



**WAREHOUSING MANAGEMENT PRACTICES AND PERFORMANCE OF
DISTRIBUTION FIRMS IN NAIROBI CITY COUNTY KENYA**

¹ Rotich Victoria Chelangat, ² Dr. Ndeto Charles

¹Masters Student, Jomo Kenyatta University of Agriculture and Technology

²Lecturer, Jomo Kenyatta University of Agriculture and Technology

ABSTRACT

Distribution firms play a pivotal role in the Kenyan economy by facilitating the flow of goods and services essential for both local consumption and export. However, the performance of distribution firms in Kenya faces significant challenges. The declining performance of distribution firms in Nairobi City County, Kenya, has been evident in recent years. The general objective of the study is to assess the influence of warehousing management practices and performance of distribution firms in Nairobi City County Kenya. Specifically, the study sought to determine the influence of inventory management on performance of distribution firms in Nairobi City County Kenya and to assess the influence of warehouse technology on performance of distribution firms in Nairobi City County Kenya. The study adopted descriptive research design. This study targeted distribution firms in Nairobi County. From data obtained from Kenya International Freight and Warehousing Association (KIFWA), there is a total of 1061 distribution firms. The Yamane formula was adopted to calculate the study sample size. Therefore, the study sample size was 290 respondents. This research used a questionnaire to collect primary data. The study used both descriptive and inferential statistics for data analysis. This was done with the help of statistical Package for Social Sciences (SPSS version 26). The study results were presented through use of tables and figures. The study concludes that inventory management has a positive and significant effect on performance of distribution firms in Nairobi City County Kenya. In addition, the study concludes that warehouse technology has a positive and significant effect on performance of distribution firms in Nairobi City County Kenya. Based on the findings, the study recommends that the management of distribution firms in Kenya should implement a standardized receiving and inspection process. By establishing clear protocols for the timely and thorough inspection of incoming goods, firms can ensure that products meet quality standards before they enter inventory.

Key Words: Warehousing Management Practices, Inventory Management, Warehouse Technology, Performance of Distribution Firms

Background of the Study

Distribution firms are businesses that manage the movement of goods from producers or manufacturers to retailers, wholesalers, or directly to consumers. These firms are essential players in supply chains, ensuring that products are delivered efficiently, timely, and in good condition to meet market demand (Bilal & Tahir, 2020). Their core functions include warehousing, transportation, inventory management, order processing, and sometimes packaging and product customization. Distribution firms act as intermediaries, connecting manufacturers, suppliers, and end consumers, ensuring that goods and services move efficiently across supply chains. Their ability to optimize the flow of products and minimize delivery time directly affects the availability of goods in the market, which in turn impacts consumer satisfaction and overall market stability. Efficient distribution contributes to price stability by lowering transportation and inventory costs, which can also lead to more competitive pricing for consumers. In essence, a well-performing distribution sector fosters economic stability by enabling smooth commerce and trade (Al-Madi, 2020).

Distribution firms significantly contribute to employment creation within a country. They provide a wide range of job opportunities, from warehouse management to logistics coordination, transportation, and supply chain analytics. The sector often employs a large percentage of the workforce, particularly in logistics hubs and urban centers where distribution networks are concentrated (Shanmugamani & Mohamad, 2023). This employment not only improves livelihoods but also stimulates local economies through income generation and consumption. In addition, the performance of distribution firms affects the ability of local industries to access international markets. Efficient distribution systems facilitate exports by ensuring that goods reach global markets in a timely manner, thereby enhancing the country's export competitiveness. This is particularly crucial for industries that rely on time-sensitive deliveries, such as fresh produce or high-tech products. The agility and reliability of distribution firms in handling international shipments can influence a country's trade balance and its integration into global supply chains (Pawar, Potter & Jimo, 2021).

Warehousing management practices refer to the strategies, processes, and techniques used to efficiently manage the storage, handling, and distribution of goods within a warehouse. These practices aim to optimize space utilization, streamline operations, reduce costs, and ensure timely order fulfillment while maintaining the quality of stored products. Effective warehousing management involves both physical aspects (layout, equipment, and storage) and operational aspects (inventory control, labor management, and technology use) (Ruburika & Munene, 2021). Warehousing management practices are essential for ensuring efficient and streamlined operations within a warehouse. Inventory management is a key component, involving tracking stock levels, organizing products, and ensuring accurate order fulfillment. Techniques like First-In-First-Out (FIFO) and Just-In-Time (JIT) help optimize stock levels, reduce waste, and prevent overstocking or stockouts. Paired with this is the use of warehouse technology like Warehouse Management Systems (WMS), which automates tracking, manages stock locations, and enhances visibility into real-time inventory data. This technology boosts efficiency and reduces errors in stock handling and order processing. Equally important are receiving and inspection processes, where incoming goods are checked for accuracy and quality before being stored. Proper inspection ensures that any damaged or incorrect products are identified early, preventing issues later in the supply chain. Lastly, warehouse design plays a critical role in optimizing space utilization and ensuring smooth workflow (Mwizerwa & Akumuntu, 2024). An effective layout reduces travel time for workers, organizes storage by product type or demand, and ensures quick access to high-movement items, ultimately improving efficiency in order fulfillment and inventory management. Together, these practices ensure a well-functioning warehouse that supports the overall supply chain (Hailu, 2020).

This study sought to assess the influence of warehousing management practices and performance of distribution firms in Nairobi City County Kenya.

