

SUPPLY CHAIN FLEXIBILITY AND PERFORMANCE OF FOOD & BEVERAGE MANUFACTURING FIRMS IN NAIROBI CITY COUNTY, KENYA.

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ABSTRACT

The performance of food and beverage manufacturing firms in Nairobi City County has declined over the past three years despite government efforts to stimulate industrial growth through tax incentives, policy reforms, and infrastructural investments aimed at improving the ease of doing business. This study examined the relationship between supply chain flexibility and the performance of food and beverage manufacturing firms in Nairobi City County, Kenya, with specific focus on supplier flexibility and distribution flexibility. The study adopted a descriptive research design. The target population comprised 476 management staff drawn from 119 food and beverage manufacturing firms in Nairobi City County. The unit of analysis was the firms, while the unit of observation included supply chain management personnel, namely heads of procurement administration, supply chain managers, warehouse managers, and production managers. Using stratified random sampling, a sample of 217 respondents was selected. Primary data were collected using structured questionnaires and analyzed using SPSS. Data analysis involved both descriptive statistics (frequencies, means, and standard deviations) and inferential statistics, including Pearson correlation and linear regression analysis. The findings revealed a positive and statistically significant relationship between supplier flexibility, distribution flexibility, and firm performance. Firms that maintain multiple alternative suppliers and can easily switch suppliers during disruptions tend to experience improved operational efficiency and profit growth. In addition, distribution flexibility, including adaptable transport arrangements and flexible delivery schedules, enhances responsiveness to market demands and improves service delivery. The study concludes that supply chain flexibility plays a critical role in enhancing the performance of food and beverage manufacturing firms. The study recommends that manufacturing firms strengthen supplier collaboration and invest in flexible distribution systems supported by digital technologies to improve supply chain responsiveness and overall organizational performance.

Key Words: Supply Chain Flexibility, Supplier Flexibility, Distribution Flexibility, Firm Performance, Nairobi City County.

Introduction

Supply chain flexibility refers to a supply chain's capacity to adjust efficiently to changes in customer demand, production fluctuations, and supplier disruptions while being cost-effective and providing adequate service levels (Ngatia et al., 2024). According to Kuria and Ndeto (2024), it is a supply chain's ability to adapt its sourcing, logistics, and operations to market conditions and uncertainties in order to maintain efficiency and competitiveness. Supply chain flexibility is the ability of supply chain operations to adjust to changes in both internal and external contexts, like shifts in demand, supplier differences, and unanticipated interruptions (Piprani et al., 2022). It is the degree to which a supply chain can adjust its resources, operations, and decision-making procedures in order to manage ambiguities and maximize performance in erratic market circumstances as argued by (Ketere & Osoro, 2024).

Performance is the ability of manufacturing companies to meet customer needs and regulatory criteria while achieving efficiency, profitability, and sustainability in production, processing, and distribution (Kiiru et al. 2022). It is assessed using operational efficiency, product quality, supply chain responsiveness, and financial metrics like as revenue growth and cost management (Karani, 2022). Okpala and Korzeniowska (2023), claim that performance is evaluated by adherence to food safety regulations, production process innovation, market competitiveness, and the capacity to maintain growth in a changing sector. According to Mwaura (2021), it includes supply chain agility, technology adoption, productivity, and adherence to food safety laws, all of which support long-term company viability and client happiness.

Supply chain flexibility is essential for improving the performance of companies that manufacture food. Businesses can swiftly adjust to changes in the market, customer preferences, and unforeseen interruptions like shortages of raw materials or delays in shipping when their supply chain is flexible (Odedo & Noor, 2024). Supply chain flexibility enables businesses to effectively adapt to demand variations, guaranteeing continuous production and reducing stockouts or surplus inventory, claim Meena and Rizwanullah (2024). This flexibility boosts cost control, decreases waste, and increases operational effectiveness, all of which increase profitability and customer happiness. Furthermore, Dharmayanti et al. (2023) argued that adaptable supply chains allow food producers to incorporate sustainable practices and new technology, which further improves performance through innovation and adherence to legal requirements.

The ability of businesses to control risks and stay competitive is another indicator of the connection linking supply chain flexibility and performance in the food and beverage manufacturing industry (Mogaka, 2024). According to Miriti and Nteere (2025), an agile and responsive supply chain guarantees consistent product quality and on-time delivery in the highly dynamic food business, where consumer preferences change quickly and food safety requirements are strict. Consequently, this enhances market share and brand repute. Furthermore, supply chain flexibility promotes cooperation between distributors and suppliers, improving coordination and efficiency throughout the supply network, according to Wakoli and Wachiuri (2025). As a result, businesses who make investments in supply chain flexibility see improvements in their production methods, higher financial performance, and heightened resilience to supply chain risks in the global food supply chain (Ngatia et al., 2024).

Statement of the problem

The performance of food and beverage manufacturing firms in Nairobi City County has been declining over the last three years. This is despite the government's ongoing efforts to promote industrial growth through tax incentives, policy reforms and infrastructural investments aimed at

enhancing the ease of doing business. For instance, Unga Holdings Limited, a prominent flour milling company, faced significant financial struggles, leading to the planned layoff of up to 50 employees in December 2023. The company cited decreased sales volumes, high cost of inputs and high fixed costs as reasons for its challenges, affecting its profitability and operations. The company posted a loss of KES 959.3 million (US\$6.6 million), reversing a profit of KES 311.3 million (US\$2.1 million) from the prior year (Unga Group PLC (2024)). Similarly, Pwani Oil Products Limited, has encountered supply chain disruptions, including inconsistent raw material supply and increased transportation costs. These challenges have affected production schedules and profitability (The Star, 2023). As a result, some of the food and beverage manufacturing firms in Nairobi have reported reduced profit margins, layoffs, and in some cases, closure of operations, signaling an urgent need for interventions to revitalize the industry.

