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DEMAND MANAGEMENT AND PERFORMANCE OF FOOD AND BEVERAGE MANUFACTURING FIRMS IN KENYA

[1*] Nyamwaro Lorna Kerubo, [2] Dr. Wachiuri Elizabeth, [3] Dr. Namusonge Erick

[1*] Doctor of Philosophy in Supply Chain management of Jomo Kenyatta University of Agriculture and Technology

[2] Lecturer, Jomo Kenyatta University of Agriculture and Technology

[3] Lecturer, Taita Taveta University, Kenya

ABSTRACT

The food and beverage supply chain is a complex network influenced by perishability, fluctuating demand, and distribution challenges. Effective demand management plays a critical role in ensuring timely delivery, reducing customer complaints, and improving operational efficiency. Despite the significant impact of demand management on supply chain performance, Kenya's food and beverage manufacturing sector continues to experience stagnated growth. The Kenya Association of Manufacturers (KAM) has highlighted concerns over declining performance, which threatens economic development and the realization of Vision 2030. This study investigates the relationship between demand management and the performance of food and beverage manufacturing firms in Kenya. The research evaluates demand planning strategies, forecasting techniques, and their impact on production efficiency, inventory levels, and overall supply chain responsiveness. The study is grounded in Institutional Theory. Using a descriptive research design, the study collected both qualitative and quantitative data from 217 food and beverage firms, targeting logistics and procurement managers. A sample size of 208 respondents was determined using Yamane's Formula and selected through simple random sampling. Data was gathered using structured and unstructured questionnaires, with qualitative responses analyzed using content analysis and quantitative data processed through descriptive statistics techniques. Pearson R correlation and regression models were applied to assess the strength and direction of relationships between demand management strategies and firm performance. The findings indicate that demand management significantly influences the performance of food and beverage firms, with effective forecasting and inventory control leading to cost reductions, improved service levels, and minimized supply chain disruptions. The study also concludes that customer response plays a moderating role in the relationship between demand management and supply chain performance. The research provides critical insights into the necessity of robust demand planning to enhance efficiency, reduce wastage, and boost competitiveness in Kenya's food and beverage industry.

Key Words: Demand Management, Bullwhip Effect, Supply Chain Performance, Food and Beverage Industry

Background of the Study

Successful organizations are a key ingredient in developing nations, playing an important role in the daily lives of citizens. As such, organizations must continuously improve their performance to sustain growth and competitiveness (Agrawal, Sengupta & Shanker, 2019). In order to compete in global markets and networked economies, companies must rely on effective supply chain management, which significantly influences firm performance (Bray & Mendelson, 2016). However, poor demand management practices within the supply chain can lead to inefficiencies, negatively impacting firm performance. Therefore, it is crucial to identify and address these inefficiencies, as they determine an organization's survival in today's competitive business environment (Erkan et al., 2018).

Food and beverage manufacturing firms primarily employ make-to-stock production systems, where production planning and activities are based on demand forecasting. This system is intended to ensure that inventory levels are well-positioned to prevent overstocking or stock-outs, as customer demand is rarely stable (Trapero & Fildes, 2016). However, demand forecasting is inherently prone to errors, leading to the need for additional safety stock at various stages of the supply chain. Without proper demand management, individual forecasts at different levels of the supply chain will create inefficiencies, weakening the entire system's effectiveness (Chopra & Meindl, 2017). Poor demand management, combined with price fluctuations and a lack of coordination among supply chain participants, results in distorted order patterns, which increase costs and operational challenges.

In the food manufacturing industry, unlike other supply chains, the perishable nature of products necessitates effective coordination to maintain quality and reduce waste. If demand management strategies are not properly implemented, companies face customer complaints and reputational damage due to inconsistent product availability or overstocked goods that lead to waste (Disney, 2018). This places additional responsibility on managers to balance responsiveness and efficiency through appropriate inventory management, ensuring that supply aligns with demand while optimizing costs and service levels (Chen & Lee, 2016). The need for effective demand management is further emphasized by increasing globalization and changing consumer behaviors. As developing countries integrate into global markets, consumer demand for food products fluctuates, requiring companies to adopt innovative forecasting techniques and improve coordination between suppliers and manufacturers (Jack et al., 2018). Producers and processors must establish contractual agreements with suppliers to ensure the availability of raw materials in the right quantities, at the right time, and at the right cost. Without such agreements, supply chain disruptions can lead to stock imbalances, affecting the firm's ability to meet customer demands efficiently.

This study, therefore, seeks to assess the role of demand management in enhancing the performance of food and beverage manufacturing firms in Kenya. By evaluating the effectiveness of demand planning, forecasting accuracy, and supply chain coordination, this research will provide insights into how firms can optimize their production and inventory management processes. Understanding these factors will help food and beverage manufacturers improve efficiency, reduce costs, and enhance their competitive position in both local and international markets.

Statement of the Problem

The food and beverage supply chain is one of the most complex supply chains, characterized by uncertainties at every stage that result in operational inefficiencies, inadequate cold chain

infrastructure, and high levels of wastage (Atieno & Karuti, 2019). Given the perishable nature of these products, effective demand management is critical to ensuring efficient distribution, inventory control, and timely product delivery to avoid supply chain disruptions and customer dissatisfaction (Saremi & Zadeh, 2019). However, many food and beverage manufacturing firms struggle with inventory fluctuations caused by demand uncertainty, leading to either overstocking or stockouts, which in turn increases costs and affects performance (Yigitbasioglu, 2019).

Proper demand management plays a key role in optimizing inventory levels, reducing lead times, and stabilizing supply chain operations. Studies indicate that effective inventory management can lead to cost savings of up to 6% and significantly enhance supply chain efficiency (Barratt, 2020). Inventory constitutes a major portion of the assets in food and beverage firms, often accounting for 50-60% of total costs, making its proper management crucial for financial sustainability (Songet, 2020; Chen, 2019). The Kenya Vision 2030 aims to boost the manufacturing sector's contribution to GDP from 10% to 20% by 2030 (RoK, 2015). However, the sector's growth has stagnated at an average of 3.1%, which is significantly lower than the national economic growth rate of 5.0% (World Bank, 2021).

The food and beverage sector, which dominates the manufacturing industry, has continued to lag behind in output growth, reflecting structural inefficiencies in demand management and supply chain coordination (World Bank's Enterprise Survey, 2021). The Kenya Association of Manufacturers (KAM, 2020) warns that declining performance in the sector is a major threat to business sustainability and economic prosperity, as it undermines Kenya's ability to achieve the Vision 2030 targets. If left unaddressed, these challenges will weaken economic growth, limit industrial competitiveness, and reduce employment opportunities.