Maalim and Moronge (2020) found that transport management is important factors which can enhance logistical performance in the commercial state corporations in Kenya. The regression coefficients of the study showed that transport management has a significant and positive influence on logistical performance in the commercial state corporations in Kenya. Ombaso and Osoro (2023) found that there is a positive relationship between supplier development and performance of preference groups in Kisii County. Partnership enforcement policy, Collective bargaining, alternative dispute resolution processes, free expression of concerns by involved parties are among the coordination factors that significantly influenced the performance of preference groups in Kisii County, Kenya. Kisii County has increased. Therefore, the study concludes that Kisii has been experiencing significant increase in service delivery through embracing proper coordination in the supply chain practices.

Ominde and Kiarie (2020) found that barcode technology data collection solutions for warehouse management systems provide powerful and flexible automatic identification system that connects the shop floor to the enterprise software. Adaptation of barcodes greatly improved the speed and accuracy of the identification process and facilitated better management of inventory and pricing when coupled with information systems. Barcodes provide benefits like operational efficiency, better customer service, improved visibility of key business information to management, data integrity, ease of implementation, and cost effectiveness.

Muhalia, Ngugi and Makori (2021) found that warehouse management systems have a positive influence on Supply chain performance. The study also established that the influence was significant. Therefore, improvements in warehouse management systems will results to an increase in Supply chain performance of FMCG in Kenya. Based on the findings, the study concluded that warehouse management systems positively and significantly influences Supply chain performance of FMCG in Kenya.

Mutua, Ngugi and Odhiambo (2020) found that a positive change in warehousing practices such as implementing optimal storage, automated picking system, adopting integrated order receiving, optimized packing, automated shipping systems and implementing integrated replenishment system results to a positive and significant change in performance of large manufacturing firms in Kenya.

Statement of the Problem

Distribution firms play a pivotal role in the economic landscape of Kenya, particularly in Nairobi City County, where they facilitate the flow of goods and services essential for both local consumption and export (Ombaso & Osoro, 2023). These firms are crucial for ensuring that products reach markets efficiently, thereby supporting trade, job creation, and overall economic development. With Nairobi being a key commercial hub in East Africa, the effectiveness of distribution firms directly impacts supply chain efficiency and customer satisfaction, making their performance vital for the country's growth and competitiveness (Muhalia, Ngugi & Makori, 2021).

However, the performance of distribution firms in Nairobi City County faces significant challenges. The declining performance of distribution firms in Nairobi City County, Kenya, has been evident in recent years, largely due to a combination of economic, infrastructural, and operational challenges. One key factor is the persistent rise in operational costs, particularly in transportation and logistics. The Kenya National Bureau of Statistics (KNBS) reported a significant increase in fuel prices, which, combined with rising inflation rates (averaging 7.5% in 2023), has strained distribution firms' ability to maintain competitive pricing. The high cost of fuel,

in particular, has directly impacted transportation costs, a major component of distribution operations. Many firms have found it difficult to offset these costs without passing them on to customers, which has led to reduced demand for their services and lower profitability. Additionally, congestion within Nairobi has also worsened the performance of distribution firms. A World Bank report (2022) highlighted that traffic congestion in Nairobi costs the city an estimated USD 1 billion annually in lost productivity, with logistics firms being among the hardest hit. Delays caused by traffic jams have led to slower delivery times, missed deadlines, and increased costs for both distributors and their clients. Furthermore, a survey conducted by the Kenya Private Sector Alliance (KEPSA) revealed that 65% of distribution firms in Nairobi reported a decline in order fulfillment rates due to these logistical challenges, contributing to a 20% drop in their overall efficiency over the past five years. Such inefficiencies have eroded customer trust and caused many businesses to reconsider their reliance on these firms for their distribution needs (Ombaso & Osoro, 2023).

Warehousing management practices significantly influence organizational performance by improving operational efficiency, reducing costs, and enhancing customer satisfaction. Effective inventory management ensures that the right products are available at the right time, preventing stockouts or overstock situations. This leads to smoother operations and optimized use of resources. Various studies have been conducted on warehousing management practices and organization performance. For instance; Maalim and Moronge (2020) assessed on the influence of warehousing management practices on logistical performance of commercial state corporations. Ominde and Kiarie (2020) researched on the effects of warehouse management practices on performance of manufacturing firms. However, none of these studies focused on performance of distribution firms in Nairobi City County Kenya. To fill the highlighted gaps, the current study sought to determine the influence of warehousing management practices (inventory management, warehouse technology, receiving and inspection and warehouse design) on performance of distribution firms in Nairobi City County Kenya.

General objectives

The general objective of the study is to assess the influence of warehousing management practices and performance of distribution firms in Nairobi City County Kenya

Specific Objectives

This study was guided by the following specific objectives

- i. To determine the influence of inventory management on performance of distribution firms in Nairobi City County Kenya
- ii. To assess the influence of warehouse technology on performance of distribution firms in Nairobi City County Kenya

Theoretical Framework

Just-In-Time (JIT) Inventory Theory

Just-In-Time (JIT) Inventory Management developed by Taiichi Ohno in the 1970s is a strategy that aims to minimize inventory levels and reduce waste by ensuring that materials and products arrive precisely when needed in the production process. This approach emphasizes efficiency and responsiveness, allowing companies to lower holding costs and optimize their inventory turnover. By aligning production schedules closely with demand, JIT reduces the risk of overproduction and excess stock, which can tie up valuable resources and lead to obsolescence (Gallien *et al* (2020). At the heart of JIT is the principle of continuous improvement, often associated with Lean

manufacturing. This philosophy encourages businesses to scrutinize their processes, eliminate non-value-adding activities, and foster a culture of problem-solving among employees. By streamlining operations and reducing lead times, organizations can respond more quickly to customer needs and market fluctuations. This adaptability is particularly advantageous in industries characterized by rapid changes in consumer preferences or technology (Matsoso *et al*, 2021).

