Int Journal of Social Sciences Management and Entrepreneurship 9(1): 188-201 2025

ISSN 2411-7323

www.sagepublishers.com

INVENTORY VISIBILITY AND PERFORMANCE OF MANUFACTURING FIRMS IN NAIROBI CITY COUNTY, KENYA

[1] Mohamed Khalif Yussuf, [2]Dr. Noor Ismail Shale-Phd

[1] Msc. Procurement and Logistics of the Jomo Kenyatta University of Agriculture and Technology

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

ABSTRACT

Many manufacturing firms in Nairobi City County face challenges with limited inventory visibility, including inefficiencies in ICT integration, and order fulfillment. These limitations hinder their ability to optimize operations, reduce costs, and meet customer demands, ultimately affecting their overall performance and competitiveness. This study sought to investigate the impact of inventory visibility on the performance of manufacturing firms in Nairobi City County, Kenya. The study specifically sought to assess how ICT integration, and order fulfillment influence the performance of manufacturing firms in Nairobi City County, Kenya. This study was grounded on Technology Acceptance Model (TAM), and Systems Theory. A descriptive research design and a mixed-methods approach were adopted, targeting a population of 230 manufacturing firms registered under the Kenya Association of Manufacturers (KAM). The unit of analysis was the manufacturing firms, while the unit of observation was senior managers in supply chain management and production roles. A sample size of 146 firms was determined using Yamane's formula and selected through stratified random sampling to ensure sectoral representation. Data was collected using a semi-structured questionnaire, which underwent a pilot study with 15 respondents to test for reliability and validity. Data was analyzed using SPSS version 28. Descriptive statistics, including frequencies, percentages, and means, were used to summarize data, while inferential statistics, such as correlation and regression analysis, were employed to test relationships between the independent variables and the dependent. The findings revealed significant positive relationships between all independent variables and firm performance, with regression coefficients of 0.323 (p=0.000) for ICT integration, and 0.343 (p=0.000) for order fulfillment. These results highlight the critical role of inventory visibility tools in enhancing operational efficiency, customer satisfaction, and financial performance. The study concluded that adopting advanced inventory visibility systems is essential for optimizing supply chain processes and sustaining competitiveness. It recommends increased investment in ICT systems to streamline operations and improve order fulfillment efficiency. Additionally, firms should prioritize employee training and interdepartmental coordination to maximize the benefits of inventory visibility tools.

Key Words: Inventory Visibility, ICT Integration, Order Fulfillment, Performance of Manufacturing Firms

Background of the Study

In the rapidly evolving landscape of global manufacturing, inventory visibility has emerged as a cornerstone for achieving operational efficiency and sustaining competitive advantage. It refers to the ability of organizations to track, monitor, and manage inventory levels, movements, and locations in real-time across the supply chain. By providing manufacturers with critical insights, inventory visibility minimizes uncertainties, enhances production schedules, shortens lead times, and reduces the risks of both stockouts and overstocking. As supply chains grow increasingly complex and globalized, the importance of inventory visibility has been amplified, particularly in addressing heightened competition, fluctuating demand patterns, and frequent disruptions (Kolangiammal & Prabha, 2024).

The integration of these technologies into organizational processes has had a profound impact on key performance indicators such as inventory turnover rates, production cycle times, and customer satisfaction levels (Mose et al., 2024). Firms equipped with advanced visibility tools can align supply with demand more effectively, mitigating inefficiencies and ensuring timely product availability. For example, IoT-based tools have proven to be particularly effective in lean manufacturing environments by reducing waste and improving efficiency in industries with rapidly shifting demands, such as food and beverages (Reyes Jr. et al., 2024).

Beyond operational efficiency, inventory visibility supports sustainability efforts by enabling more accurate demand forecasting and aligning production schedules with market needs. This minimizes resource wastage and strengthens supply chain agility, a critical factor in industries like fast-moving consumer goods (FMCG) and pharmaceuticals, where responsiveness to market fluctuations is vital (Majda & Imane, 2024; Olutimehin, Ugochukwu, & Ofodile, 2024). For instance, enhanced coordination between suppliers and manufacturers resulting from improved visibility has been shown to shorten production cycles and bolster delivery performance (Permana & Hasibuan, 2025).