Prior research on supply chain management in Kenya has mostly concentrated on more general topics like procurement procedures and distribution, paying little attention to the particular function of supply chain flexibility in the food and beverage manufacturing industry (Mogaka, 2023). This study looks into how supply chain flexibility affects the performance of local food and beverage manufacturing companies in an effort to close the knowledge gap. It is anticipated that the results would help improve supply chain procedures and guide policy choices that increases the industry's competitiveness and sustainability. The researcher did an in-depth study on the relationship between supplier, and distribution flexibility and performance of food and beverage manufacturing firms

General Objective of the Study

The general objective of the study was to establish the relationship between supply chain flexibility and performance of food and beverage manufacturing firms in Nairobi City County, Kenya.

Specific Objectives

- i. To determine the relationship between supplier flexibility and performance of food and beverage manufacturing firms in Nairobi City County, Kenya.
- ii. To analyze the relationship between distribution flexibility and performance of food and beverage manufacturing firms in Nairobi City County, Kenya.

Research Questions

- i. What is the relationship between supplier flexibility and the performance of food and beverage manufacturing firms in Nairobi City County, Kenya?
- ii. What is the relationship between distribution flexibility and the performance of food and beverage manufacturing firms in Nairobi City County, Kenya?

LITERATURE REVIEW

Theoretical framework

Transaction Cost Theory (TCT)

The theory was proposed by Ronald Coase in 1937 and further developed by Oliver Williamson in 1975. It examines the costs incurred when firms engage in economic exchanges, particularly the costs of coordinating and managing transactions within and across organizational boundaries. The main tenets of the theory include the concepts of bounded rationality, opportunism, asset specificity, and uncertainty. Bounded rationality implies that decision-makers work within

informational and cognitive bounds, whereas opportunism focus on how people's self-serving actions can raise transaction costs. Asset specificity describes how much an investment is customized for unique transactions, while uncertainty shows the unpredictability that calls for adaptable risk management techniques. In order to eliminate inefficiencies, Williamson (1985) showed how to apply TCT to analyze supply chain structures and contracts. Moreover, he showed the importance of supplier flexibility in reducing transaction uncertainty hazards.

However, the theory has been criticized. According to Ghoshal and Moran (1996), TCT exaggerates opportunism and prioritizes self-serving human relationships, which may not always be consistent with cooperative organizational dynamics. Furthermore, the theory is criticized by Zajac and Olsen (1993) for having a narrow focus on static transaction structures while ignoring the dynamic character of inter-organizational linkages. On the other hand, TCT has some strengths, such as its capacity to explain why companies select particular governance structures (Williamson, 2008) and its usefulness in solving real-world problems like supplier flexibility (Rindfleisch and Heide, 1997). In this study, TCT is very important since it offers a framework for investigating how supplier flexibility might lower transaction costs, allowing Nairobi-based food and beverage manufacturing companies to improve their performance and operational efficiency. The theory is a vital lens for analyzing the dynamics of supplier flexibility in this industry since it emphasizes how crucial it is to manage supplier relationships in order to reduce uncertainty and maximize resource allocation.

Systems Theory

The theory was developed by von Bertalanffy (1968). It suggests asserts that all elements of a system are interconnected, meaning a change in one part can influence the entire system. It also suggests that systems must be understood as wholes rather than by isolating individual components, as the interaction between parts creates emergent properties that cannot be understood separately. Furthermore, systems often maintain dynamic equilibrium, adjusting to external changes while preserving internal stability. Systems theory's emphasis on dynamic equilibrium suggests that firms must continuously adjust their distribution strategies to maintain optimal performance, ensuring they remain responsive to external factors such as market changes or supply disruptions

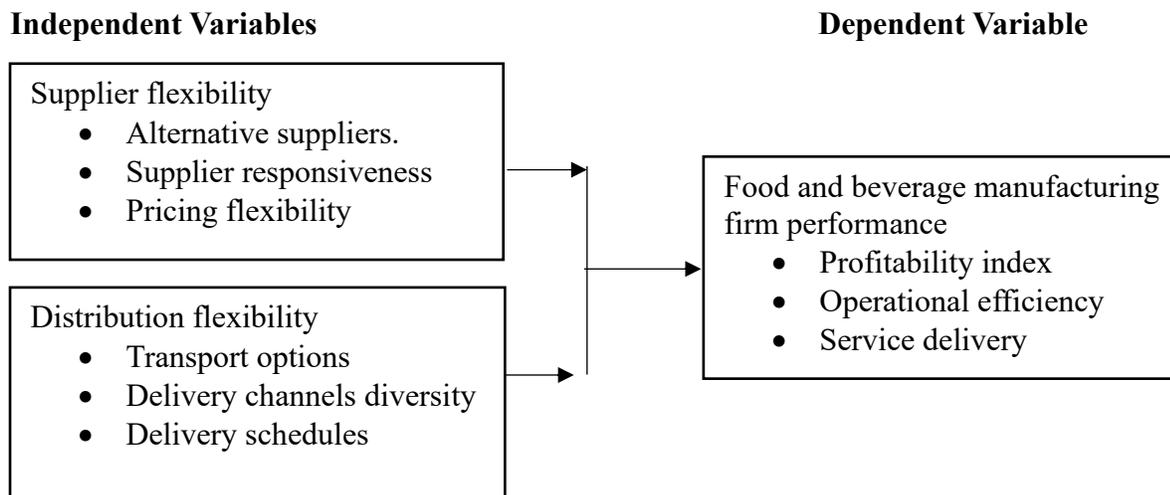
Systems theory informs the study by showing the interconnectedness of supply chain elements. Through viewing distribution flexibility as a key component within the broader supply chain system, the theory illustrates how this flexibility enhances firm performance through its ability to adapt to both external and internal changes. This adaptability enables firms to maintain operational efficiency, respond to market shifts, and meet customer demands, all of which directly influence overall performance. When distribution flexibility is considered in the context of the entire supply chain system, systems theory helps explain how adjustments in distribution operations such as transportation strategies can trigger ripple effects that either optimize or hinder firm performance.

