 Years	104	44.4
6 – 9 Years	19	8.1
Over 10 Years	22	9.4
Total	**234**	**100.0**

Source: Field Data (2025)

4.3.5 Number of Years the Firm Has Been in Business

The study also sought to determine the number of years the firm has been in operation in Table 4.7 present the study findings. Table 4.6 showed that 97(41.5%) indicated that the firm has been in operation for less than 5 years, 93(39.7%) indicated that the firm has been in operation for a period between 6 to 10 years, 25(10.7%) reveals that the firm has been in operation for a period of 11 to 15 years and finally 19(8.1%) found that the firm has been in operation for a period of over 15 years.

Table 4.6 Number of Years the Firm Has Been in Business

Number of Years	Frequency	Percent
Below 5 Years	97	41.5
6 - 10 Years	93	39.7
11 - 15 Years	25	10.7
Over 15 Years	19	8.1
Total	**234**	**100.0**

Source: Field Data (2025)

4.3.6 Number of Employees

The researcher also sought to determine the number of employees working the manufacturing company. Table 4.7 showed that 98(41.9%) indicated that the 98(41.7%) of the respondent had below 50 employees, majority of the respondent also indicates that 122(52.1%) had between 50-100 employees and finally 14(6.0%) found that the firm had above 100 employees.

Table 4.7 Number of employees in the firm.

Number of Employees	Frequency	Percent
Below 50 Employees	98	41.9
50 - 100 Employees	122	52.1
Above 100 Employees	14	6.0
Total	**234**	**100.0**

Source: Field Data (2025)

4.4 Descriptive Analysis

In this section, descriptive statistics for both the dependent variable and the five independent variables are presented. This was achieved using a five-point Likert scale; 1=Strongly Disagree, 2=Disagree, 3=Undecided/neutral, 4=Agree, 5=Strongly Agree and also SD indicates (Strongly Disagreed), D represents (Disagree), N represents (Neutral), A represents (Agree) and SA (Strongly Agree).

4.4.1 Descriptive Statistics on Inventory Management

The study sought to determine the effect of inventory management on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The average response rate and the frequency of agreement were then computed and the findings are presented in Table 4.8. For clarity in this table, the abbreviations used are as follows: Analysis of the mean scores of the responses was carried out on a continuous scale: the mean values below 1.5 indicated strongly disagreed, 1.5-2.4 indicated disagreed, 2.5-3.4 denoted neutrality, 3.5-4.5 indicated agreed and scores above 4.5 signified strongly agreed. A total of 7 statements were used to examine the effect of inventory management on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya and responses elicited on a 5-point Likert scale as shown in Table 4.8.

According to the results in Table 4.8, the descriptive statistics findings showed that 165(70.5%) of the respondents agreed that higher inventory turnover rate leads to increased competitiveness of the firm while 55(23.5%) of the respondents disagreed that higher inventory turnover rate leads to increased competitiveness of the firm. The study findings further revealed that higher inventory turnover rate leads to increased competitiveness of the firm with mean rating of 3.65. The standard deviation of 1.29

indicates a moderate degree of dispersion around the mean score of 3.65, suggesting that while a majority of respondents concurred that a higher inventory turnover rate enhances firm competitiveness, there exists a noteworthy level of variability in individual perceptions. This dispersion may be attributable to heterogeneity in industry contexts, managerial experience, or familiarity with inventory turnover metrics. The study findings agreed with the study done by Kamau and Kagiri, (2015) found that inventory shrinkage, inventory investment and inventory turnover affect the competitiveness of Safaricom Ltd.

Furthermore, 176(75.2%) of the respondents agreed that improved order fulfilment rate positively impacts the firm's competitiveness and 44(18.8%) of the respondents disagreed that improved order fulfilment rate positively impacts the firm's competitiveness. However, respondents agreed that improved order fulfilment rate positively impacts the firm's competitiveness with mean rating of 3.83. A standard deviation of 1.24 reflects a moderate variation in respondents' views regarding the positive impact of improved order fulfillment on competitiveness. Although the central tendency demonstrates overall agreement (M = 3.83), the degree of variability implies that some respondents may possess divergent operational experiences or interpret "order fulfillment" through different logistical frameworks. These findings agreed with the study done by Saragih et al., (2020) reveal that sustainable competitive advantage could be achieved through supply chain management.

Further, 172(73.5%) of the respondents agreed that maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness and those who disagreed that maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness are 45(19.2%). The study findings revealed that participants agreed

with the statement that maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness with mean rating of 3.80. The standard deviation of 1.25 suggests a moderately dispersed set of responses, despite the consensus indicated by a mean of 3.80. This level of variability may be indicative of differences in how participants assess the strategic importance of inventory accuracy or in the maturity levels of inventory systems employed across firms, influencing their perceptions of its role in competitive advantage. These findings are consistent with the study done by Ramadan et al., (2024) reveal a consensus among participants on the pivotal roles of managerial competence and advanced inventory management practices. Managerial competence encompasses data-driven decision-making and adaptability, while advanced inventory techniques like Economic Order Quantity (EOQ) and Activity-Based Cost (ABC) analysis significantly impact profitability.

Similarly, 163(69.7%) of the participants agreed that efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage. However, 52(22.2%) of the respondents disagreed that efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage. Further, the study findings revealed that participants agreed towards the statement that efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage with mean rating of 3.68. With a standard deviation of 1.22, the responses exhibit a modest spread around the mean (M = 3.68), denoting general agreement among participants that efficient inventory management is a key determinant of competitiveness. However, the presence of some variability reflects that a subset of respondents may evaluate inventory efficiency based on divergent operational benchmarks or organizational priorities. The study findings are consistent with the study done by Kaewchur et al.,

(2021) found that inventory control systems had the greatest influence on the competitive advantage, followed by inventory control practices, and information technology, respectively.

Additionally, 171(73.1%) of the respondents agreed that timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness and on the other hand 51(21.8%) of the respondents disagreed that timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness. Additionally, the study results father revealed that the respondents agreed that timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness with mean rating of 3.72. The reported standard deviation of 1.23 denotes a moderate level of dispersion in responses, despite a mean score of 3.72 suggesting general agreement. The variability implies that while timely and accurate fulfillment is largely viewed as critical to competitiveness, respondents may differ in the extent to which they experience or prioritize fulfillment processes within their respective supply chain structures.

Further, findings also indicate that 175(75.8%) of the respondents agreed that consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm and 44(18.8%) of the respondents disagreed that consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm. Moreover, the study's findings revealed that in terms of mean and standard deviations the respondent agreed consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm with a mean of 3.79. A standard deviation of 1.22, in conjunction with a mean of 3.79, signals moderate variability in the perceived importance of consistent inventory accuracy. Although a majority of respondents

affirmed its contribution to firm competitiveness, the variation underscores potential differences in organizational emphasis on accuracy, possibly shaped by technological integration, industry standards, or operational scale.

Finally, 180(76.9%) of the respondents agreed that effective inventory management, encompassing inventory turnover rate, order fulfilment rate, and inventory accuracy, is essential for maintaining a competitive edge in the market and those who disagreed 43(18.3%) that agreed that effective inventory management, encompassing inventory turnover rate, order fulfilment rate, and inventory accuracy, is essential for maintaining a competitive edge in the market. Furthermore, the study's findings revealed that participants agreed with mean of 3.83. The standard deviation of 1.23, alongside a high mean of 3.83, reflects substantial alignment among respondents that comprehensive inventory management including turnover rate, fulfillment, and accuracy is essential to sustaining market competitiveness. Nevertheless, the modest spread in responses suggests that perceptions may differ slightly in terms of which inventory dimensions exert the most influence, highlighting the multifaceted nature of inventory management practices. These findings are consistent with the study done by Akinlabi, (2021) revealed that automated inventory system was found to be positively and significantly related to operational performance.

Table 4.8 Descriptive Statistics on Inventory Management

Statements		SD	D	N	A	SA	Mean	Sd
1. Higher inventory turnover rate leads to increased competitiveness of the firm.	F	23	32	14	100	65	3.65	1.29
	%	9.8	13.7	6.0	42.7	27.8		
2. Improved order fulfilment rate positively impacts the firm's competitiveness.	F	19	25	14	94	82	3.83	1.24
	%	8.1	10.7	6.0	40.2	35.0		
3. Maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness.	F	19	26	17	92	80	3.80	1.25
	%	8.1	11.1	7.3	39.3	34.2		
4. Efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage.	F	16	36	19	98	65	3.68	1.22
	%	6.8	15.4	8.1	41.9	27.8		
5. Timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness.	F	18	33	12	105	66	3.72	1.23
	%	7.7	14.1	5.1	44.9	28.2		
6. Consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm.	F	19	25	15	102	73	3.79	1.22
	%	8.1	10.7	6.4	43.6	31.2		
7. Effective inventory management, encompassing inventory turnover rate, order fulfilment rate, and inventory accuracy, is essential for maintaining a competitive edge in the market.	F	20	23	11	102	78	3.83	1.23
	%	8.5	9.8	4.7	43.6	33.3		
Valid N = 234							**3.76**	

Source: Field Data (2025)

4.4.2 Descriptive Statistics on Strategic Sourcing

The study sought to establish the effect of strategic sourcing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Findings from Table 4.9 indicates that 178(76.1%) of the respondents agreed that public participation in procurement processes has increased staff accountability in adhering to procurement professional ethics and 48(20.5%) of the respondents disagreed that public participation in procurement processes has increased staff accountability in adhering to procurement professional ethics. However, the respondents agreed that public participation in procurement processes has increased staff accountability in adhering to procurement professional ethics with mean rating of 3.83. The reported standard deviation of 1.24, alongside a mean score of 3.83, indicates moderate variability in respondents' views regarding the influence of public participation on staff accountability in ethical procurement conduct. Although the central tendency suggests general agreement, the spread of responses implies that a considerable proportion of participants may interpret or experience the mechanisms of public engagement and ethical adherence differently, possibly due to institutional or procedural disparities across organizations. These findings are consistent with Hughes, Morrison and Ruwanpura, (2019) showed that ethical sourcing is significantly less advanced in the UK public sector than it is in consumer goods sectors, with implications for social justice in a whole realm of under-researched global supply chains.

Further, 164(70.0%) of the respondent agreed that collaborative relationships with key suppliers, characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms and 57(24.3%) of the respondents disagreed that collaborative relationships with key suppliers,

characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms. Furthermore, the study's findings revealed that the respondents agreed with the statement that collaborative relationships with key suppliers, characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms with mean rating of 3.65. A standard deviation of 1.33 reflects a relatively high level of dispersion in perceptions concerning the role of collaborative supplier relationships in enhancing competitiveness. Despite the mean rating of 3.65 indicating overall agreement, the elevated standard deviation points to divergent experiences or inconsistent practices regarding open communication and information sharing with suppliers. This variability may stem from differences in supply chain maturity, firm size, or resource availability within the Kenyan food and beverage sector. The study findings agreed with Chebichii, Namusonge and Nambuswa, (2021) found that effective buyer-supplier collaboration enhances organizational performance of food and beverage manufacturing companies.

Similarly, 158(67.5%) of the participants agreed that they efficient contract management practices (clear terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers. However, 73(26.9%) of the respondents disagreed that efficient contract management practices (clear terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers. Further, the study findings also indicated the respondents agreed that efficient contract management practices (clear terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers with mean rating of 3.62. The standard deviation of 1.34 reveals a substantial level of variability in

respondents' perspectives on the effectiveness of efficient contract management in advancing competitiveness. The mean score of 3.62 denotes agreement, but the high standard deviation suggests that experiences with contract clarity, communication timeliness, and performance monitoring vary considerably. This could be attributed to differences in contractual frameworks, enforcement capacity, or managerial competence across the participating firms. These study findings concur with Wanjiku, (2019) indicated that reverse logistics, outsourcing, strategic alliances and vendor managed inventory have a positive relationship with performance of food and beverage manufacturing firms in Kenya.

Additionally, 170(72.7%) of the respondents agreed that focusing solely on the lowest price during supplier selection weakens the competitive advantage of Kenyan food and beverage companies in the long run. On contrary 51(22.7%) of the respondents disagreed that focusing solely on the lowest price during supplier selection weakens the competitive advantage of Kenyan food and beverage companies in the long run. Further, the mean rating of 3.70 and indicates that the respondents agreed that focusing solely on the lowest price during supplier selection weakens the competitive advantage of Kenyan food and beverage companies in the long run. The standard deviation of 1.24 accompanying a mean of 3.70 demonstrates moderate variability among respondents' agreement with the assertion that prioritizing the lowest bid undermines long-term competitiveness. While consensus exists, the level of deviation suggests that some firms may continue to perceive cost-minimization as a viable strategy, potentially due to budget constraints, procurement policy limitations, or differing strategic orientations. These findings are consistent with the study done by Mogaka, (2023) showed that Kenyan food and beverage manufacturers' competitive advantage was positively correlated with functional integration, supplier integration,

customer integration, and technology integration with the inclusion of supply chain adaptability (moderator).

Majority of the respondent that 174(74.3%) agreed that increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports. However, 48(20.5%) of the respondents disagreed that increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports. As per the survey results, the participants agreed in terms of mean and standard deviation that increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports (Mean, =3.74, Std. dev=1.23). With a standard deviation of 1.23, the responses regarding collaboration with local suppliers exhibit moderate dispersion. The mean score of 3.74 signifies overall agreement, yet the variability reflects potential discrepancies in the availability, reliability, or performance of local suppliers. These inconsistencies may influence respondent judgments concerning the strategic benefit of local sourcing relative to import reliance.

Further, 173(73.9%) of the respondents agreed with the statement that utilizing technology (e-procurement platforms) to streamline contract management processes enhances the responsiveness and competitiveness of Kenyan food and beverage firms. However, 48(20.5%) of the respondents disagreed that Utilizing technology (e-procurement platforms) to streamline contract management processes enhances the responsiveness and competitiveness of Kenyan food and beverage firms. From mean and standard deviation, the respondents agreed that Utilizing technology (e-

procurement platforms) to streamline contract management processes enhances the responsiveness and competitiveness of Kenyan food and beverage firms (Mean =3.77, Std. dev=1.21). A standard deviation of 1.21 indicates a relatively lower degree of variability in opinions compared to other items. Coupled with a mean of 3.77, this suggests that respondents largely concur on the competitive value of leveraging technology such as e-procurement platforms for enhancing contract management efficiency. The reduced dispersion likely reflects widespread adoption or exposure to digital procurement practices within the sector, signaling a converging understanding of technological utility. The study findings agreed with Mary, (2024) findings indicated that majority of respondents agreed with statements on green procurement procedures, green supplier techniques, e-procurement practices, and reverse logistics techniques. Further, respondents moderately agreed with statements on supply chain performance.

Finally, 170(72.6%) of the participants agreed that the ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies. On contrary, 51(21.8%) of the participants disagreed that the ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies. Further, the study results also showed, in terms of mean and standard deviation respondents agreed that the ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies (Mean=3.74, standard deviation=1.24). The standard deviation of 1.24, alongside a mean of 3.74, reflects moderate variability in the perception that

cultivating long-term partnerships with reliable suppliers facilitates innovation and competitive advantage. The study results agreed with the study done by Ngetich, Ndolo and Wanyoike, (2022) established that there was a strong and positive correlation between strategic supplier partnerships and operational performance of food and beverage manufacturing firms.