Although previous studies have explored aspects of supply chain inefficiencies, limited research has been conducted on the impact of demand management on food and beverage manufacturing firms in Kenya. Existing studies, such as those by Buchmeister, Pavlinjek, and Palcic (2021) in Slovenia, have examined demand variability and production challenges, while Whitman et al. (2019) highlighted the need for customer-centric supply chain systems. Additionally, Otieno, Ondiek, and Odhiambo (2020) analyzed inefficiencies in Kenyan firms but focused on capacity constraints rather than demand management strategies. These studies, however, do not comprehensively address the role of demand management in mitigating supply chain inefficiencies in the Kenyan context.

This study sought to bridge this gap by assessing the relationship between demand management and the performance of food and beverage manufacturing firms in Kenya. By evaluating the effects of demand forecasting, order stability, and supply chain coordination, this research provided insights into how firms can optimize their supply chains, enhance efficiency, and achieve long-term growth in a competitive market environment.

Objective of the Study

i. To assess the effect of Demand management on performance of food and beverage manufacturing firms in Kenya

Research Hypothesis

H_{01}: Demand management has no effect on performance of food and beverage manufacturing firms in Kenya

Theoretical Review

Institutional Theory

Institutional theory is based in the social constructionism of Peter Berger and Thomas Luckmann (1967). The institutional environment is defined as an entity that lies outside the boundaries of the organization. It influences organizational outcomes by imposing constrains on firms' operations and demanding adaptation of firms' processes in order to survive. Institutional theory is recognized through the pressures of social, cultural, political, and legal sector as main factors influencing the operation of organizations (Yang & Sheu, 2011).

Furusten, (2013) indicated that according to the institutional approach under organizational field, there are three mechanisms of pressures by which imitations (isomorphism) in structure and processes between organizations are motivated: coercive, mimetic, and normative. Coercive isomorphism derives from formal and informal pressures carried out on organizations by other organizations upon which they depend. Such forces can be exerted through persuasion, invitation to join shared behavioral models, laws and regulations, and government mandates.

Coercive forces are typically given to governmental authorities by issuing laws and regulations. Mimetic isomorphism is a firm's standard response to environmental uncertainty by imitating themselves as other organizations, e.g. using lean or agile manufacturing in production, Just-In-Time in sourcing, and Efficient Customer Response in distribution. Normative isomorphism arises from the high degree of socialization and interaction that often occurs between members of the same organizational environment. When these members interact, they reinforce and spread norms of behavior among themselves (Furusten 2013; Miles, 2012).

Everything we do is a Process, which is the transformation of a set of inputs, which can include action, methods and operations, into the desired outputs, which satisfy the customers' needs and expectations. In each area or function within an organisation there was many processes taking place, and each can be analysed by an examination of the inputs and outputs to determine the action necessary to improve quality (Baganha & Cohen, 2011).

There are mixed views and perspectives regarding the effect of liberalization on the sector based on the average demand for processors. The theory as explained above supports the specific objective on the Demand managementeffect on performance since institutional environment influences organizational outcomes by imposing constrains on firms' operations and demanding adaptation of firms' processes in order to survive. Hence the theory can help in putting in place mechanisms to demand forecast.

Conceptual Framework

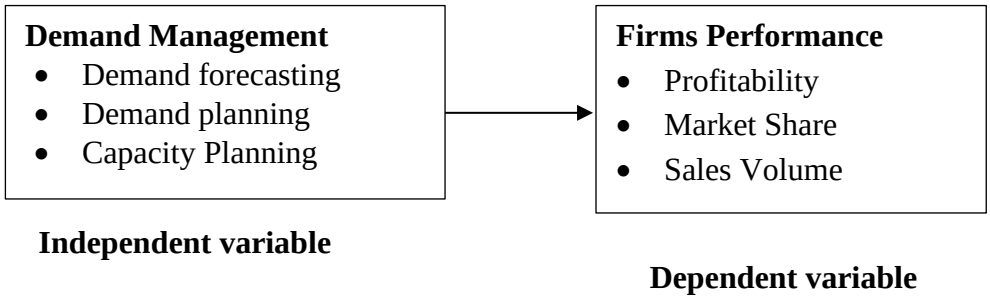

Figure 2.1: Conceptual Framework
Demand Management

In order to determine its target inventory level, each stage of the supply chain must forecast both the expected demand and the standard deviation of demand. This forecasting can be done using any of the forecasting techniques, for example, moving average or exponential smoothing. In the moving average forecast, the forecast average demand per period is simply

the average of the demands observed over some fixed number of periods. Each link in supply chain, starting from manufacturers, distributors, wholesalers or retailers strives for taking suitable measures at their levels towards forecasting of demand for their products (Chent *et al.*, 2016).

Demand forecasting is the process of predicting future demand for materials, labor, and other resources required for a construction project. It involves analyzing historical data, market trends, and other relevant information to estimate the future needs of a project, ensuring that construction firms have the right amount of resources available when needed (Caroll & Rao, 2018). Accurate demand forecasting helps prevent resource shortages or overstocking, both of which can lead to project delays or cost overruns. For example, by understanding seasonal trends or fluctuations in construction activity, firms can anticipate periods of high demand for materials like concrete, steel, or wood and plan accordingly (Chent *et al*., 2016). Inaccurate forecasting, on the other hand, can result in project delays or interruptions when demand exceeds supply or when too much material is ordered, leading to excess inventory and storage costs (Sterman, 2019). Sophisticated software tools and data analytics are increasingly used in demand forecasting, providing real-time updates and allowing construction managers to make informed decisions. This predictive capability also helps firms optimize their procurement processes, ensuring they procure materials only when necessary, thereby minimizing waste and reducing project costs (Ryan, 2017).

Demand planning is a critical component of the overall demand management process, focusing on creating strategies and actions to ensure that materials, labor, and other resources are available at the right time and in the correct quantity (Caplin, 2019). It builds on the insights gained from demand forecasting and involves developing specific plans to fulfill that forecasted demand. In construction, demand planning involves coordinating with suppliers, subcontractors, and labor forces to ensure that all resources are aligned with the project timeline. For instance, if a construction manager forecasts a surge in demand for a particular material, such as steel, demand planning would involve negotiating with suppliers ahead of time to ensure availability at the required stages of construction (Hunt & Kern, 2016). Additionally, it helps construction firms prepare for fluctuations in demand, ensuring that projects are not stalled due to resource shortages. Demand planning also includes managing lead times for procurement, reducing the risk of delays caused by late deliveries or unavailable materials. Through careful demand planning, construction firms can minimize disruptions and maintain smooth workflow throughout the project lifecycle (Kelly, 2019).