Conceptual Framework

A conceptual framework is structured set of principles and ideas that directs research by defining the connections between important constructs and variables (Perez-Vega et al., 2021). According to Naeem et al. (2023), it acts as a basis for comprehending the theoretical foundations of a subject and aids in defining the parameters of the investigation. A conceptual framework facilitates hypothesis formulation and data analysis by offering a descriptive or visual depiction of these relationships (Sukma & Leelasantitham, 2022). In this study, the independent variables were the

supplier flexibility, and distribution flexibility and the dependent variable was the firm performance. Below is figure 1.1 showing the variables to be explored by this study.

Figure 1.1 Conceptual Framework



Supplier flexibility

Kuria and Ndeto (2024) define supplier flexibility as the ability to adjust to changing customer needs, market conditions, and unexpected supply chain interruptions. It refers to the supplier’s ability to modify their production methods, delivery schedules, product offers, and service levels to suit the changing needs of their customers (Ngatia et al., 2024). This flexibility allows enterprises to adapt swiftly to market variations, personalize products, and preserve operational continuity, resulting in supply chain resilience and performance (Leet et al., 2020).

Shukor et al. (2021) argue that in today’s competitive business environment, supplier flexibility is crucial for improving manufacturing organizations’ responsiveness and agility. It allows organizations to quickly alter their procurement strategies in response to market developments, reducing lead times and enhancing efficiency. When suppliers can adjust production plans or accommodate unexpected orders, firms can better manage stock levels, reduce delays, and ensure timely product delivery. This versatility allows businesses to maintain a regular supply of raw materials and components, reducing production downtime and ensuring customer satisfaction (Mostofa, 2024).

Furthermore, supplier flexibility is crucial for lowering supply chain risk. Economic downturns, political turmoil, natural disasters, and pandemics all impede global supply networks (Mishra et al., 2024). A flexible supplier can reduce risk by offering alternative sourcing choices, shifting manufacturing, or changing price structures (Kitaba et al., 2024). This capacity improves a company’s ability to recover swiftly from disruptions and maintain operations even in risky environments (Kamalahmadi et al., 2022).

Sanni (2024) adds that, supplier flexibility fosters innovation and collaboration. Firms can co-develop new products, improve customization, and enhance quality standards by working closely with adaptable suppliers. Suppliers that can modify their processes to accommodate unique client requirements contribute to product differentiation and market competitiveness. This collaboration strengthens long-term partnerships and encourages continuous improvement in supply chain performance (Bennett, 2025).

Distribution flexibility

Distribution flexibility refers to the ability to swiftly adjust the movement and delivery of goods within the supply chain (Odedo & Noor, 2024). This requires having a variety of transport options available to ensure the timely movement of goods, regardless of external factors. It also means utilizing multiple delivery channels, allowing firms to choose the most suitable method to reach various destinations based on demand changes. It also encompasses the adjustability of delivery schedules to accommodate changes in time requirements or unexpected delays (Sharma et al., 2023).

In an increasingly globalized market, distribution flexibility has become a critical factor in ensuring seamless supply chain operations. The ability to switch between different transportation modes such as air, road, rail, or sea provides firms with alternative routes to maintain supply chain continuity in case of disruptions like strikes, roadblocks, or adverse weather conditions (Lebedeva & Shkuropadska, 2024). Companies can limit their dependence on a single method of transportation by leveraging multiple distribution solutions, decreasing risks associated with delays and cost variations (Mızrak, 2023).

Furthermore, distribution flexibility improves a company's ability to respond to unexpected fluctuations in client demand, according to Kmiecik (2023). Businesses that can dynamically adapt their delivery routes and schedules may easily handle peak seasons, unanticipated order increases, and last-minute changes in customer locations. This flexibility improves customer satisfaction by ensuring on-time delivery, especially when unexpected logistical challenges develop. Real-time tracking and predictive analytics enhance adaptability by allowing businesses to make data-driven decisions about delivery changes (Rane et al., 2022).

According to Das et al. (2025), technology is critical to improving logistical flexibility. Firms can increase delivery efficiency and reduce operational costs by integrating automated warehouse management systems, GPS-enabled fleet tracking, and artificial intelligence-driven route optimization. Furthermore, the rise of third-party logistics (3PL) providers has increased firms' capacity to outsource flexible transportation and distribution options, providing them better control over supply chain interruptions without requiring large capital investments in infrastructure (Özcan & Yumurtacı Hüseyinoğlu, 2024).

Performance of food and beverage manufacturing firms

Performance encapsulates extent to which an organization effectively attains its strategic goals and objectives, encompassing multidimensional indicators such as financial outcomes, operational productivity, client satisfaction levels, and workforce engagement metrics (Eng'airo, 2024). Measuring organizational performance involves evaluating outcomes such as profitability, productivity, market share, and quality of products or services. It also includes assessing how effectively the organization uses its resources to meet strategic goals and respond to external and internal challenges (Akpa et al., 2021).