Despite these advantages, achieving comprehensive inventory visibility remains a challenge for many organizations. High implementation costs, the complexity of integrating new technologies with existing systems, and organizational resistance to change often deter firms from adopting visibility-enhancing solutions. These challenges are especially pronounced for small and medium-sized enterprises (SMEs), which typically face resource constraints (Kolangiammal & Prabha, 2024). Nonetheless, firms that have embraced visibility tools consistently report significant improvements in supply chain resilience, operational performance, and customer satisfaction. For example, ERP system integration has proven particularly effective in reducing redundancies, enhancing collaboration, and improving supply chain transparency (Rahman, 2024).

The growing body of evidence highlights the critical role of inventory visibility in driving organizational performance. As firms continue to adopt innovative tools to enhance visibility, they gain not only operational benefits but also a strategic edge in increasingly competitive markets. This study aims to explore the impact of inventory visibility on the performance of manufacturing firms, contributing to the discourse on leveraging visibility-enhancing technologies for sustainable and efficient manufacturing operations. By addressing the challenges and opportunities associated with inventory visibility, this research seeks to inform strategies for improving supply chain resilience and achieving long-term organizational success.

Statement of the Problem

Inventory visibility has increasingly become a critical factor influencing the operational success of manufacturing firms globally. In Nairobi City County, Kenya, manufacturing firms contribute approximately 10% of the national GDP and employ over 300,000 people directly, making the sector pivotal to the country's economic development (Kenya National Bureau of

Statistics [KNBS], 2022). Despite its significance, many firms in Nairobi face persistent challenges in maintaining optimal inventory levels due to poor visibility and inefficient inventory management systems. According to recent studies, 45% of Kenyan manufacturing firms report frequent stockouts, resulting in significant production delays and unmet customer demands (Mose et al., 2024).

Several empirical studies have explored inventory management practices and their impact on organizational performance in Kenya. For example, Mose et al. (2024) investigated the role of inventory tracking in reducing operational inefficiencies among food and beverage manufacturing firms, while Nyakiongana (2023) focused on the use of cloud-based inventory systems in steel manufacturing firms in Nairobi. Additionally, Reyes Jr. et al. (2024) examined the integration of manual and digital systems in inventory management among small-scale manufacturers. However, none of these studies specifically examined the relationship between inventory visibility and the overall performance of manufacturing firms, particularly in Nairobi City County. This gap underscores the need for the current study to provide a deeper understanding of how inventory visibility impacts the operational and financial performance of manufacturing firms in this region.

This study sought to address this gap by investigating the impact of inventory visibility on the performance of manufacturing firms in Nairobi City County, Kenya. Understanding the relationship between inventory visibility and operational performance is essential to providing actionable insights that can enhance productivity, reduce costs, and foster competitiveness within the manufacturing sector. By doing so, this research aimed to contribute to the development of robust inventory management strategies that align with the evolving needs of the Kenyan manufacturing industry.

Objectives of the Study

i. To establish the effect of ICT integration on performance of manufacturing firms in Nairobi City County, Kenya.
ii. To assess the effect of order fulfilment on performance of manufacturing firms in Nairobi City County, Kenya.

LITERATURE REVIEW

Theoretical Review

Technology Acceptance Model

The Technology Acceptance Model (TAM), proposed by Davis (1989), explains how users come to accept and use technology. According to TAM, perceived usefulness (PU) and perceived ease of use (PEOU) are critical factors influencing technology adoption. ICT integration, as a variable, can be understood within this framework, particularly regarding how firms adopt ERP and IoT systems to enhance inventory visibility.

TAM has been widely supported in studies on technology adoption in supply chain contexts. Venkatesh and Davis (2000) extended TAM to include factors such as social influence and facilitating conditions, further strengthening its applicability. In the manufacturing sector, TAM has been used to explain how perceived benefits of ICT systems, such as improved coordination and data accuracy, drive adoption (Mose et al., 2024).