Capacity planning is a crucial process in demand management, as it ensures that a construction firm has the appropriate resources—whether labor, machinery, or equipment—available to meet the forecasted and planned demand for a project (Fransoo & Wouters, 2019). It involves assessing the current resources available and determining if additional capacity is required to meet future demand. For example, if a construction project is expected to scale up during a particular phase, capacity planning ensures that sufficient labor and equipment are available to handle the increased workload. This may involve hiring additional workers, renting extra machinery, or securing more space for storage and operations (Jianhua, 2018). Effective capacity planning also helps avoid the opposite problem—underutilization of resources. If a firm overestimates the demand, it may lead to an inefficient allocation of resources, resulting in idle machinery or unnecessary labor costs. Therefore, construction managers must continuously monitor project progress and adjust capacity as needed to align with the project's evolving needs (Fransoo & Wouters, 2019). The key to successful capacity planning is maintaining flexibility, as construction projects often face unexpected delays or disruptions that may impact demand. By accurately planning for capacity, construction firms can ensure smoother operations, improve project efficiency, and avoid costly bottlenecks in the construction process (Graves, 2019).

Katemauswa and Naude (2020) conducted a case study focusing on a prominent South African apparel retailer to identify factors influencing demand forecasting and planning. Their exploratory and descriptive research utilized thematic analysis to analyze data. The findings revealed several critical factors affecting demand forecasting and planning practices, including competition, economic issues, weather conditions, system issues, poor internal collaboration, supplier challenges, and the impact of social media. The study emphasized the importance of considering these factors to meet consumer needs effectively and improve overall performance in the apparel industry.

Mokilane et al. (2018) applied a quantile regression (QR) model to forecast the hourly distribution of electricity demand in South Africa. Their study aimed to evaluate variabilities in forecasts and assess uncertainties around point forecasts. The results indicated that future distributions of hourly and peak daily demands are likely to shift towards lower levels until 2023. The QR model provided accurate long-term point forecasts, effectively capturing peak demands. This approach offers valuable insights for long-term electricity demand planning, enabling better resource allocation and infrastructure development.

Gülay (2019) compared various forecasting models to predict total electricity production in South Africa. The study evaluated hybrid models, including artificial neural networks (ANN) combined with seasonal autoregressive integrated moving average (SARIMA) and Holt-Winters (HW) models. Findings demonstrated that the ANN-based multiplicative HW model outperformed traditional univariate time series models, achieving higher forecasting accuracy. This suggests that hybrid models can effectively capture the complexities of electricity production, leading to improved demand forecasting and operational performance in the energy sector.

A study assessing demand forecasting models for multi-store retail operations in South Africa evaluated the empirical performance of various models, including the existing AdaBoost.RT algorithm. The research followed a robust experimental methodology to compare forecast accuracy. Results indicated that modifying meta-parameters in the AdaBoost.RT algorithm enhanced its performance, leading to more reliable demand forecasts across multiple retail stores. This improvement in forecasting accuracy can contribute to better inventory management and overall operational efficiency in the retail sector.

The energy sector in Nigeria has been a focal point for demand forecasting research due to its pivotal role in economic development. Thomas and Okafor (2021) utilized historical energy consumption data to predict future electricity demand, revealing a significant positive correlation between advancing years and increased electricity demand. Their findings indicated that Nigeria would require over 17,000 MW in 2021 and more than 23,000 MW by 2040 to meet the growing needs of its population. The study emphasized that accurate demand forecasting is essential for effective energy planning and infrastructure development.

Similarly, Popoola and Akanji (2024) conducted a comparative analysis of three predictive models—ARIMA, RNN, and LSTM—to forecast Nigeria's energy demand over a five-year period. Their research demonstrated that the RNN model outperformed the others, highlighting the effectiveness of advanced deep learning techniques in capturing complex consumption patterns. This study underscores the importance of adopting sophisticated forecasting models to enhance accuracy in energy demand predictions.

Despite its benefits, demand forecasting in Nigeria faces several challenges, including data scarcity, market volatility, and infrastructural limitations. To address these issues, innovative approaches have been proposed. Novatia Consulting (2024) highlighted the importance of integrating technology, such as data analytics and artificial intelligence, to improve the accuracy of demand forecasts. Their approach involves analyzing real-time data to identify

consumer behavior patterns, enabling businesses to adjust their supply chains proactively. This strategy not only enhances responsiveness to market fluctuations but also fosters economic resilience.

Makoni and Chikobvu (2018) utilized Seasonal ARIMA (SARIMA) models to forecast tourist arrivals at Victoria Falls, emphasizing the importance of accurate demand forecasting for strategic planning in tourism. Their study highlighted that univariate time-series methods, like SARIMA, are effective in capturing seasonal patterns inherent in tourism data.

Similarly, Nyoni (2021) applied the Box-Jenkins ARIMA methodology to model international tourism demand in Zimbabwe from 1980 to 2019. The study projected an increase in international tourist arrivals between 2020 and 2030, suggesting a positive outlook for the country's tourism industry. Nyoni advocated for the enforcement of COVID-19 preventive measures and support for tourism development policies to sustain this growth.

In the energy domain, Nyoni (2019) employed the ARIMA model to forecast electricity demand in Zimbabwe using data from 1971 to 2014. The findings indicated a projected decline in electricity demand from 2015 to 2025. The study recommended liberalizing the electricity sector to attract private investments, aiming to enhance efficiency and meet the anticipated demand.

In the healthcare domain, effective demand forecasting is crucial for ensuring the availability of essential medicines and medical supplies. A performance audit by the National Audit Office (2014) highlighted challenges in the Medical Stores Department's (MSD) demand forecasting processes, leading to stock outs in public health facilities. The audit recommended integrating demand forecasting into the Comprehensive Council Health Planning (CCHP) guidelines and enhancing the quality assessment of forecast reports at zonal levels. Additionally, a study by Msemo et al. (2021) developed an interpretable predictive model using machine learning to forecast vaccine utilization at individual health facilities in Tanzania. This model achieved a forecasting fraction error of less than two for about 45% of regional health facilities, significantly improving over existing systems.

Tourism is a vital industry in Tanzania, and accurate demand forecasting is essential for strategic planning. Ndiege (2015) analyzed the performance of international tourism demand using ARIMA models and found that, despite a growth trend, the annual increase was approximately 1%, below the global average reported by the World Tourism Organization. The study suggested that to capitalize on global tourism demand, Tanzania should develop artificial tourism attractions to complement its natural heritage and diversify tourism products.

In the financial sector, understanding money demand is critical for effective monetary policy. O'Connell et al. (2011) identified a well-behaved dynamic demand function for M2 in Tanzania, enhancing the forecasting of velocity. The study emphasized that conditioning on the determinants of money demand significantly improves forecast performance, which is vital for monetary policy formulation.

Accurate load forecasting is essential for energy planning and infrastructure development. A feasibility study (2009) prepared a demand forecast for Tanzania's energy needs up to 2025, considering new projects and electrification of non-electrified areas. The study provided detailed projections of energy and capacity requirements, which are crucial for strategic planning in the energy sector.