Table 4.9 Descriptive Statistics on Strategic Sourcing

Statements		SD	D	N	A	SA	Mean	Sd
1. The use of clearly defined criteria for supplier selection enhances the competitive advantage of Kenyan food and beverage manufacturers.	F	17	31	8	97	81	3.83	1.24
	%	7.3	13.2	3.4	41.5	34.6		
2. Collaborative relationships with key suppliers, characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms.	F	26	31	13	93	71	3.65	1.33
	%	11.1	13.2	5.6	39.7	30.3		
3. Efficient contract management practices (clear terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers.	F	23	40	13	84	74	3.62	1.34
	%	9.8	17.1	5.6	35.9	31.6		
4. Focusing solely on the lowest price during supplier selection weakens the competitive advantage	F	20	31	13	106	64	3.70	1.24
	%	8.5	13.2	5.6	45.3	27.4		
5. Increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports.	F	20	28	12	107	67	3.74	1.23
	%	8.5	12.0	5.1	45.7	28.6		
6. Utilizing technology to streamline contract management processes enhances the responsiveness and competitiveness	F	16	32	13	103	70	3.77	1.21
	%	6.8	13.7	5.6	44.0	29.9		

7. The ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies.	F	17	34	13	100	70	3.74	1.24
	%	7.3	14.5	5.6	42.7	29.9		
Valid N = 234							**3.72**	

Source: Field Data (2025)

4.4.3 Descriptive Statistics on Adoption of Technology

The study further sought to determine the effect of adoption of technology on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Analysis of the mean scores of the responses was carried out on a continuous scale: scores below 1.5 indicated strong disagreement, 1.5-2.4 indicated disagreement, 2.5-3.4 denoted neutrality, 3.5-4.5 indicated agreement, and scores above 4.5 signified strong agreement. A total of 7 statements were used to effect of adoption of technology on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya and responses elicited on a 5-point Likert scale as shown in Table 4.10.

From Table 4.10 the study findings reveal that 178(76.1%) of the respondents agreed that the level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market while 46(19.7%) of the respondents disagreed with the statement that the level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market. In terms of mean and standard deviation the respondent agreed on the statement that the level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market (Mean, =3.81, Std. dev=1.26). The standard deviation of 1.26 denotes moderate variability in the perception that a firm’s investment in technology significantly affects its

competitiveness in the Kenyan market. While the high mean of 3.81 reflects strong overall agreement, the observed dispersion suggests that some respondents may evaluate the strategic value of technology investment differently, potentially due to varying organizational capabilities, technological maturity, or sector-specific challenges. The study results agreed with Kiveu, Namusonge and Muathe, (2019) indicate 97% of the manufacturing SMEs were innovating with majority implementing incremental innovations. Process, marketing and organisational innovations had positive significant effect on competitiveness, while product innovation had positive non-significant effect.

Moreover, 70(66.1%) of the respondents agreed that the speed at which a firm implements new technologies effects its competitive advantage in Kenya while 31(29.3%) of the respondents disagree with the statement that the speed at which a firm implements new technologies effects its competitive advantage in Kenya. Consequently, the respondents agreed in terms of mean and standard deviation that the speed at which a firm implements new technologies effects its competitive advantage in Kenya is (Mean, =3.59, Std. dev=1.32). The relatively high standard deviation of 1.32, coupled with a moderate mean of 3.59, suggests considerable heterogeneity in respondents' views on how swiftly adopting new technologies influences competitive advantage. The broad range of responses may be attributed to differing operational realities, where firms with limited resources or regulatory constraints may perceive the speed of implementation as less influential relative to other competitive factors. The study results agreed with the study done by Mang'ana, (2022) found that the adoption of innovative technologies (E-Money transfer, Telephone banking, Internet banking and, Internal controls) had positive and significant influence on competitive advantage of Commercial banks in Kenya.

Additionally, 168(71.8%) of the respondent agreed that the effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya while 54(23.1%) disagree with the statement that the effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya. In terms of mean and standard deviation the respondent agreed that the effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya (Mean, =3.66, Std. dev=1.31). The standard deviation of 1.31 indicates a moderate to high level of dispersion in perceptions concerning the impact of employee training on new technologies. Although the mean score of 3.66 suggests general agreement, the variability implies differences in organizational investment in training programs or perceptions of their effectiveness, reflecting the uneven implementation of capacity-building initiatives across firms. These findings agreed with Chege, Wang and Suntu, (2020) indicate that technology innovation influences firm performance positively.

Furthermore, 156(66.7%) of the respondents agreed that a firm's competitiveness in Kenya is more affected by the level of technology investment than the implementation rate and 63(26.5%) of the respondents disagreed that a firm's competitiveness in Kenya is more affected by the level of technology investment than the implementation rate. However, respondents agreed that a firm's competitiveness in Kenya is more affected by the level of technology investment than the implementation rate with mean rating of 3.64 and Standard deviation of 1.33. A standard deviation of 1.33 demonstrates significant variability in the belief that a firm's competitiveness is more influenced by the level of technology investment than by the rate of implementation. Despite the mean value of 3.64 showing agreement, the spread reveals that

respondents may weigh the two factors differently based on contextual nuances such as organizational strategy, market positioning, and resource availability.

Additionally, majority 168(71.8%) of the respondents agreed that effective employee training on new technologies can compensate for a slower implementation rate in Kenya. On contrary to that, 55(23.5%) of the respondents disagreed that effective employee training on new technologies can compensate for a slower implementation rate in Kenya. Further, the study results also indicated that the respondents agreed that effective employee training on new technologies can compensate for a slower implementation rate in Kenya with mean rating of 3.71 and standard deviation of 1.31. The standard deviation of 1.31 denotes a moderate level of variation in agreement that effective employee training can offset the drawbacks of a slower technology implementation rate. Although the mean of 3.71 indicates general support for this assertion, the dispersion implies that respondents may have differing experiences with or confidence in training outcomes as a compensatory mechanism.

Furthermore, 169(72.3%) of the respondents agreed that in Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional. However, 51(21.8%) of the respondents disagreed that in Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional. Analysis on mean and standard deviation of 3.68 and 1.30 respectively revealed that the respondents agreed with the statement that in Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional. With a standard deviation of 1.30, this finding reflects moderate variability in agreement that firms

with high technology implementation rates and exceptional training can remain competitive even with lower investment levels. The mean score of 3.68 suggests overall concurrence, though the standard deviation highlights a nuanced understanding among respondents, potentially shaped by disparities in access to skilled labor, training infrastructure, and cost-efficiency measures. These findings agreed with Achieng, (2021) revealed that AMT statistically predicts performance of large manufacturing companies in Kenya. Results showed that competitive advantage statistically predicts performance but partially mediates the relationship between AMT and performance of large manufacturing companies in Kenya. Results also show that although organizational resources statistically predict performance it is not significant on moderating the relationship between AMT and performance of large manufacturing companies in Kenya.

Finally, it was noted that 173(73.9%) of the participants agreed that the ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training. Conversely to that, it was noted that 52(22.2%) of the respondents disagreed that the ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training. Further, the mean rating of 3.77 revealed that the respondents agreed that the ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training. The standard deviation of 1.27, along with a strong mean rating of 3.77, signifies a shared belief in the strategic advantage of integrating high technology investment, rapid implementation, and robust employee training. Nonetheless, the moderate variability observed may be reflective of practical

constraints in achieving all three dimensions simultaneously within resource-constrained or structurally diverse firms. These findings agreed with Okuku, (2024) established the significant growth of the Kenyan banking sector, influenced by mobile phone usage and financial inclusion initiatives, while also presenting challenges and opportunities. Notably, FinTech startups disrupt traditional banking models, emphasizing the need for continuous innovation. The adoption of mobile banking necessitates a digitally proficient workforce, urging comprehensive upskilling programs.

Table 4.10 Descriptive Statistics on Adoption of Technology

Statements		SD	D	N	A	SA	Mean	Sd
1. The level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market.	F	21	25	10	99	79	3.81	1.26
	%	9.0	10.7	4.3	42.3	33.8		
2. The speed at which a firm implements new technologies effects its competitive advantage in Kenya.	F	24	39	11	95	65	3.59	1.32
	%	10.3	16.7	4.7	40.6	27.8		
3. The effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya.	F	26	28	12	101	67	3.66	1.31
	%	11.1	12.0	5.1	43.2	28.6		
4. A firm's competitiveness in Kenya is more affected by the level of technology investment than the implementation rate.	F	21	41	16	80	76	3.64	1.33
	%	9.0	17.5	6.8	34.2	32.5		
5. Effective employee training on new technologies can compensate for a slower implementation rate in Kenya.	F	23	32	11	93	75	3.71	1.31
	%	9.8	13.7	4.7	39.7	32.1		
6. In Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional.	F	26	25	14	101	68	3.68	1.30
	%	11.1	10.7	6.0	43.2	29.1		
7. The ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training.	F	19	33	9	96	77	3.77	1.27
	%	8.1	14.1	3.8	41.0	32.9		
Valid N = 234							**3.69**	

Source: Field Data (2025)

4.4.4 Descriptive Statistics on Logistic Cost

The study also sought to establish the effect of logistic cost on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Analysis of

the mean scores of the responses was carried out on a continuous scale: scores below 1.5 indicated strong disagreement, 1.5-2.4 indicated disagreement, 2.5-3.4 denoted neutrality, 3.5-4.5 indicated agreement, and scores above 4.5 indicates strong agreement. A total of 7 statements were used to establish the effect of logistic cost on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya and responses elicited on a 5-point Likert scale as shown in Table 4.11.

Table 4.11 showed that 156(76.7%) of the respondents agreed with the statement that higher inventory carrying costs significantly reduce a firm's ability to compete on price. However, 58(24.8%) of the respondents disagreed with the statement that higher inventory carrying costs significantly reduce a firm's ability to compete on price. Further the study findings showed in terms of means and standard deviation that the respondents agreed with the statement that higher inventory carrying costs significantly reduce a firm's ability to compete on price is (Mean, =3.54, Std. dev=1.32). A standard deviation of 1.32 suggests a considerable spread in respondent views on whether higher inventory carrying costs significantly diminish a firm's ability to compete on price. Despite a mean score of 3.54 indicating general agreement, the pronounced variability implies divergent experiences across firms, likely influenced by differences in inventory management efficiency, sectoral cost structures, and organizational strategies related to pricing. The study findings agreed with the study done by Nuangchumnong, Silpcharu and Wattanakomol, (2023) revealed that 4 major guideline areas for reducing inventory costs for the finished goods were found, prioritized as follows: data insight, alliance-centric, resource management, and innovation technology.

Also, the study showed that 178(76.1%) of the respondents agreed that efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times. But, 56(19.6%) of the respondents disagree with the statement that efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times. Further the study findings showed in terms of means and standard deviation showed that efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times is (Mean=3.84, Std. dev=1.21). The relatively lower standard deviation of 1.21, alongside a high mean of 3.84, signifies strong consensus among respondents regarding the assertion that efficient order processing systems which reduce costs contribute to faster delivery and enhanced competitive advantage. The reduced dispersion indicates that this relationship is widely recognized and experienced consistently across firms, likely due to the direct operational and customer service implications of order processing efficiency. These findings agreed with Liao, Hu and Ding, (2017) show that the relationships among supply chain collaboration value innovation, supply chain capacity and competitive advantage can have a positive impact, and that supply chain capability is a full mediator.

Based on their feedback, 166(71.0%) of the respondents agreed with the statement that effectively managing reverse logistics costs (for example, returns, product recalls) enhances customer satisfaction and brand loyalty, ultimately boosting competitiveness. This is a cumulative number of those who strongly agreed and those that agreed. Furthermore, 63(222.6%) of the respondents disagreed with the statement that effectively managing reverse logistics costs (for example, returns, product recalls) enhances customer satisfaction and brand loyalty, ultimately boosting competitiveness. Further the study findings showed in terms of means and standard

deviation that the respondents agreed with the statement that effectively managing reverse logistics costs (for example, returns, product recalls) enhances customer satisfaction and brand loyalty, ultimately boosting competitiveness is (Mean, =3.72, Std. dev=1.28). With a standard deviation of 1.28 and a mean of 3.72, this finding reflects moderate variability in agreement on the benefits of managing reverse logistics costs. While a substantial majority support the statement, the variability suggests that differences in reverse logistics complexity, customer expectations, and product lifecycle management may influence how firms perceive and experience the impact of reverse logistics on customer satisfaction and brand loyalty. These findings agreed with Adesoga, Patricia, Olaiya, Ajayi and Dorcas, (2024) found that reverse logistics fosters job creation in recycling, refurbishing, and remanufacturing, promoting economic growth and community development.

Similarly, 167(71.7%) of the participants agreed that firms with lower overall logistics costs, including inventory carrying, order processing, and reverse logistics, are more likely to achieve higher profit margins. The study further reveals that, 59(25.2%) of the respondents disagreed that firms with lower overall logistics costs, including inventory carrying, order processing, and reverse logistics, are more likely to achieve higher profit margins. Further, the study findings revealed that participants agreed that firms with lower overall logistics costs, including inventory carrying, order processing, and reverse logistics, are more likely to achieve higher profit margins with mean rating of 3.67 and the standard deviation of 1.32. The standard deviation of 1.32 indicates a significant degree of variation in perceptions regarding the association between low logistics costs and improved profit margins. Although the mean rating of 3.67 confirms general agreement, the broad dispersion likely reflects contextual differences, such as the scale of operations, logistics infrastructure, and the

degree of cost transparency within the supply chain, which shape how firms evaluate cost-to-profit relationships. These findings agreed with the study done by Piyachat, (2017) showed that there were positive associations between resource commitment and reverse logistics innovation, resource commitment and reverse logistics performance, reverse logistics innovation and reverse logistics performance, and reverse logistics performance and reverse logistics cost savings. The results further reported that there was a partial mediate effect of resource commitment on reverse logistics performance through reverse logistics innovation. The result further revealed that the size of company had moderate effect on model level, however, did not have moderate effect on path level.

Moreover, 171(73.1%) of the respondents agreed that in today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs and on the other hand 54(23.1%) of the respondents disagreed that in today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs. Additionally, the study results father revealed that the respondents agreed that in today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs with mean rating of 3.77 and a standard deviation of 1.30. The standard deviation of 1.30 reflects moderate divergence in views concerning the relative importance of minimizing order processing costs compared to inventory carrying costs. A mean of 3.77 indicates overall agreement, but the variability implies that some respondents may prioritize inventory efficiency over order processing, possibly influenced by product characteristics, industry practices, or real-time customer demand considerations.

However, 181(77.4%) of the participants agreed that implementing efficient reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness. On contrary, 43(18.4%) of the participants disagreed that implementing efficient reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness. Further, the study results also showed that the respondents agreed that implementing efficient reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness with mean rating of 3.85 and the standard deviation of 1.25. A standard deviation of 1.25, alongside a high mean of 3.85, suggests that most respondents concur that reverse logistics can represent a significant cost burden that impairs competitiveness. The moderate variability, however, reflects that some firms may have developed more cost-effective reverse logistics strategies or may operate in environments where such systems are mandated or subsidized, thereby altering the perceived financial impact. The study findings agreed with Waqas et al., (2018) high cost of reverse logistics adoption (finance and economics), lack of skilled professionals (knowledge and experience), lack of government supportive policies (law and regulation), poor organizational culture (management), lack of human resources (infrastructure and technology), lack of environmental law awareness (environment), lack of community pressure (market) and company policies (reverse logistics in policy).

Lastly, vast majority of the respondent 159(72.6%) of the respondents agreed that the impact of reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type. However, 66(28.2%) of the respondents disagreed that the impact of reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type. Analysis on mean and standard deviation of 3.53 and 1.37 respectively revealed the respondents agreed with the statement that the impact of

reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type. The highest observed standard deviation in this table (1.37) indicates a substantial degree of dispersion in respondents' agreement that the impact of reverse logistics costs on competitiveness is industry- and product-specific. Despite the mean of 3.53 showing overall support for the claim, the variability underscores the contextual sensitivity of reverse logistics, with firms operating in durable goods, electronics, or fast-moving consumer goods sectors likely experiencing very different cost implications and customer expectations. The study results agreed with Aćimović, Mijušković and Rajić, (2020) indicate that the influence of reverse logistics onto green supply chain competitiveness is dependent on the product return option and is mainly negative with Serbian consumers, since the perceived quality of each of the three return options is considered to be inferior compared to new products.

