Int Journal of Social Sciences Management and Entrepreneurship 8(1): 910-925 2024

ISSN 2411-7323

www.sagepublishers.com

SUPPLY CHAIN VISIBILITY AND PERFORMANCE OF DISTRIBUTION FIRMS IN NAIROBI CITY COUNTY, KENYA

[1] Mwaiwa Stephen Wambua, [2] Dr. Noor Ishmail Shale

[1] Master of Science Degree, Jomo Kenyatta University of Agriculture and Technology, Kenya

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

ABSTRACT

The study aim was to determine the supply chain visibility on performance of distribution firms. Specifically, the study determined the effect of technological integration, and demand visibility on performance of distribution firms in Nairobi City County, Kenya. The study adopted the correlational research design. The target population was the 142 employees in the supply chain department in the distribution firms in Nairobi City County. The study sample size was 142 respondents. The study adopted the census method to select the respondents. Primary data was collected using a questionnaire. Quantitative data was analyzed using the descriptive and inferential statistics. Descriptive statistics that were used include frequencies, percentages, mean and standard deviation. Inferential statistics that were used include correlational and regression analysis. The Pearson moment correlation was used to determine the relationship between the independent and dependent variables. Regression analysis was used to determine the association of supply chain visibility and performance. Data was presented in form of tables and figures. The study found that technological integration had a positive and significant relationship with performance of distribution firms in Nairobi City County, Kenya. The study revealed that demand visibility had a positive and significant relationship with performance of distribution firms in Nairobi City County. The study recommends that distribution firms should consider allocating resources to invest in and adopt advanced technologies that facilitate integration across the supply chain. The study recommends that the firms should invest in advanced demand forecasting tools and techniques. Utilize data analytics, machine learning, and predictive modeling to accurately forecast demand patterns. This enables distribution firms to proactively plan inventory levels, minimize stockouts, and optimize overall supply chain efficiency.

Key Words: Supply Chain Visibility, Technological Integration, Demand Visibility, Performance, Distribution Firms

Background of the Study

In the current business environment which is characterized by intense competition, changing customer requirements, diminishing resources, emphasis on quality and sustainable supply chain practices as well as globalization among other factors, to ensure business continuity, the structure of supply chain and specifically distribution function is continuously evolving by aligning companies objectives to their vision to support their capability to increase profitability by cutting unnecessary costs, avoiding delays, improving supply chain speed, minimizing the bullwhip effect, improved customer satisfaction levels, lead time management, meeting quality targets as well as opening of new potential for delivery improvement (Cohen & Roussel, 2019). Effective distribution strategy is a key pillar of production and innovation within a company (Hult et al., 2021).

Striking a balance between offering excellent value to clients and doing it in a way that keeps costs competitive is necessary to maintain a competitive edge (Kristianto et al., 2022). A value chain includes every step of the process, from designing goods and services to providing clients with after-sale assistance (Harrison &Hoek, 2020). The goal is for every link in the chain to function as a whole, providing customers with goods and services when, where, and how they want them, all the while focusing on reducing costs and resources to maximize value. The goal is to include the client in driving the supply chain's distribution process (Pfanelo, 2020). Therefore, re-designing distribution around the customer makes it easier to integrate production into distribution.

Globally, suppliers who deliver to remote areas run a significant risk due to poorly managed supply chains and visibility issues. This problem exists due to the complexity of supply systems, which have evolved from simple local supply chains to complex global supply routes subject to third-party risks (Gurzawska, 2020). Further, given the complexity of modern company, it is imperative that supply chain visibility should be properly integrated into supply chain procedures to support a healthy company. Additionally, firms are constantly on edge due to financial, economic, and reputational risk, and manually managing these risks in the middle of other objectives can occasionally be quite difficult (Messina, 2019). According to Messina (2020), supply chain visibility refers to tracking inventory movements and deliveries, being aware of its location at any given time, and having a thorough understanding of the supply chain's partners.

In the supply chain, distribution is the activities of transferring and storing a product from the supplier to the customer. This process entails moving the product from the manufacturer to the final consumer (Klapita, 2019). Since distribution directly impacts both supply chain costs and customer value, it is a major factor in a company's overall profitability. The transportation of commodities from the place of origin to the final destination is a critical component of logistics and is composed of three components; customer service, transportation, warehousing functions (Inventory management -packaging, inventory handling, stock control and information flow, to ensure efficient and effective product delivery (Marasco, 2018) that may be fulfilled through four channels; direct channel, wholesaler channel, retailer channel and e-commerce, which have prompted quick changes and forced distributors to reconsider their conventional approaches, which involve virtually representing goods and services online before delivering them straight to the customer (Hadebe, 2019).

Statement of Problem

The distribution market in Kenya was projected to expand at a compound annual growth rate (CAGR) of 25% between 2013 and 2018. Kenya's advantageous location as the entry point to East Africa and an increase in government infrastructure expenditure were the primary causes of the boom. Kenya's distribution industry is booming in contrast to the worldwide trend, making it a profitable area for foreign distributors (Watanuki, 2018).

However, the performance of distribution firms in Kenya has been fluctuating over the years. A report by World bank (2022), measured performance of the firms in terms of performance index that is (1=low to 5=high). In 2013, the performance index of distribution firms was 2.4 indicating that it was low, in 2016 it was high at a performance index of 3.3 while in 2019 it was high at a performance index of 2.8. This shows that the performance of distribution industry in Kenya fluctuate annually. The performance is affected by challenges in the supply chain like economic challenges such as Taxation policies, economic downturns and booms, abrupt shifts in consumer or market demands, fluctuations in exchange rates and payment problems, product disruptions such as recalls, packaging problems, and quality control problems, and buyer disruptions such as order modifications, shipment address alterations, and product returns, as well as natural disasters like extreme weather, shortages of raw materials, pest damage, and pandemics or epidemics. Transit interruptions comprise maintenance outages, accidents, riots, protests, wars, and strikes; human disruptions include airline delays, new or restricted transit laws, and automobile breakdowns (Hadebe, 2018).