Kiplagat (2024) investigated the influence of demand forecasting systems on the performance of manufacturing firms in Kenya. Utilizing a descriptive survey research design, the study sampled 90 managers from firms registered with the Kenya Association of Manufacturers. The findings indicated that demand forecasting systems accounted for 7.6% of the variance in firm performance, suggesting a significant positive impact. The study recommended the adoption

of quantitative, qualitative, causal, and time series forecasting methods to enhance performance.

Wamoto, Kwasira, and Ndolo (2022) examined the relationship between demand forecasting practices and operational performance in commercial state corporations in Kenya. The study targeted 906 senior management, procurement managers, and inventory officers across 54 corporations, with a sample size of 99 respondents. Results demonstrated a significant influence of maintained inventory levels and information flow on operational performance, with coefficients (β) of -0.223 (p=0.018) and 0.372 (p=0.000), respectively. The authors recommended the formulation of policies to adopt effective demand forecasting strategies to improve inventory management and operational efficiency.

A study focusing on the Kenya Medical Supplies Authority (KEMSA) assessed the impact of demand forecasting on organizational performance. The research concluded that analyzing past demand and employing trend projection methods positively and significantly affect KEMSA's performance. The study recommended the development of robust demand forecasting systems leveraging historical data to enhance efficiency and service delivery. □cite□turn0search3□

Chilshe and Phiri (2022) explored the impact of demand forecasting on the performance of SMEs, specifically agro-dealers in Zambia. While this study is geographically outside Kenya, its insights are pertinent due to similar market dynamics. The research found that effective demand forecasting significantly improves inventory management and overall business performance in SMEs. The authors advocated for capacity-building initiatives to enhance forecasting skills among SME operators.

Kiplagat (2024) also examined the relationship between lead time systems and performance in manufacturing firms. The study revealed that lead time systems accounted for 7.6% of the change in performance, emphasizing the importance of proactive lead time reduction strategies. Recommendations included adopting practices that minimize lead times to improve responsiveness and efficiency.

Awanga (2018) conducted a study focusing on FMCG companies in Nairobi and Kiambu counties. The research highlighted that effective demand planning, particularly through accurate forecasting and Sales and Operations Planning (S&OP), significantly enhances supply chain performance. The study emphasized that robust forecasting practices lead to optimized inventory levels, reduced operational costs, and improved customer satisfaction.

A study by Stratford Journals (2022) examined the impact of demand forecasting systems on the performance of manufacturing firms in Kenya. The findings indicated that the implementation of advanced demand forecasting systems accounted for a 7.6% improvement in the performance metrics of these firms. The research suggested that integrating sophisticated forecasting tools enables better anticipation of market demands, leading to enhanced operational efficiency and competitiveness.

Research by The International Journal of Business Management and Technology (2022) explored the relationship between demand forecasting practices and operational performance in commercial state corporations in Kenya. The study found that maintaining optimal inventory levels and ensuring efficient information flow are critical components of demand forecasting that positively influence operational performance. Specifically, the study reported that effective demand forecasting practices lead to cost efficiency, reduced lead times, and improved service delivery in state corporations.

A study published in the International Journal of Social Sciences Management and Entrepreneurship (2023) focused on the Kenya Medical Supplies Authority. The research concluded that analyzing past demand and employing trend projection methodologies have a positive and significant effect on KEMSA's performance. The study recommended the

development of a robust demand forecasting system that leverages historical data to enhance the accuracy of supply chain operations, thereby ensuring timely and adequate medical supplies distribution.

While not specific to Kenya, Ghanayem (2024) conducted a study in Jordan's FMCG sector that offers relevant insights. The research examined the impact of demand planning processes—including demand forecasting, S&OP, and demand collaboration—on supply chain performance. Findings revealed strong positive correlations between these processes and supply chain performance metrics such as inventory control, agility, and customer satisfaction. These insights underscore the potential benefits of implementing comprehensive demand planning strategies in similar contexts, including Kenya.

Nangulu (2018) examined capacity management strategies within Kenya's sugar manufacturing firms, identifying a positive correlation between effective capacity management and operational performance. The study emphasized the importance of aligning capacity with demand to optimize production efficiency.

Similarly, Wachiuri (2023) investigated the influence of supplier capacity on the performance of state corporations in Kenya. The findings indicated that supplier capacity significantly and positively affects organizational performance, underscoring the need for suppliers to enhance their capabilities to meet customer expectations.

A study by Muli and Kyalo (2022) focused on building construction projects in Nairobi County, assessing the impact of capacity planning alongside technology adoption, resource allocation, and stakeholder involvement. The research concluded that effective capacity planning positively influences the sustainability and success of construction projects.

In the agricultural domain, research by Muthoni and Wangui (2023) explored resource capacity planning in climate-smart agriculture projects in Laikipia County. The study found that strategic capacity planning is essential for the successful implementation and performance of these projects, particularly in adapting to climate change challenges. Wachiuri (2023) also examined the effect of capacity planning on supply chain performance within Kenyan manufacturing firms. The study highlighted that comprehensive capacity planning, beyond mere demand forecasting, is crucial for enhancing supply chain efficiency and overall organizational performance.

Performance of Food and Beverage Manufacturing Firms

Performance measurement refers to the process of measuring the action's efficiency and effectiveness (Staudt, Alpan, Di Mascolo, & Rodriguez, 2017). In the current business management, performance measurement is considered to be in a more critical role compared to quantification and accounting (Koufopoulos, Zoumbos, Argyropoulou & Motwani, 2018). This is consistent with Franco-Santos, Lucianetti and Bourne (2016) who described performance management as a process wherein the organization manages its performance to match its corporate and functional strategies and objectives. Additionally, the firm's value can be described as the benefits stemming from the firm's shares by the shareholders. The company's performance can be viewed from the financial statement reported by the company. Consequently, a good performing company will reinforce management for quality disclosure (AlMatari et al., 2018).

Performance comprises the actual output or results of an organization as measured against its intended outputs (Staudt et al., 2017). Firm performance includes multiple activities that help in establishing the goals of the organization, and monitor the progress towards the target. However, for any business to be successful, functions must be defined and accomplished. It is important for an organization to develop strategies that are designed around the skills that would enhance its performance. It is used to make adjustments to accomplish goals more

efficiently and effectively. Firm performance is what business executives and owners are usually frustrated about (Ostroff & Bowen, 2016).

Measurement of performance can offer significant invaluable information to allow management's monitoring of performance, report progress, improve motivation and communication and pinpoint problems; therefore, it is in the firm's best interest to evaluate its performance. Nevertheless, this is a management area characterized by lack of consistency as to what constitutes firm performance. The countless number of ways has been brought forward to measure financial performance and among them are: measurement of performance as the level of Return on Assets (ROA), Return on Equity (ROE), Tobin-Q, and Profit Margin (PM), Market Share among many other measures (Al-Matari, Al-Swidi & Fadzil, 2018).