Table 4.11 Descriptive Statistics on Logistic Cost

Statement		SD	D	N	A	SA	Mean	Sd
1. Higher inventory carrying costs significantly reduce a firm's ability to compete	F	29	29	20	98	58	3.54	1.32
	%	12.4	12.4	8.5	41.9	24.8		
2. Efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times.	F	15	31	10	99	79	3.84	1.21
	%	6.4	13.2	4.3	42.3	33.8		
3. Effectively managing reverse logistics costs enhances customer satisfaction and brand loyalty, ultimately	F	19	34	15	91	75	3.72	1.28
	%	8.1	14.5	6.4	38.9	32.1		
4. Firms with lower overall logistics costs, including inventory carrying, order processing, and reverse logistics.	F	23	36	8	96	71	3.67	1.32
	%	9.8	15.4	3.4	41.0	30.3		
5. In today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs.	F	19	35	9	88	83	3.77	1.30
	%	8.1	15.0	3.8	37.6	35.5		
6. Implementing efficient reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness.	F	21	22	10	98	83	3.85	1.25
	%	9.0	9.4	4.3	41.9	35.5		
7. The impact of reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type.	F	31	35	9	96	63	3.53	1.37
	%	13.2	15.0	3.8	41.0	26.9		
Valid N = 234							**3.70**	

Source: Field Data (2025)

4.4.5 Descriptive Statistics on Information Sharing

The study findings sought to determine the effect of information sharing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Analysis of the mean scores of the responses was carried out on a continuous scale: scores below 1.5 indicated strong disagreement, 1.5-2.4 indicated disagreement, 2.5-3.4 denoted neutrality, 3.5-4.5 indicated agreement, and scores above 4.5 signified strong agreement. A total of 7 statements were used to determine the effect of information sharing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya and responses elicited on a 5-point Likert scale as shown in Table 4.12.

Table 4.12 showed that 154(65.9%) of the respondents agreed with the statement that frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency. However, 67(28.7%) of the respondents disagreed with the statement that frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency. Further the study findings showed in terms of means and standard deviation showed that the respondents agreed with the statement that frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency (Mean=3.54, Std. dev=1.34). The standard deviation of 1.34 reveals considerable variability in respondents' perceptions regarding the impact of frequent information exchange with supply chain partners on operational efficiency. Although the mean score of 3.54 indicates general agreement, the wide spread suggests that organizational differences in communication infrastructure, information systems, or the maturity of supply chain relationships may account for divergent experiences and interpretations of efficiency gains. These study findings agreed with Baah et al.,

(2022) information sharing positively and significantly influenced supply chain visibility, collaboration, agility and performance. Supply chain visibility presented significant effects on collaboration, agility and performance, while supply chain collaboration and agility had significant impact on supply chain performance.

Secondly, 174(74.4%) of the respondents agreed that timely information sharing with our suppliers and customers enables us to better respond to changes in market demand and 62(22.2%) of the respondents disagreed that timely information sharing with our suppliers and customers enables us to better respond to changes in market demand. However, the respondents agreed that timely information sharing with our suppliers and customers enables us to better respond to changes in market demand with mean rating of 3.71 and standard deviation of 1.25. With a standard deviation of 1.25 and a mean of 3.71, this result denotes moderate variability in the belief that timely sharing of information with suppliers and customers enhances responsiveness to market demand fluctuations. While consensus is evident, the deviation suggests that some firms may face challenges in leveraging shared data for demand forecasting due to limitations in integration systems, data accuracy, or real-time analytics capabilities. The study results agreed Dwaikat et al., (2018) confirm that sharing demand forecasts is a key enabler of supplier volume and delivery flexibility while sharing inventory data is not.

Similarly, 164(71.8%) of the respondent agreed that collaborative planning with our supply chain partners helps us to better coordinate production and inventory levels and 63(27.0%) of the respondents disagreed that collaborative planning with our supply chain partners helps us to better coordinate production and inventory levels. Furthermore, the study's findings revealed that the respondents agreed with the

statement that collaborative planning with our supply chain partners helps us to better coordinate production and inventory levels with mean rating of 3.66 and a standard deviation of 1.30. The standard deviation of 1.30 reflects moderate dispersion around the mean of 3.66, indicating that while collaborative planning is widely seen as beneficial for coordinating production and inventory levels, there exists variability in its implementation and perceived effectiveness. This may stem from differing levels of strategic alignment, trust, and technological compatibility between firms and their supply chain partners.

Additionally, 166(71.0%) of the participants agreed that frequent information exchange with our supply chain partners reduces the risk of product shortages or surpluses. However, 53(22.7%) of the respondents disagreed that frequent information exchange with our supply chain partners reduces the risk of product shortages or surpluses. Further, the study findings also indicated the respondents agreed that frequent information exchange with our supply chain partners reduces the risk of product shortages or surpluses with mean rating of 3.69 and a standard deviation of 1.19. A relatively lower standard deviation of 1.19 indicates strong agreement among respondents that frequent information exchange mitigates the risks of product shortages or surpluses. Coupled with a mean of 3.69, the reduced dispersion signifies that this practice is broadly recognized across firms as a stabilizing factor in supply chain operations, reflecting a well-understood and frequently observed benefit of information transparency. The study findings agreed with Shareef et al., (2022) identified that although the supply chain of perishable food items is controlled truly by private parties, from a realistic view, the private–public partnership is essential where the government should play the coordinating role.

Additionally, 175(64.8%) of the respondents agreed that timely information sharing with our customers allows us to better tailor our product offerings to their needs and 48(20.5%) of the respondents disagreed that timely information sharing with our customers allows us to better tailor our product offerings to their needs. However, the respondents agreed that timely information sharing with our customers allows us to better tailor our product offerings to their needs with mean rating of 3.81 and standard deviation of 1.29. The standard deviation of 1.29 suggests moderate variability in perceptions regarding the extent to which timely information sharing with customers enables product customization. While the mean rating of 3.81 demonstrates strong support, the observed variability may arise from differences in customer engagement models, responsiveness of internal production systems, and data interpretation capabilities across firms.

Similarly, 164(70.0%) of the respondent agreed that collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies and 44(23.1%) of the respondents disagreed that collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies. Furthermore, the study's findings revealed that the respondents agreed with the statement that collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies with mean rating of 3.67 and a standard deviation of 1.31. A standard deviation of 1.31, along with a mean of 3.67, reflects moderate variability in respondent agreement that collaborative planning enhances distribution and logistics strategies. The variability highlights potential disparities in supply chain integration levels, resource availability, and logistical complexity, which may influence how effectively collaborative planning is executed and perceived in practice. The study results agreed with

Mofokeng and Chinomona, (2019) revealed that the research constructs partnership, collaboration and integration influence supply chain performance in a positive way.

Finally, 176(75.2%) of the respondents agreed that frequent, timely, and collaborative information sharing with our supply chain partners leads to overall improvements in our firm's financial performance. On contrary 51(21.8%) of the respondents disagreed that frequent, timely, and collaborative information sharing with our supply chain partners leads to overall improvements in our firm's financial performance. Further, the mean rating of 3.74 and standard deviation of 1.29 indicates that the respondents agreed that frequent, timely and collaborative information sharing with our supply chain partners leads to overall improvements in our firm’s financial performance. With a standard deviation of 1.29, this result indicates moderate dispersion around the mean score of 3.74 concerning the belief that collaborative information sharing improves financial performance. Although agreement is generally strong, the variation suggests that the financial impact of information sharing may be mediated by other operational variables such as cost control, technological investments, or market volatility, which differ across firms. These findings agreed with the study done by Baah et al., (2022) indicate information sharing positively and significantly influenced supply chain visibility, collaboration, agility.

Table 4.12 Descriptive Statistics on Information Sharing

Statement		SD	D	N	A	SA	Mean	Sd
1. Frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency.	F	24	43	13	90	64	3.54	1.34
	%	10.3	18.4	5.6	38.5	27.4		
2. Timely information sharing with our suppliers and customers enables us to better respond to changes in market demand.	F	21	31	8	110	64	3.71	1.25
	%	9.0	13.2	3.4	47.0	27.4		
3. Collaborative planning with our supply chain partners helps us to better coordinate production and inventory	F	17	46	7	90	74	3.68	1.30
	%	7.3	19.7	3.0	38.5	31.6		
4. Frequent information exchange with our supply chain partners reduces the risk of product shortages	F	13	40	15	105	61	3.69	1.19
	%	5.6	17.1	6.4	44.9	26.1		
5. Timely information sharing with our customers allows us to better tailor our product offerings to their needs.	F	22	26	11	90	85	3.81	1.29
	%	9.4	11.1	4.7	38.5	36.3		
6. Collaborative planning with our supply chain partners helps us to develop more efficient distribution	F	25	29	16	93	71	3.67	1.31
	%	10.7	12.4	6.8	39.7	30.3		
7. Frequent, timely, and collaborative information sharing with our supply chain partners leads to overall improvements in our firm's financial performance.	F	24	27	7	103	73	3.74	1.29
	%	10.3	11.5	3.0	44.0	31.2		
							3.69	

Valid N = 234

Source: Field Data (2025)

4.4.6 Descriptive Statistics on Competitiveness of Food and Beverage

The study sought to establish the effect of competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The average response rate and the frequency of agreement were then computed, and the findings are presented in Table 4.13. Analysis of the mean scores of the responses was carried out on a continuous scale: the mean values below 1.5 indicated strong disagreement, 1.5-2.4 indicated disagreement, 2.5-3.4 denoted neutrality, 3.5-4.5 indicated agreement, and scores above 4.5 indicates strongly agreed. A total of 7 statements were used to establish the effect of competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya and responses elicited on a 5-point Likert scale as shown in Table 4.13.

Findings from Table 4.13 indicates that 157(67.1%) of the respondents agreed that a food and beverage company with a larger market share is inherently more competitive and 59(25.2%) of the respondents disagreed that a food and beverage company with a larger market share is inherently more competitive. However, the respondents agreed that a food and beverage company with a larger market share is inherently more competitive with mean rating of 3.60 and standard deviation of 1.32. A standard deviation of 1.32 suggests notable variability in perceptions regarding the assertion that a larger market share inherently equates to greater competitiveness. While the mean score of 3.60 indicates general agreement, the broad dispersion implies differing contextual interpretations, possibly influenced by industry segment, firm size, or strategic orientation. This variability highlights the nuanced understanding that market share alone may not be a definitive indicator of competitiveness. These findings are consistent with Dimitrantzou, Psomas and Vouzas, (2024) indicated that cost

leadership, centralization and formalization influence the CoQ positively and significantly.

Further, 168(71.8%) of the respondent agreed that a food and beverage company with higher profitability is a stronger competitor in the market and 58(24.8%) of the respondents disagreed that a food and beverage company with higher profitability is a stronger competitor in the market. Furthermore, the study's findings revealed that the respondents agreed with the statement that a food and beverage company with higher profitability is a stronger competitor in the market with mean rating of 3.64 and a standard deviation of 1.27. With a standard deviation of 1.27 and a mean of 3.64, there is moderate variability in responses affirming that profitability contributes to competitive strength. The spread in views suggests that while profitability is broadly recognized as a competitive asset, respondents may weigh its relevance differently depending on their firm's financial strategies, competitive pressures, or market volatility. The study findings agreed with Konstantinidis, Natos and Mattas, (2021) show that market share, profitability and capital intensity affect positively both on market share and profitability, while operating costs have a negative and statistically significant effect on profitability.

Similarly, 168(71.8%) of the participants agreed that a food and beverage company that can produce goods at a lower cost is more competitive. However, 57(24.3%) of the respondents disagreed that a food and beverage company that can produce goods at a lower cost is more competitive. Further, the study findings also indicated the respondents agreed that a food and beverage company that can produce goods at a lower cost is more competitive with mean rating of 3.65 and a standard deviation of 1.33. The relatively high standard deviation of 1.33 points to considerable divergence

in opinion concerning the idea that cost-efficient production enhances competitiveness. Although the mean rating of 3.65 reflects consensus, the variability suggests that some respondents may consider other strategic factors (for example, differentiation, innovation, or customer service) as equally or more vital in defining competitiveness. These study findings concur with Gitari, (2023) showed that cost leadership, differentiation strategy, focus strategy and innovative strategy, positively and significantly influence performance of small and medium size food and beverage manufacturing firms in Nairobi County.

Additionally, 175(74.8%) of the respondents agreed that a highly profitable company, even with a lower market share, can be competitive in the long run. On contrary 48(20.5%) of the respondents disagreed that a highly profitable company, even with a lower market share, can be competitive in the long run. Further, the mean rating of 3.73 and standard deviation of 1.23 indicates that the respondents agreed that a highly profitable company, even with a lower market share, can be competitive in the long run. A standard deviation of 1.23 indicates relatively less variability in agreement with the view that profitability can ensure long-term competitiveness, even when market share is limited. The high mean of 3.73, coupled with modest dispersion, suggests that respondents generally appreciate the strategic value of sustained profitability over sheer market dominance.

Majority of the respondent that 164(70.1%) agreed that a company with a large market share, but lower profitability due to inefficiency, may not be truly competitive. However, 59(25.2%) of the respondents disagreed that a company with a large market share, but lower profitability due to inefficiency, may not be truly competitive. As per the survey results, the participants agreed in terms of mean and standard deviation that

a company with a large market share, but lower profitability due to inefficiency, may not be truly competitive (Mean, =3.68, Std. dev=1.31). The standard deviation of 1.31 indicates moderate-to-high variability in perceptions that market share accompanied by operational inefficiencies undermines competitiveness. A mean of 3.68 reveals agreement with the statement, yet the observed variability may be explained by the operational context of respondents, such as the presence of monopolistic dynamics or varying cost structures. The study findings agreed with Edeling and Himme, (2018) found that service firms than for manufacturing firms, and for U.S. markets than for emerging and Western European markets.

Further, 168(61.8%) of the respondents agreed with the statement that in some food and beverage sectors, brand recognition and product innovation can be more important for competitiveness than pure market share. However, 54(23.0%) of the respondents disagreed that in some food and beverage sectors, brand recognition and product innovation can be more important for competitiveness than pure market share. From mean and standard deviation, the respondents agreed that in some food and beverage sectors, brand recognition and product innovation can be more important for competitiveness than pure market share (Mean =3.72, Std. dev=1.31). With a standard deviation of 1.31 and a mean of 3.72, this result reflects moderate dispersion in views about the role of brand recognition and innovation as potentially more critical than market share in certain sectors. The variability suggests that respondents may place differing emphasis on these intangible assets based on their firm's branding capabilities, R&D investment, and customer engagement strategies. The study findings agreed with Karaev, (2023) suggests that companies embracing a realistic market-oriented outlook in their product planning and advertising, combined with

centering on novelty, are better placed to stay successful within this fiercely competitive business space.

Finally, 168(71.8%) of the participants agreed that while cost efficiency is crucial, maintaining high-quality standards is equally important for long-term competitiveness in the food and beverage industry. On contrary, 54(23.0%) of the participants disagreed that while cost efficiency is crucial, maintaining high-quality standards is equally important for long-term competitiveness in the food and beverage industry. Further, the study results also showed, in terms of mean and standard deviation respondents agreed that while cost efficiency is crucial, maintaining high-quality standards is equally important for long-term competitiveness in the food and beverage industry (Mean=3.66, standard deviation=1.32). The standard deviation of 1.32 reflects significant variation in the belief that balancing cost efficiency with quality standards is essential for sustained competitiveness. While the mean score of 3.66 demonstrates general consensus, the relatively wide dispersion implies that respondents may prioritize these factors differently, possibly influenced by market positioning (for example, premium vs. value segments) and internal quality control practices. The study results agreed with Makinde et al., (2023) revealed that quality management practices had a significant effect on the competitive advantage of Food and Beverages manufacturing firms in Lagos State.