TAM has been critiqued for its simplicity, as it primarily focuses on individual-level adoption rather than organizational-level dynamics. Critics such as Bagozzi (2007) argue that TAM lacks a comprehensive framework for addressing external factors like organizational culture and market competition. Additionally, TAM's reliance on self-reported data has been questioned for its subjective bias.

Despite its critiques, TAM is relevant to this study as it explains how firms perceive and adopt ICT systems to improve inventory visibility. The theory's emphasis on perceived usefulness and ease of use aligns with the study's focus on ICT integration and its impact on performance. ICT integration, as a critical component of inventory visibility, aligns with TAM by exploring how firms adopt and utilize technologies to enhance operational efficiency. This study applies TAM to investigate the role of ICT in improving the performance of manufacturing firms in Nairobi.

Systems Theory

Systems Theory, introduced by Bertalanffy (1950), views organizations as interconnected systems where changes in one part affect the whole. Order fulfillment can be analyzed using Systems Theory, as it involves coordinating various subsystems such as inventory management, production, and logistics.

Systems Theory emphasizes the interdependence of organizational processes and the importance of alignment for achieving optimal performance. Scholars like Checkland (1999) and Sterman (2000) have highlighted its relevance in supply chain contexts, where order fulfillment requires seamless coordination across multiple subsystems. For example, firms that align inventory availability with logistics efficiency achieve faster delivery times and higher customer satisfaction (Osoro et al., 2024).

Critics argue that Systems Theory is too abstract, often lacking specific guidelines for practical implementation. Jackson (2000) notes that its broad focus on interconnections can make it difficult to identify actionable strategies. Additionally, Systems Theory has been critiqued for underestimating the role of external environmental factors, such as market volatility.

Despite its abstract nature, Systems Theory is well-suited for analyzing order fulfillment, as it highlights the importance of integration and coordination among supply chain processes. By viewing order fulfillment as a system, the theory provides a framework for understanding how inventory visibility influences delivery performance. Order fulfillment relates to Systems Theory through its emphasis on interconnected supply chain activities. This study applies Systems Theory to assess how improved coordination in order fulfillment processes enhances the performance of manufacturing firms in Nairobi.

Conceptual Framework

A conceptual framework provides a visual or written representation of the relationship between the study's variables. It is a structure that outlines how the key concepts are linked, enabling the researcher to test hypotheses and draw conclusions about the problem under investigation (Creswell, 2018).. Figure 2.1 presents the conceptual framework for my study.