Global pandemics, manual processes, poor integration and shortages in supply have a key effect on SC and have been an ongoing concern. The Institute of Supply Management (ISM) surveyed 559 participants and discovered that, typical lead times for distributors continue to increase. During the Covid-19 pandemic, China distribution lead times increased by 222%, Europe by 201% and the US by 200% (ISM, 2022), ISM proposes that a good place for the distribution industry to start addressing the challenge is through auditing their supply chains to be able to pinpoint portions of the chain that are either struggling to deliver, have fallen apart outright, or are showing signs of stress to be able to identify and address challenges before disruption happens.

Rob and Meghan (2022) pointed out that a Singaporean food and beverage manufacturer discovered that utilizing sophisticated automation and digital tools increased productivity. By reorganizing its distribution network, it was able to improve service levels while cutting expenses by over 20%. Over 95% of shipments were made the same day, and 98% of service levels were completed on time. Here is an example of a UK-based home accessory firm that, by implementing lean methods, revamping the internal design of its distribution centers, and capitalizing in technologies to automate operations, generated significant savings in less than a year. Thus far, these approaches have improved service levels while reducing overall distribution and transportation expenses by 15%. The corporation wants to reduce by 40% in three years. And realization of a customer-focused distribution strategy.

Companies typically measure their productivity using industrial processes rather than the entire supply chain. They consequently fail to notice ineffective distribution networks. A pilot project in the largest retail sector in America suggested enhancing visibility to enhance technology and process flow. It was determined that, with effective application, savings of over $100 million might be achieved (Rob & Meghan, 2022). If companies can achieve efficiency throughout their distribution operations, they can upgrade their systems and reduce their distribution network expenses by 10% to 25%. A distribution center footprint that provides the optimum general performance can be determined and disappointing decisions can be avoided with the use of digital tools and modelling.

In today's globalized and extremely competitive business environment, SCV plays a crucial role in enhancing the overall organizational performance of distribution firms. However, there is a lack of comprehensive understanding regarding the association between supply chain visibility and performance of distribution firms precisely within the context of NCC, Kenya (Gurzawska, 2020). While supply chain visibility is widely recognized as a key driver of operational efficiency, customer satisfaction, and cost reduction, the extent to which distribution firms in Nairobi City County have implemented and leveraged supply chain visibility practices remains unclear. The problem lies in the fact that without adequate visibility into the supply chain, distribution firms

may face challenges such as inefficient inventory management, delivery delays, poor order fulfillment, limited responsiveness to customer demands loss of market share and diminishing customer satisfaction levels (Somapa, Cools & Dullaert, 2018).

Furthermore, the specific impact of SCV on performance of distribution firms in NCC needs to be explored. It is essential to determine whether enhanced visibility effectively supports a firm's key performance indicators (KPIs) like timely delivery, customer satisfaction, inventory turnover, and financial performance. The concept of SCV has been supported by Swift (2019) who noted that firms with high SCV realize enhanced sales performance and stock market valuations in the United States. Saqib, Saqib and Ou (2019) indicated that sharing the information creates visibility among supply chain partners in China. Therefore, there was need to conduct the study in Kenya, to determine the effect supply chain visibility has on performance of distribution firms in NCC, Kenya.

Specific Objectives of the Study

The study was guided by the following specific objectives;

i. To investigate the effect of technological integration on performance of distribution firms in Nairobi City County, Kenya.
ii. To determine the effect of demand visibility on performance of distribution firms in Nairobi City County, Kenya

LITERATURE REVIEW

Theoretical Review

Systems Theory

The theory was developed in the early 1950s by Ludwig von Bertalanffy. It presents an entity as a collection of interconnected systems and subsystems that work together to form the larger system. A system in a business is an organized set of tools, processes, information, and actions (Bertalanffy, 1950). The system theory's primary focus is interdependence. A system is made up of groupings of actions or pieces that work together or interact on a regular basis to form a whole. Hence, changing one part of a system may affect other parts or the whole system. Systems theory speaks of how technology supports integration of various components of the supply chain that is customer service, transportation, warehousing functions to create a subsystem that is subsequently a component of a bigger network or supply chain system (Sarkis, 2020).

Complex supply chain networks of today necessitate the use of cutting-edge technologies to set up business process and information exchange platforms between supply chain participants. To meet customer expectations, the complete supply chain system needs to function cohesively and smoothly. Consumers expect the on-time delivery of products (Esper, 2021). Through supply chain system, the visibility of distribution can be ensured. This is because the system ensures the collaboration of the different supply chain functions. The interdependence of the functions helps to keep track of steps in supply and distribution chains leading to enhanced customer satisfaction and minimal errors (Esper, 2021).

Also, supply chain systems offer the opportunity to outsource providers to enhance visibility throughout the supply chain. Adopting new techniques like vendor-managed inventory and transportation systems helps to improve visibility in the supply chain. The systems theory is applied to show how different activities in the supply chain are integrated through technology to achieve good performance. The theory will be used to determine the effect technological integration on performance of distribution firms.

Network Perspective Theory

Harland (1996) was the one who established the network perspective theory. The idea explains the interactions that take place between businesses, vendors, buyers, and customers. The theory evolved from emphasizing strategic alliances, or partnerships between two companies, to an approach that incorporates numerous relationships between various counterparts along the supply chain. Networks are defined by Harland (1996) as a specific type of relationships that connect a predetermined collection of individuals, things, or events. According to Chang, Chiang, and Pai (2012), the network for supply chain is complex and is influenced by the connections between network participants. Thorelli (1986), describes a network as any group of two or more organizations that have long-term interactions with one another. Furthermore, networks are viewed as advantageous for each business that becomes a part of them through the investments and deeds of its other equivalents.