In the food and beverage manufacturing sector, strong performance is essential due to the highly competitive environment and the constant demand for top-quality products (Kajula, 2021). As noted by Le Thi Kim et al. (2021), financial performance includes key indicators like revenue growth, profit margins, and return on investment. To stay ahead, food manufacturers are always looking for ways to strengthen their financial position whether through cutting costs, improving production efficiency, or adopting smart pricing strategies. Operational efficiency also plays a major role in overall performance. It means making production processes more streamlined, reducing waste, and boosting output (Hasan, 2023). Manufacturers may dramatically enhance

productivity, reduce costs, and get products to market faster by adopting lean production practices and investing in current technologies (Taher & Bashar, 2024)

Companies that stress quality control and respond quickly to criticism are more likely to gain loyal customers (Santos & Sotelo-Drequito, 2024). According to Burity (2021), customer complaints, return rates, and consumer feedback surveys are all performance measures that can provide useful information about how effectively a company meets its customers' expectations. Furthermore, consumers reward companies that engage in sustainable practices and sourcing transparency, which increases customer loyalty. Employees that are engaged are more productive, imaginative, and dedicated to the aims of their firm (Aldabbas et al., 2023). Implementing training programs, providing career development opportunities, and cultivating a healthy workplace culture can lead to increased employee satisfaction and retention. Companies that invest in their workforce often see improvements in operational performance and overall productivity (Nganga & Nyaga, 2022).

Furthermore, assessing market share is important for understanding a company's competitive position in the industry (Bhattacharya et al., 2022). Companies that regularly compare their performance to competitors might identify both opportunities and hazards. This strategic understanding enables organizations to efficiently adapt their business models and marketing strategies (Leppänen et al., 2023). The ability to adapt to internal and external challenges is essential for long-term success. Food manufacturers must deal with regulatory changes, supply chain disruptions, shifts in customer behavior, technological advancements, environmental concerns, and raw material price volatility (Suali et al., 2024).

Empirical Review

Supplier flexibility and performance of food and beverage manufacturing firms

Ngatia et al. (2024). sought to evaluate impact of supplier flexibility on operational outcomes of food and beverage manufacturing enterprises in Kenya. A cross-sectional data collection strategy was adopted, targeting senior procurement managers from 246 food and beverage manufacturing companies. Using Krejcie and Morgan's (1970) sampling equation, research sample of 150 subjects was determined, with simple random sampling employed to select participants. A pilot study involving 15 firms was conducted, and 13 questionnaires were returned. Data collection was done through semi-structured and self-administered questionnaires, with 135 questionnaires distributed and 119 successfully returned. Analytics involved descriptive statistics, correlation, regression, and hypothesis testing using SPSS version 28, with results displayed in tables. Results include, supply chain flexibility shows a marked and upward linear association with the operational success of Kenyan food and beverage entities, an increase in supplier flexibility results in proportional rise in firm achievement level and the study confirmed that strategically implementing supplier flexibility is crucial for improving organizational efficiency and positioning.

Siagian et al. (2021) investigated the impact of supply chain integration on business performance through supplier flexibility, supply chain resilience, and innovation systems in Indonesia's manufacturing companies, particularly in response to COVID-19 disruptions. A quantitative research design was used, with data collected from 470 valid questionnaires and analyzed using the partial least squares (PLS) technique via SmartPLS software version 3.0. The findings showed that supply chain integration significantly enhances supplier flexibility by facilitating better information sharing and production planning. Additionally, supplier flexibility strengthens supply chain resilience by improving the ability to manage sudden changes in customer demand and production challenges.

The study by Jum'a and Bushnaq (2024) examined the impact of supplier flexibility on supply chain performance and explored the mediating role of supply chain flexibility in the relationship between supply chain integration and SCP within Jordan's manufacturing sector. Using a quantitative design, the study surveyed 219 managers from various manufacturing firms. Data were collected through an online self-administered questionnaire, and structural equation modeling was conducted using SmartPLS. The findings revealed that integrating and enhancing supply chain flexibility can significantly improve SCP in dynamic markets. Moreover, both SCI investments and supplier flexibility practices positively impact SCP, with SCF serving as a crucial moderator, driving improvements in productivity, cost reduction, and customer satisfaction.

Distribution flexibility and performance of food and beverage manufacturing firms

Srisawat and Srisawat (2024) did a study to examine the effect of distribution and supply chain flexibility on the performance of businesses in Thailand. The research utilized a quantitative approach with a survey design, targeting businesses operating in Thailand. The sample size was not explicitly mentioned, but a sampling technique and method of data analysis were employed to investigate the relationships. With environmental unpredictability acting as a mediator, the study found that supply chain and distribution flexibility improved business performance. Additionally, the findings suggest that both educational institutions and companies should collaborate in offering training courses to improve distribution and supply chain flexibility, particularly in the face of ongoing business uncertainties.

The study by Sandberg (2021) aimed to examine how dynamic capabilities (DCs) contribute to the creation of distribution flexibility in Swedish fast fashion retailer. The research utilized a theory elaboration approach, analyzing case study data to identify specific DCs and their characteristics. The study's findings include the identification of three DC classes sensing, seizing, and reconfiguring that drive distribution flexibility, which is categorized into operational, structural, and strategic levels. The research also found that these DC classes influence both distribution range and response flexibility.

Study by Korucuk and Aytekin (2023), aimed to explore the role of distribution flexibility in helping distribution firms adapt to rapid market changes, customer demands, and service differentiation. The research employed the Interval-Valued Fermatean Fuzzy Stepwise Weight Assessment Ratio Analysis method to assess and prioritize the criteria crucial for evaluating distribution flexibility. This structured approach ensured a rigorous analysis, providing insights into the factors that impact flexibility in distribution operations. The study found that "Distribution Information Integration" was the most critical factor in enhancing distribution flexibility, as it enables seamless execution of distribution activities. "Asset Efficiency" ranked lower in importance, suggesting a reduced impact on overall flexibility.