Table 4.13 Descriptive Statistics on Competitiveness of Food and Beverage

Statement		SD	D	N	A	SA	Mean	Sd
1. A food and beverage company with a larger market share is inherently more competitive.	F	25	34	18	90	67	3.60	1.32
	%	10.7	14.5	7.7	38.5	28.6		
2. A food and beverage company with higher profitability is a stronger competitor in the market.	F	21	37	8	107	61	3.64	1.27
	%	9.0	15.8	3.4	45.7	26.1		
3. A food and beverage company that can produce goods at a lower cost is more competitive.	F	27	30	9	101	67	3.65	1.33
	%	11.5	12.8	3.8	43.2	28.6		
4. A highly profitable company, even with a lower market share, can be competitive in the long run.	F	20	28	11	111	64	3.73	1.23
	%	8.5	12.0	4.7	47.4	27.4		
5. A company with a large market share, but lower profitability due to inefficiency, may not be truly competitive.	F	21	38	11	90	74	3.68	1.31
	%	9.0	16.2	4.7	38.5	31.6		
6. In some food and beverage sectors, brand recognition and product innovation can be more important for competitiveness than pure market share.	F	23	31	12	91	77	3.72	1.31
	%	9.8	13.2	5.1	38.9	32.9		
7. While cost efficiency is crucial, maintaining high-quality standards is equally important for long-term competitiveness in the food and beverage industry.	F	27	27	12	100	68	3.66	1.32
	%	11.5	11.5	5.1	42.7	29.1		
Valid N = 234							**3.67**	

Source: Field Data (2025)

4.5 Reliability Test Results

The reliability of the research constructs was assessed using Cronbach's Alpha, a measure of internal consistency that indicates how well the items within each scale are correlated. A threshold of 0.7 and above is generally considered acceptable for ensuring the reliability of constructs in social science research. As presented in the table 4.14, all the variables met this criterion. Inventory management had a Cronbach's Alpha of 0.771 across 7 items, indicating good reliability. Strategic sourcing recorded the highest reliability with an Alpha of 0.800, also based on 7 items, suggesting strong internal consistency.

Adoption of technology had an Alpha of 0.767, which is above the acceptable threshold, confirming the reliability of its 7 items. Similarly, logistic cost and information sharing recorded Alpha values of 0.742 and 0.760 respectively, each measured using 7 items, reflecting satisfactory consistency. Lastly, the dependent variable, competitiveness of food and beverage manufacturing firms, had a Cronbach's Alpha of 0.730, indicating that the items used to measure this outcome were reliable. Overall, these results confirm that the research instruments used for all constructs in the study were internally consistent and suitable for further statistical analysis

Table 4.14 Reliability Test Results

Variables	Cronbach's Alpha	N of Items
Inventory management	.771	7
Strategic sourcing	.800	7
Adoption of technology	.767	7
Logistic cost	.742	7
Information sharing	.760	7

Competitiveness of food and beverage manufacturing	.730	7

Source: Field Data (2025)

4.6 Factor Analysis

Construct validity was tested using factor analysis as presented in the following subsections. The values presented in the rotated component matrix represent factor loadings, which indicate the strength of association between individual items (statements or indicators) and the underlying latent variables (factors). In exploratory factor analysis, loadings greater than 0.5 are generally considered meaningful, while those above 0.7 are regarded as strong. These values help validate the construct validity of the proposed dimensions in the study, ensuring that the observed variables reliably measure the intended theoretical constructs.

For Factor 1 (Inventory Management), the loadings are consistently high, ranging from 0.601 to 0.844. Items such as “Consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm” (0.844) and “Timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness” (0.834) show strong associations with this factor. These values underscore the importance of effective inventory control including accuracy, order fulfillment, and turnover rate as a fundamental operational capability that significantly influences competitiveness in the food and beverage sector.

In the case of Factor 2 (Strategic Sourcing), the loadings fall between 0.505 and 0.685. While slightly lower than those in the inventory management domain, these values are still statistically significant and support the notion that qualitative criteria in supplier selection, collaborative partnerships, and efficient contract management contribute meaningfully to competitive advantage. Notably, the item “Focusing solely

on the lowest price during supplier selection weakens the competitive advantage…" shows a strong negative implication through a high positive loading (0.685), reinforcing the need for balanced sourcing strategies.

Factor 3 (Competitiveness) captures core business outcomes such as profitability, market share, cost efficiency, and brand strength, with loadings ranging from 0.676 to 0.839. The item "While cost efficiency is crucial, maintaining high-quality standards is equally important…" has the highest loading (0.839), indicating that long-term competitiveness is closely tied not just to financial outcomes, but also to quality assurance and innovation. This cluster of values highlights a multifaceted understanding of competitiveness in the food and beverage industry.

Regarding Factor 4 (Information Sharing), the loadings are particularly strong, ranging from 0.619 to 0.818. For example, "Collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies" shows a high loading of 0.818. These values affirm that real-time, bilateral, and structured communication with supply chain partners leads to enhanced operational efficiency, coordination, and financial performance. The consistency and strength of these loadings validate information sharing as a strategic enabler of supply chain agility and responsiveness.

Factor 5 (Logistics Cost) demonstrates high loadings as well, between 0.515 and 0.867. Items like "Implementing efficient reverse logistics practices can be a cost burden…" (0.867) and "Effectively managing reverse logistics costs…boosts competitiveness" (0.848) emphasize the dual nature of logistics costs: while necessary, they require careful management to avoid undermining profitability. These strong values indicate that logistics efficiency covering order processing, inventory

carrying, and returns directly affects competitive standing, especially in industries with tight margins.

Finally, Factor 6 (Adoption of Technology) shows consistently high loadings from 0.671 to 0.777. Statements such as “The speed at which a firm implements new technologies affects its competitive advantage in Kenya” (0.777) and “The effectiveness of employee training programs…” (0.768) indicate that technology adoption is a multidimensional construct involving investment, implementation speed, and human resource development. The high factor loadings validate that technological readiness particularly when accompanied by staff training is a significant determinant of competitiveness.

In addition to the factor loadings, the Kaiser-Meyer-Olkin (KMO) measure of 0.683 suggests that the sampling adequacy is acceptable for factor analysis. The Bartlett’s Test of Sphericity, with a significance value of 0.000, confirms that the correlation matrix is not an identity matrix, validating the suitability of the dataset for structure detection. The total variance explained by the six components is approximately 44%, which is acceptable in social science research involving complex organizational constructs. Together, these statistical values affirm that the factor analysis successfully identified six distinct and theoretically meaningful dimensions influencing the competitiveness of food and beverage manufacturing firms.

Table 4.15 Rotational Component Matrix

	Components					
	1	**2**	**3**	**4**	**5**	**6**
1. Higher inventory turnover rate leads to increased competitiveness of the firm.		0.713				
2. Improved order fulfilment rate positively impacts the firm's competitiveness.		0.601				
3. Maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness.		0.757				
4. Efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage.		0.646				
5. Timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness.		0.834				
6. Consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm.		0.844				
7. Effective inventory management, encompassing inventory turnover rate, order fulfilment rate, and inventory accuracy, is essential for maintaining a competitive edge in the market.		0.834				
1. The use of clearly defined criteria for supplier selection (quality, price, reliability) enhances the competitive advantage of Kenyan food and beverage manufacturers.	.552					
2. Collaborative relationships with key suppliers, characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms.	.505					
3. Efficient contract management practices (clear	.638					

	terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers.		
4.	Focusing solely on the lowest price during supplier selection weakens the competitive advantage of Kenyan food and beverage companies in the long run.	.685	
5.	Increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports.	.626	
6.	Utilizing technology (e-procurement platforms) to streamline contract management processes enhances the responsiveness and competitiveness of Kenyan food and beverage firms.	.513	
7.	The ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies.	.558	
1.	The level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market.		0.718
2.	The speed at which a firm implements new technologies effects its competitive advantage in Kenya.		0.777
3.	The effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya.		0.768
4.	A firm's competitiveness in Kenya is more affected by the		0.701

	level of technology investment than the implementation rate.		
5.	Effective employee training on new technologies can compensate for a slower implementation rate in Kenya.		0.671
6.	In Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional.		0.707
7.	The ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training.		0.74
1.	Higher inventory carrying costs significantly reduce a firm's ability to compete on price.	0.587	
2.	Efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times.	0.812	
3.	Effectively managing reverse logistics costs (for example, returns, product recalls) enhances customer satisfaction and brand loyalty, ultimately boosting competitiveness.	0.848	
4.	Firms with lower overall logistics costs, including inventory carrying, order processing, and reverse logistics, are more likely to achieve higher profit margins.	0.837	
5.	In today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs.	0.515	
6.	Implementing efficient	0.867	

	reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness.			
7.	The impact of reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type.			0.737
1.	Frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency.		0.619	
2.	Timely information sharing with our suppliers and customers enables us to better respond to changes in market demand.		0.767	
3.	Collaborative planning with our supply chain partners helps us to better coordinate production and inventory levels.		0.74	
4.	Frequent information exchange with our supply chain partners reduces the risk of product shortages or surpluses.		0.792	
5.	Timely information sharing with our customers allows us to better tailor our product offerings to their needs.		0.726	
6.	Collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies.		0.818	
7.	Frequent, timely, and collaborative information sharing with our supply chain partners leads to overall improvements in our firm's financial performance.		0.815	
1.	A food and beverage company with a larger market share is inherently more competitive.	0.676		
2.	A food and beverage company with higher	0.716		

profitability is a stronger competitor in the market.						
3. A food and beverage company that can produce goods at a lower cost is more competitive.			0.724			
4. A highly profitable company, even with a lower market share, can be competitive in the long run.			0.74			
5. A company with a large market share, but lower profitability due to inefficiency, may not be truly competitive.			0.716			
6. In some food and beverage sectors, brand recognition and product innovation can be more important for competitiveness than pure market share.			0.691			
7. While cost efficiency is crucial, maintaining high-quality standards is equally important for long-term competitiveness in the food and beverage industry.			0.839			
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.683					
Bartlett's Test of Sphericity	3221.767					
df	861					
Sig.	.000					
Initial Eigenvalues	3.846	3.372	3.167	2.920	2.625	2.542
Total Variance Explained	9.157	8.029	7.541	6.951	6.249	6.052

Source: Field Data (2025)

4.7 Data Transformation Results

After performing factor analysis, the next step involves transforming the data by extracting the factor scores, which represent the underlying dimensions or constructs identified during the factor extraction process. This transformation involves assigning each observation a score on each of the extracted factors, which is done by multiplying the original data matrix by the factor loading matrix. These factor scores are then used as new variables in subsequent analyses, such as regression or correlation analysis, to explore relationships between the factors and other variables. The transformation allows for a more simplified and interpretable dataset, where the complex interrelationships between original variables are condensed into a smaller number of latent factors. Additionally, the factor scores are typically standardized to have a mean of zero and a standard deviation of one to facilitate comparability and ensure consistency across different datasets. This transformed data is now ready for further statistical modeling or analysis, providing a clearer understanding of the underlying structures within the original variables.

The data transformation results presented in Table 4.16 summarize the descriptive statistics and normality measures for six key variables related to the competitiveness of food and beverage manufacturing firms, based on responses from 234 participants. The mean values for all variables range between 3.38 and 3.67, indicating a generally positive perception among respondents. Specifically, information sharing (mean = 3.66) and competitiveness of firms (mean = 3.67) scored the highest, suggesting that respondents strongly agree with statements regarding these factors. Adoption of technology (mean = 3.51), logistics cost (mean = 3.47), and strategic sourcing (mean = 3.42) follow closely behind, while inventory management has the lowest mean (3.38), reflecting a relatively more neutral or mixed view.

Standard deviations range from 0.79 (information sharing) to 1.12 (inventory management), implying that responses about inventory management varied more widely, whereas opinions on information sharing were more consistent. Skewness values for all variables are negative, ranging from -0.468 to -1.102, indicating that the distributions are slightly left-skewed meaning most responses lean towards agreement (the higher end of the scale). Information sharing and competitiveness show the strongest left-skewness, suggesting consistently high ratings. Kurtosis values vary from -0.969 (inventory management) to 1.224 (information sharing), indicating that some distributions are flatter (platykurtic), while others are more peaked (leptokurtic). Notably, all skewness and kurtosis values fall within the acceptable range of -2 to +2, confirming that the data are approximately normally distributed.

Table 4.16 Data Transformation Results

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Inventory management	234	1.00	5.00	3.382	1.1186	-.468	.15	-.969	.31
Strategic sourcing	234	1.00	5.00	3.420	1.0308	-.621	.15	-.744	.31
Adoption of technology	234	1.00	5.00	3.509	.93131	-.709	.15	-.172	.31
Logistic cost	234	1.00	5.00	3.466	.99207	-.852	.15	-.374	.31
Competitiveness of food and beverage manufacturing firms	234	1.00	5.00	3.668	.95370	-.970	.15	.157	.31
Information sharing	234	1.00	4.86	3.660	.79075	-1.10	.15	1.224	.31
Valid N (listwise)	234								

Source: Field Data (2025)

4.8 Assumptions Test of Regression Model

The multiple regression analysis was conducted after ensuring that the assumptions of linearity, normality, multicollinearity, and homoscedasticity are met. Diagnostic tests were performed to check for any violations of these assumptions. The following are some of the regression assumptions that was tested in this study.

4.8.1 Linearity Assumption Test

The results of the linearity assumption test presented in Table 4.17 confirm that all four independent variables inventory management, strategic sourcing, adoption of technology, and logistic cost demonstrate statistically significant linear relationships with the dependent variable. The p-values for the linearity test are all .000, which are significant at the 0.01 level, indicating that the relationship between each independent variable and the dependent variable is indeed linear. Additionally, the p-values for the deviation from linearity test are all above 0.05, ranging from .082 to .228. These non-significant values suggest that there is no substantial departure from linearity for any of the variables. In essence, this means that the assumption of linearity is met, and the use of parametric statistical techniques such as multiple linear regression is appropriate for further analysis.

Table 4.17 Linearity Assumption Test (ANOVA)

Variables	Linearity	Deviation from Linearity
Inventory management	.000	.082
Strategic souring	.000	.228
Adoption of technology	.000	.147
Logistic cost	.000	.144

Correlation significant at the 0.01 level (2-tailed).
Source: Field Data (2025)

4.8.2 Normality Assumption Test

Normality in linear regression refers to the assumption that the residuals are normally distributed (Knief & Forstmeier, 2021). The study employed the Shapiro-Wilk test to determine whether or not the data significantly deviated from the assumed normal distribution. Research results showed that all Kolmogorov-Smirnov a value in Table 4.18 were statistically significant at the 0.05 level or more. Since the significance values were smaller than 0.05, the data were assumed to have come from a normal distribution. The assumption of normality in linear regression (Knezevic, Savic, Kutlesic & Opacic, 2017). If the Kolmogorov-Smirnov value is more than 0.05, then the data is normally distributed, while if it is less than 0.05, then the data considerably deviates from a normal distribution (Ahad, Yin, Othman and Yaacob, 2011).

Table 4.18 Normality Assumption Test (Kolmogorov-Smirnov)

Variables	Statistic	Sig.
Inventory management	.337	.324
Strategic souring	.308	.143
Adoption of technology	.250	.077
Logistic cost	.208	.079
Information sharing	.288	.119

Source: Field Data (2025)

4.8.3 Multicollinearity Assumption Test

Multicollinearity in linear regression refers to the assumption that the independent variables are not highly correlated with each other (Lindner, Puck & Verbeke, 2020). A correlation matrix can be used to measure the correlation between the independent variables. If the correlation coefficients are close to 1 or -1, then multicollinearity is present. VIF can also be used to measure multicollinearity. A VIF greater than 10 indicates multicollinearity. If the correlation coefficients are close to 1 or -1, then multicollinearity is present. If the VIF is greater than 10, then multicollinearity is

present. Table 4.19 displays that the variation inflation factors for inventory management were 2.234%, strategic sourcing were 1.796%, adoption of technology were 2.687%, logistic cost was 2.449% and information sharing were 1.030%. We observed that the results were fewer than 10, hence there is no multicollinearity as defined by Field (2009). The data showed that the multicollinearity assumption was correct due to the high tolerance values for all variables (above 0.10).

Table 4.19 Multicollinearity Assumption Test (Tolerance and VIF)

Variables	Tolerance	VIF
Inventory management	.448	2.234
Strategic souring	.557	1.796
Adoption of technology	.372	2.687
Logistic cost	.408	2.449
Information sharing	.971	1.030

Source: Field Data (2025)

4.8.4 Homoscedasticity Assumption Test

Homoscedasticity in linear regression refers to the assumption that the variance of the residuals is constant across all levels of the independent variables (Đalić & Terzić, 2021). A p-value greater than 0.05 indicates homoscedasticity, while a p-value less than 0.05 indicates heteroscedasticity. If the p-value is less than 0.05, then homoscedasticity is violated. The study results indicated that the p-value in Levenes test for inventory management was 3.151. P-value in Levenes test for strategic sourcing was 2.016. P-value in Levenes test for adoption of technology was 2.267. P-value in Levenes test for logistic cost was 1.946 and information sharing was 1.798. All the P-values were above 0.05. Thus, the homoscedasticity assumption was made showing that data used had no heteroscedasticity. Table 4.20 displays the results of the assumed-true-positive tests.