According to the theory, companies that occupy a key position within a network may gain a competitive edge or share knowledge and information with their partners. Furthermore, the idea can be applied to the most significant decision points in terms of its contribution to distribution. Through the simplification of resource allocation achieved through the settlement of strategic long-term partnerships, the theory aids in distribution planning. Additionally, it is considered that the partnerships between businesses are reliable, which adds value to both parties and makes choosing a distribution plan even easier (Chang, Chiang & Pai, 2012). The theory explains the interactions that take place between businesses, suppliers, buyers, and customers. It shows how the organization can work with suppliers and customers to enhance demand. This theory was used to examine the effect of demand visibility on performance of distribution firms in NCC, Kenya.

Conceptual framework

An illustration of the anticipated cause-and-effect relationship is provided by a conceptual framework. The model incorporates several variables and their presumed relationships to mirror the expectations (Imenda, 2014). It was demonstrated via the conceptual framework how the predictor and response variables were related. The independent variables in this study were warehousing, technological integration, rates and demand while the dependent variables were performance of distribution firms. This is as shown in Figure 2.1.

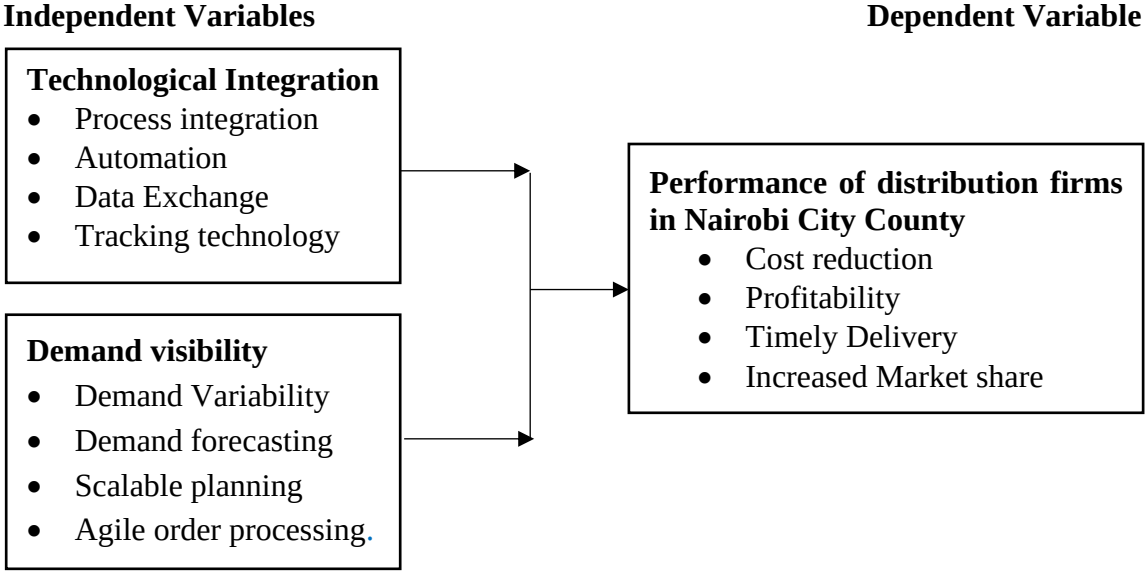

Figure 2.1: Conceptual Framework

Technological Integration

The purpose of system integration is to establish a closer interaction between parties and sub systems with the support of technology (Leppelt, 2023). It makes system integration possible by connecting different systems into one larger system that functions as a single entity to improve on productivity, quality of operations and products, reduce operational costs and better and real time information flow (Auty & Moon, 2016). The aims is to achieve interconnecting interactions within a value chain to improve efficiency of supply chain practices. This technology in procurement functions makes system integration possible

Technology integration into supply chain processes enables for real-time chain monitoring, including shipment and billing. Distribution leverages technology solutions like warehouse management systems (WMS), transportation management systems (TMS) and tracking technologies (GPS, RFID) to enhance visibility, traceability, and control throughout distribution process. These technologies enable real-time monitoring, data analytics, and optimization of distribution operations (Caridi, Moretto, Perego & Tumino, 2018). Technology integration requires data exchange, tracking technology and automation for efficiency realization.

Data exchange involves exchanging information between two or more parties in a SC. Managers can coordinate activities throughout the SC, make decisions more quickly and effectively, and help businesses accomplish shared objectives with the use of information exchange. Tracking technology is use of technology like GPS and sensor to track inventory movement in the SC. Managers can obtain critical information, make informed decisions, and streamline procedures for increased productivity and customer satisfaction by using tracking technologies. The use of technology and software designed specifically for the supply chain sector to increase productivity, lower error rates, and improve process outcomes is known as SC automation. Its primary objective is to substitute manual, labor-intensive procedures with automated ones that need little to no human involvement (Bode, and Wagner, 2020). Automation integration refers to the process of incorporating automation technologies, like robotics, artificial intelligence (AI), machine learning (ML), Internet of Things (IoT), and blockchain, into varied stages of the SC. This integration seeks to streamline operations, increase visibility, and enable data-driven decision-making.

Distribution firms are becoming aware of the value and potential of technological integration into their distribution part of their supply chain. Among the major strategies of focus include process integration, Automation, Data exchange and tracking techniques. In addition to data, automation is an important tactic in distribution organizations' go-to-market transformation programs. These techniques are thus implemented with high consideration and advance preparation based on data from orders, tracking systems, and the utilization of self-driving trucks to convey products to order pickers. Through such approaches, customer needs will be fulfilled in time, satisfactorily while minimizing on costs. By examining historical data and market movements, distributors can predict future demand and optimize their inventory levels and production schedules. Monitoring important performance metrics, like delivery times, inventory levels, and production rates, they will be able to determine where to improve and make necessary adjustments to maximize its operations (Lambert's, 2016).