In measuring manufacturing firms performance, this study adopted ROA, ROE, sales growth and profit margins ratios. Use of return on asset ratio shows the amount of earnings that have been generated from invested capital assets (Epps & Cereola, 2018). Return on assets allows users to assess how well firms mechanisms are assisting in securing and monitoring the efficiency of the management in utilizing assets to generate profits (Mohamad, et al. 2017). Profit margin is one of the commonly used profitability ratios to gauge profitability of a business activity. It represents how much percentage of sales has turned into profits. Simply put, the percentage figure indicates how many cents of profit the business has generated for each dollar of sale.

Goga (2023) assessed the influence of organizational structure on the performance of state corporations in Kenya. Using an exploratory survey design targeting 187 state corporations, the study established that organizational culture significantly and positively influences performance. The research recommends that leaders adopt effective and flexible organizational structures to promote employee productivity and overall organizational performance.

Empirical Review

Demand fluctuations, capacity-demand mismatches, and service quality challenges are critical supply chain risks (SCRs) affecting businesses (Park et al., 2020; Alhawari et al., 2021). Deleris and Erhun (2007) identified key risks in supply chain (SC) operations—demand, supply, control, and process—highlighting their impact on performance (Kumar, 2015). Resilient supply chains mitigate these risks through re-engineering, collaboration, and fostering a risk management culture (Christopher & Peck, 2004).

Klassen and Rohleder (2010) emphasized the role of demand management options (DMOs), advocating for both short-term and long-term strategic actions to address demand variability. The presence of SCRs negatively affects SC performance, while effective risk mitigation enhances it (Chen et al., 2013; Alhawari et al., 2021). This study explores how the implementation of demand management strategies (DMS) can positively impact business performance despite the persistence of SCRs.

According to a study by Whang *et al*., (2016) on analyzing the Bullwhip Effects in Supply Chains at P&G, concluded that every company in a supply chain usually does product forecasting for its production scheduling, capacity planning, inventory control, and material requirements planning. Forecasting is often based on the order history from the company's immediate customers. The outcomes of the beer game are the consequence of many behavioral factors, such as the players' perceptions and mistrust. An important factor is each player's thought process in projecting the demand pattern based on what he or she observes.

A study by Caroll and Rao (2018) while attempting to establish the causes and remedies of Bullwhip Effect in supply chains established that when a downstream operation places an order, the upstream manager processes that piece of information as a signal about future product demand. Based on this signal, the upstream manager readjusts his or her demand

forecasts and, in turn, the orders placed with the suppliers of the upstream operation. With exponential smoothing, future demands are continuously updated as the new daily demand data become available. The order you send to the supplier reflects the amount you need to replenish the stocks to meet the requirements of future demands, as well as the necessary safety stocks. The future demands and the associated safety stocks are updated using the smoothing technique. With long lead times, it is not uncommon to have weeks of safety stocks.

Chent *et al.,* (2016) study on the Bullwhip Effect of managerial insights of forecasting and information on variability in a supply chain stated that the fluctuations in order quantities can be much greater than those in demand data. If the upstream neighbour in the supply chain uses exponential smoothing and uses the orders to forecast the demand, the orders that are placed by this neighbour had even bigger swings. It is intuitively clear that longer lead times lead to greater fluctuations. As explained above, safety stock contributes to the bullwhip effect. With longer lead times the need for safety stock was greater.

Rajani et al. (2022) explored demand management strategies in the service sector and their impact on company performance, revealing that demand variability risk significantly influences the adoption of demand planning, forecasting, peak-time customer arrival control, and demand shifting. When capacity is underutilized, businesses implement strategies to boost demand during lean periods, leading to improved supply chain efficiency and financial outcomes. Additionally, managing customer arrival during peak periods to redistribute demand enhances financial performance. However, the study found that delivery quality risk does not notably impact the adoption of demand management strategies (DMS), and short-term business and customer handling techniques do not significantly affect company performance. This highlights the importance of long-term, strategic demand management approaches in optimizing service sector performance.

Critique of Existing Literature

Demand management and Organization Performance

The study by Whang et al. (2016) focused on analyzing the Bullwhip Effect in supply chains at P&G, emphasizing how companies engage in product forecasting for production scheduling, capacity planning, inventory control, and material requirements planning. However, the study primarily addressed supply chain inefficiencies rather than directly examining how price fluctuations impact the performance of food and beverage manufacturing firms. Additionally, it was conducted in a multinational corporate context, limiting its applicability to Kenya's food and beverage sector, where demand management may have different implications due to economic, regulatory, and market dynamics. This creates a research gap by highlighting the need for an empirical investigation into the direct effects of demand management on firm performance within Kenya's food and beverage manufacturing industry.

Caroll and Rao (2018) examined the causes and remedies of the Bullwhip Effect in supply chains, highlighting how upstream managers interpret downstream orders as signals of future demand. However, their study primarily focused on supply chain inefficiencies rather than directly assessing how price fluctuations influence the performance of food and beverage manufacturing firms in Kenya. Additionally, their research did not account for the unique market dynamics, cost structures, and external economic factors affecting these firms. This creates a research gap in understanding the direct impact of demand management on financial performance, production stability, and market competitiveness in Kenya's food and beverage sector.

Chent et al. (2016) provided valuable insights into the Bullwhip Effect by illustrating how forecasting methods, particularly exponential smoothing, exacerbated order fluctuations within supply chains. However, their study primarily focused on managerial forecasting techniques

and supply chain variability rather than directly addressing the impact of price fluctuations on firm performance. Additionally, their research did not consider the unique challenges faced by food and beverage manufacturing firms in Kenya, where price volatility is influenced by factors such as raw material availability, regulatory policies, and market dynamics. This gap necessitated further investigation into how demand management specifically affect the operational and financial performance of these firms, providing a contextualized understanding within the Kenyan market.

Rajani et al. (2022) focused on demand management strategies in the service sector, emphasizing how demand variability risk influenced demand planning, forecasting, peak-time customer arrival control, and demand shifting. However, their study did not address the manufacturing sector, particularly food and beverage firms, which experience price fluctuations due to raw material costs, market dynamics, and economic instability. Additionally, their research primarily examined demand-side factors rather than the impact of price fluctuations on overall firm performance, including profitability, cost management, and production efficiency. This gap necessitated an investigation into how demand management affects the performance of food and beverage manufacturing firms in Kenya, providing industry-specific insights beyond the service sector.

RESEARCH METHODOLOGY

This study used descriptive research design to collect both qualitative and quantitative data. This study adopted constructive epistemology and specifically post positivism approach. This approach puts emphasis on utilising both positivist and interpretivist philosophy and views both of them as continuum rather than contradictions. Neuman (2016) asserts that positivists assume that objective truth exists and advocate for organized methods for handling probabilistic causal laws used to predict patterns in human activity in an empirical way. The target population was 217 food and beverage manufacturing firms in Kenya. The food and beverage companies formed the unit of analysis while logistics/ procurement managers and their assistants formed the unit of observation. Hence a total of 434 respondents were targeted.