Effective implementation of JIT requires a high level of coordination among suppliers, manufacturers, and distributors. Businesses must cultivate strong relationships with their suppliers to ensure reliable and timely delivery of materials. This often involves sharing information about production schedules and inventory levels to foster collaboration (Kairu 2020). Additionally, organizations must invest in technology to monitor inventory and production processes in real-time, allowing for quick adjustments as needed. However, JIT is not without its challenges. Relying heavily on timely deliveries can expose companies to risks associated with supply chain disruptions, such as natural disasters, political instability, or transportation issues. Therefore, businesses must balance the benefits of JIT with the need for contingency planning. This might involve maintaining some level of safety stock or developing alternative supply sources to mitigate potential risks (Kamau & Kagiri, 2021).

Just-In-Time (JIT) Inventory Management is built on several key assumptions that shape its implementation and effectiveness. One primary assumption is that demand for products can be accurately forecasted, allowing businesses to synchronize production with customer needs. This implies a stable market environment where fluctuations in demand are minimal. Additionally, JIT assumes that suppliers can deliver materials promptly and reliably, ensuring that production processes are not interrupted. This reliance on supplier efficiency requires close relationships and effective communication between companies and their vendors (Sang & Kihara, 2021).

However, JIT is not without its critiques. One major criticism is its vulnerability to supply chain disruptions. The reliance on minimal inventory levels means that any delay or problem with suppliers can halt production, leading to lost sales and dissatisfied customers. This risk is particularly pronounced in industries with complex supply chains or those reliant on just a few key suppliers (Gallien *et al*, 2020). Furthermore, JIT may not be suitable for all types of products, especially those with unpredictable demand patterns or in industries where inventory can be a strategic buffer against market volatility. Another critique of JIT focuses on the potential negative impact on employee well-being. The push for efficiency and minimal inventory can lead to increased pressure on workers, resulting in stress and reduced morale. In some cases, this pressure can result in rushed processes, increasing the likelihood of errors. Additionally, JIT's emphasis on cost-cutting might lead organizations to overlook the importance of investing in employee training and development, which can be detrimental to long-term performance (Matsoso *et al*, 2021). This theory was relevant in determining the influence of inventory management on performance of distribution firms in Nairobi City County Kenya.

Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM) is a theoretical framework that helps explain how users come to accept and use new technologies. Developed by Fred Davis in 1989, TAM posits that two primary factors influence users' decisions to embrace technology: perceived usefulness and perceived ease of use (Nguyen, 2020). Perceived usefulness refers to the degree to which a person believes that using a particular technology will enhance their job performance or overall productivity. In contrast, perceived ease of use relates to the extent to which a person believes that using the technology will be free of effort. Together, these factors contribute to the users' attitude

toward using the technology, which ultimately influences their actual usage behavior (Margo & Jokonya, 2024).

One of the strengths of TAM is its ability to provide insights into user behavior across various contexts, from workplace applications to consumer technology. By focusing on perceived usefulness and ease of use, TAM offers a straightforward and intuitive approach to understanding acceptance. This simplicity makes it easier for organizations to gauge user attitudes and identify potential barriers to technology adoption. For instance, if users perceive a technology as complicated or not beneficial, they are less likely to adopt it, highlighting the importance of user training and support (Ominde & Kiarie, 2021). TAM has been extended and adapted over the years to incorporate additional variables and contextual factors. For example, later iterations of the model include external variables such as social influence and facilitating conditions, which further shape users' perceptions and attitudes. Researchers have also explored the role of personal factors, such as user experience and individual characteristics, in influencing technology acceptance. These adaptations enhance the model's applicability across diverse technological environments, including mobile applications, e-learning platforms, and enterprise software (Wanjiru & Ngugi, 2020).

The Technology Acceptance Model (TAM) is built on several key assumptions that underpin its theoretical framework. One primary assumption is that user acceptance of technology is largely influenced by individual perceptions rather than external factors. This suggests that users are rational actors who evaluate technologies based on perceived usefulness and perceived ease of use before making decisions. Another assumption is that these perceptions are stable and consistent over time, implying that once users develop an opinion about a technology, it remains unchanged unless significant new information is introduced. Additionally, TAM assumes a linear relationship between the constructs; that is, an increase in perceived usefulness or ease of use will directly lead to increased acceptance and use of the technology (Mutua, Ngugi & Odhiambo, 2020).

However, TAM has faced several critiques over the years. One significant critique is its simplicity; the model focuses primarily on perceived usefulness and ease of use, potentially neglecting other critical factors that influence technology acceptance, such as social influence, organizational culture, and individual differences (e.g., age, gender, experience). Critics argue that this narrow focus may not adequately capture the complexities of real-world technology adoption processes. Furthermore, some researchers point out that TAM primarily emphasizes cognitive evaluations, potentially overlooking emotional and contextual factors that can also play significant roles in technology acceptance. Another limitation of TAM is its reliance on self-reported measures of perceived usefulness and ease of use, which may introduce biases. Users might overestimate their perceived ease of use or underestimate challenges they face, leading to skewed results (Nguyen, 2020). Additionally, the original model was developed in a specific context (information systems), which raises questions about its generalizability to other domains, such as mobile applications or emerging technologies like artificial intelligence. As a result, while TAM provides a valuable framework for understanding technology acceptance, it may require adaptations or extensions to better fit the diverse contexts and dynamic nature of technology adoption today (Margo & Jokonya, 2024). This theory was relevant in assessing the influence of warehouse technology on performance of distribution firms in Nairobi City County Kenya.