Leveraging on cloud computing to store and analyze large amounts of supply chain data is also a vital milestone as well as block chain technology to improve transparency and traceability in distribution leading to optimization of operations, reduce costs, and enhance business performance and get a competitive edge by providing better customer service, introducing new products more quickly, and reducing waste in its operations (L'Oréal, 2020).

Demand visibility

Demand visibility involves the methods used to forecast or estimate demand in order to guarantee that goods can be supplied on schedule and meet client expectations. Finding the needed balance in maintaining adequate inventory to satisfy client demands and circumventing having an excess is the aim (Somapa, Cools & Dullaert, 2018). Demand visibility helps to achieve more accurate forecasting, smarter resource allocation, increased efficiency, greater transparency, reduced inventory costs, and improved customer on-time delivery. Also demand visibility enables the alignment of supply chain with market demand and delivery of value to customers (Sanders, 2016).

Demand variability is the fluctuation in customer demand for a firm which is caused by factors, like seasonality, trends, promotions, customer preferences, competition, external events, volatility, uncertainty, complexity and ambiguity. Supply chain management is highly affected by demand variability. It is the determinant between the variance between the company's anticipated result and the customer demand (Tezek, 2018). Therefore, managing demand variability can help enhance customer satisfaction, service delivery, operational efficiency, and profitability (Santana, Afonso & Rocha, 2016). To improve demand variability management, the company can ensure that suppliers are fully informed about anticipated demand, mostly in real-time, in order to secure inventory for building safety stockpiles.

Also, aligning supply with demand using flexible production systems, inventory management, and supplier collaboration can assist to reduce variability. Further, forecasting demand more accurately using historical data, market research, and customer feedback is important. Additionally, buffering against variability using safety stock, backup suppliers, and contingency plans to cope with unexpected fluctuations can help further reduce variability. Smoothing demand using pricing, incentives, and marketing strategies to balance demand across different periods and segments is also important (Choi, 2018).

Demand forecasting include projecting consumer desire for goods and services, determining what to change and finding new products to meet needs. However, forecasting what people will desire, in what amounts, and when is difficult and necessitates the use of a number of methods. Accurate demand projections are necessary for effective inventory management. Inadequate inventory can lead to lost future business in addition to costing money and leaving clients unhappy. Additionally, overstocking is not an option. In addition to being expensive in terms of transportation and storage, it may result in some product going unsold and a complete loss of investment. Determining the appropriate inventory balance is a crucial component of a reliable demand projection.

Demand visibility can be achieved by understanding customer needs, anticipating future demand and possible changes in their preferences and behavior. Also, organizations need to coordinate demand forecasts, inventory levels, production schedules, and delivery plans to achieve demand visibility. Organizations should design and execute logistics operations while minimizing costs, maximizing efficiency, to ensures quality and reliability. Further, demand visibility can be achieved by adoption of agile and flexible methodologies and practices, such as lean, just-in-time, postponement, and mass customization (McIntire, 2016).

Effective demand planning plays a very vital role in distribution processes. There is evidence that proper distribution management is emerging as a critical strategic approach for improving quality, cutting cost and improving customer responsiveness for gaining of a competitive edge. Thus, distributors must be able to strategize at the global frontier and create a stream of new processes that will support them in progressing faster than their rivals by trying to realize agility, responsiveness, flexibility and customer oriented to meet emerging objectives (Delgado et al., 2021). Distributors need to ensure effective supply chain management as it contributes greatly in the achievement of the goals (Lee et al., 2020). Ranging from cost reduction, effective supply chain integration, continuous quality improvement, customer satisfaction, reduced lead times and

well as increasing market share through edging out competitors. Due to the constantly changing customer needs and volatility of the business environment, distributors should continuously keep on evaluating its success strategies in place through the use of factual market research data to predict, plan and make it possible to fulfill both the current and future needs of its customers (Zoeteman, 2022).

Distributors need to have operations planning strategy in place that makes it possible to predict market volatility to be able to provide an optimal service to clients which will enable them to forecast through the use of data and artificial intelligence making it possible to provide the best possible client experience in relation to speed, cost, quality and sustainability. They should thus endeavor to work towards positioning itself to be able to respond to market expectations in real-time (L'Oréal, 2020).

Supply chain agility strategy that focuses on enhancing the speed, flexibility and responsiveness of its SC operations, aims to enable the firm to swiftly adapt to changes in the market, customer demands and disruptions in the supply chain through a number of focus areas that can be a game changer for its business: With an agile SC, distributors are able to respond to customer demand more swiftly and effectively. This will also enable the them reduce lead times, provide faster delivery and ensure a more accurate delivery of products to consumers. This could result in increased consumer satisfaction and loyalty. An agile supply chain will also help better manage supply chain disruptions. By implementing a Supply Chain Agility strategy, distributors will continuously improve on their competitive advantage differentiating themselves from competitors by providing better customer service, reducing costs, and introducing new products more quickly (Chopra & Miendl, 2021).

Empirical review

Technological Integration and Performance

Supply chain integration enabled by IT on company operational performance in the Tokyo Stock Exchange was investigated by Ganbold, Matsui, and Rotaru (2021). With data from executives of large manufacturing enterprises listed on TSE, the relationship between SCI, operational performance, and IT competency characteristics was tested theoretically using the structural equation modeling approach. The results revealed that IT competency has a favorable impact on SCI. The findings also showed that all operational performance metrics are positively and significantly impacted by SCI, particularly customer integration.

In Hong Kong, Choy (2020) investigated how IT affected the logistics sector's performance, using the Pearl Delta and Hong Kong. The study surveyed 210 logistics enterprises in Hong Kong and the Pearl River Delta region to assess technology use and its effect on the performance of logistics services. Interview were used to get data. Structural equation modeling was used to test the model. The results indicated that IT directly improves the logistics companies' service quality, and that IT impact on service quality raises competitiveness.