Table 4.20 Homoscedasticity Assumption Test (Levenes)

Variables	Levene Statistic	df1	df2	Sig.
Inventory management	3.151	52	181	.179
Strategic souring	2.016	47	186	.153
Adoption of technology	2.267	43	190	.088
Logistic cost	1.946	57	176	.152
Information sharing	1.798	27	206	.123

Source: Field Data (2025)

4.9 Inferential Analysis

In this section, inferential analysis was conducted using correlation and multiple regression models. The relationship between the independent variables and the dependent variable was demonstrated through these analyses.

4.9.1 Correlation Analysis

The degree and direction of the relationship between the dependent and independent variables was analysed using Pearson's correlation. The outcomes are shown in Table 4.21. The research found that inventory management has a strong positive correlation with competitiveness of food and beverage manufacturing firms (r=0.657**; p<0.01). The results showed that there was a strong positive correlation between strategic souring and competitiveness of food and beverage manufacturing firms (r= 0.610; p<0.01). Adoption of technology was found to have a strong positive significant correlation with competitiveness of food and beverage manufacturing firms (r=0.698**; p<0.01). Logistic cost was found to have a strong positive correlation with competitiveness of food and beverage manufacturing firms (r=0.708**; p<0.01 statistically). Information sharing was found to have a weak positive correlation with competitiveness of food and beverage manufacturing firms (r=0.247**; p<0.01).

According to Armstrong (2019), the presence of two or more variables with a high correlation indicates that these variables are connected to one another in a significant manner, whereas the presence of two or more variables with a low correlation indicates that these variables are not connected at all. When interpreting the results of an experiment, a value of 0.00 indicates that there is no association between the variables.

Table 4.21 Correlation Analysis Results

		Competitiveness of food and beverage	Inventory management	Strategic sourcing	Adoption of technology	Logistic cost	information sharing
Competitiveness of food and beverage	Pearson Correlation	1					
Inventory management	Pearson Correlation	.657**	1				
Strategic sourcing	Pearson Correlation	.610**	.562**	1			
Adoption of technology	Pearson Correlation	.698**	.677**	.637**	1		
Logistic cost	Pearson Correlation	.708**	.680**	.549**	.714**	1	
information sharing	Pearson Correlation	.247**	.104	.048	.097	.162*	1
	Sig. (2-tailed)	.000	.114	.465	.139	.013	

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Source: Field Data (2025)

4.9.2 Results for Multiple Regression Analysis

The power of a link between the dependent variable and several predictor variables was established with multiple regression analysis, and the relative relevance of each predictor was determined, typically with the effect of other predictors eliminated statistically.

4.9.3 Model Summary

The coefficient of determination (R^2) and correlation coefficient (R) showed the degree of association between dependent and independent variables. The results are presented in Table 4.22.

Table 4.22 Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.787[a]	.619	.612	.59394

Source: Field Data (2025)

Table 4.22 displays the regression findings, which showed an R^2 of 0.619 and R-value of 0.787. The high linear correlation between the dependent and independent variables was indicated by the R-value of 0.787. According to the coefficient of determination (R^2), the independent variables provided 0.619 of the total explanation. The regression model accounted for is 61.9% of the observed variation in the independent variable.

4.9.4 Regression Model Fitness Test

The model's fitness was checked to test if it provided the best possible fit for the data. Table 4.23 showed the outcomes of the investigation.

Table 4.23 Fitness of Regression Model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	131.141	4	32.785	92.936	.000[b]
Residual	80.784	229	.353		
Total	211.925	233			

Source: Field Data (2025)

Table 4.23 displayed an F-statistic of (F =92.936), which was statistically significant at the p=0.000 level, demonstrating that the model was accurate. This means that the data were well-fit by the multiple regression model and this ANOVA table relates to the direct effects model.

4.9.5 Regression Model Coefficients

Running a regression model yielded coefficients for use in the regression equation n. Table 4.24 showed that the inventory management had a positive linear effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_1=0.153, p=0.004). This showed that a 0.153-unit improvement in competitiveness of food and beverage manufacturing firms can be attained by introducing a more inventory management. Competitiveness of food and beverage manufacturing firms was also found to have a positive significant effect with strategic sourcing (β_2=0.174, p=0.001). Therefore, an increase in strategic sourcing results in a 0.174-unit increase in competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

There was a positive and statistically significant relationship between adoption of technology and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_3=0.237, p=0.001). These reveals that and increase in adoption of technology leads to a unit increase in competitiveness of food and

beverage manufacturing firms in Uasin Gishu County, Kenya by 0.237 units. The effect of logistic cost on competitiveness of food and beverage manufacturing firms is favorable and statistically significant (β_4=0.307, p=0.000). This suggested that a change in logistic cost would improve competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya by 0.307 units on the competitiveness for every unit increase in logistic cost.

$Y = 0.668 + 0.153X_1 + 0.174X_2 + 0.235X_3 + 0.307X_4$ ……. Equation 4.1

Table 4.24 details of the study's findings.

Table 4.24 Regression Model Coefficients

	Unstandardized Coefficients		**Standardized Coefficients**		
	B	**Std. Error**	**Beta**	**t**	**Sig.**
(Constant)	.668	.163		4.099	.000
Inventory management	.153	.052	.179	2.941	.004
Strategic sourcing	.174	.051	.188	3.447	.001
Adoption of technology	.235	.068	.229	3.429	.001
Logistic cost	.307	.061	.319	5.037	.000

Source: Field Data (2025)

4.10 Hierarchical Moderated Regression Analysis

To examine the interaction effect between the independent variables and the dependent variable, information sharing was introduced as a moderating variable. The moderating effect was tested using hierarchical linear regression analysis (Baron & Kenny, 1986). Separate regression analyses were conducted for each independent and dependent variable to assess the individual moderating effect of each factor on the competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

Model 1 serves as the baseline model and includes only the control variables firm age and firm size. The results show that both variables are statistically significant, with p-values of .043 and .041, respectively, and positive beta coefficients (.118 and .154). This suggests that older and larger firms tend to exhibit slightly higher competitiveness in the food and beverage manufacturing sector. However, the explanatory power of this model is quite limited, as indicated by an R^2 of 0.055, meaning that only 5.5% of the variance in competitiveness is explained by these two firm-level characteristics. This low R^2 underscores the need to include more substantial predictors to account for differences in firm competitiveness.

Model 2 adds the four main independent variables (IVs): Inventory Management, Strategic Sourcing, Adoption of Technology, and Logistic Cost. All four variables are highly statistically significant ($p < .005$) and positively related to competitiveness, with logistic cost showing the strongest beta coefficient (.300). This indicates that improvements in these operational areas have a direct and meaningful impact on a firm's competitive standing. Importantly, the R^2 jumps dramatically from 0.055 to 0.621, reflecting a ΔR^2 of 0.566. This substantial increase of over 56% in explained variance highlights that these four IVs are core determinants of competitiveness, far more impactful than firm age and size alone. The model's F-statistic also increases sharply, suggesting significantly improved model fit.

In Model 3, the moderator Information Sharing (Z) is added as a direct predictor. Its coefficient is positive and significant ($\beta = .181$, $p = .000$), indicating that higher levels of information sharing directly enhance a firm's competitiveness. The model's R^2 increases to 0.643, representing an additional 2.2% of explained variance ($\Delta R^2 = .022$). Though this is a smaller gain compared to Model 2, it is still meaningful in

regression modeling, especially when the variable added is not an entirely new construct but a moderator. This suggests that information sharing, by itself, plays an independent role in boosting competitiveness, beyond the operational practices previously included.

Model 4 introduces the interaction between Information Sharing and Inventory Management. The interaction term is negative and significant ($\beta = -0.103$, $p = .002$), implying that information sharing reduces the effectiveness of inventory management on competitiveness. This may suggest redundancy or over coordination in inventory when too much information is shared. The model's R^2 rises slightly to 0.658, adding 1.5% more explained variance.

Model 5 includes the interaction between Information Sharing and Strategic Sourcing. Here, the interaction is positive and significant ($\beta = .059$, $p = .010$), showing that information sharing strengthens the influence of strategic sourcing on competitiveness. This makes intuitive sense, as sourcing decisions often benefit from broader, real-time data. The R^2 further increases to 0.668, contributing 1.0% additional variance.

Model 6 adds the interaction with Adoption of Technology, also yielding a positive and significant interaction ($\beta = .087$, $p = .009$). This suggests that when information sharing is high, the competitive benefits of technology adoption are amplified. The R^2 reaches 0.678, indicating another 1.0% improvement in explanatory power.

Model 7 represents the culmination of the regression analysis, integrating all control variables, independent variables, the moderator, and the interaction terms. This model offers the most complete picture of what drives competitiveness in food and beverage

manufacturing firms and how these drivers are influenced by information sharing, the moderating variable.

At the foundation, the control variables Firm Age and Firm Size lose their statistical significance in this final model (p-values = .990 and .636, respectively), suggesting that once operational and strategic practices and their interactions with information sharing are considered, basic firm demographics no longer contribute meaningfully to explaining competitiveness. This highlights the dominance of functional and process-level factors over structural characteristics in determining competitive outcomes.

Among the main independent variables, inventory management and logistic cost retain strong positive and statistically significant direct effects on competitiveness (β = .543 and .875, respectively, both with $p < .001$). This indicates that regardless of moderation, improvements in inventory control and reductions in logistic costs are consistently associated with stronger competitive performance. However, the direct effects of Strategic Sourcing (β = -.044, p = .597) and Adoption of Technology (β = -.149, p = .230) are no longer significant. This shift implies that the benefits of sourcing and technology on competitiveness may be highly contingent on other factors particularly the extent to which information is shared across the organization.

The moderator, Information Sharing, remains a strong and statistically significant predictor in its own right (β = .503, p = .001). This reinforces its central role in enhancing competitiveness through improved coordination, transparency, and alignment across business functions.

Most crucially, Model 7 includes four interaction terms between the moderator and each of the independent variables. The interaction between Information Sharing and

Inventory Management is negative and significant (β = -0.115, p = .005), suggesting that while inventory management is beneficial on its own, its effectiveness may be dampened when there is high information sharing. This could be due to overcommunication or process rigidity, potentially reducing responsiveness or adding unnecessary complexity. Similarly, the interaction between Information Sharing and Logistic Cost is also negative and significant (β = -0.182, p = .002), indicating that extensive information sharing may diminish the marginal returns of logistics efficiency possibly due to resource misallocation or coordination overhead.

Conversely, the interaction between Information Sharing and Strategic Sourcing is positive and significant (β = .060, p = .007), meaning that the competitiveness gains from strategic sourcing are enhanced when firms share information effectively. A similar pattern holds for the interaction with Adoption of Technology (β = .128, p = .000), which showed a strong positive and significant interaction, highlighting that technology adoption yields greater benefits when embedded within a culture of open information sharing.

Overall, Model 7 achieves an R^2 of 0.691, the highest among all models, indicating that 69.1% of the variance in competitiveness is explained by this comprehensive set of predictors and interactions. The additional 1.4% variance ($\Delta R^2 = .014$) gained by including the final interaction term (Z × Logistic Cost) confirms the meaningful contribution of moderating effects even at this advanced modeling stage. The high F-statistic (F = 45.21) further indicates a statistically robust model.

The regression equation can be summarized as:

$$\mathbf{Y = 3.106 + .118C_1 + .154C_2 + 0.152X_1 + 0.173X_2 + 0.232X_3 + 0.300X_4 + 0.181Z - 0.103ZX_1 + 0.059ZX_2 + 0.087ZX_3 - 0.182ZX_4}$$

Table 4.25 Hierarchical Moderated Regression Analysis Summary

	Model 1		Model 2		Model 3		Model 4		Model 5		Model 6		Model 7	
	β	**p-v**	**β**	**p-v**	**β**	**p-v**	**β**	**p-v**	**β**	**p-v**	**β**	**p-v**	**β**	**p-v**
(Constant)	3.106	.000	.601	.001	.004	.986	-1.084	.010	-.610	.176	-.121	.802	-1.051	.061
Firm Age	.118	.043	.009	.817	.007	.844	.010	.773	.001	.973	.002	.962	.000	.990
Firm Size	.154	.041	.045	.349	.048	.305	.020	.668	.032	.489	.028	.542	.021	.636
Inventory management			.152	.004	.150	.004	.511	.000	.575	.000	.738	.000	.543	.000
Strategic sourcing			.173	.001	.181	.000	.184	.000	.004	.961	.000	.996	-.044	.597
Adoption of technology			.232	.001	.235	.001	.248	.000	.242	.000	-.021	.862	-.149	.230
Logistic cost			.300	.000	.272	.000	.257	.000	.241	.000	.216	.000	.875	.000
Information sharing					.181	.000	.507	.000	.374	.003	.240	.073	.503	.001
Z × Inventory management							-.103	.002	-.124	.000	-.168	.000	-.115	.005
Z × Strategic sourcing									.059	.010	.053	.019	.060	.007
Z × Adoption of technology											.087	.009	.128	.000
Z × Logistic cost													-.182	.002
R^2	.055		.621		.643		.658		.668		.678		.691	
ΔR^2	.055		.566		.022		.015		.010		.010		.014	
F	6.749		61.96		58.10		54.04		50.03		46.90		45.21	

* . significant at the 0.05 level (2-tailed) **Source: Field Data (2025)**

4.11 Hypotheses Testing

For each hypothesis, the regression equation was first obtained using the B coefficients on the line of best of fit. The decision rule was that if the p–value is less than conventional 0.05 the null hypothesis was rejected and when its above 0.05 we fail to reject the null hypothesis. Hypothesis was tested at 5% alpha level of significance.

4.11.1 Hypothesis Testing of Effect of Inventory Management on Competitiveness of Food and Beverage Manufacturing Firms.

Hypothesis H_{01} stated that inventory management has no significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study findings showed that inventory management has a positive and significant effect on competitiveness of food and beverage manufacturing firms (β_1=0.152, $p<0.05$). Basing on the results the null hypothesis is rejected suggesting that inventory management had significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

This finding implies that effective inventory management enhances the competitiveness of food and beverage manufacturing firms by ensuring optimal stock levels, reducing stockouts or overstocking, and improving operational efficiency. Firms that efficiently manage their inventory are better able to meet customer demand promptly, minimize holding costs, and respond flexibly to market changes. Consequently, strong inventory management practices contribute to improved service delivery, cost savings, and a stronger market position among food and beverage manufacturers in Uasin Gishu County.

4.11.2 Hypothesis Testing of Effect of Strategic Sourcing on Competitiveness of Food and Beverage Manufacturing Firms.

Hypothesis H_{02} stated that strategic sourcing has no significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Results showed that strategic sourcing has a positive and significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_2=0.173, p<.05). Basing on the results the null hypothesis is rejected suggesting that strategic sourcing had a significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

This finding suggests that firms engaging in strategic sourcing are better able to select suppliers that provide high-quality inputs, reliable delivery, and cost-effective solutions, which in turn enhances their competitive position. By aligning sourcing decisions with organizational goals and market demands, food and beverage manufacturers can optimize production processes, reduce costs, and improve product quality. Consequently, strategic sourcing acts as a key driver of operational efficiency, customer satisfaction, and overall competitiveness within Uasin Gishu County.

4.11.3 Hypothesis Testing of Effect of Adoption of Technology on Competitiveness of Food and Beverage Manufacturing Firms

Hypothesis H_{03} stated that adoption of technology has no significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study findings indicate that adoption of technology has a positive and significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_3=0.232, p<0.05). Basing on the results the null hypothesis is rejected suggesting that adoption of technology had significant effect on

competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

This finding implies that the use of modern technology in production, operations, and management enhances the competitiveness of food and beverage manufacturers by improving efficiency, accuracy, and speed of service delivery. Technology adoption allows firms to streamline processes, reduce operational costs, and innovate in product development, enabling them to meet customer demands effectively. As a result, firms that integrate technology into their operations are better positioned to gain a competitive edge and achieve sustainable growth in Uasin Gishu County.