The sample size of the study was determined using Yamane's Formula (Yamane, 1997). Therefore, the sample size for the study was 208 respondents. This represented 47.9% of the study target population. The study adopted a simple random sampling because the method is free of sampling error or classification error. The researcher used structured and unstructured questionnaires to elicit appropriate responses for the study (Atieno, Moronge, & Wario, 2019). A pilot study was conducted to test the instrument's reliability, validity, and completeness of responses, and analyse the various measures within the instrument. In the pilot study 21 participants were invited to participate in filling the questionnaires. This was 10% of the study sample size. The selected respondents were excluded from the final study.

The Statistical Package for Social Sciences (SPSS) version 25 software was used to analyze the data. The research used descriptive analysis. Descriptive statistics allow a researcher to explain the distribution of measures and summarize data comprehensibly (Kothari, 2019; Mugenda & Mugenda, 2020). The open-ended component of the questionnaire was coded, and repeated themes (responses) or concepts were recorded until saturation was reached (Jennings, 2019). Quantitative data was analyzed using descriptive statistics such as frequency, percentages, and means and summary graphs, pie charts, and frequency distribution tables to depict the data's sets of categories. This study conducted inferential statistics through correlation analysis. A multiple regression model was used to test the significance of the influence of the independent variables on the dependent variable.

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

Descriptive Analysis

Demand Management and Firm Performance

The first specific objective of the study was to assess the effect of demand management on performance of food and beverage manufacturing firms in Kenya. The respondents were requested to indicate their level of agreement on various statements relating to demand management and performance of food and beverage manufacturing firms in Kenya. The results were as shown in Table 4.1.

Table 4.1: Descriptive Results for Demand Management

Demand Management	Mean	Std. Dev.
Our firm regularly monitors and evaluates our production capacity utilization	3.954	0.365
We have effective strategies in place to manage fluctuations in demand without compromising capacity	3.941	0.406
We have a clear plan for scaling our production capacity up or down in response to changing demand	3.926	0.421
Our company uses forecast to update its target inventory level	3.914	0.407
Our replenishment policy improves inventory management	3.875	0.429
Demand forecasting allows for limitation of costs generated as a result of storage of excessive amount of unsold products	3.856	0.391
Demand management significantly improves our production planning processes.	3.845	0.453
Our organization uses advanced tools for demand planning and forecasting.	3.839	0.378
Effective demand management helps us maintain optimal inventory levels.	3.827	0.412
Our organization regularly adjusts production schedules based on demand forecasts.	3.796	0.476
Demand management contributes to reducing stockouts and overstock situations.	3.764	0.398
Our organization collaborates closely with key customers to forecast demand.	3.759	0.763

From the results the respondents agreed that their firm regularly monitors and evaluates their production capacity utilization (M=3.954, SD= 0.365). In addition, the respondents agreed that they have effective strategies in place to manage fluctuations in demand without compromising capacity (M= 3.941, SD= 0.406).Further, the respondents agreed that they have a clear plan for scaling their production capacity up or down in response to changing demand (M=3.926, SD= 0.421). The respondents also agreed that their company uses forecast to update its target inventory level (M= 3.914, SD= 0.407). From the results, the respondents agreed that replenishment policy improves inventory management (M= 3.875, SD= 0.429). In addition they agreed that demand forecasting allows for limitation of costs generated as a result of storage of excessive amount of unsold products (M= 3.856, SD= 0.391). These results are supported by the findings of Mentzer and Moon (2019) who established that effective demand forecasting enables firms to anticipate market needs, reduce uncertainty, and make informed decisions regarding production and inventory. In addition, Chopra and Meindl (2020), highlight that synchronized supply and demand planning leads to better alignment of production schedules, procurement processes, and inventory levels. This integration helps firms optimize their resources and respond more effectively to market changes.

The respondents agreed that demand management significantly improves their production planning processes (M=3.845, SD= 0.453). In addition, the respondents agreed that their organization uses advanced tools for demand planning and forecasting (M= 3.839, SD= 0.378). Further, the respondents agreed that effective demand management helps us maintain optimal inventory levels (M=3.827, SD= 0.412). The respondents also agreed that their organization regularly adjusts production schedules based on demand forecasts (M= 3.796, SD= 0.476). From the results, the respondents agreed that demand management contributes to reducing stockouts and overstock situations (M= 3.764, SD= 0.398). In addition they agreed that their organization collaborates closely with key customers to forecast demand (M= 3.759, SD= 0.763). The findings are supported by the findings of Silver, Pyke, and Peterson (2021) who assert that maintaining optimal inventory levels based on accurate demand forecasts minimizes carrying costs and reduces the risk of stockouts. This practice ensures that firms can meet customer demand without overinvesting in inventory, which is critical for financial performance and operational efficiency. In addition, Zipkin (2019), revealed that effective replenishment policies, such as just-in-time (JIT) and continuous replenishment, help firms maintain appropriate inventory levels, reduce excess stock, and improve cash flow.

Based on the findings as supported by majority of the respondents, it was evident that demand management affected performance of food and beverage manufacturing firms in Kenya as supported by an aggregate mean of 3.824 (SD= 0.399). The study findings agree with those of Whang *et al.,* (2016) that demand management is a key factor which influences performance of an organization. Forecasting is often based on the order history from the company's immediate customers. The outcomes of the beer game are the consequence of many behavioral factors, such as the players' perceptions and mistrust. Also, Caroll and Rao (2018) while attempting to establish the causes and remedies of Bullwhip Effect in supply chains established that when a downstream operation places an order, the upstream manager processes that piece of information as a signal about future product demand.

The respondents were also requested to indicate how demand management in their organization can be improved. From the results, the respondents indicated that demand management can be improved through the utilization of data analytics and machine learning algorithms. By analyzing historical sales data, market trends, and consumer behavior patterns, companies can identify significant insights and predict future demand more accurately. These tools can process vast amounts of data quickly and efficiently, uncovering trends that might not be immediately apparent through traditional analysis. Advanced analytics not only enhance the accuracy of forecasts but also enable real-time adjustments as new data becomes available. The results are supported by the findings of Studies by Cachon and Terwiesch (2019) who indicate that accurate demand forecasting and effective inventory management reduce holding costs and minimize waste, thereby improving overall profitability.