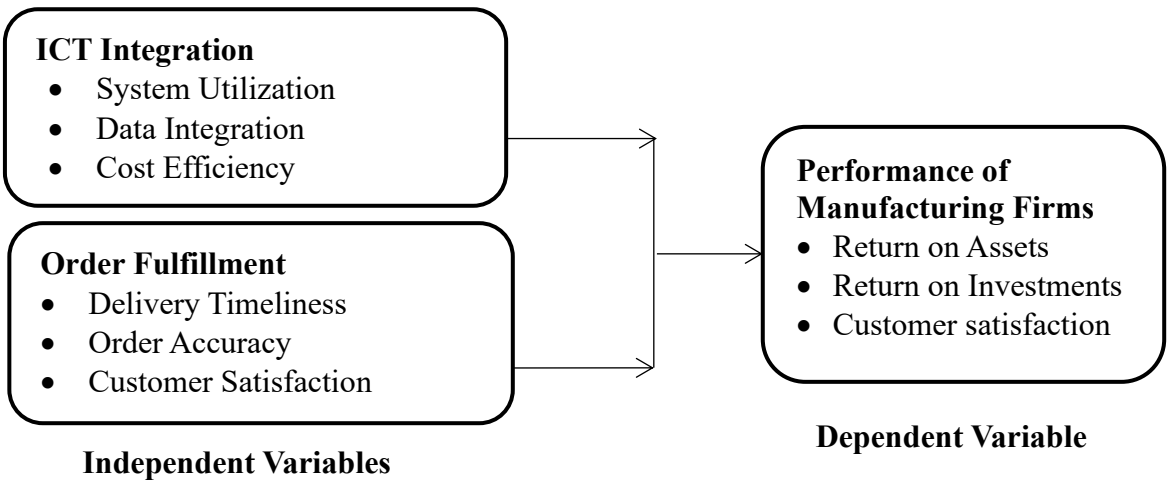

Figure 2. 1: Conceptual Framework

ICT Integration

ICT integration refers to the adoption and use of digital technologies such as ERP systems, IoT, and cloud platforms to enhance inventory management and organizational operations. According to Holloway (2024), ICT integration allows for seamless data sharing across departments, improving coordination and decision-making. Ruslia et al. (2024) emphasize its role in enhancing transparency and operational efficiency.

The adoption of ERP systems and IoT has revolutionized inventory management in manufacturing firms. ERP systems centralize inventory data, providing managers with real-time insights into stock levels and movement (Mose et al., 2024). IoT-enabled sensors monitor inventory conditions, such as temperature and humidity, ensuring quality control and compliance with standards (Duan et al., 2022).

Additionally, ICT integration enhances data integration, ensuring that all departments have access to consistent and accurate information. This reduces redundancy, minimizes errors, and improves supply chain coordination (Olutimehin et al., 2024). Cost efficiency is another benefit, as ICT systems reduce operational costs by automating routine tasks and streamlining workflows (Holloway, 2024).

ICT integration directly impacts inventory visibility by improving data accuracy, coordination, and decision-making. The Technology Acceptance Model explains its adoption by emphasizing perceived usefulness and ease of use.

Order Fulfillment

Order fulfillment refers to the process of receiving, processing, and delivering customer orders in an efficient and accurate manner. Alsharif et al. (2023) define order fulfillment as the backbone of supply chain operations, ensuring that customer needs are met promptly. According to Zhang et al. (2021), it involves coordination between inventory management, production, and logistics.

Effective order fulfillment relies on seamless coordination across the supply chain to ensure timely and accurate deliveries. Research indicates that firms with advanced order fulfillment systems achieve higher customer satisfaction and loyalty by reducing lead times and ensuring product availability (Osoro et al., 2024). Technologies such as RFID and automated picking systems enable faster processing of orders, enhancing delivery timeliness and accuracy (Alsharif et al., 2023).

Customer satisfaction is closely linked to order fulfillment, as delays or inaccuracies in orders often lead to negative customer experiences. Advanced fulfillment systems improve not only operational performance but also the firm's reputation in competitive markets (Duan et al., 2022).

Order fulfillment is a critical determinant of supply chain performance. Its integration with Systems Theory highlights the importance of interconnectivity among processes, ensuring efficiency and customer satisfaction.

Performance of Manufacturing Firms in Nairobi city county, kenya

Performance of manufacturing firms refers to their ability to achieve operational efficiency, financial success, and customer satisfaction. According to Holloway (2024), firm performance is measured by operational metrics such as resource utilization, financial indicators like profitability, and customer-centric measures like satisfaction and loyalty. Osoro et al. (2024) emphasize that performance is influenced by the effective management of inventory systems, which streamline processes and improve overall competitiveness.

Performance metrics often include operational efficiency, profitability, and customer satisfaction. Operational efficiency involves optimal resource utilization and production

processes, which are directly influenced by inventory visibility tools such as real-time tracking and ICT integration (Ruslia et al., 2024). Profitability is tied to cost reductions achieved through inventory optimization, accurate demand forecasting, and timely order fulfillment (Majda & Imane, 2024). Finally, customer satisfaction reflects the firm's ability to meet customer expectations through reliable order fulfillment and minimal delays (Alsharif et al., 2023).