4.11.4 Hypothesis Testing of Effect of Logistic Cost on Competitiveness of Food and Beverage Manufacturing Firms

Hypothesis H_{04} stated that logistic cost has no significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study findings indicate that logistic cost has a positive and significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_4=0.300, $p<0.05$). Basing on the results the null hypothesis is rejected suggesting that logistic cost had significant effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

This finding suggests that managing logistic costs effectively by optimizing transportation, warehousing, and distribution expenses can significantly enhance a firm's competitiveness. Lower logistic costs allow firms to price products more competitively, improve delivery efficiency, and maintain consistent product availability. Therefore, efficient logistics management contributes to operational

effectiveness, customer satisfaction, and overall market competitiveness for food and beverage manufacturing firms in Uasin Gishu County.

4.11.5 Hypothesis Testing of Information Sharing on the Relationship Between Inventory Management and Competitiveness of Food and Beverage Manufacturing Firms

Hypothesis H_{05}: Information sharing has no moderating effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Results showed that information sharing has a significant moderating effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_5=0.181, $p<0.05$). Basing on the results the null hypothesis was rejected suggesting that information sharing has a positive significant moderating effect on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

This finding indicates that effective information sharing strengthens the impact of inventory management on competitiveness by ensuring timely and accurate communication across supply chain partners. When firms share critical data regarding stock levels, demand forecasts, and production schedules, they can make informed decisions that reduce stockouts, avoid overstocking, and enhance operational efficiency. Consequently, information sharing acts as a key enabler that amplifies the benefits of inventory management, thereby improving the competitiveness of food and beverage manufacturing firms in Uasin Gishu County.

4.11.6 Hypothesis Testing of Information Sharing on the Relationship Between Inventory Management and Competitiveness of Food and Beverage Manufacturing Firms

Hypothesis H_{06a} stated that information sharing has no significant moderating effect on the relationship between inventory management and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Results showed that information sharing has a significant moderating effect on the relationship between inventory management and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_{6a}=-0.103, $p<0.05$). Basing on the results the null hypothesis was rejected suggesting that information sharing has a negative moderating effect on relationship between inventory management and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

In Figure 4.1, the interaction plot shows mean competitiveness (Y) as a function of inventory management with separate lines for low and high information sharing. Both lines ascend, indicating that firms with better inventory management tend to exhibit higher competitiveness regardless of information-sharing level. Notably, the line for high information sharing is steeper and reaches a higher mean at the “high inventory management” end, while the two lines are nearly coincident at the “low inventory management” end. Visually, this pattern implies an interaction: as inventory management improves, the gain in competitiveness is greater for firms with high information sharing than for those with low information sharing, suggesting that information sharing strengthens the positive association between inventory management and competitiveness.

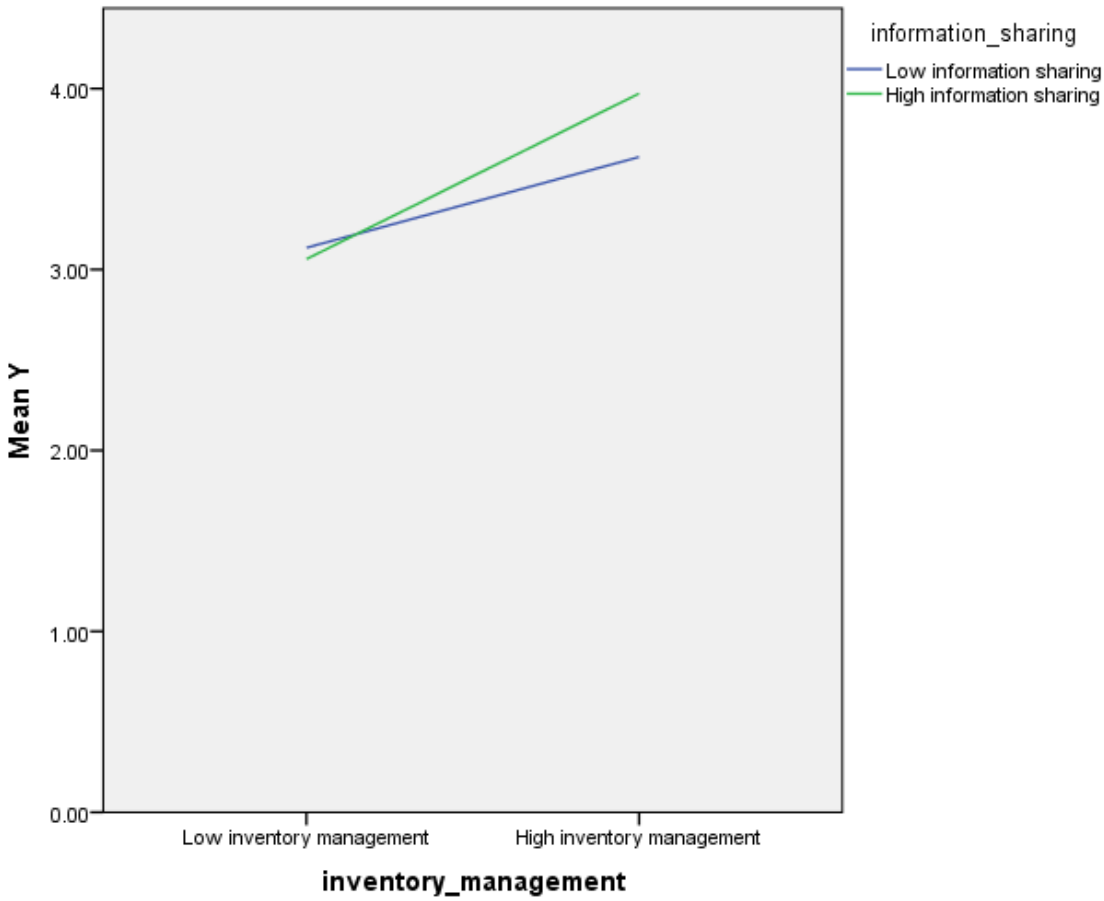

Figure 4.1 Information Sharing on the Relationship Between Inventory Management and Competitiveness of Food and Beverage Manufacturing Firms

4.11.7 Hypothesis Testing of Information Sharing on the Relationship Between Strategic Sourcing and Competitiveness of Food and Beverage Manufacturing Firms

Hypothesis H_{06b} stated that information sharing has no significant moderating effect on the relationship between strategic sourcing and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Results showed that information sharing has a positive significant moderating effect on the relationship between strategic sourcing and competitiveness of food and beverage manufacturing

firms in Uasin Gishu County, Kenya (β_{6b}=0.059, p<0.05). Basing on the results the null hypothesis was rejected suggesting that information sharing has a positive significant moderating effect on relationship between strategic sourcing and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

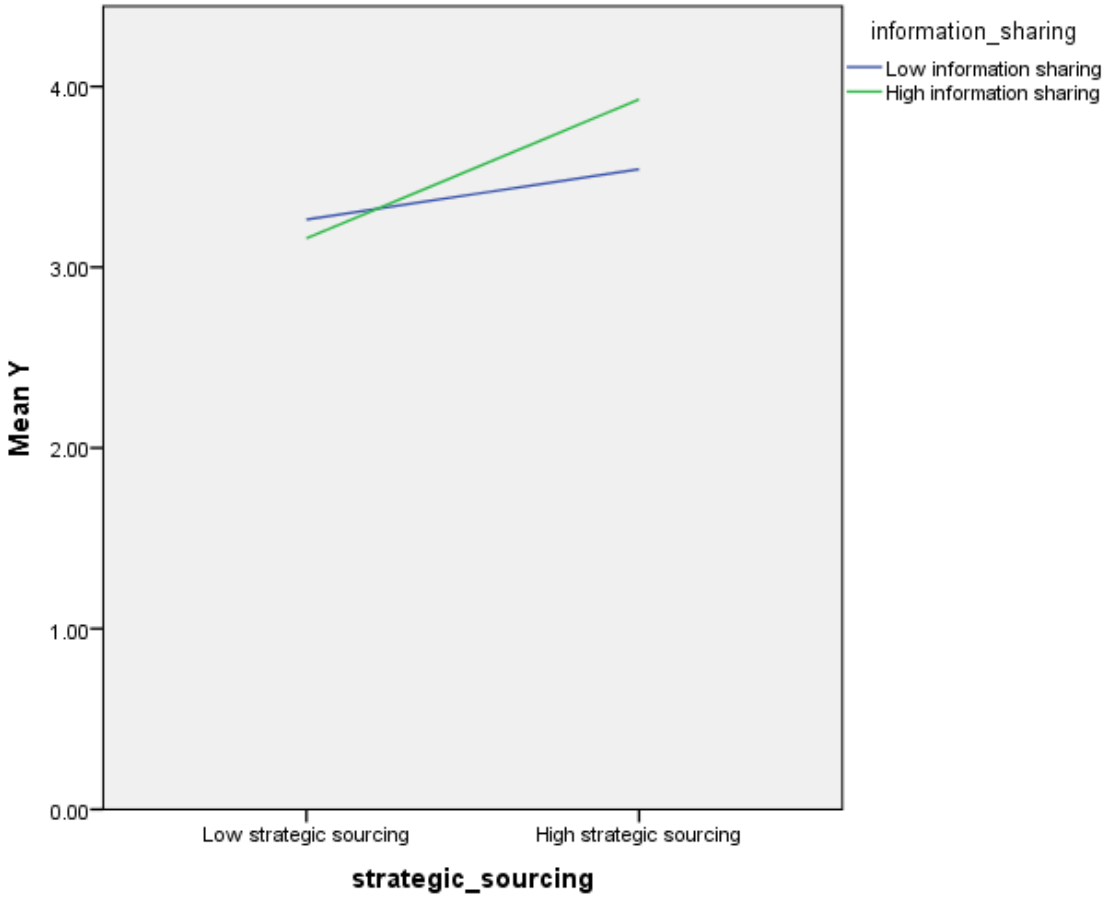

Figure 4.2 Information Sharing on the Relationship Between Strategic Sourcing and Competitiveness of Food and Beverage Manufacturing Firms

In Figure 4.2, the interaction plot depicts mean competitiveness (Y) across levels of strategic sourcing, with separate lines for low and high information sharing. Both lines ascend, indicating that greater strategic sourcing is associated with higher competitiveness regardless of information-sharing level. However, the line for high

information sharing is visibly steeper and attains a higher mean at the “high strategic sourcing” end, while the two lines are close at the “low strategic sourcing” end. This non-parallel pattern visually suggests a positive moderating effect: improvements in strategic sourcing yield larger gains in competitiveness when information sharing is high than when it is low.

4.11.8 Hypothesis Testing of Information Sharing on the Relationship Between Adoption of Technology and Competitiveness of Food and Beverage Manufacturing Firms

Hypothesis H_{06c} stated that information sharing has no significant moderating effect on the relationship between adoption of technology and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Results showed that information sharing has a positive and significant moderating effect on the relationship between adoption of technology and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_{6c}=0.087, $p<0.05$). Basing on the results the null hypothesis is rejected suggesting that information sharing has a positive significant moderating effect on relationship between adoption of technology and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

In Figure 4.3, the interaction plot depicts mean competitiveness (Y) across levels of technology adoption with separate lines for low and high information sharing. Both lines trend upward, indicating that higher technology adoption is associated with greater competitiveness overall. Notably, the lines cross: at low adoption, the high–information-sharing group begins slightly below the low–information-sharing group, but as adoption increases the high–information-sharing line rises more steeply and

ends higher. This non-parallel, crossing pattern visually indicates an interaction in which information sharing strengthens the positive association between technology adoption and competitiveness—firms reap larger competitiveness gains from adopting technology when information sharing is high.

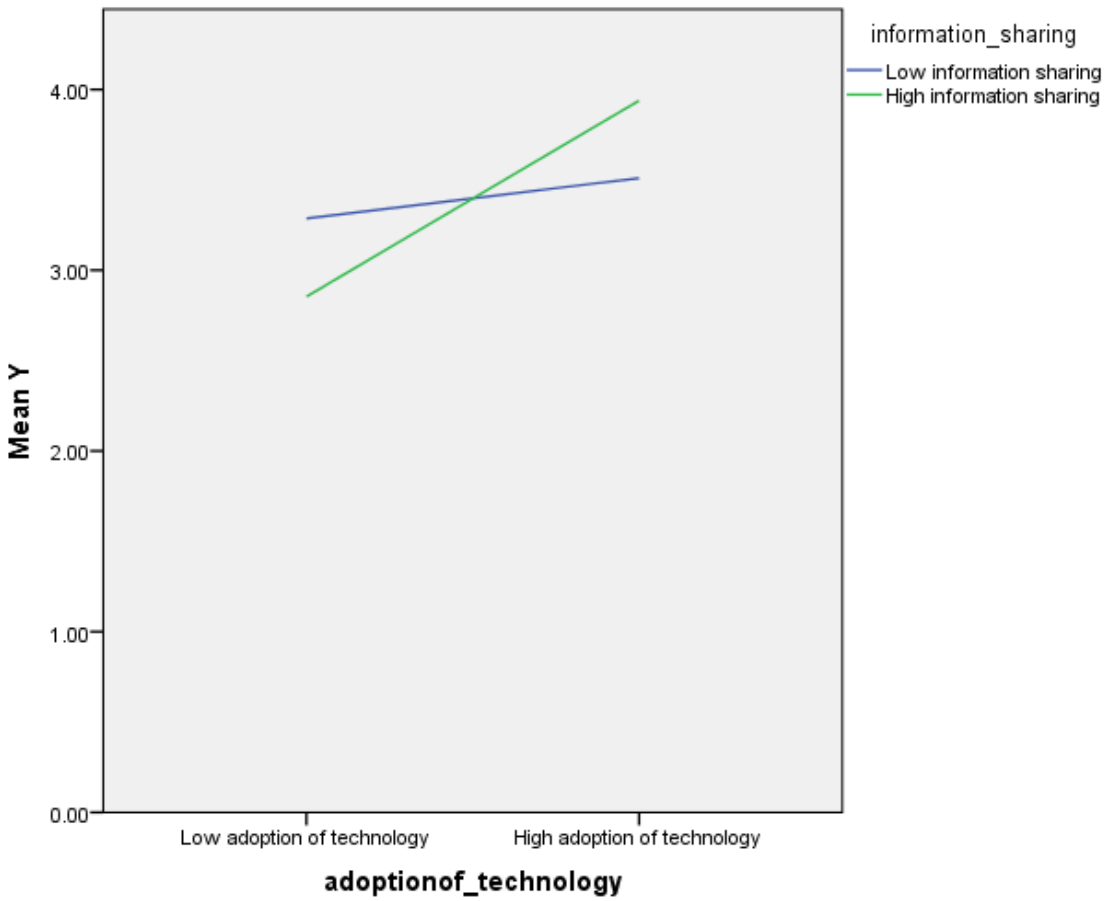

Figure 4.3 Information Sharing on the Relationship Between Adoption of Technology and Competitiveness of Food and Beverage Manufacturing Firms

4.11.9 Hypothesis Testing of Information Sharing on the Relationship Between Logistic Cost and Competitiveness of Food and Beverage Manufacturing Firms.