RESEARCH METHODOLOGY

The study adopted a descriptive research design, which provides a structured approach for collecting and analyzing data to describe relationships among variables within a population. Descriptive designs are appropriate when the objective is to examine existing phenomena without manipulating variables and to generate findings that can be generalized from a sample to a broader population (Siedlecki, 2020; Safari & Kengere, 2023). The target population comprised 476 management-level employees from 119 food and beverage manufacturing firms located in Nairobi City County, Kenya. The study focused on key operational managers who influence supply chain decisions, including heads of procurement administration, supply chain managers, warehouse

managers, and production managers. These categories were selected because they are directly involved in procurement, inventory management, distribution, and production processes that affect firm performance (KAM, 2024).

The sample size was determined using Yamane's (1967) formula at a 5% level of precision, resulting in a sample of 217 respondents. To ensure adequate representation of each managerial category, the study applied stratified random sampling, which enables proportional selection of respondents from each subgroup and improves the representativeness of the sample (Stratton, 2021). Primary data were collected using a structured questionnaire. Structured questionnaires are widely used in quantitative research because they facilitate standardized data collection and statistical analysis (Coe et al., 2021).

Prior to the main survey, a pilot study involving 10% of the sample (22 respondents) was conducted in Kiambu County to assess the clarity and suitability of the research instrument. Instrument validity was ensured through face validity, obtained through expert review, and construct validity, which was assessed using factor loadings where values above 0.5 were considered acceptable (Wang et al., 2023). Reliability of the instrument was evaluated using Cronbach's alpha, with a threshold of 0.7 adopted to confirm acceptable internal consistency (Castillo, 2009). Data were analyzed using both descriptive and inferential statistical techniques. Descriptive statistics included frequencies, means, and standard deviations, while inferential analysis involved Pearson correlation and multiple linear regression to examine the relationship between supply chain flexibility dimensions and firm performance (Washington et al., 2020). The regression model estimated the effect of supplier flexibility, and distribution flexibility, on the performance of food and beverage manufacturing firms.

RESEARCH FINDINGS AND DISCUSSION

The number of questionnaires issued to the respondents was 217. 191 questionnaires were properly filled and returned, representing a response rate of 88.02%. The remaining 26 questionnaires, accounting for 11.98%, were either not returned, incompletely filled, or contained errors that rendered them unusable for analysis. The high response rate of 88.02% indicates strong participant engagement and provides a reliable basis for drawing meaningful conclusions from the collected data. According to Sammut et al. (2021) a response rate above 70% is considered excellent for generalization of research results.

Descriptive Results

This chapter presents the findings of the study in alignment with the research objectives. Descriptive together with inferential outcomes were provided. The descriptive analysis covered means, standard deviations, and percentages.

Descriptive Results for Supplier Flexibility

The first objective of the study was to determine the relationship between supplier flexibility and performance of food and beverage manufacturing firms in Nairobi City County, Kenya. Participants of the research were supposed to indicate their agreement perspectives with statements provided concerning supplier flexibility practice in their organizations. This was done in an ordinal scale ranging from one (1) to five (5). The lowest value of 1 indicated strong disagreement while the highest possible value of 5 indicated strong agreement. A neutral stand was represented by (3). The perspectives in percentages, means and SD are as indicated in Table 1.

Table 1: Supplier Flexibility.

	SD	D	N	A	SA	Mean	SD
Our company has multiple alternative suppliers for key raw materials.	5.57%	8.09%	11.18%	44.79%	30.37%	4.06	0.82
We can easily switch to alternative suppliers in case of disruptions.	2.09%	7.33%	13.61%	38.74%	38.22%	4.04	0.89
Our suppliers can quickly adjust order quantities based on our needs.	8.90%	7.85%	10.47%	48.17%	24.61%	3.72	1.01
Our suppliers respond quickly to urgent or unexpected orders.	12.09%	13.61%	8.38%	33.74%	32.17%	3.84	0.98
Our suppliers are open to negotiating prices based on long-term contracts.	2.62%	7.33%	8.90%	57.07%	24.08%	3.93	0.93
Our suppliers offer flexible pricing options based on order volume.	2.09%	13.61%	8.38%	52.36%	23.56%	3.82	0.84
Average						3.87	0.91

Source: Author (2025)

The analysis revealed that a significant majority (75.16%) of the respondents affirmed that their firms maintain multiple alternative suppliers for key raw materials. Only 13.66% refuted this, while 11.18% remained indifferent. The mean score of 4.06 and a standard deviation of 0.82 indicate that most firms deliberately structure their sourcing strategies to enhance supply continuity and mitigate the risk of operational disruptions. Ngatia et al. (2024) also found that supplier diversification strengthens a firm's resilience by minimizing dependence on single sources and allowing greater flexibility in response to supply shocks

Regarding the ease of switching to alternative suppliers during supply disruptions, 76.96% of participants indicated that their organizations are capable of doing so. In contrast, 9.42% expressed dissenting views, and 13.61% adopted a neutral stance. With a mean of 4.04 and a standard deviation of 0.89, the findings reflect a considerable degree of agility in supplier relationships an essential factor in sustaining production in the food and beverage manufacturing organizations. This echoes the findings of Kitaba et al., (2024) who asserted that the ability to reconfigure supplier networks rapidly, is crucial for managing turbulence and maintaining service continuity in organizations. In terms of suppliers' ability to adjust order quantities in response to changing needs, 72.78% of respondents signaled agreement, while 16.75% disagreed, and 10.47% were undecided. The mean of 3.72 and a relatively higher standard deviation of 1.01 imply that while this flexibility is generally present in most of the F&B manufacturing firms, its consistency across firms and suppliers varies, possibly due to differences in supplier capacity or contractual terms. Siagian et al. (2021) argue that supplier flexibility in adjusting order volumes is a key enabler of supply chain responsiveness, which strengthens firms capacity to adapt to fluctuating operational and market demands with minimal disruption.