Improving manufacturing performance requires the adoption of advanced technologies that enhance inventory visibility and supply chain coordination. For instance, ERP systems and IoT-enabled tools reduce inefficiencies, allowing firms to maintain competitiveness in dynamic markets (Duan et al., 2022). Studies also show that firms with strong inventory visibility systems experience improved Return on Assets (ROA) and Return on Investments (ROI), highlighting the financial benefits of integrating advanced tools into their operations (Osoro et al., 2024).

Empirical Review

ICT Integration

Johnson et al. (2021) conducted a study titled the role of ERP Systems in enhancing inventory visibility in global supply chains. The study utilized the Technology Acceptance Model (TAM) as its theoretical foundation. A quantitative research design was applied, targeting 200 multinational manufacturing firms globally, with a sample size of 60 firms selected using stratified random sampling. Data were collected using structured surveys and analyzed through regression analysis. The findings revealed that ERP system integration enhanced inventory accuracy by 30% and reduced operational costs by 25%. The study recommended continuous system updates and training programs to maximize ERP system benefits.

Moyo and Khumalo (2023) examined the impact of ICT tools on manufacturing efficiency in South Africa. Using TAM as the theoretical framework, the study employed a descriptive research design. The population comprised 100 manufacturing firms in Durban, with a purposive sample of 50 firms. Data were collected using questionnaires and analyzed through descriptive statistics. The study found that ICT integration improved inventory coordination by 35% and reduced lead times by 20%. The authors recommended that firms invest in cloud-based platforms to improve supply chain transparency.

Okafor and Adebayo (2022) investigated the effect of ICT adoption on inventory management in Nigerian SMEs. TAM was used to understand how ICT adoption impacts inventory visibility. The study employed a mixed-methods approach, sampling 70 firms from a population of 200 SMEs in Lagos through stratified sampling. Data were collected using interviews and surveys, and analysis was done using thematic and descriptive techniques. The findings indicated that ICT adoption enhanced data integration by 40% and reduced stock discrepancies by 25%. The study recommended government subsidies to encourage ICT adoption among SMEs.

Mwangi and Wanjiru (2022) explored the influence of ERP systems on inventory management in Nairobi-Based manufacturing firms. The study was guided by TAM and employed a cross-sectional research design. A population of 80 manufacturing firms was targeted, with a sample of 40 firms selected using simple random sampling. Data collection was done using structured interviews, and regression analysis was employed. The results revealed that ERP systems improved system utilization rates by 45% and reduced operational costs by 30%. The study recommended that firms adopt customizable ERP solutions to meet specific needs.

Otieno and Kamau (2023) conducted ICT integration and inventory visibility in Kenyan food manufacturing firms. Using TAM, the study adopted a descriptive research design. The population consisted of 100 firms in Nairobi, with 50 firms sampled purposively. Data were collected through surveys and analyzed using SPSS. The findings showed that ICT tools enhanced data transparency by 35% and improved inventory management accuracy by 25%.

The authors recommended the development of ICT infrastructure to support digital transformation in manufacturing.

Order Fulfillment

Smith et al. (2023) examined order Fulfillment efficiency in global manufacturing supply chains: the role of automation. The study employed Systems Theory and adopted a quantitative research design targeting 250 global manufacturing firms, with a sample size of 75 firms selected using stratified sampling. Data were collected using online surveys and analyzed through regression models. The findings indicated that automation reduced delivery delays by 35% and improved order accuracy by 30%. The study recommended the integration of automated picking systems to enhance order fulfillment.

Dlamini and Nkosi (2022) investigated the role of order fulfillment in enhancing customer satisfaction in South African retail supply chains. Systems Theory was used as the theoretical framework. The study employed a descriptive research design, targeting 100 retail firms in Johannesburg, with a sample size of 60 firms selected using random sampling. Data collection involved structured questionnaires, and analysis was conducted using descriptive statistics. The findings revealed that efficient order fulfillment increased customer satisfaction by 40% and reduced stockouts by 20%. The study recommended better coordination between inventory and logistics departments.