Hypothesis H_{06d} stated that information sharing has no significant moderating effect on the relationship between logistic cost and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Results showed that information

sharing has a negative and significant moderating effect on the relationship between logistic cost and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya (β_{6d}=-0.182, $p<0.05$). Basing on the results the null hypothesis is rejected suggesting that information sharing has a negative significant moderating effect on relationship between logistic cost and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

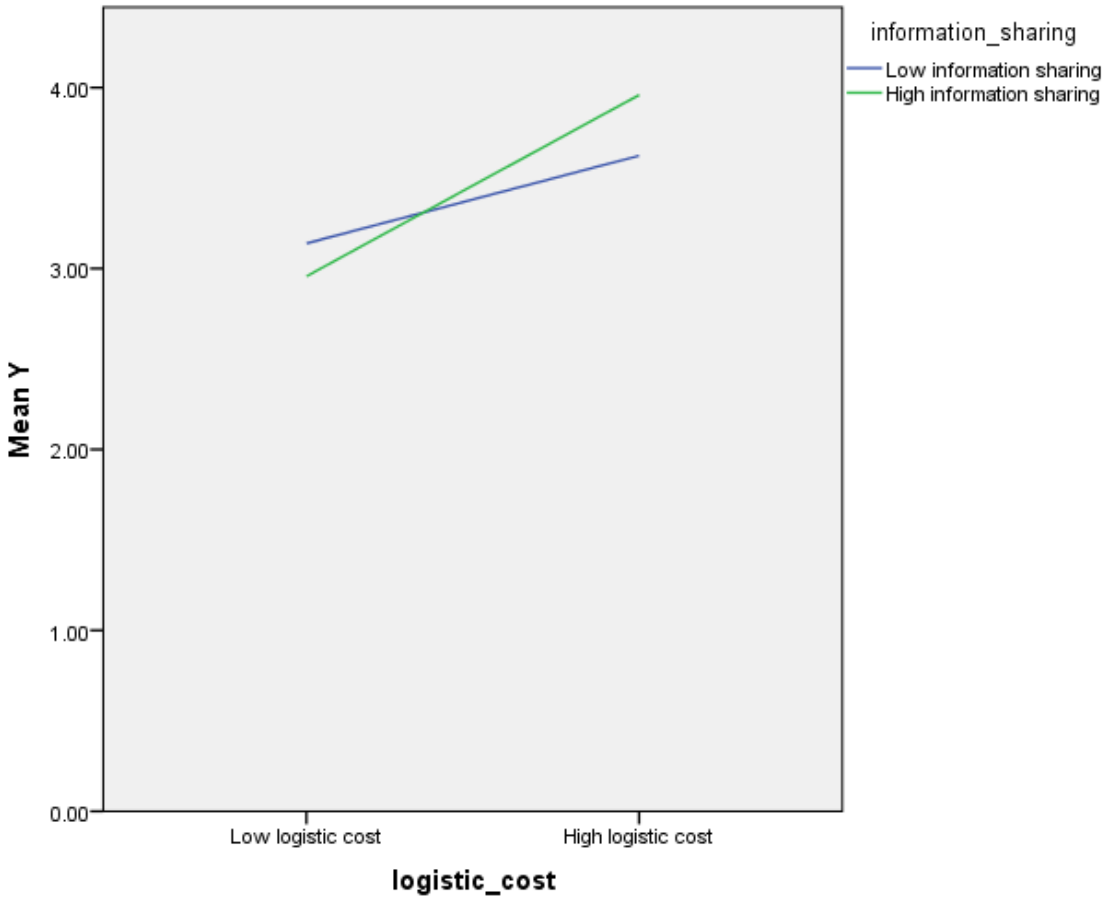

Figure 4.4 Information Sharing on the Relationship Between Logistic Cost and Competitiveness of Food and Beverage Manufacturing Firms

The interaction plot displays mean competitiveness (Y) across low versus high logistic cost, with separate lines for low and high information sharing. Both lines rise from left to right, indicating that higher logistic cost is associated with higher

competitiveness in both groups. The line for high information sharing is noticeably steeper and ends higher, while the two lines are close and even nearly intersect at the low-cost end. This non-parallel, diverging pattern visually indicates an interaction: as logistic cost increases, the gain in competitiveness is larger when information sharing is high than when it is low, suggesting that information sharing strengthens the positive association between logistic cost and competitiveness.

Table 4.26 Summary of Hypotheses Test Results

Hypotheses	β and P values	Decision rule
H_{01}: Inventory management has no significant effect on competitiveness of food and beverage	β_1= .152, p=0.004<0.05	Rejected the null hypothesis
H_{02}: Strategic sourcing has no significant effect on competitiveness of food and beverage	β_2=.173, p=0.001<0.05	Rejected the null hypothesis
H_{03}: Adoption of technology has no significant effect on competitiveness of food and beverage	β_3=.232, p=0.001<0.05	Rejected the null hypothesis
H_{04} Logistic cost has no significant effect on competitiveness of food and beverage	β_4=.300, p=0.000<0.05	Rejected the null hypothesis
H_{05}: Information sharing has no moderating effect on competitiveness of food and beverage	β_5=.181, p=0.000<0.05	
H_{06a}: Information sharing has no significant moderating effect on the relationship between inventory management and competitiveness of food and beverage	β_{6a} =-.103, p=0.002<0.05	Rejected the null hypothesis
H_{06b}: Information sharing has no significant moderating effect on the relationship between strategic sourcing and competitiveness of food and beverage	B_{6b} =0.059, p=0.010<0.05	Rejected the null hypothesis
H_{06c}: Information sharing has no significant moderating effect on the relationship between adoption of technology and competitiveness of food and beverage	β_{6c} = 0.087, p=0.009<0.05	Rejected the null hypothesis
H_{06d}: Information sharing has no significant moderating effect on the relationship between logistic cost and competitiveness of food and beverage	β_{6d} =-0.182, p=0.002<0.05	Rejected the null hypothesis

Source: Field Data (2025)

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary, conclusions and recommendations of the study results.

5.2 Summary of the Findings

The following section presents the summary of the findings as per the objectives.

5.2.1 Inventory Management on Competitiveness of Food and Beverage Manufacturing Firms

The first specific objective of the study was to determine the effect of inventory management on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study findings indicates that majority of the respondent agreed that higher inventory turnover rate leads to increased competitiveness of the firm and also, they agreed that improved order fulfilment rate positively impacts the firm's competitiveness. Findings also indicate that maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness and also, they agreed that efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage.

Further, the study results also reveals that timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness and also, they agreed that consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm and finally they agreed that effective inventory management, encompassing inventory turnover rate, order fulfilment rate, and inventory accuracy, is essential for maintaining a competitive edge in the market.

5.2.2 Strategic Sourcing on Competitiveness of Food and Beverage Manufacturing Firms

The second objective of the study was to establish the effect of strategic sourcing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study findings indicate that majority of the respondent agreed that the use of clearly defined criteria for supplier selection (quality, price, reliability) enhances the competitive advantage of Kenyan food and beverage manufacturers and also, they agreed that collaborative relationships with key suppliers, characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms.

Further, the study findings also reveal that efficient contract management practices (clear terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers and also, they agreed that focusing solely on the lowest price during supplier selection weakens the competitive advantage of Kenyan food and beverage companies in the long run.

Finally, they agreed that increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports and also, they agreed that utilizing technology (e-procurement platforms) to streamline contract management processes enhances the responsiveness and competitiveness of Kenyan food and beverage firms and finally they agreed that the ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies.

5.2.3 Adoption of Technology on Competitiveness of Food and Beverage Manufacturing Firms

The third objective of the study was to determine the effect of adoption of technology on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study findings indicate that majority of the respondent agreed that the level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market and also, they agreed that the speed at which a firm implements new technologies effects its competitive advantage in Kenya.

Additionally, the respondent agreed that the effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya and also, they agreed that a firm’s competitiveness in Kenya is more affected by the level of technology investment than the implementation rate. The study results also indicates that effective employee training on new technologies can compensate for a slower implementation rate in Kenya and also they agreed that in Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional and finally they agreed that the ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training.

5.2.4 Logistic Cost on Competitiveness of Food and Beverage Manufacturing Firms

The fourth objective of the study was to establish the effect of logistic cost on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study results indicate that majority of the respondent agreed that higher

inventory carrying costs significantly reduce a firm's ability to compete on price and also, they agreed that efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times.

The study findings also reveals that the respondent agreed that effectively managing reverse logistics costs (for example, returns, product recalls) enhances customer satisfaction and brand loyalty, ultimately boosting competitiveness and also, they agreed that firms with lower overall logistics costs, including inventory carrying, order processing and reverse logistics, are more likely to achieve higher profit margins and also they agreed that in today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs. Findings also reveals that the respondent agreed that implementing efficient reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness and finally they agreed that the impact of reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type.

5.2.5 Information Sharing on Competitiveness of Food and Beverage Manufacturing Firms

The study also sought to determine the effect of information sharing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. The study results indicate that the respondent agreed that frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency and also, they agreed that timely information sharing with our suppliers and customers enables us to better respond to changes in market demand.

The study findings also reveal that collaborative planning with our supply chain partners helps us to better coordinate production and inventory levels and also, they

agreed that frequent information exchange with our supply chain partners reduces the risk of product shortages or surpluses. Further, they agreed that timely information sharing with our customers allows us to better tailor our product offerings to their needs and also, they agreed that collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies and finally majority of the respondent agreed that frequent, timely and collaborative information sharing with our supply chain partners leads to overall improvements in our firm's financial performance.

5.3 Conclusions

The study concludes that effective inventory management greatly contributes to the increase in competitiveness among food and beverage manufacturing firms in Uasin Gishu County. Higher inventory turnover, reliable inventory records, and faster order fulfilment increase the level of competitiveness among food and beverage manufacturing firms. Appropriate inventory management ensures adequate stock, reduces waste, and allows prompt delivery of goods to clients. These measures help a company gain a competitive edge. Efficient inventory management enables companies to effectively meet fluctuating market requirements and thus outperform their less organized rivals.

Strategic sourcing plays a significant role in shaping the level of competitiveness experienced by food and beverage manufacturing firms. In particular, implementing careful standards such as value, quality, and dependability can contribute to greater competitiveness in the market. Collaboration with suppliers and the deployment of technology for contract management were found to increase the firm’s competitive advantage. Establishing enduring relationships with suppliers allows firms to access

novel ideas, heighten their responsiveness to changes, and maintain a stable supply, which ultimately promotes their long-term competitiveness.

it's also noted in the research that applying technology has a substantial influence on the competitiveness of food and beverage manufacturers. Respondents indicated that dedicating significant resources to technology, adopting new systems quickly and providing employees with thorough training results in a marked improvement in a company's competitive position. How much employees are able to use new technologies efficiently plays a vital role in determining whether the adoption of technology positively impacts a company's competitiveness. The most effective approach for improving competitiveness is to invest heavily, implement new technology quickly and provide employees with thorough training.

The study additionally concludes that logistics costs play an important role in determining the competitiveness of food and beverage manufacturing firms. Findings indicate that high inventory carrying costs reduce a firm's price competitiveness, while efficient order processing enhances delivery times and customer satisfaction. Effective management of reverse logistics, such as product returns and recalls, also boosts brand loyalty and operational efficiency. However, the study also observed that if not managed properly, reverse logistics can become a cost burden and hinder a firm's competitiveness. Therefore, firms must strike a balance between managing logistics costs and maintaining service quality to stay competitive in the market.

The study finally concludes that information sharing has a positive influence on the competitiveness of food and beverage manufacturing firms. Frequent and timely communication with suppliers and customers was found to improve operational efficiency and responsiveness to market changes. Collaborative planning and

information exchange reduced the risks of inventory shortages or surpluses and enabled better coordination in production and logistics. Additionally, sharing market insights and customer preferences allowed firms to align their product offerings more closely with consumer needs, resulting in better financial performance. Thus, effective information sharing is a key enabler of strategic decision-making and long-term competitiveness.

5.4 Theoretical Implications of the Study

This study contributes meaningfully to the theoretical understanding of competitiveness within the supply chain and operations management literature. By validating the influence of inventory management, strategic sourcing, technology adoption, and logistics cost on firm competitiveness, the findings reinforce the Resource-Based View (RBV) and Dynamic Capabilities Theory. These frameworks emphasize that a firm's internal capabilities particularly those that are rare, valuable, and difficult to imitate are crucial for sustaining competitive advantage. The study's evidence that operational practices significantly enhance competitiveness lends strong support to this line of thinking. Moreover, the role of information sharing as a moderator expands the theoretical discourse by showing that information flow can either strengthen or weaken the effect of operational strategies, depending on the functional area. This dual nature aligns with Contingency Theory, which posits that organizational outcomes depend on the alignment between strategy and context. For example, while information sharing enhances the benefits of strategic sourcing and technology adoption, it appears to undermine the impact of inventory and logistics practices. These nuanced findings suggest that a one-size-fits-all approach to communication and information transparency may not be optimal. Theoretically, this

study offers a more layered understanding of how coordination and internal capabilities interact to shape competitive outcomes in manufacturing environments.

5.5 Managerial and Policy Implications of the Study

From a managerial perspective, the study provides several actionable insights. First, the findings suggest that managers should prioritize enhancing inventory and logistics capabilities, as these have the strongest direct influence on competitiveness. Adopting lean inventory systems, real-time tracking technologies, and efficient delivery methods can offer measurable performance gains. Secondly, the moderating role of information sharing requires that managers implement targeted communication strategies. While sharing information widely can improve decision-making in sourcing and technology use, excessive information flow may hinder inventory responsiveness or logistical agility. Thus, managers should balance transparency with process efficiency by tailoring information flow based on specific operational needs. Thirdly, given that firm size and age lose significance in the final model, organizational leaders should focus more on improving internal processes and capabilities rather than relying on structural characteristics to drive competitiveness.

On the policy front, the study highlights several areas for governmental and regulatory intervention. Policymakers are encouraged to design programs that support digital transformation in the food and beverage sector, particularly for small and medium-sized enterprises (SMEs). This could take the form of tax incentives, grants, or subsidized training programs aimed at inventory management, logistics optimization, and technology adoption. Moreover, policy frameworks should encourage local sourcing and supplier development to increase domestic supply chain resilience. There is also a need for national standards in inventory and supplier

management to promote best practices and ensure consistency across the industry. Capacity-building programs focusing on supply chain optimization and digital literacy would further enhance sector-wide competitiveness.

5.6 Practical Implications of the Study

The study's practical implications are significant for firms seeking to enhance their market position through operational excellence. The results indicate that firms should invest in modern inventory systems such as barcode scanners, demand forecasting software, and Just-in-Time (JIT) production models. These tools help firms maintain stock accuracy, reduce excess inventory, and respond quickly to customer demands. In strategic sourcing, the development of long-term partnerships with reliable suppliers can promote innovation, cost-efficiency, and improved supply chain responsiveness. The implementation of electronic procurement systems and automated contract management platforms can further streamline sourcing operations.

Technology adoption emerges as another critical area of focus. To fully benefit from new technologies, firms must not only acquire them but also ensure their proper implementation through employee training and change management initiatives. The benefits of such technologies are magnified when paired with robust information-sharing practices that promote cross-functional alignment and real-time decision-making. However, the findings also caution that information sharing must be selectively applied. In areas such as inventory management and logistics, excessive information flow can introduce inefficiencies or reduce flexibility. Therefore, firms must adopt a tailored approach that enhances coordination without overcomplicating operational workflows.

5.7 Recommendations of the Study

Drawing from the study's comprehensive regression analysis and hypothesis testing, several key recommendations can be made. First, firms should enhance their inventory management systems by integrating advanced tools and practices such as regular audits, forecasting, and lean inventory strategies. These practices improve service delivery and operational control. Second, firms should strengthen their sourcing functions by fostering strategic relationships with key suppliers. Emphasis should be placed not solely on cost, but also on quality, reliability, and the capacity for long-term collaboration. Third, technology should be adopted strategically, ensuring that its implementation is supported by thorough training and aligned with broader business goals.

Moreover, companies must develop well-defined information-sharing policies that facilitate strategic alignment without burdening operations. Instead of adopting an all-inclusive information approach, firms should identify areas where transparency adds the most value such as sourcing and technology and limit excessive coordination in areas like inventory or logistics where it might hinder efficiency. Lastly, regular evaluations of supply chain performance should be institutionalized. These reviews can help managers detect inefficiencies and recalibrate strategies using data-driven insights, ultimately leading to sustained competitiveness and improved customer satisfaction.

5.8 Suggestions for Further Studies

Future research can build on this study in several directions. One potential avenue is to expand the geographic scope to include other counties or regions in Kenya. Such comparative analyses could uncover whether regional infrastructure, regulatory

environments, or market dynamics influence the impact of supply chain practices on competitiveness. Additionally, this model can be tested in other manufacturing sectors such as pharmaceuticals, textiles, or automotive to explore how different industries prioritize and benefit from operational and strategic capabilities.

Further studies could also investigate the influence of macroeconomic and policy factors on supply chain effectiveness. Understanding how government incentives, tax structures, trade regulations, or customs procedures affect firm performance would provide valuable insights for both policymakers and industry stakeholders. Lastly, future research could adopt longitudinal or qualitative methodologies. Longitudinal studies would help assess how the effects of information sharing and operational practices evolve over time, while qualitative methods such as interviews or case studies could offer deeper context and uncover organizational behaviors that quantitative methods might overlook. Such explorations would enrich the existing body of knowledge and offer more holistic strategies for enhancing competitiveness in dynamic market environments.