In addition, incorporating real-time market intelligence is another crucial aspect. This includes monitoring economic indicators, competitor activities, and industry reports to obtain a comprehensive view of the market landscape. By integrating these insights, firms can adjust their forecasts to reflect current market conditions, making them more responsive to external changes. For instance, understanding shifts in consumer preferences or identifying emerging market trends can help firms anticipate demand more effectively and align their production and inventory strategies accordingly. Further, the respondents indicated that enhancing collaboration between various departments within the organization, such as sales, marketing, and supply chain, is essential for improving demand forecasting. An integrated approach ensures that all relevant insights and data points are considered in the forecasting process. Regular cross-functional meetings and information-sharing platforms can facilitate better communication and coordination, leading to more accurate and holistic forecasts. This collaboration helps in aligning the goals and strategies of different departments, ensuring that

everyone works towards the same objectives based on shared data and insights. The results are in line with the findings of Vollmann, *et al* (2019) who established that effective demand management ensures that production schedules are aligned with market needs, reducing lead times and enhancing responsiveness to customer demand.

The study found that implementing demand sensing techniques can significantly improve the responsiveness of demand forecasting. Demand sensing uses real-time data to detect and respond quickly to fluctuations in demand. This method is particularly effective for managing short-term changes and seasonal variations, allowing firms to adjust their production schedules and inventory levels promptly. By leveraging technologies that provide real-time visibility into sales and inventory data, companies can make informed decisions to meet changing market demands swiftly. According to Seifert (2020), collaboration between suppliers and customers enhances the accuracy of demand forecasts, improves inventory management, and fosters stronger supply chain relationships.

Performance of Food and Beverage Manufacturing Firms

Performance of food and beverage manufacturing firms in Kenya was measured through use of profitability, market share and sales volume in a period of 5 years from 2018-2022. The results were as shown in Figures 4.1.

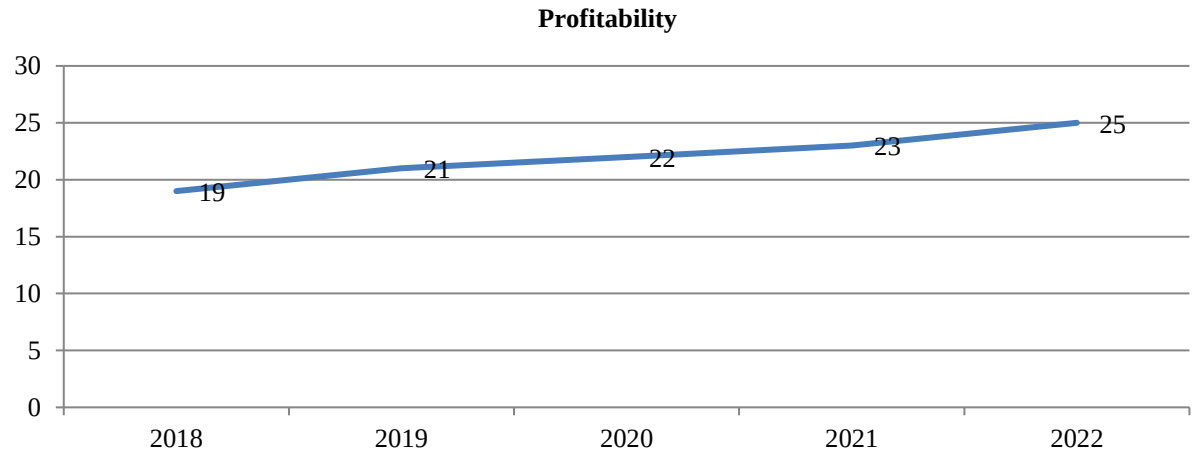

Figure 4.1: Profitability

The study collected data on profitability of food and beverage manufacturing firms in Kenya for a period of 5 years from 2018 to 2022. The results were as shown in Figure 4.5. From the results, profitability of food and beverage manufacturing firms in Kenya improved by 19% in the year 2018, in the years 2019, profitability increased by 21% and slightly increased to 22% in 2020 before increasing to 23% and 25% in 2021 and 2022 respectively.

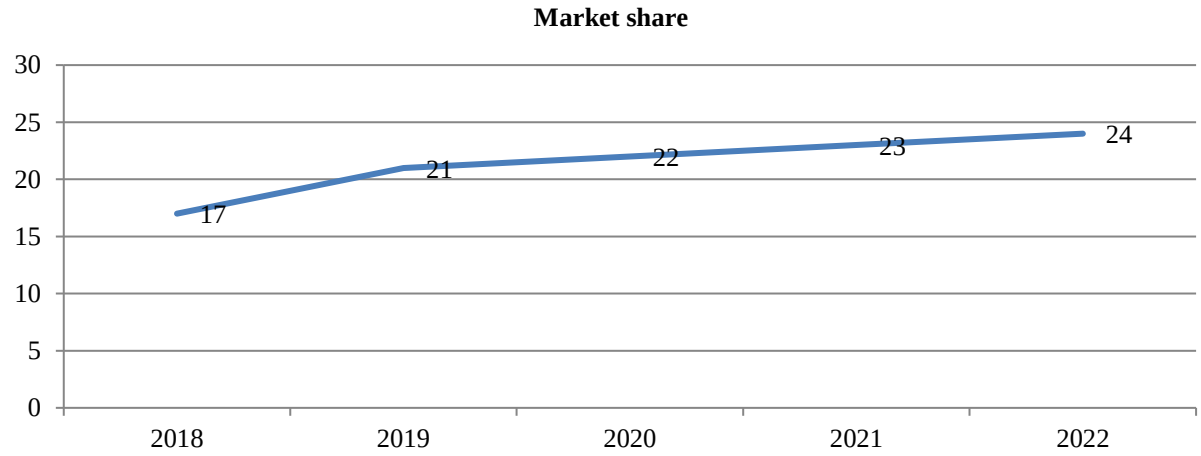

Figure 4.1: Market share

The study collected data on market share of food and beverage manufacturing firms in Kenya for a period of 5 years from 2018 to 2022. The results were as shown in Figure 4.2. From the results, the market share of food and beverage manufacturing firms in Kenya improved by 17% in the year 2018, in the years 2019, the market share increased by 21% and slightly increased to 22% in 2020 before increasing to 23% and 24% in 2021 and 2022 respectively.