In China, Liu and Chiu (2021) conducted research on effect of supply chain integration and digitalization on company performance. Specifically, the research model examines the moderating influence of SC digitalization and the mediating effect of SC integration. Chinese workers in supply chain sector were given access to an online poll. Using Smart PLS 3.0, PLS-SEM was used to evaluate data. The results showed that SCI and digitization improves business performance. Also, the association between SC digitization and firm performance was mediated by SCI.

Somapa, Cools, and Dullaert (2018) investigated supply chain visibility characterization. The study's objectives were to review literature so that to shed light on the features and usefulness of SCV. A methodical examination of the SC literature was done to determine the features and

efficacy of SCV. The process-oriented technique, linking SCV effectiveness to enhanced performance, served as the foundation for evaluation. According to the study, information quality, utility, and accessibility may all be used to describe the traits of SCV. The advantages of SCV were discovered to go beyond raising an organization's strategic competences or operational efficiency of business processes.

Siror (2019) conducted research on how RFID technology affects Kenyan export commodities tracking. The study determined how RFID-based tracking would help with the problems caused by export items diversion into Kenya's local market. Products would be transported out of export centers under the pretense of overseas market destination, nevertheless, they are discarded and fake paperwork would be created to prove that the goods have been exported, allowing for an unfair advantage and a chance to avoid paying taxes. An RFID-based In-Transit Visibility solution was developed and tested in order to address the issues. The system tracked export shipments from the manufacturer to the port. The system's functioning, design, and pilot results were all discussed. The pilot's findings demonstrated that RFID-based tracking greatly reduced diversion and offered carriers and other stakeholders' substantial benefits by increasing output and reducing turnaround times.

Technology integration impact on SC collaboration and the performance of Kenyan manufacturing companies was studied by Sarite (2021). The primary goal was to evaluate how technological integration affected manufacturing companies' performance. Managers were targeted. The study instruments used were a questionnaire and a document analysis. Descriptive and inferential statistics were used. The (SPSS version 22) was used to statistically examine quantitative data gathered from the document analysis. The results showed that the performance of businesses is significantly and favorably impacted by technological integration. Consequently, the major factor impacting on the success of distribution companies is technological integration as a concept of supply chain collocation.

Demand visibility and Performance

The influence of improved demand insight on production and inventory control efficiency was studied by Sma and Lehtonen (2018). Discrete-event simulation was utilized in this study to investigate the influence on operational efficiency when traditional order data from non-VMI consumers is combined with sales data from VMI cosumers for production and inventory control. The simulation model makes use of genuine demand and product data, having been grounded in a real-world VMI installation. The study discovered that, even for products with steady demand, a partial increase in demand visibility can boost the effectiveness of production and inventory control. However, visibility value is highly dependent on the rate of replenishment of the target products and the cycle for production planning.

Jemai and Karaesmen (2015) investigated how a make-to-stock queue in Turkey performed in relation to demand variability. The study examined how demand variability affects capacitated production locations and examined a make-to-stock queue that follows a base stock policy and has general demand arrival times. The findings showed that higher arrival time variability does, in fact, increase ideal base-stock levels and optimal inventory-related costs when demand inter-arrival distributions are organized in a stochastic fashion.

Lehtonen, Småros, and Holmström (2018) investigated how product launches affected demand visibility. The purpose was to determine the variables influencing the usefulness of access to downstream demand data to manage product introductions. A comparison of the various forms of demand information and their utility to a producer was conducted using simulation based on real data on 19 product debuts. There were two new measures introduced. Bias shows whether demand data from two sources consistently differs from one another. The amount of time it takes for demand data from two sources to begin communicating correspondingly in a temporary scenario

is measured by the delay in demand synchronization. The study discovered that, in the supply chain under investigation, distributors are mostly responsible for demand variability, whereas retail outlets—particularly for products with larger wholesale packages in relation to their sales—are primarily responsible for bias and delays in demand synchronization.

Mwangeka (2020) conducted study on the operational performance and supply chain visibility of logistics companies in Mombasa County, Kenya. The supply chain visibility and operational effectiveness of logistics companies in Mombasa County, Kenya, were the main subjects of this study. Descriptive cross-sectional survey approach was used in the study. The study's target group consisted of Mombasa County logistics companies. A closed-ended survey was used to gather data. Frequency tables were used to depict the data that was collected and analyzed using SPSS software. Calculations were made for frequencies, means, standard deviations, test findings, correlation, and regression coefficients. Conclusions showed a favorable correlation amid operational effectiveness and supply chain visibility. The study did discover, however, that operational performance was not much impacted by SCV. The results showed that businesses used SCV to a moderate degree. This suggested that companies would see higher operational performance if supply chain awareness was adopted more widely.

RESEARCH METHODOLOGY

The correlational research design was used in the study. The study was conducted at distribution firms in Nairobi City County. According to the Nairobi City County investment report 2023 and Kenya Revenue Authority half year revenue report 2023/2024, there are 142 registered and active tax paying distribution firms in NCC. The study population was the heads of supply chain in the distribution firms. Given their involvement in the organization's supply chain, these respondents were specifically targeted and hence, they can provide information about supply chain visibility. Therefore, the target population was 142 respondents. The distribution firms were categorized as wholesalers and retailers. The study employed the census sampling method to select the respondents. Census involved the enumeration of all members of the population. Hence, in this study the sample comprised all members of the population. The study sample size was 142 respondents.

In this study, primary data was obtained using a questionnaire. Data collected from the field was checked for completeness and edited. In the analysis SPSS version 28 will be used. The quantitative data was examined using descriptive and inferential statistics. Descriptive statistics that were used include frequencies, percentages, mean and standard deviation. Inferential statistics that were used include correlational and regression analysis. The relationship of the dependent and independent variables was determined using the Pearson moment correlation. Regression analysis was used to determine the association of supply chain visibility and performance.