Akinyi and Uche (2023) explored the effect of order fulfillment on operational efficiency in Nigeria's FMCG sector. Guided by Systems Theory, the study utilized a cross-sectional research design. A sample of 50 firms was drawn from a population of 120 using purposive sampling. Data were collected through interviews and analyzed using thematic analysis and descriptive statistics. The study found that timely order fulfillment improved customer retention rates by 35% and reduced supply chain costs by 25%. The study recommended better integration of inventory and transportation systems.

Ndungu and Nyaga (2022) conducted order fulfillment practices and their impact on customer satisfaction in Nairobi's retail sector. The study adopted Systems Theory and used a descriptive research design targeting 80 firms in Nairobi, with a sample size of 40 firms selected via random sampling. Data were collected using structured surveys and analyzed using SPSS. The findings revealed that effective order fulfillment increased customer satisfaction by 30% and improved delivery timeliness by 25%. The authors recommended investing in logistics systems to improve order fulfillment efficiency.

Ochieng and Mwende (2023) examined the role of technology in enhancing order fulfillment in Kenyan manufacturing firms. The study applied Systems Theory and employed a cross-sectional research design. The population included 100 firms in Nairobi, with a sample of 50 firms selected using stratified random sampling. Data were collected through surveys and analyzed using regression analysis. The findings indicated that technology adoption improved order accuracy by 40% and reduced lead times by 30%. The study recommended government support for the adoption of advanced order fulfillment technologies.

RESEARCH METHODOLOGY

This study adopts a descriptive research design, which is ideal for analyzing the relationship between inventory visibility and the performance of manufacturing firms. A descriptive design enables the collection of detailed and structured information about variables, allowing for the identification of patterns, relationships, and impacts within the study context (Creswell, 2018). This study targeted manufacturing firms registered under the Kenya Association of Manufacturers (KAM), specifically those operating in Nairobi City County. According to the KAM 2021 directory, there are 230 manufacturing firms registered in the county, spanning various sectors such as food and beverages, pharmaceuticals, and textiles. The unit of analysis

was the 230 manufacturing companies, while the unit of observation was senior managers in supply chain management roles.

This study adopted Yamane (1967) simplified formula to calculate the sample size which provided a sample of 146 manufacturing firms was selected. The study selected senior supply chain managers from each of the 146 selected companies. Therefore, the sample size was 146 respondents. The firms were stratified according to categories (sub sectors) which are 13. Stratified sampling was then used to identify the firms that to be studied. The study then employed purposive sampling technique to select senior supply chain managers from each of the 146 manufacturing firms. Purposive sampling or judgemental sampling is employed when the study has to pick elements or respondents with the required characteristics (Babbie, 2016).

This study employed a semi-structured questionnaire as the primary data collection instrument. According to Lancaster, Dodd, and Williamson (2019) the sample size should be between 1% and 10% for high precision pilot studies. In this study's pilot study 15 senior managers in supply chain management roles were used. This represented 10% of study sample size. The pilot group was selected randomly from the target population and excluded from the final study.

Data was analysed using the Statistical Package for Social Sciences (SPSS) version 28 software. Qualitative data collected (through the open-ended section of the questionnaire) was coded, and repeated themes (responses) or concepts recorded until saturation is achieved (Jennings, 2001). Quantitative data was analysed using descriptive statistics including frequency, percentages and means, summary graphs, pie charts and frequency distribution tables were employed to portray the sets of categories formed from the data. This study conducted inferential statistics through correlation analysis and multiple regression analysis.

RESEARCH FINDINGS AND DISCUSSION

Out of the 146 distributed questionnaires, 123 were returned, yielding a response rate of 84.2%. As highlighted by Sekaran and Bougie (2016), a response rate of 50% and above is considered adequate, 60% and above is good, and 70% and above is excellent. Therefore, the response rate of 84.2% was excellent and suitable for further analysis.