With respect to responsiveness to urgent or unexpected orders, 65.91% of the firms reported that their suppliers are quick to react. Meanwhile, 25.70% contradicted this view, and 8.38% maintained neutrality. A mean of 3.84 and a standard deviation of 0.98 support the notion that prompt supplier responsiveness is prevalent, albeit with some variability as evidenced by the substantial disagreement and indifferent responses. According to Kamalahmadi et al. (2022), supplier responsiveness significantly contributes to the overall responsiveness of the supply chain, especially when dealing with time-sensitive products.

Additionally, 81.15% of respondents acknowledged that their suppliers are open to negotiating prices under long-term contractual frameworks. Only 9.95% expressed disagreement, and 8.90% remained non-committal. With a mean of 3.93 and standard deviation of 0.93, these results highlight a strategic orientation toward fostering collaborative supplier relationships that support cost stability and long-term performance gains in the F&B manufacturing firms. It is in line with Mostofa (2024) whose study detected that strategic supplier relationships contribute significantly to improved performance outcomes through stable pricing and reduced transaction costs.

About 75.92% of the participants affirmed the existence of flexible pricing options based on order volume, while 15.70% disagreed, and 8.38% were neutral. A mean of 3.82 and standard deviation of 0.84 suggest that such pricing arrangements are fairly widespread potentially enhancing the F&B firms' ability to manage procurement costs relative to scale and demand fluctuations. This echoes the findings of Sanni (2024) who noted that volume-based pricing incentives can reduce transaction costs and improve efficiency in buyer-supplier relationships.

The average across the supplier flexibility dimensions yielded a composite mean of 3.87 and standard deviation of 0.91. This pattern indicates that supplier flexibility is generally robust among food and beverage manufacturing firms in Nairobi City County. The high levels of agreement across various indicators suggest that supplier agility, responsiveness, and adaptability are perceived as critical enablers of operational performance. These attributes are likely to support production continuity, cost management, and responsiveness to market demands key determinants of firm performance in a competitive and dynamic manufacturing landscape.

Descriptive Results for Distribution Flexibility

The second objective of the study was to determine the relationship between distribution flexibility and performance of food and beverage manufacturing firms in Nairobi City County, Kenya. Participants of the research were supposed to indicate their agreement perspectives with statements provided concerning distribution flexibility practice in their organization. This was done in an ordinal scale ranging from one (1) to five (5). The lowest value of 1 indicated strong disagreement while the highest possible value of 5 indicated strong agreement. A neutral stand was represented by (3). The perspectives in percentages, means and SD are as indicated in Table 4.10.

Table 2: Distribution flexibility

	SD	D	N	A	SA	Mean	SD
Our company has multiple transport options to ensure smooth distribution operations.	4.19%	7.85%	18.32%	50.79%	18.85%	3.72	1.00
Our transport providers can quickly adapt to changes in delivery requirements.	5.52%	5.76%	15.71%	38.74%	34.27%	4.10	0.91
We can adjust delivery routes and methods to meet changing customer demands.	4.00%	7.33%	7.52%	39.27%	41.88%	4.16	0.9
Our company utilizes various delivery channels to enhance distribution efficiency	6.57%	12.52%	9.71%	45.03%	26.18%	3.82	1.01
Our company offers flexible delivery schedules to accommodate customer needs.	3.00%	4.71%	4.71%	83.91%	3.66%	3.90	0.51
Our company collaborates with distribution s partners to improve delivery schedule flexibility.	4.52%	5.24%	11.52%	63.02%	15.71%	3.92	0.72
Agg. Mean						3.94	0.84

Source: Author (2025)

The analysis revealed that 69.64% of respondents agreed that their companies utilize multiple transport options to support uninterrupted distribution activities. In contrast, 12.04% disagreed, while 18.32% remained neutral. The mean score of 3.72 and a standard deviation of 1.00 suggest that while most of the F&B firms generally recognize the importance of diversified transport logistics, some of the firms have not implemented this. According to Lebedeva and Shkuropadska (2024), transport flexibility is a key component of supply chain resilience and allows organizations to firms to maintain consistent delivery performance despite infrastructure challenges or seasonal fluctuations.

Regarding the adaptability of transport providers to evolving delivery requirements, 72.01% of participants acknowledged this capability, 11.28% dissented, and 15.71% were indifferent. The relatively high mean score of 4.10 and a standard deviation of 0.91 indicate that firms are increasingly relying on agile logistics partnerships to ensure responsiveness, particularly in fluctuating demand scenarios. It shows that most of the firms rely on transport who providers who are adaptable to changes in delivery requirements. This resonates with Kmiecik (2023) that agile logistics capabilities enhance supply chain performance by improving alignment with customer needs and reducing lead times.

Notably, 81.15% of respondents affirmed that their organizations can modify delivery routes and methods to align with shifting customer expectations. Only 7.33% disagreed, while 11.52% neither agreed nor disagreed. A mean of 4.16 coupled with a standard deviation of 0.90 reflects a strong and consistent commitment to route and method flexibility an essential component of competitive distribution practices in the F&B manufacturing firms in Nairobi City County. This is in line with Das et al. (2025) findings that distribution flexibility, particularly in route and method adaptation, enhances customer satisfaction and improves service delivery in firms.

When asked whether their firms employ multiple delivery channels to enhance distribution efficiency, 71.21% expressed agreement. Conversely, 19.09% opposed this view, and 9.71% were undecided. With a mean score of 3.82, is shows that most of the firms have multiple delivery channels for their products. However, the SD of 1.01 points to a variation in responses showing that a significant number of firms have not adopted multiple delivery channels. Findings by Mızrak (2023) showed that multi-channel logistics strategy enhances service reliability and responsiveness among manufacturing firms.