RESEARCH FINDINGS AND DISCUSSION

The study's sample consisted of 142 workers from Nairobi County's distribution companies. Questionnaires were distributed to the chosen sample. After cross-checking the completed surveys for accuracy and completeness, 124 were determined to be valid and reliable, allowing for additional analysis and reporting. The response rate from the completed surveys was 87%. According to Sekaran and Bougie (2016), a response rate of 50% or above is sufficient for analysis, 60% or higher is good, and 70% or higher is exceptional. As a result, the 87% response rate was outstanding for additional reporting and analysis.

Descriptive Statistics

The respondents were required to indicate their level of agreement on the statements. A five-point Likert scale was used in this study to collect data on independent and dependent variables. The scale of 1 was strongly disagree while the scale of 5 was strongly agree.

Technological Integration and Performance

The respondents were requested to indicate their level of agreement about the effect of technological integration on performance of distribution firms in Nairobi City County, Kenya.

The results showed that the respondents agreed that their organization has implemented tracking technology throughout its processes which has helped to track products throughout the supply chain (M=4.016, SD=0.882), their organization has automated its functions (M=3.976, SD=0.844), their business has leveraged on data exchange (M=3.944, SD=0.838), technological integration throughout the supply chain has improved the performance of their firm (M=3.847, SD=0.770) and process integration has helped improve efficiency and effectiveness throughout the supply chain (M=3.790, SD=0.801).

The findings concur with those of Ganbold, Matsui, and Rotaru (2021) who discovered a favorable correlation between IT skill and SCI. According to Choy (2020), information technology immediately raises the caliber of services provided by logistics firms. Liu and Chiu (2021) discovered that supply chain integration and digitization both improve business performance. Siror (2019) discovered that through greater efficiency and faster turnaround times, RFID-based tracking significantly benefited carriers and other stakeholders while also having a significant positive influence on reducing diversion. Technology integration significantly and favorably affects business performance, according to Sarite (2021) research.

Table 1: Technological Integration and Performance

Statement	1	2	3	4	5	Mean	Std. Dev
Our business has leveraged on data exchange	5	7	17	56	39	3.944	0.838
Our organization has automated its functions	4	10	15	51	44	3.976	0.844
Process integration has helped improve efficiency and effectiveness throughout our supply chain	7	8	19	60	30	3.790	0.801
Our organization has implemented tracking technology throughout its processes which has helped to track products throughout the supply chain	5	9	14	47	49	4.016	0.882
Technological integration throughout our supply chain has improved the performance of our firm.	8	10	18	45	43	3.847	0.770

Demand visibility and Performance

The respondents were requested to indicate their level of agreement about effect of demand on performance of distribution firms in Nairobi City County, Kenya. The results were as presented in Table 2.

The findings showed that the respondents agreed that their firm has adopted demand forecasting to determine demand for products and services ensuring better proactive supply chain planning and process improvement (M=4.016, SD=0.880), their firm has adopted agile order processing strategy which has helped their firm to be more responsive to customer demand (M=3.927, SD=0.799), demand forecasting has enabled our firm to effectively manage demand variability (M=3.879, SD=0.784), scalable planning has helped in effective coordination of their supply chain process and reduction of supply chain costs (M=3.863, SD=0.817), and agile order processing helps their firm to be more responsive to customer demand (M=3.742, SD=0.768).

The findings agree with those of Sma and Lehtonen (2018) that production and inventory control efficiency can be enhanced even for items with steady demand if demand visibility is somewhat increased. According to Jemai and Karaesmen (2015), there is a positive correlation between increased arrival time variability and optimal base-stock levels as well as optimal inventory-related costs when demand inter-arrival distributions are organized in a stochastic way.Lehtonen, Småros, and Holmström (2018) discovered that, within the supply chain under investigation, distributors are mostly responsible for demand variability, whereas retail outlets are primarily responsible for bias and delays in demand synchronization, particularly for products with larger wholesale packages in relation to their sales..

Table 2: Demand visibility and Performance

Statement	1	2	3	4	5	Mean	Std. Dev
Our firm has adopted demand forecasting to determine demand for products and services ensuring better proactive supply chain planning and process improvement	5	9	15	45	50	4.016	0.880
Demand forecasting has enabled our firm to effectively manage demand variability	6	11	17	48	42	3.879	0.784
Scalable planning has helped in effective coordination of our supply chain process and reduction of supply chain costs	8	7	16	56	37	3.863	0.817
Our firm has adopted agile order processing strategy which has helped our firm to be more responsive to customer demand.	5	10	19	45	45	3.927	0.799
Agile order processing helps our firm to be more responsive to customer demand.	9	9	18	57	31	3.742	0.768

Performance of Distribution Firms

The respondents were requested to indicted their level of agreement about performance of distribution firms in Nairobi City County, Kenya. Table 3 is a summary of the findings.

The findings showed that the respondents agreed that the performance of their firm can continuously been improving compared to industry competitors (M=3.976, SD=0.866), there is improved timely delivery and fulfilment of customer needs (M=3.927, SD=0.852), the firm market share has shown an upward trend (M=3.871, SD=0.801), cost throughout the supply chain has reduced (M=3.863, SD=0.777) and the profitability of our firm has constantly been increasing (M=3.702, SD=0.705).

Table 3: Performance of Distribution Firms

Statement	1	2	3	4	5	Mean	SD
There is improved timely delivery and fulfilment of customer needs	4	10	14	59	37	3.927	0.852
The firm market share has shown an upward trend	8	10	15	48	43	3.871	0.801
The performance of our firm can continuously been improving compared to industry competitors.	6	9	13	50	46	3.976	0.866
The profitability of our firm has constantly been increasing	9	12	19	51	33	3.702	0.705
Cost throughout the supply chain has reduced	6	8	20	53	37	3.863	0.777

Correlational Analysis

The results depict that technological integration and performance of distribution firms had a positive and significant correlation (r= 0.791, 0.002<0.05). Also, demand visibility had a positive and significant correlation with performance of distribution firms in Nairobi (r= 0.725, 0.002<0.05). The findings agree with Sarite (2021) discovered that the performance of a company is positively and significantly impacted by technology integration. Gegeleso (2020) discovered that warehouse operations enhance the effective distribution of resources, enhance the quality of goods delivered, and boost overall performance. According to Masithah and Tarli (2020), there is a favorable correlation between supply chain efficacy and all supply chain strategies, including supplier development, supply chain visibility, supply chain flexibility, and inventory control.