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APPENDICES

APPENDIX I: RESEARCH QUESTIONNAIRE

INSTRUCTIONS:

This questionnaire consists of part A to E. First section deals with biographic questions intended to give respondent's detail. While section B, C, D and E is based on the objectives of research titled: moderating effect of information sharing on the relationship between supply chain cost optimization and competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya.

Please Tick √ as appropriate

PART A: BIOGRAPHIC INFORMATION

1. Please indicate your Gender

Male [ ] Female [ ]

2. Please indicate your age bracket

Below 30 year [ ] 30 – 39years [ ] 40 – 49 years [ ] 50 – 59 years [ ] Above 60 years

3. Please indicate your highest level of education

Diploma [] Bachelor [] Masters [] Doctorate [] Other (Please specify) _____

4. How long have you been working in the food and beverage manufacturing firms?

Less than 2 years [ ] 3 – 5 years [ ] 6 – 9 years [ ] 10 years and above [ ]

5. How long has the firm been in business?

Below 5 years [ ] 6 –10 years [ ] 11 – 15 years [ ] Above 15 years [ ]

6. What is the number of employees in this firm?

[ ] Below 50 [ ] 51-100 [ ] Above 100

PART B: Inventory Management on Competitiveness of Food and Beverage Manufacturing Firms

Kindly indicate to what extent you agree with the following statements on effect of inventory management on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Using the following scale, please tick the one that best describes your opinion. **(1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree)**

Statements	**5**	**4**	**3**	**2**	**1**
8. Higher inventory turnover rate leads to increased competitiveness of the firm.					
9. Improved order fulfilment rate positively impacts the firm's competitiveness.					
10. Maintaining high inventory accuracy is crucial for enhancing the firm's competitiveness.					
11. Efficient inventory management, as measured by inventory turnover rate, is a key driver of the firm's competitive advantage.					
12. Timely and accurate order fulfilment is a significant factor in determining the firm's competitiveness.					
13. Consistent and reliable inventory accuracy contributes to the overall competitiveness of the firm.					
14. Effective inventory management, encompassing inventory turnover rate, order fulfilment rate, and inventory accuracy, is essential for maintaining a competitive edge in the market.					

PART C: Strategic Sourcing and Competitiveness of Food and Beverage Manufacturing Firms

Kindly indicate to what extent you agree with the following statements on effect of strategic sourcing on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya. Using the following scale, please tick the one that best describes your opinion. **(1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree)**

Statements	**5**	**4**	**3**	**2**	**1**
1. The use of clearly defined criteria for supplier selection (quality, price, reliability) enhances the competitive advantage of Kenyan food and beverage manufacturers.					
2. Collaborative relationships with key suppliers, characterized by open communication and information sharing, contribute to the competitiveness of Kenyan food and beverage firms.					
3. Efficient contract management practices (clear terms, timely communication, performance monitoring) improve the competitive position of Kenyan food and beverage manufacturers.					
4. Focusing solely on the lowest price during supplier selection weakens the competitive advantage of Kenyan food and beverage companies in the long run.					
5. Increased collaboration with local suppliers of raw materials strengthens the competitiveness of Kenyan food and beverage manufacturers compared to relying solely on imports.					
6. Utilizing technology (e-procurement platforms) to streamline contract management processes enhances the responsiveness and competitiveness of Kenyan food and beverage firms.					
7. The ability to develop long-term partnerships with reliable suppliers fosters innovation and product development, ultimately leading to a competitive advantage for Kenyan food and beverage companies.					

Part E: Adoption of Technology on Competitiveness of Food and Beverage Manufacturing Firms

Kindly indicate to what extent you agree with the following statements on effect of adoption of technology on competitiveness of food and beverage manufacturing firms

in Uasin Gishu County, Kenya. Using the following scale, please tick the one that best describes your opinion. **(1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree)**

Statements	**5**	**4**	**3**	**2**	**1**
8. The level of a firm's investment in technology significantly impacts its competitiveness in the Kenyan market.					
9. The speed at which a firm implements new technologies effects its competitive advantage in Kenya.					
10. The effectiveness of employee training programs on new technologies directly affects a firm's competitiveness in Kenya.					
11. A firm's competitiveness in Kenya is more affectd by the level of technology investment than the implementation rate.					
12. Effective employee training on new technologies can compensate for a slower implementation rate in Kenya.					
13. In Kenya, firms with a high rate of technology implementation but lower investment may still achieve competitiveness if employee training is exceptional.					
14. The ideal scenario for maximizing competitiveness in Kenya involves a high level of technology investment coupled with a rapid implementation rate and comprehensive employee training.					

PART F: Logistic Cost on Competitiveness of Food and Beverage Manufacturing Firms

Kindly indicate to what extent you agree with the following statements on effect of logistic cost on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya **.** Using the following scale, please tick the one that best describes your opinion. **(1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree)**

Statement	**5**	**4**	**3**	**2**	**1**
8. Higher inventory carrying costs significantly reduce a firm's ability to compete on price.					
9. Efficient order processing systems that minimize costs lead to a competitive advantage in terms of faster delivery times.					
10. Effectively managing reverse logistics costs (for example, returns, product recalls) enhances customer satisfaction and brand loyalty, ultimately boosting competitiveness.					
11. Firms with lower overall logistics costs, including inventory carrying, order processing, and reverse logistics, are more likely to achieve higher profit margins.					
12. In today's competitive market, minimizing order processing costs is more important than minimizing inventory carrying costs.					
13. Implementing efficient reverse logistics practices can be a cost burden for firms, ultimately hindering their competitiveness.					
14. The impact of reverse logistics costs on a firm's competitiveness depends heavily on the industry and product type.					

PART G: Information Sharing

Kindly indicate to what extent you agree with the following statements on information sharing**.** Using the following scale, please tick the one that best describes your opinion. **(1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree)**

Statement	**5**	**4**	**3**	**2**	**1**
8. Frequent information exchange between our firm and our supply chain partners leads to improved operational efficiency.					
9. Timely information sharing with our suppliers and customers enables us to better respond to changes in market demand.					
10. Collaborative planning with our supply chain partners helps us to better coordinate production and inventory levels.					
11. Frequent information exchange with our supply chain partners reduces the risk of product shortages or surpluses.					
12. Timely information sharing with our customers allows us to better tailor our product offerings to their needs.					
13. Collaborative planning with our supply chain partners helps us to develop more efficient distribution and logistics strategies.					
14. Frequent, timely, and collaborative information sharing with our supply chain partners leads to overall improvements in our firm's financial performance.					

PART G: Competitiveness of Food and Beverage Manufacturing Firms

Kindly indicate to what extent you agree with the following statements on competitiveness of food and beverage manufacturing firms in Uasin Gishu County, Kenya **.** Using the following scale, please tick the one that best describes your opinion. **(1=Strongly Disagree, 2= Disagree, 3=Neutral, 4= Agree, 5=Strongly Agree)**

Statement	**5**	**4**	**3**	**2**	**1**
8. A food and beverage company with a larger market share is inherently more competitive.					
9. A food and beverage company with higher profitability is a stronger competitor in the market.					
10. A food and beverage company that can produce goods at a lower cost is more competitive.					
11. A highly profitable company, even with a lower market share, can be competitive in the long run.					
12. A company with a large market share, but lower profitability due to inefficiency, may not be truly competitive.					
13. In some food and beverage sectors, brand recognition and product innovation can be more important for competitiveness than pure market share.					
14. While cost efficiency is crucial, maintaining high-quality standards is equally important for long-term competitiveness in the food and beverage industry.					

APPENDIX II: UNIVERSITY PERMISSION LETTER

University of Eldoret

P. O. Box 1125 - 30100, Eldoret, Kenya
Tel: +254 53 2063257 /2033712/13 Ext. 2352/3
Mob: 0736 493555; Fax: +254 53 206 3257
E-mail: hodbbusinessmgt@uoeld.ac.ke
Website: www.uoeld.ac.ke

OFFICE OF THE DEPUTY VICE CHANCELLOR (ASA)
SCHOOL OF BUSINESS, ECONOMICS AND MANAGEMENT SCIENCES
DEPARTMENT OF BUSINESS MANAGEMENT

THE EXECUTIVE SECRETARY, **DATE**: 14th FEBRUARY, 2025

NATIONAL COUNCIL FOR SCIENCE TECHNOLOGY & INNOVATION

P.O BOX 30623 – 00100,

NAIROBI.

Dear Sir/Madam,

SUBJECT: REQUEST FOR NACOSTI LICENSE –MISS RACHEL JEROTICH KIPTOO SBUS/BBM/M/011/21

Reference is made to the above named who is applying to the National Commission for Science Technology and Innovation for a Research permit.

Miss Rachel is a student at University of Eldoret undertaking a Master Degree in Business Management in the School of Business, Economics and Management Science. She has completed presenting her research proposal titled "*Supply Chain Cost Optimization, Information Sharing and Competitiveness of Food and Beverage Manufacturing Firms in Uasin Gishu County, Kenya*''

Any assistance accorded to her will be highly appreciated.

Thank you

HOD
Business Management
Dept.
UNIVERSITY OF ELDORET

DR. EMMANUEL TANUI
HEAD, DEPARTMENT OF BUSINESS MANAGEMENT
CC.DEAN, SCHOOL OF BUSINESS, ECONOMICS AND MANAGEMENT SCIENCE

APPENDIX III: NACOSTI LETTER

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 923376

Date of Issue: 08/April/2025

RESEARCH LICENSE

This is to Certify that Miss.. RACHEL KIPTOO of University of Eldoret, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Uasin-Gishu on the topic: SUPPLY CHAIN COST OPTIMIZATION, INFORMATION SHARING AND COMPETITIVENESS OF FOOD AND BEVERAGE MANUFACTURING FIRMS IN UASIN GISHU COUNTY, KENYA for the period ending : 08/April/2026.

License No: NACOSTI/P/25/418061

923376

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

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THE SCIENCE, TECHNOLOGY AND INNOVATION ACT, 2013 (Rev. 2014)
Legal Notice No. 108: The Science, Technology and Innovation (Research Licensing) Regulations, 2014

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

CONDITIONS OF THE RESEARCH LICENSE

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

National Commission for Science, Technology and Innovation(NACOSTI).
Off Waiyaki Way, Upper Kabete.
P. O. Box 30623 - 00100 Nairobi, KENYA
Telephone: 020 4007000, 0713788787, 0735404245
E-mail: dg@nacosti.go.ke
Website: www.nacosti.go.ke

APPENDIX IV: FOOD AND BEVERAGE MANUFACTURING FIRMS

1. Brian Kipkemboi
2. Chengo Limited
3. Coffee Bean
4. Eagles Tea Trade Africa Limited
5. Great Rift Coffee
6. Jossy Production
7. Kabunyeria Fcs
8. Kenco Supplies Agency
9. Latek Supplier's International Limited
10. Muthaiga Farm Fresh
11. Nia Cosmetics Limited
12. Papaya Africa
13. Plantvillage
14. Prayosha Ventures Ltd
15. Robeen Feeds
16. Royal Oil
17. Skyrosa Ltd
18. Spanex Limited
19. Tamuuji Enterprises
20. Tibralink Limited
21. Westrade
22. Whitestone Engineering Ltd.

Source: Uasin Gishu County Ministry of Industrialization, Trade and Enterprise Development, (2024)

APPENDIX V: SPSS OUTPUT

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.235[a]	.055	.047	.93101	.055	6.749	2	231	.001
2	.788[b]	.621	.611	.59492	.566	84.678	4	227	.000
3	.802[c]	.643	.632	.57874	.022	13.870	1	226	.000
4	.811[d]	.658	.646	.56780	.015	9.799	1	225	.002
5	.817[e]	.668	.654	.56064	.010	6.777	1	224	.010
6	.823[f]	.678	.663	.55340	.010	6.903	1	223	.009
7	.831[g]	.691	.676	.54279	.014	9.801	1	222	.002

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	11.700	2	5.850	6.749	.001[b]
	Residual	200.225	231	.867		
	Total	211.925	233			
2	Regression	131.582	6	21.930	61.961	.000[c]
	Residual	80.343	227	.354		
	Total	211.925	233			
3	Regression	136.227	7	19.461	58.102	.000[d]
	Residual	75.698	226	.335		
	Total	211.925	233			
4	Regression	139.386	8	17.423	54.044	.000[e]
	Residual	72.538	225	.322		
	Total	211.925	233			
5	Regression	141.517	9	15.724	50.025	.000[f]
	Residual	70.408	224	.314		
	Total	211.925	233			
6	Regression	143.631	10	14.363	46.900	.000[g]
	Residual	68.294	223	.306		
	Total	211.925	233			
7	Regression	146.518	11	13.320	45.210	.000[h]
	Residual	65.407	222	.295		
	Total	211.925	233			

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.106	.165		18.841	.000
	Firm_Age	.118	.058	.141	2.039	.043
	Firm_Size	.154	.075	.142	2.058	.041
2	(Constant)	.601	.175		3.437	.001
	Firm_Age	.009	.038	.010	.231	.817
	Firm_Size	.045	.048	.042	.939	.349
	X1	.152	.052	.178	2.898	.004
	X2	.173	.051	.187	3.409	.001
	X3	.232	.069	.227	3.383	.001
	X4	.300	.061	.312	4.904	.000
3	(Constant)	.004	.234		.017	.986
	Firm_Age	.007	.037	.009	.197	.844
	Firm_Size	.048	.047	.045	1.029	.305
	X1	.150	.051	.176	2.951	.004
	X2	.181	.049	.195	3.658	.000
	X3	.235	.067	.229	3.512	.001
	X4	.272	.060	.283	4.526	.000
	Z	.181	.049	.150	3.724	.000
4	(Constant)	-1.084	.416		-2.603	.010
	Firm_Age	.010	.036	.012	.289	.773
	Firm_Size	.020	.047	.019	.429	.668
	X1	.511	.126	.600	4.068	.000
	X2	.184	.048	.199	3.789	.000

	X3	.248	.066	.242	3.773	.000
	X4	.257	.059	.267	4.349	.000
	Z	.507	.115	.421	4.427	.000
	ZX1	-.103	.033	-.537	-3.130	.002
	(Constant)	-.610	.449		-1.357	.176
	Firm_Age	.001	.036	.001	.034	.973
	Firm_Size	.032	.047	.030	.693	.489
	X1	.575	.126	.675	4.546	.000
	X2	.004	.084	.004	.050	.961
5	X3	.242	.065	.237	3.735	.000
	X4	.241	.059	.250	4.098	.000
	Z	.374	.124	.310	3.009	.003
	ZX1	-.124	.033	-.646	-3.701	.000
	ZX2	.059	.023	.298	2.603	.010
	(Constant)	-.121	.481		-.250	.802
	Firm_Age	.002	.035	.002	.048	.962
	Firm_Size	.028	.046	.026	.611	.542
	X1	.738	.139	.866	5.294	.000
	X2	.000	.083	.000	-.005	.996
6	X3	-.021	.119	-.020	-.173	.862
	X4	.216	.059	.225	3.678	.000
	Z	.240	.133	.199	1.804	.073
	ZX1	-.168	.037	-.880	-4.538	.000
	ZX2	.053	.022	.268	2.360	.019
	ZX3	.087	.033	.415	2.627	.009
7	(Constant)	-1.051	.558		-1.884	.061

Firm_Age	.000	.034	-.001	-.013	.990
Firm_Size	.021	.045	.020	.474	.636
X1	.543	.150	.637	3.612	.000
X2	-.044	.082	-.047	-.529	.597
X3	-.149	.123	-.145	-1.203	.230
X4	.875	.218	.910	4.009	.000
Z	.503	.155	.417	3.243	.001
ZX1	-.115	.040	-.600	-2.855	.005
ZX2	.060	.022	.302	2.706	.007
ZX3	.128	.035	.612	3.658	.000
ZX4	-.182	.058	-.916	-3.131	.002

a. Dependent Variable: Y

APPENDIX VI: SIMILARITY REPORT

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