On the matter of flexible delivery schedules to meet customer requirements, an overwhelming 87.57% of respondents agreed that such flexibility exists within their operations. Only 7.71% disagreed, and 4.71% remained neutral. The mean score of 3.90 and a notably low standard deviation of 0.51 suggest a high degree of uniformity in the perception of schedule adaptability, which likely enhances customer satisfaction and service reliability (Mızrak, 2023).

Approximately 78.73% of respondents acknowledged that their organizations collaborate with distribution partners to improve delivery schedule flexibility. In contrast, 9.76% expressed dissenting views, and 11.52% did not take sides. A mean score of 3.92 and standard deviation of 0.72 imply that strategic partnerships are widely leveraged to enhance responsiveness, although the degree of collaboration may vary among firms. (Mızrak, 2023). argues that strong collaboration with logistics partners improves visibility, trust, and coordination, key drivers of distribution agility.

Collectively, the constructs assessed yielded an average mean score of 3.94 with a standard deviation of 0.84. These findings underscore the widespread adoption of distribution flexibility mechanisms within food and beverage manufacturing firms in Nairobi City County. The consistent

alignment of transport adaptability, route reconfiguration, multiple delivery channels, and schedule customization reflects a sector that is actively prioritizing agile distribution models.

Descriptive Results for Performance

The study further sought for respondents' perspectives on performance of the manufacturing firms in their respective institution. Their perspectives were sought in a Likert scale of 1-5 where the respondents were to show their level of agreement. The lowest value of 1 indicated strong disagreement while the highest possible value of 5 indicated strong agreement. A neutral stand was represented by (3). The perspectives in percentages, means and SD are as indicated in Table 3.

Table 3: Performance

	SD	D	N	A	SA	Mean	SD
Our company has experienced consistent profit growth over the past years.	7.33%	15.18%	10.47%	48.17%	18.85%	3.56	1.17
Our revenue streams have expanded for the last 3 years	2.62%	16.75%	12.57%	40.84%	27.23%	3.73	1.11
Our operations run efficiently with minimal downtime.	3.14%	11.52%	5.76%	47.12%	32.46%	3.94	1.06
The firm consistently meets production targets within scheduled timelines.	4.19%	5.24%	7.85%	52.88%	29.84%	3.99	0.98
Our customers are satisfied with the quality of our products.	0.00%	3.66%	6.28%	63.87%	26.18%	4.13	0.68
Our service delivery has consistently improved for the last three years	3.14%	7.85%	8.90%	59.16%	20.94%	3.87	0.94
Average						3.87	0.99

Source: Author (2025)

The analysis revealed that 67.02% of respondents affirmed that their companies had recorded consistent profit growth over the past years. However, 22.51% of participants held a contrary view, and 10.47% were ambivalent. The mean score of 3.56 and a relatively high standard deviation of 1.17 suggest that while profitability trends are generally positive, a significant proportion of firms still grapple with financial inconsistencies or fluctuating earnings. With respect to revenue growth, 68.07% of respondents reported that their organizations had experienced an expansion in revenue streams over the past three years. In contrast, 19.37% disagreed, while 12.57% remained neutral. The mean score of 3.73 and a standard deviation of 1.11 indicate that although most firms are seeing upward revenue trends, this growth is not uniformly experienced across all organizations.

In terms of operational efficiency, 79.58% of respondents agreed that their firms operate with minimal downtime, whereas 14.66% expressed dissenting views, and only 5.76% were non-committal. A mean score of 3.94 with a standard deviation of 1.06 highlights a strong level of confidence in the firms' internal efficiency and capacity utilization. These results suggest that most firms have successfully streamlined their operations to minimize disruptions and enhance productivity. Similarly, 82.72% of the respondents affirmed that their firms consistently meet production targets within the scheduled timelines. Only 9.43% reported otherwise, and 7.85% neither agreed nor disagreed. The mean score of 3.99 with a standard deviation of 0.98 underscores the importance placed on operational timeliness and throughput, indicating mature production planning and scheduling capabilities in most of the F&B manufacturing firms in Nairobi City County.

Regarding product quality and customer satisfaction, an overwhelming 90.05% of respondents agreed that their customers are content with the quality of the products offered. Only 3.66% disagreed, and 6.28% were neutral. The high mean score of 4.13 and the relatively low standard deviation of 0.68 reflect a strong and consistent commitment to quality standards, which is likely contributing to customer retention and brand loyalty. Over 80% of the respondents acknowledged that their companies have experienced steady improvements in service delivery over the past three years. In contrast, 10.99% disagreed, while 8.90% maintained a neutral stance. The mean score of 3.87 and a standard deviation of 0.94 suggest a generally positive trajectory in service performance, although some firms may still be undergoing transitional improvements or structural adjustments.

The aggregated responses produced an average mean score of 3.87 and a standard deviation of 0.99. These findings indicate that most food and beverage manufacturing firms in Nairobi City County exhibit robust organizational performance across key dimensions, including profitability, operational efficiency, revenue growth, product quality, and service delivery. However, the presence of variation in profitability and cost control highlights the need for targeted strategies to address performance disparities and reinforce competitiveness across the board.

Correlation analysis

Pearson’s correlation coefficient (r) ranges from -1 to +1. A positive value indicates a direct relationship, while a negative value implies an inverse relationship. A value closer to ±1 signifies a stronger correlation. The significance level (p-value) was tested at 0.05 confidence levels. Table 4 shows the results.

Table 4: Correlation analysis.