Conceptual Framework

Maxwell, (2019) avers that a conceptual model is a research tool for modelling theoretical relationships of constructs under study for further investigation. It is the system of concepts, assumptions and expectations about phenomenon under consideration (Maxwell, 2020) thus in this study the independent variables include; inventory management and warehouse technology, while

the dependent variable include performance of distribution firms in Nairobi City County Kenya. Figure 2.1 presents the framework for testing in this study:

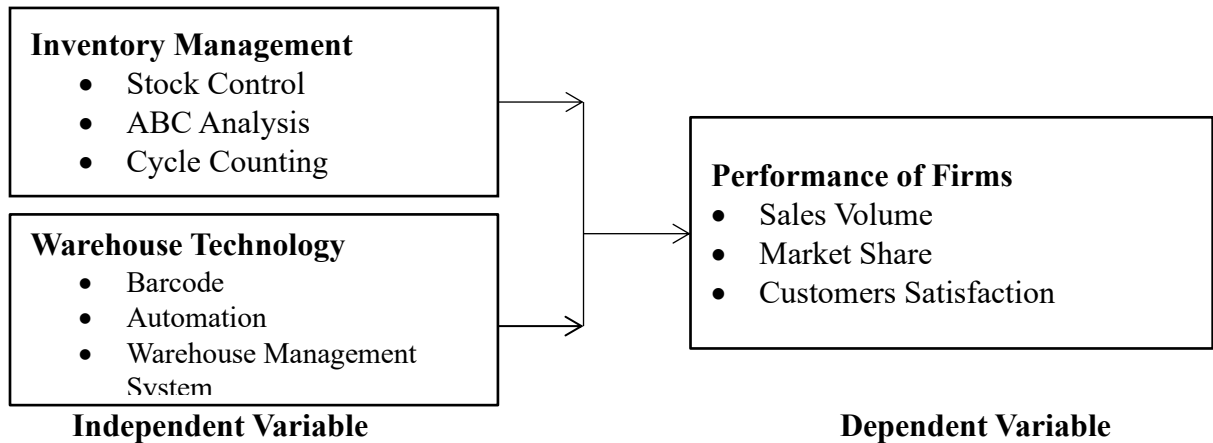


Figure 2.1: Conceptual Framework

Inventory management

Inventory management is the systematic approach to overseeing and controlling the flow of goods and materials within an organization. It involves tracking inventory levels, orders, sales, and deliveries to ensure that the right amount of stock is available at the right time to meet customer demand, while minimizing excess inventory and associated costs (Kairu 2020). Stock control is a fundamental aspect of inventory management that focuses on maintaining optimal inventory levels to meet customer demand while minimizing costs. It involves a systematic approach to tracking stock quantities, monitoring stock movements, and implementing processes for replenishment and order management. Effective stock control helps prevent stockouts, which can lead to lost sales and dissatisfied customers, as well as overstock situations that tie up capital and increase holding costs. Techniques such as setting reorder points, utilizing just-in-time (JIT) inventory practices, and leveraging technology like inventory management software can significantly enhance stock control. By ensuring that the right amount of inventory is available at the right time, organizations can improve operational efficiency, reduce waste, and enhance customer satisfaction (Kamau & Kagiri, 2021).

ABC analysis is an inventory categorization technique that helps organizations prioritize their inventory management efforts based on the value and turnover rate of different items. This method classifies inventory into three categories: A, B, and C. Category A items are high-value items that contribute to a significant portion of revenue but are typically low in quantity. Category B items are of moderate value and turnover, while Category C items are low-value items that are high in quantity but contribute less to overall revenue. By focusing resources and management attention on the A items, organizations can ensure that high-impact inventory is closely monitored and managed. This prioritization allows for better allocation of resources, enhanced stock control, and more effective decision-making in procurement and inventory strategies (Sang & Kihara, 2021).

Cycle counting is an inventory auditing technique that involves regularly counting a subset of inventory items on a rotating schedule, rather than conducting a full physical inventory at once. This approach allows organizations to maintain accurate inventory records and identify discrepancies between recorded and actual stock levels without disrupting daily operations. Cycle counting can be performed on different categories of inventory based on their importance, value, or turnover rate, similar to the principles of ABC analysis. Regular cycle counts help organizations quickly identify and correct inventory inaccuracies, improve data integrity, and enhance overall

inventory management practices. By integrating cycle counting into their operations, businesses can reduce the likelihood of stockouts, improve customer service, and streamline their inventory processes (Gallien *et al*, 2020).

Warehouse technology

Warehouse technology refers to the various tools, systems, and innovations designed to improve the efficiency, accuracy, and productivity of warehouse operations. This technology encompasses a range of solutions that facilitate the management of inventory, streamline processes, and enhance overall logistics performance (Ominde & Kiarie, 2021). Barcodes are machine-readable representations of data that are widely used in warehouse operations to track and manage inventory efficiently. A barcode consists of a series of vertical lines and spaces that correspond to specific numbers or characters. When scanned with a barcode reader, the encoded information is quickly translated into human-readable data, such as product details, inventory levels, and location within the warehouse. The use of barcodes streamlines various processes, including receiving, picking, packing, and shipping. By minimizing manual data entry, barcodes significantly reduce the risk of errors and enhance accuracy in inventory management. Additionally, barcode technology allows for real-time visibility into inventory levels, enabling organizations to make informed decisions and respond promptly to changes in demand. Overall, the implementation of barcode systems improves operational efficiency and contributes to better inventory control in warehouse environments (Wanjiru & Ngugi, 2020).