Table 4: Correlational Analysis

		Employee Turnover	Technological integration	Demand visibility
Performance	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	124		
Technological integration	Pearson Correlation	.791**	1	
	Sig. (2-tailed)	.002		.
	N	124	124	
Demand visibility	Pearson Correlation	.725**	.319	1
	Sig. (2-tailed)	.002	.023	
	N	124	124	124

Regression Analysis

Regression analysis was used to determine the association of supply chain visibility and performance. The study examined the effect of technological integration, demand visibility and performance of distribution firms.

Model Summary

Model summary was employed to establish level of variation in performance of distribution firms that can be explained by changes in technological integration and demand visibility. The summary of results is shown in Table 5.

The results depicted that the R-squared is 0.853 which implied that 85.3% variation in performance of distribution firms in Nairobi County are explained by changes in technological integration, and demand visibility. The remaining 14.7% suggest that there are other factors that can be attributed to performance of distribution firms that were not discussed in this model.

Table 5: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.924	0.853	0.848	0.16276

Analysis of Variance

To find out the fitness of the model to predict the dependent variable (performance of distribution firms), the study conducted an F-test at 95% confidence level. Table 6 is a summary of the results.

The findings showed that the p-value 0.001 is less than 0.05 which is the selected significance level. This implies that the model is fit in predicting performance of distribution firms in NCC, Kenya. Further, the results showed that the f-calculate (172.903) was greater than the f-critical

(2.448) from the f-distribution tables. This submits that technological integration, and demand visibility can be used to predict performance of distribution firms in NCC, Kenya.

Table 6: Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	18.784	4	4.696	172.903	.001[b]
	Residual	3.232	119	0.027		
	Total	22.016	123			

Beta Coefficients of Study Variables

From the coefficients in Table 7, the following regression model was fitted;

$Y = 1.538 + 0.336\ X_1 + 0.304X_2 + 0.281X_3 + 0.315X_4$

The findings showed that holding technological integration, and demand visibility at a constant of zero performance of distribution firms in NCC, Kenya would be at a constant of 1.538.

The findings further showed that technological integration had a positive and significant effect on performance of distribution firms in Nairobi City County (B=0.336, P=0.001<0.05). This suggested that a unit increase of technological integration would cause an increase in performance of distribution firms in Nairobi City County by 33.6%. The findings agree with Liu and Chiu (2021) found that supply chain integration and digitization both improve a company's performance.

Further, demand visibility had a positive and significant connection with performance of distribution firms in NCC (B=0.315, P=0.002<0.05). This suggested that a unit increase of demand visibility would increase performance of distribution firms in Nairobi City County by 31.5%. The findings agree with Sma and Lehtonen (2018) discovered that a small increase in demand visibility can boost the effectiveness of production and inventory control even for products with steady demand.

Table 7: Beta Coefficients of Study Variables

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.538	0.302		5.093	0.001
	Technological integration	0.336	0.098	0.301	3.416	0.001
	Demand visibility	0.315	0.096	0.295	3.429	0.001

Conclusions

Technological Integration - The study found that technological integration had a positive and significant relationship with performance of distribution firms in NCC, Kenya. Further, a unit increase of technological integration would cause an increase in performance of distribution firms in Nairobi City County. The study concludes that technological integration positively affects performance of distribution firms in NCC.

Demand Visibility - The study established that demand visibility had a positive and significant association with performance of distribution firms in Nairobi City County, Kenya. Further, a unit increase of demand visibility would cause an increase in performance of distribution firms in Nairobi City County. The study concludes that demand visibility positively affects performance of distribution firms in NCC.

Recommendations

Technological Integration - The study found that technological integration had a positive and significant association with performance of distribution firms in NCC, Kenya. The study recommends that distribution firms should consider allocating resources to invest in and adopt advanced technologies that facilitate integration across the supply chain. This could include the implementation of advanced inventory management systems, warehouse automation, RFID (Radio-Frequency Identification), and other Industry 4.0 technologies. The firms should recognize the dynamic nature of technology and ensure a strategy for continuous upgrades and improvements. Regularly assess the technological landscape, and be proactive in integrating new and improved technologies that align with the evolving needs of the distribution industry.

Demand Visibility - The study revealed that demand visibility had a positive and significant association with performance of distribution firms in NCC. The study recommends that the firms should invest in advanced demand forecasting tools and techniques. Utilize data analytics, machine learning, and predictive modeling to accurately forecast demand patterns. This enables distribution firms to proactively plan inventory levels, minimize stock outs, and optimize overall supply chain efficiency. There is need to foster collaboration with suppliers and customers to share relevant demand information. Building strong partnerships allows for better visibility into upstream and downstream activities, enhancing the accuracy of demand forecasts and improving overall supply chain coordination.

Suggestions for Further Research

This study focused on determining the effect of supply chain visibility on performance of distribution firms in NCC, Kenya. The study recommends that a comparative study should be conducted by expanding the research to include distribution firms in other regions of Kenya. Othe researchers should complement quantitative data with qualitative insights by conducting interviews, surveys, or case studies to gather in-depth information on the perceptions, challenges, and success stories related to supply chain visibility from the perspective of distribution firms in Nairobi City County.

REFERENCES

Bode, C., and Wagner, S. M. (2020). Structural drivers of upstream supply chain complexity and the frequency of supply chain disruptions. *Journal of Operations Management,* 36, 215–228.