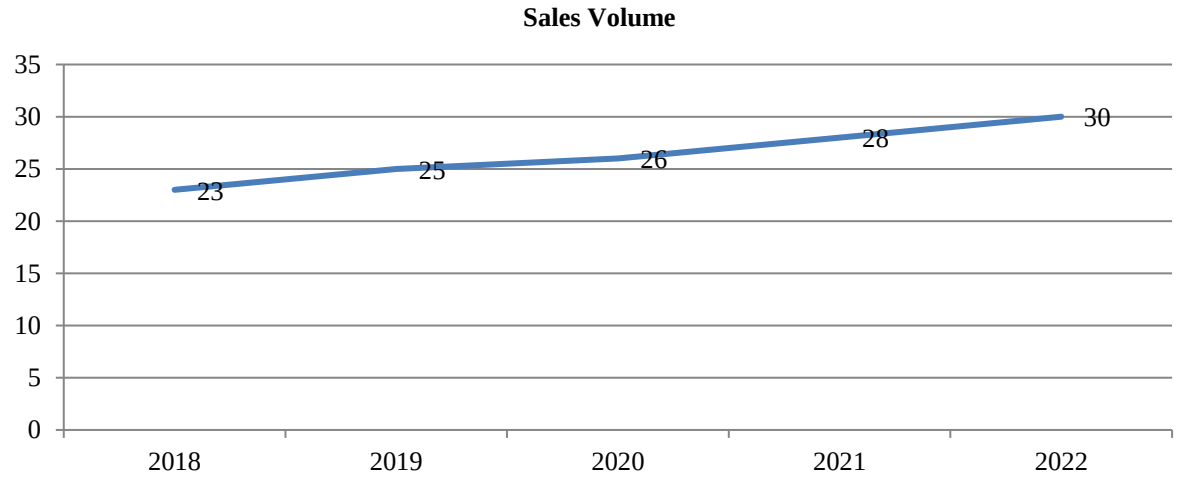

Figure 4.2: Sales Volume

The study collected data on sales volume of food and beverage manufacturing firms in Kenya for a period of 5 years from 2018 to 2022. The results were as shown in Figure 4.2. From the results, the sales volume of food and beverage manufacturing firms in Kenya improved by 23% in the year 2018, in the years 2019, the sales volume increased by 25% and slightly increased to 26% in 2020 before increasing to 28% and 30% in 2021 and 2022 respectively.

Linear Regression Analysis- Demand management on Performance

The first objective of the study sought to assess the effect of demand management on performance of food and beverage manufacturing firms in Kenya. The corresponding hypothesis was:

Table 4.2: ANOVA for Demand management and Firm performance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	51.159	1	51.159	426.33	.000[b]
	Residual	22.816	191	0.12		
	Total	73.975	192			

a. Dependent Variable: Performance of food and beverage manufacturing firms
b. Predictors: (Constant), Demand management

The analysis of variance was used to determine whether the regression model is a good fit for the data. From the analysis of variance (ANOVA) findings in Table 4.2, the study found out that that Prob>$F_{1,191}$= 0.000 was less than the selected 0.05 level of significance. This suggests that the model as constituted was fit to predict performance of food and beverage manufacturing firms in Kenya. Further, the F-calculated, from the table (426.33) was greater than the F-critical, from f-distribution tables (3.891) supporting the findings that demand management can be used to predict performance of food and beverage manufacturing firms in Kenya.

Table 4.3: Model Summary for Demand management and firm Performance

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.519[a]	.692	.672	.68365

a. Predictors: (Constant), Demand management

Table 4.3 presents the model summary for the relationship between demand management and firm performance. The correlation coefficient (R) of 0.519 indicates a moderate positive relationship between demand management and firm performance. The R Square value of 0.692 suggests that approximately 69.2% of the variance in firm performance can be explained by demand management, highlighting its substantial contribution to performance outcomes. The adjusted R Square (0.672) accounts for potential overestimation and confirms that after adjusting for predictors, 67.2% of the variation in firm performance remains attributable to demand management. The standard error of the estimate (0.68365) reflects the average deviation of observed values from the regression line, indicating the model's predictive accuracy. Overall, these statistics suggest that demand management is a significant determinant of firm performance, though other factors may also contribute to performance variations.

Table 4.4: Coefficients for Demand Management and Firm Performance

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	0.292	.067		4.358	.000
	Demand Management	.476	.099	.481	4.808	.000

a. Dependent Variable: Firm performance

Table 4.4 represents the coefficient of regression where interpretation is made at the unassimilated coefficients that depict the estimated coefficients which show the size or the magnitude of the change and the t-statistics which tests the statistical significance of the individual regression coefficient as compared to the p-value. Therefore, the study established that the demand management coefficient value was found to be .476 which shows that a unit increase demand management on average increases performance of food and beverage manufacturing firms in Kenya by .431 units hence a direct positive correlation between demand management on performance of food and beverage manufacturing firms in Kenya.

The study also observed that the calculated t-value for the hip demand management on performance 4.808 with an associated p-value of 0.000. Since the p-value is less than 0.05 at 5% level of significance, the study concludes that demand management has a significant and

positive effect on performance hence, the null hypothesis, There is no significant effect between the demand management and firm performance, was rejected since $\rho<0.05$ and adopted the alternative hypothesis that, there is significant effect between demand management and firm performance in the commercial state corporations.

The regression equation for predicting firm performance from Demand management was $Y = 0.292 + 0.476\ X_2$ implying that demand management has positive significant effect on firm performance ($B=0.476$, $p<0.05$).

Summary of Hypothesis Testing

The study sought to assess the influence of bullwhip effect on performance of food and beverage manufacturing firms in Kenya. To test the hypotheses from the t-statistics was presented in Table 4.5.

Table 4.5: Summary of hypothesis testing

Null Hypothesis	Decision reached
Demand management has no effect on performance of food and beverage manufacturing firms in Kenya	The hypothesis was rejected and the alternative hypothesis accepted.

Conclusions

The first null hypothesis test was 'demand management does not significantly influence performance of food and beverage manufacturing firms in Kenya'. The study found that demand management is statistically significant in explaining performance of food and beverage manufacturing firms in Kenya'. The influence was found to be positive. This means that unit increase in demand management would lead to an increase in performance of food and beverage manufacturing firms in Kenya''. Based on the findings, the study concluded that demand management positively and significantly influences performance of food and beverage manufacturing firms in Kenya'.

Recommendations

In addition, this study recommended the management food and beverage manufacturing firms in Kenya should implement advanced demand forecasting techniques and inventory optimization tools to better align production with market needs. By utilizing data analytics and consumer behavior insights, companies can more accurately predict demand fluctuations and adjust production schedules accordingly. Additionally, fostering flexible production processes and strengthening collaborative relationships with distributors and retailers will enable firms to respond swiftly to changing demand, ensuring product availability while minimizing costs associated with overproduction or stockouts.

Recommendations for further Studies

This study was limited to assessing the influence of bullwhip effect on performance of food and beverage manufacturing firms in Kenya. The study thus recommends a similar study to be conducted in other firms in the sectors of the economy such as textiles, pharmaceuticals, construction industry etc. Also, customer response was used as the moderating variable; the study thus recommends the use of a different moderator such as change in taste and preference since customers are highly influenced by their tastes and preferences. Also, the study was limited to four components of bullwhip effect which explained 78.5% of all variation in performance of food and beverage manufacturing firms in Kenya. There is therefore need for a study to be conducted on other factors that can explain the remaining 21.5% variation in performance of food and beverage manufacturing firms in Kenya.

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