Automation in warehousing involves the use of technology and robotics to streamline and enhance various operational processes, reducing reliance on manual labor. Automated systems can include everything from conveyor belts and robotic arms to fully automated storage and retrieval systems (AS/RS). These technologies improve efficiency by speeding up processes such as picking, packing, and sorting, leading to faster order fulfillment and reduced lead times. Automation also enhances accuracy by minimizing human error, especially in repetitive tasks. Furthermore, it allows organizations to optimize space utilization and improve safety by reducing the risk of accidents associated with manual handling. As e-commerce continues to grow and customer expectations for fast delivery increase, the adoption of automation in warehouses has become essential for maintaining competitive advantage and meeting operational demands (Mutua, Ngugi & Odhiambo, 2020).

A Warehouse Management System (WMS) is a software platform designed to support and optimize warehouse operations, providing tools for managing inventory, orders, and logistics. WMS facilitates real-time tracking of inventory levels and movements, enabling organizations to have complete visibility over their stock. Key features of a WMS include order processing, inventory management, shipping and receiving, and labor management. By automating various tasks, such as order fulfillment and stock replenishment, a WMS helps reduce manual errors and improve operational efficiency. Additionally, WMS can integrate with other systems, such as Enterprise Resource Planning (ERP) and transportation management systems, to create a seamless flow of information across the supply chain. The insights gained from data analytics within a WMS can also inform strategic decision-making, such as optimizing inventory levels and enhancing service levels. Ultimately, a robust WMS is vital for modern warehouses seeking to improve productivity, reduce costs, and elevate customer satisfaction (Nguyen, 2020)

Empirical review

Inventory Management and Organization Performance

Gallien *et al* (2020) focused on the impact of inventory management on stock-outs of essential drugs in Sub-Saharan Africa: Secondary Analysis of a Field Experiment . Daily clinic storeroom

stock levels of artemether-lumefantrine (AL) products in 2009–2010 were captured in 145 facilities through photography and manual transcription of paper forms, then used to determine historical stock-out levels and estimate demand patterns. Delivery lead-times and estimates of monthly facility accessibility were obtained through worker surveys. While almost no stock-outs of AL products were observed during Q4 2009 consistent with primary analysis, up to 30% of surveyed facilities stocked out of some AL product during Q1 2010 despite ample inventory being simultaneously available at the national warehouse. Simulation experiments closely reproduced these results and linked them to the use of average past monthly issues and failure to capture lead-time variability in current inventory control policies. Inventory control policies widely recommended and used for distributing medicines in sub-Saharan Africa directly account for a substantial fraction of stock-outs observed in common situations involving demand seasonality and facility access interruptions. Developing central capabilities in peripheral demand forecasting and inventory control is critical.

Matsoso *et al* (2021) researched on inventory management systems used by manufacturing small medium and micro enterprises in Cape Town. The research method deployed for this research study was that of survey research. A total of 50 questionnaires were distributed (by hand) to respondents. Of these 50 questionnaires, only 21 responses were received. All 21 of the received responses were valid. From the findings it is clear that respondents knew what inventory, inventory systems and inventory management were about. Although they are aware of the latter it was revealed that respondents do not make adequate use of formal inventory management systems available to them. It is evident that respondents did in fact make use of more informal inventory management systems and also deployed customized inventory management strategies.

Kairu (2020) researched on role of strategic inventory management on performance of manufacturing firms in Kenya: a case of diverse eastern and central Africa limited. The study focused on 155 employees in the supply chain department at Diverse Eastern and Central Africa (DECAL). The target population was 105 employees from the various sections in the supply chain department who are directly involved in managing inventories in the organization. The sampling frame was the Human Resource register at DECAL which stipulates that the Supply Chain department comprises of 155 employees working in the various sections in the organization. The population sample was 51 respondents and stratified sampling technique was used since the population from which the sample is drawn does not constitute a homogenous group. Structured questionnaires containing both open ended and closed ended questions were used to collect primary data. 48 questionnaires were filled and returned for analysis. Data collected was analyzed using both qualitative and quantitative data analysis approaches with the aid of Statistical Package for Social Science (SPSS) version 20. From the ANOVA statistics in the table 4.3, the processed data, which is the population parameters, had a significance level of zero which shows that the data is ideal for making a conclusion on the population parameters as the value of significance is very low. The study also found that there was a positive relationship between performance of manufacturing firms and inventory control, order fulfillment, demand management and ICT application.

Kamau and Kagiri (2021) investigated the influence of inventory management practices on organizational competitiveness: a case of safaricom Kenya ltd. A descriptive research design was used in this study. The study targeted personnel in those departments as they are better placed to answer questions relating to inventory control and the company's competitiveness. The target respondents included the 103 management staffs from the Company's Head Offices in Nairobi. Stratified random sampling was applied where a sample was calculated using Fishers Formula. This generated a sample of 80 respondents. The study found that inventory shrinkage, inventory investment and inventory turnover affects the competitiveness of Safaricom Ltd. The study

concludes that inventory management practices are very vital to the competitiveness of organizations.

Sang and Kihara (2021) conducted a case study on the effect of inventory management practices on performance of manufacturing firms in Kenya: a case study of Sameer Africa. The research methodology involved collection of primary data through questionnaire. The study employed descriptive study design. The population of the study was 527 employees of Sameer Africa and the sample size was 96 managers and supervisors. The study used a multiple linear regression and correlation analysis to show the relationship between the variables. The study findings indicated a positive and significant correlation between all the predictor variables used and the performance of manufacturing firms. The study also established a positive and significant relationship between the variables and performance apart from inventory stock takes. Based on the study findings. The study concludes that more inventory stock taking practices should be embraced by manufacturing firms in Kenya for instance development of new accession registers for stocks to replace the old one, entering the records captured into the automated systems, taking of stock differences at the end of each day, documenting all goods in the store by tracking and reconciling stock frequently.