Caridi, M., Moretto, A., Perego, A., and Tumino, A., (2018). The benefits of supply chain visibility: A value assessment model. *International Journal of Production Eco-nomics*, 151, pp.1–19

Caridi, M., Perego, A., & Tumino, A. (2020). Measuring supply chain visibility inthe apparel industry. *Benchmarking: An International Journal, 20*(1), 25–44.

Choi, H. (2018). Information sharing in supply chain management: a literature review on analytical research. *California Journal of Operations Management,* 8(1), pp. 110-116, 2018

Chopra ,S., and Meindl, P. (2021). Supply Chain Management; Strategy, Planning and Operations: Pearson.

Choy, K. (2020). Impact of information technology on the performance of logistics industry: the case of Hong Kong and Pearl Delta region. *Journal of the Operational Research Society*, 65(6), 904-916.

Institute of Supply Management. (2022). *Distribution efficiency for agile supply chain: An ISM approach*. Decision Making: Applications in Management and Engineering. https://dmame-journal.org/index.php/dmame/article/view/417

Ganbold, O., Matsui, Y. & Rotaru, K. (2021), "Effect of information technology-enabled supply chain integration on firm's operational performance", *Journal of Enterprise Information Management, 34(*3), pp. 948-989

Gegeleso, O. M. (2020). Effect of Warehousing Operation on Inbound Logistics Practices of Consumer Goods Industries Performance in South Western Nigeria. *Journal Of Humanities And Social Science, 22*(6), 46-52

Gurzawska, A. (2020). Towards Responsible and Sustainable Supply Chains—Innovation, Multi-Stakeholder Approach and Governance. *Philosophy of Management*, 19, 267-295.

Hadebe, N.P., (2018). *Supply chain collaboration and organizational performance in the fast-moving consumer goods industry*. Doctoral thesis, University of Johannesburg, Johannesburg,

Harrison, A. & Hoek, R.V., (2020). *Logistics Management and Strategy; Competing through supply chain* 2nd edition ;Pearson Education Ltd

Imenda, S. (2014). *Is There a Conceptual Difference between Theoretical and Conceptual Frameworks?* Sosyal Bilimler Dergisi/Journal of Social Sciences, 38(2), 185

Jemai, Z. & Karaesmen, F. (2015). The influence of demand variability on the performance of a make-to-stock queue. *European Journal of Operational Research*, 164(1), 195-205

Klapita, V. (2019) Processes solution in the warehouse by the queueing theory application. In: Horizons of railway transport. *Scientific papers*, 3(1): 64-69.

Kristianto, Y., Ajmal, M.M & Sandhu, (2022). Adopting TQM approach to achieve customer satisfaction: *TQM Journal;* Published by Emerald

Lee, Y., & Rim, S.-C. (2018). Quantitative Model for Supply Chain Visibility: Process Capability Perspective. *Mathematical Problems in Engineering*, 11.

Lehtonen, J., Småros, J. & Holmström, J. (2018), "The effect of demand visibility in product introductions", *International Journal of Physical Distribution & Logistics Management,* 35 No. 2, pp. 101-115

Liu, K.P., Chiu, W. Supply Chain 4.0: the impact of supply chain digitalization and integration on firm performance. *Asian J Bus Ethics* 10, 371–389 (2021

L'Oréal. (2020, November 30). *How supply chain evolves to meet our consumers' demands*. https://www.loreal.com/en/articles/operations/supply-chain-transformation/

Mani, V., Gunasekaran, A. & Delgado, C. (2018). Enhancing supply chain performance through supplier social sustainability: An emerging economy perspective. *International Journal of Production Economics,* v195, 259-272

Marasco, A. (2018). Third-party logistics: A literature review. *International Journal of Production Economics*, 11(3):127-147.

McIntire, J.S. (2016). *Supply chain visibility*: From theory to practice, Routledge

Messina, D. (2019). *Visibility in Complex Supply Chains: An Information Management Approach to Support Risk and Disruption Management Decisions.* Ph.D. Thesis, Universidade do Porto

Rob, R., & Meghan, S. (2022, September 11). *Distribution and transportation management*. Bain & Company Inc. https://www.bain.com/insights/are-your-distribution-and-transportation-costs-out-of-control/

Sanders, N.R. (2016). 'How to use big data to drive your supply chain'. *California Management Review, 58*(3), 26-48

Santana, A., Afonso, P., & Rocha, A. M. (2016). A prescriptive cost model for demand shaping: an application for target costing. *Proceedings of the 3rd International Conference on Project Evaluation* (ICOPEV 2016).

Saqib, Z. A., Saqib, K. A. and Ou, J. (2019). *Role of Visibility in Supply Chain Management*. https://www.intechopen.com/chapters/68370

Sarite, S. K. (2018). Role Of Order Fulfillment On The Performance Of Manufacturing Firms In Kenya. *American Journal of Supply Chain Management*, *3*(1), 1-15.

Siror, J. K. (2019). Impact of RFID Technology on Tracking of Export Goods in Kenya. *Journal of Convergence Information Technology*, 5(9).

Småros, J., & Lehtonen, J., (2018). The impact of increasing demand visibility on production and inventory control efficiency. *International Journal of Physical Distribution & Logistics Management*, 33 No. 4, pp. 336-354

Somapa, S., Cools, M., & Dullaert, W. (2018). Characterizing Supply Chain Visibility—A Literature Review. *International Journal of Logistics Management*, 29, 308-339

Swift, C. (2019). Does supply chain visibility affect operating performance? Evidence from conflict minerals disclosures. *Journal of Operations Management*, *65*(1).

Too, I. C., & Simiyu, E. (2018). Firms characteristics and Financial Performance of general insurance firms in Kenya. *International Journal of Business Management & Finance*, 1(39): 672, 89.

Watanuki, M. (2018). *Review of logistics service regulations for freight forwarding businesses: what should be addressed for a better logistics regulatory framework*? The World Bank.