		Performance	Supplier Flexibility	Distribution Flexibility
Performance	Pearson Correlation Sig. (2-tailed)	1		
Supplier Flexibility	Pearson Correlation Sig. (2-tailed)	.793** 0.004	1	
Distribution Flexibility	Pearson Correlation Sig. (2-tailed)	.729** 0.000	.514** 0.003	1

Source: Author (2025)

The findings indicated a strong and statistically significant positive correlation between supplier flexibility and performance ($r = 0.793, p = 0.004 < 0.05$). This implies that food and beverage manufacturing firms that effectively segment their markets based on customer needs and profitability tend to experience better performance outcomes. These results resonate with the findings of Ngatia et al. (2024) who observed that supplier flexibility enhances supplier responsiveness hence improving organizational performance.

The analysis established another strong and statistically significant relationship between distribution flexibility and performance ($r = 0.729, p = 0.000 < 0.05$). This result implies that firms that continuously have distribution flexibility, are more adaptive and better positioned to respond to market dynamics, leading to improved performance. This finding is consistent with the work of

Srisawat and Srisawat (2024) who emphasized the importance of enhancing delivery channel and monitoring delivery schedules for improved performance in firms.

Regression Analysis

This section displays regression analysis outcomes undertaken to examine extent to which variable predict performance among food and beverage manufacturing firms in Nairobi City County.

Table 5: Regression Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients		t	Sig.
	B	Std. Error	Beta			
1 (Constant)	0.326	0.145			2.247	0.026
Supplier flexibility	0.285	0.051	0.293		5.631	0.002
Distribution Flexibility	0.357	0.04	0.337		8.912	0.000

a Dependent Variable: performance

Source: Author (2025)

From the findings, the constant value ($\alpha = 0.326$) represents the level of performance when supply chain flexibility is held at zero. This implies that even without any influence from the identified practices, there is a baseline level of performance in the organizations studied. The regression coefficient for supplier flexibility was 0.285 with a p-value of 0.002 ($\beta = 0.285$, $p < 0.002$). This indicates that supplier flexibility has a positive and significant effect on performance. For every unit increase in the effectiveness of supply flexibility, performance improves by 0.285 units. This finding is consistent with the study by Jum'a and Bushnaq (2024) which found that having alternative suppliers and pricing flexibility significantly improve the efficacy of performance in firms, leading to better performance outcomes.

Moreover, distribution flexibility had a regression coefficient of 0.357 with a p-value of 0.000 ($\beta = 0.357$, $p = 0.000$). This indicates a positive and significant effect on firms' performance, such that a one-unit improvement in distribution flexibility leads to an increase in performance by 0.357 units. This finding is supported by the research of Korucuk and Aytakin (2023), which showed that distribution flexibility is a powerful tool that organizations may utilize to increase their efficiency and quality of customer service.

Regarding regression analysis, regression model below was established:

$$Performance = 0.326 + 0.285 (\text{supplier flexibility}) + 0.357 (\text{distribution flexibility}) + \epsilon$$

Conclusion

It was concluded that firms that maintain multiple alternative suppliers and can easily switch during disruptions tend to experience greater profit growth and operational efficiency. Furthermore, the ability of suppliers to adjust order quantities and respond swiftly to urgent demands correlates with consistent production timelines and enhanced service delivery. A conclusion was made that supplier willingness to negotiate prices and offer flexible pricing options contributes to cost stability, which in turn supports customer satisfaction and the expansion of revenue streams. Additionally, it was concluded that supplier flexibility enhances the overall

responsiveness of firms, enabling them to meet market demands while maintaining quality and performance consistency.

It was also concluded that firms that utilize multiple transport options and collaborate with distribution partners to improve schedule flexibility tend to experience consistent profit growth and expanded revenue streams. Furthermore, the ability of transport providers to adapt quickly to delivery changes and the use of flexible delivery schedules correlates with efficient operations and timely achievement of production targets. Adjusting delivery routes and using various channels to enhance distribution efficiency leads to improved service delivery and higher customer satisfaction. Additionally, distribution agility supports stable and responsive supply chains, which enhances overall firm performance.

Recommendations

Manufacturing firms should strengthen supplier flexibility by developing strategic relationships with multiple suppliers and establishing flexible contractual arrangements that allow quick adjustments in order quantities, delivery timelines, and pricing structures during supply disruptions. Firms should also enhance distribution flexibility by diversifying transport options, collaborating closely with logistics partners, and adopting digital logistics systems that improve visibility of deliveries and enable quick adjustments of delivery routes and schedules. These practices will enable firms to respond effectively to market fluctuations and improve operational efficiency and service reliability.

Policy makers, particularly the Ministry of Industrialization, Trade and Enterprise Development, should promote policies that encourage resilient supplier networks and efficient distribution systems within the manufacturing sector. This may include facilitating industry collaboration platforms through the Kenya Association of Manufacturers (KAM) to strengthen partnerships between manufacturers, suppliers, and logistics providers. In addition, improving logistics infrastructure and streamlining regulatory processes related to supplier contracts and transportation operations would enhance distribution efficiency and support the competitiveness of food and beverage manufacturing firms in Kenya.

Recommendations Further Studies

Based on the findings of this study, it is recommended that future research should explore the influence of moderating or mediating variables on the relationship between supply chain flexibility and firm performance. While the current study focused on direct linear relationships, incorporating variables such as technology adoption, firm size, organizational culture, or regulatory environment may provide deeper insights into how supply chain flexibility interacts with contextual factors to influence performance outcomes. This approach could help identify conditions under which flexibility is most effective and guide more targeted managerial strategies. Additionally, further studies can be conducted across different sectors such as pharmaceuticals, construction, or retail to allow for cross-industry comparisons. Such studies would help determine whether the influence of supply chain flexibility on performance is consistent or varies by industry characteristics. A similar study can be done by outside Nairobi City County for comparison of findings.

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