Warehouse Technology and Organization Performance

Nguyen (2020) researched on improving warehouse performance in logistics companies in Vietnam. This study is mainly implemented based on quantitative research methodology through conducting case study to explore research objectives. The results indicated that logistics companies in Viet Nam have paid more attention to warehouse operations and tried to improve their performance with different level and awareness. Almost companies are moving to higher level of performance with more updated applications of warehouse management system and modern technical equipment. The trend of applying IT and upgrading machine and equipment with more information sharing and integration with clients and supplier has been highly accepted to develop by almost of the respondent companies. The report conclude that logistics companies in Viet Nam have been moving forward in providing their clients with fully integrated logistics services such as transport, warehouse, handling, customs clearance, freight forwarding, document services, and added value services.

Margo and Jokonya (2024) explored the factors affecting the adoption of emerging technologies in warehouse management. The study used quantitative content analysis to analyze data collected from published articles. The study results suggest that the technological factor (relative advantage), the organizational factor (management), and the environmental factor (market structure) were the most dominant factors affecting the adoption of emerging technologies in warehouse management. The paper contributes to the body of knowledge on factors affecting the adoption of emerging technologies in warehouse management. The study reviewed the following technological factors: security, complexity, compatibility, uncertainty, relative advantage, trialability, and availability in the published articles to determine which factor would be the most cited. The results indicate that relative advantage was the most cited factor affecting the adoption of emerging technologies in warehouses. In conclusion, the objective of the study was to explore the factors affecting the adoption of emerging technologies in warehouse management.

Ominde and Kiarie (2021) conducted a case study on the effects of warehouse technology systems on performance of manufacturing firms in Kenya. The study adopted a descriptive survey which is a method of collecting information by interviewing or administering a questionnaire to a sample of individuals. The data was collected from respondents using self-administered questionnaires. The study established a significant relationship between influence of radio frequency identification barcode technology, manufacturing resources planning distribution requirements planning and productivity in manufacturing firms in Kenya. The study concluded that warehouse technology

systems provide flexible, automated support in processing all goods movements and in managing stocks in the manufacturing firms.

Wanjiru and Ngugi (2020) investigated the effect of e-warehousing on performance of public health institutions in kiambu county, Kenya. this research used descriptive research design. In research, a descriptive research design refers to the collection and presentation of detailed information about a particular participant or small group, frequently including the accounts of subjects themselves. The study established that E-Warehousing enables the execution of a real-time warehouse management system that greatly minimize the paperwork conventionally which are associated with warehouse functions and also makes sure timely and perfect flow of inventory and information. E-Warehousing provides a comprehensive range of fulfillment, warehousing and distribution services for the Public Health Institutions. The study concluded that E-Warehousing plays a significant role in growing Public Health Institutions in Kiambu supply chain operation fast and strong.

Mutua, Ngugi and Odhiambo (2020) researched on the influence of digital Warehousing technology Practices on Performance of Large Manufacturing Firms in Kenya. The unit of analysis consisted of 138 large manufacturing firms registered with the Kenya association of manufacturing under the category of large scale manufacturing firms; the unit of observation consisted of the Heads of Supply chain, Production and Logistics. Data was collected using questionnaires. study findings indicated a positive significant influence of digital warehousing technology on performance of large manufacturing firms. Based on the study findings, the study concluded that that a positive change in lean warehousing practices such as implementing optimal storage, automated picking system, adopting integrated order receiving, optimized packing, automated shipping systems and implementing integrated replenishment system results to a positive and significant change in performance of large manufacturing firms in Kenya.

RESEARCH METHODOLOGY

Research Design

The study adopted descriptive research design. The descriptive research design allows the researcher to gather information, summarize, present and interpret it for purpose of clarification (Karama, Iravo, & Shale, 2019). The design is suitable for the study since it enables description of both dependent and independent variables. Therefore, this design was appropriate for this study which extensively tested the analysis of the relationships between variables (Amuhaya, Namusonge, & Nthigah, 2019). Descriptive research design was therefore appropriate since the study intended to establish the influence of transport optimization on performance of distribution firms in Kenya. The descriptive studies are more formalized and typically structured with clearly stated hypotheses or investigative questions.

Target Population

The target population is a collection of research components that refers to all members of an actual or imaginary group of people, events, or objects to whom the findings should be applied (Prabhat & Meenu, 2017). This study targeted distribution firms in Nairobi County. From data obtained from Kenya International Freight and Warehousing Association (KIFWA), there is a total of 1061 distribution firms. The distribution firms formed the unit of analysis while management employees formed the unit of observation.

Sampling Frame

A sampling frame describes a list of all the items from where a representative sample is drawn for the purpose of a study (Nachmias & Nachmias, 2019). It is a list of members of the research population from which a random sample may be drawn (Kothari & Garg, 2014). The sample frame for this study was compiled from list of 1061 distribution firms in Kenya.

Sample Size and Sampling Procedures

A sample is a representative of certain known percentage, frequency distributions of elements' characteristics similar to the corresponding distributions within the whole population (Kasomo, 2019). Kothari (2019) explains that a sample size refers to the number of items to be selected from the universe to constitute a sample while sampling procedures refers to the technique used in selecting the items of the sample. The Yamane formula was adopted to calculate the study sample size as follows;

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

Where n is the sample size, and N is the population size, e- acceptable sampling error (0.05)

$$= \frac{1061}{1+1061(0.05^2)}$$

$$= \frac{1061}{3.65} = 290.48$$

$$n \approx 290$$

Therefore, the study sample size was 290 respondents.

Data Collection Instruments

This research used a questionnaire to collect primary data. According to Patton *et. al* (2019), a questionnaire is appropriate in gathering data and measuring it against a particular point of view. It provides a standardized tool for data collection. Structured questions were used to collect primary data from the field. Questionnaires were preferred because they are effective data collection instruments that allow respondents to give much of their opinions pertaining to the research problem (Dempsey, 2019). According to Kothari (2019), the information obtained from questionnaires is free from bias and researchers' influence and thus accurate and valid data was gathered. The preference for the questionnaire is based on the premise that it gives respondents freedom to express their views or opinions more objectively.

Pilot Study

A pilot test was conducted to assess the questionnaire's validity and reliability of the data that was collected. According to Copper and Schindler (2019), a pilot test is conducted to detect weaknesses in the design and instrumentation and provide a proxy data for selection of probability sample. According to Leedy and Ormrod (2019), a pilot study is an excellent way to determine the feasibility of the study. The subjects participating in the pilot study were not included in the final study to avoid survey fatigue. In this study, 10% of the sample size participated in the pilot study.

Data Analysis and Presentation

The researcher collected questionnaires, coded them, and entered them into the statistical Package for Social Sciences (SPSS version 26) for analysis. The sort function was used to perform the

initial screening. The data was based on the study's objectives and research hypothesis. The descriptive statistical techniques of frequency, mean, and standard deviation were used to analyze the quantitative data acquired. The results were displayed using frequency distribution tables, which kept track of how many times a score or response appears. Qualitative data collected was analyzed using content analysis and presented in prose form.

Inferential statistics including regression and correlation analysis was used in the study. According to Saunders *et al.* (2019), correlation is a statistical tool that helps to determine the relationships between two or more variables. Cooper and Schindler (2019) indicate that correlation, as measured by a correlation coefficient, is the degree to which a linear predictive relationship exists between random variables. Pearson correlation coefficient was used for testing associations between the independent and the dependent variables. According to Wagana (2019), a correlation coefficient (r) has two characteristics, strength and direction. The strength of the relationship is indicated by how r tends toward 1, the maximum value possible. r is interpreted as follows; when $r = +1$ it means there is perfect positive correlation between the variables, when $r = 0$ it means there is no correlation between the variables, that is the variables are uncorrelated, when $r = -1$ it means there is perfect inverse correlation between the variables.

A multiple regression model was used to test the significance of the influence of the independent variables on the dependent variable. Regression analysis attempts to determine whether a group of variables together predict a given dependent variable and, in this way, attempts to increase the accuracy of the estimate (Mugenda & Mugenda, 2019). The use of regression model is ideal due to its ability to show whether a positive or a negative relationship exists between independent and dependent variables (Mason, Lind, & Marchal, 2019).

The regression model was as follows;

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$$

Where: - Y = performance of distribution firms in Nairobi City County Kenya,

X_1 = inventory management,

X_2 = warehouse technology

β_0 = Intercept,

β = Coefficient of independent variables, and ϵ = error term

PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

Descriptive Statistics Analysis

Inventory Management and Performance of Firms

The first specific objective of the study was to determine the influence of inventory management on performance of distribution firms in Nairobi City County Kenya. The respondents were requested to indicate their level of agreement on statements relating to inventory management and performance of distribution firms in Nairobi City County Kenya. The results were as presented in Table 4.1.

From the results, the respondents agreed that their organization has well-defined stock control policies and procedures in place ($M=3.957$, $SD= 0.875$). In addition, the respondents agreed that they utilize inventory management software to monitor stock levels effectively ($M=3.948$, $SD=$

0.823). Further, the respondents agreed that they categorize their items based on their importance and value using ABC analysis. (M=3.909, SD= 0.635).

The respondents also agreed that a clear differentiation is made between A, B, and C items in their inventory management strategy (M=3.804, SD= 0.671). Further, the respondents agreed that they regularly conduct cycle counts as part of their inventory management practices (M=3.801, SD= 0.793). The respondents also agreed that the frequency of cycle counting is sufficient to maintain accurate inventory records (M=3.787, SD= 0.776).

Table 4. 1: Inventory Management and Performance of Firms

	Mean	Std. Dev.
Our organization has well-defined stock control policies and procedures in place.	3.957	0.875
We utilize inventory management software to monitor stock levels effectively.	3.948	0.823
We categorize our inventory items based on their importance and value using ABC analysis.	3.909	0.635
A clear differentiation is made between A, B, and C items in our inventory management strategy.	3.804	0.671
We regularly conduct cycle counts as part of our inventory management practices.	3.801	0.793
The frequency of cycle counting is sufficient to maintain accurate inventory records.	3.787	0.776
Aggregate	3.868	0.762

Warehouse Technology and Performance of Firms

The second specific objective of the study was to assess the influence of warehouse technology on performance of distribution firms in Nairobi City County Kenya. The respondents were requested to indicate their level of agreement on the statements relating to warehouse technology and performance of distribution firms in Nairobi City County Kenya. The results were as shown in Table 4.2. From the results, the respondents agreed that they use barcode systems to track inventory movement within their warehouse (M=3.902, SD= 0.897). In addition, the respondents agreed that the implementation of barcodes has improved the accuracy of their inventory records (M=3.884, SD= 0.731). Further, the respondents agreed that their warehouse utilizes automated systems for picking and packing processes (M=3.843, SD= 0.763). The respondents also agreed that automation has significantly increased their warehouse efficiency and productivity (M=3.816, SD=0.641). In addition, the respondents agreed that they have implemented a Warehouse Management System to streamline their operations (M=3.736, SD= 0.675). The respondents agreed that the WMS provides real-time visibility of inventory levels in their warehouse (M=3.721, SD=0.866).

Table 4. 2: Warehouse Technology and Performance of Firms

	Mean	Std. Dev.
We use barcode systems to track inventory movement within our warehouse.	3.902	0.897
The implementation of barcodes has improved the accuracy of our inventory records.	3.884	0.731
Our warehouse utilizes automated systems for picking and packing processes.	3.843	0.763
Automation has significantly increased our warehouse efficiency and productivity.	3.816	0.641
We have implemented a Warehouse Management System to streamline our operations.	3.736	0.675
The WMS provides real-time visibility of inventory levels in our warehouse.	3.721	0.866
Aggregate	3.817	0.762

Correlation Analysis

The present study used Pearson correlation analysis to determine the strength of association between independent variables (inventory management and warehouse technology) and the dependent variable (performance of distribution firms in Nairobi City County Kenya). Pearson correlation coefficient range between zero and one, where by the strength of association increase with increase in the value of the correlation coefficients.

Table 4. 3: Correlation Coefficients

		Firm Performance	Inventory Management	Warehouse Technology
Firm Performance	Pearson Correlation			
	Sig. (2-tailed)			
	N	270		
Inventory Management	Pearson Correlation	.805**	1	
	Sig. (2-tailed)	.003		
	N	270	270	
Warehouse Technology	Pearson Correlation	.815**	.297	1
	Sig. (2-tailed)	.000	.060	
	N	270	270	270

From the results, there was a very strong relationship between inventory management and performance of distribution firms in Nairobi City County Kenya ($r = 0.805$, p value = 0.003). The relationship was significant since the p value 0.003 was less than 0.05 (significant level). The findings are in line with the findings of Gallien *et al* (2020) who indicated that there is a very strong relationship between inventory management and firm performance.

Moreover, there was a very strong relationship between warehouse technology and performance of distribution firms in Nairobi City County Kenya ($r = 0.815$, p value = 0.000). The relationship was significant since the p value 0.000 was less than 0.05 (significant level). The findings are in line with the findings of Nguyen (2020) who indicated that there is a very strong relationship between warehouse technology and firm performance.

Regression Analysis

Multivariate regression analysis was used to assess the relationship between independent variables (inventory management and warehouse technology) and the dependent variable (performance of distribution firms in Nairobi City County Kenya).

Table 4. 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.869 ^a	.755	.756	.10412

The model summary was used to explain the variation in the dependent variable that could be explained by the independent variables. The r-squared for the relationship between the independent variables and the dependent variable was 0.755. This implied that 75.5% of the variation in the dependent variable (performance of distribution firms in Nairobi City County Kenya) could be explained by independent variables (inventory management, warehouse technology).

Table 4.5: Analysis of Variance

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	102.028	2	51.014	500.14	.002 ^b
Residual	13.653	265	.051		
Total	115.681	269			

a. Dependent Variable: performance of distribution firms in Nairobi City County Kenya

b. Predictors: (Constant), inventory management and warehouse technology

The ANOVA was used to determine whether the model was a good fit for the data. F calculated was 500.14 while the F critical was 2.406. The p value was 0.002. Since the F-calculated was greater than the F-critical and the p value 0.002 was less than 0.05, the model was considered as a good fit for the data. Therefore, the model can be used to predict the influence of inventory management, warehouse technology, receiving and inspection and warehouse design on performance of distribution firms in Nairobi City County Kenya.

Table 4.6: Regression Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.335	0.085		3.941	0.000
inventory management	0.345	0.089	0.344	3.876	0.002
warehouse technology	0.361	0.093	0.362	3.882	0.001

The regression model was as follows:

$$Y = 0.335 + 0.345X_1 + 0.361X_2 + \varepsilon$$

According to the results, inventory management has a significant effect on performance of distribution firms in Nairobi City County Kenya ($\beta_1=0.345$, p value= 0.002). The relationship was

considered significant since the p value 0.002 was less than the significant level of 0.05. The findings are in line with the findings of Gallien et al (2020) who indicated that there is a very strong relationship between inventory management and firm performance.

The results also revealed that warehouse technology has a significant effect on performance of distribution firms in Nairobi City County Kenya, $\beta_1=0.361$, p value= 0.001). The relationship was considered significant since the p value 0.001 was less than the significant level of 0.05. The findings are in line with the findings of Nguyen (2020) who indicated that there is a very strong relationship between warehouse technology and firm performance.

Conclusions

The study concludes that inventory management has a positive and significant effect on performance of distribution firms in Nairobi City County Kenya. Findings revealed that stock control, ABC analysis and cycle counting influences performance of distribution firms in Nairobi City County Kenya.

In addition, the study concludes that warehouse technology has a positive and significant effect on performance of distribution firms in Nairobi City County Kenya. Findings revealed that barcode, automation and warehouse management system influences performance of distribution firms in Nairobi City County Kenya.

Recommendations

The study recommends that the management of distribution firms in Kenya should implement an advanced inventory management system (AIMS). By utilizing AIMS, companies can enhance their forecasting capabilities, reduce stockouts and overstock situations, and optimize order fulfillment processes.

In addition, the study recommends that the management of distribution firms in Kenya should adopt automated warehouse management systems (WMS). By integrating technologies such as barcode scanning, RFID tracking, and automated picking systems, firms can streamline their inventory processes, reduce manual errors, and enhance order accuracy.

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