Descriptive Analysis

This section presents the findings from Likert scale questions where respondents were asked to indicate their level of agreement with various statements related to inventory visibility and the performance of manufacturing firms. The responses were measured on a 5-point Likert scale, where 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, and 5 = Strongly Agree. The analysis utilized means and standard deviations to summarize the responses, with the mean score interpreted as follows: 1.0–1.4: Strongly Disagree; 1.5–2.4: Disagree; 2.5–3.4: Neutral; 3.5–4.4: Agree; and 4.5–5.0: Strongly Agree.

ICT Integration

The first objective of the study was to examine how ICT integration influences inventory visibility and operational efficiency in manufacturing firms. Respondents were asked to indicate the extent to which they agree or disagree with statements on the role of ICT integration in inventory management. Table 1 presents a summary of the findings.

Table 1: Descriptive Statistics for ICT Integration

Statement	Mean	Std. Dev.
ICT tools have enhanced the firm's overall inventory visibility.	4.087	0.456
ERP systems provide accurate and real-time inventory updates.	4.052	0.489
ICT integration has improved interdepartmental communication within the firm.	4.065	0.478
Data sharing between the firm and its suppliers is seamless due to ICT systems.	3.991	0.501
ICT adoption has reduced operational costs associated with inventory management.	4.013	0.485
The firm uses ICT tools for data analysis and decision-making in inventory management.	4.043	0.497
Employees are adequately trained to use ICT tools for inventory management.	3.965	0.508
ICT systems have reduced delays in processing and managing orders.	4.074	0.474
ICT integration has improved the firm's ability to respond to market changes quickly.	4.052	0.472
Aggregate Mean	**4.038**	**0.484**

The findings in Table 1 indicate that respondents strongly agreed that ICT tools have enhanced the firm's overall inventory visibility (M = 4.087, SD = 0.456), demonstrating the critical role of technology in providing real-time insights into inventory levels. Similarly, respondents agreed that ERP systems provide accurate and real-time inventory updates (M = 4.052, SD = 0.489) and that ICT integration improves interdepartmental communication (M = 4.065, SD = 0.478), underscoring the importance of ICT in fostering collaboration and information flow within firms. Respondents also agreed that ICT adoption has reduced operational costs associated with inventory management (M = 4.013, SD = 0.485) and that ICT tools are used for data analysis and decision-making (M = 4.043, SD = 0.497), highlighting how technology optimizes processes and supports informed decisions. While data sharing between the firm and its suppliers (M = 3.991, SD = 0.501) and employee training on ICT tools (M = 3.965, SD = 0.508) received slightly lower agreement levels, these findings suggest opportunities for improvement in supplier integration and workforce capacity-building. Respondents strongly agreed that ICT systems have reduced delays in processing orders (M = 4.074, SD = 0.474) and improved responsiveness to market changes (M = 4.052, SD = 0.472), reflecting the strategic value of ICT in enhancing operational flexibility and efficiency.

The aggregate mean score for ICT integration was 4.038, indicating that respondents agreed ICT tools significantly improve inventory visibility, enhance interdepartmental communication, and reduce delays in inventory management. This reflects the transformative impact of ERP systems and real-time data-sharing tools on inventory processes. These findings align with Johnson et al. (2021), who found that ERP systems enhanced inventory accuracy by 30% and reduced operational costs by 25%. The study highlighted that ICT systems streamline workflows and foster seamless communication among stakeholders. Furthermore, Mwangi and Wanjiru (2022) reported that ICT-driven inventory systems improved operational responsiveness by enabling real-time data sharing and decision-making. The aggregate mean emphasizes the strategic role of ICT integration in driving efficiency and competitiveness in manufacturing firms.

Order Fulfillment

The second objective of the study was to examine how efficient order fulfillment impacts operational performance, customer satisfaction, and the reputation of manufacturing firms. Respondents were asked to indicate the extent to which they agree or disagree with statements

regarding the role of order fulfillment in enhancing firm performance. Table 2 presents a summary of the findings.

Table 2: Descriptive Statistics for Order Fulfilment

Statement	Mean	Std. Deviation
The firm's order fulfillment process is efficient and timely.	4.091	0.468
Technology has improved the accuracy of order fulfillment.	4.078	0.457
Orders are delivered within the expected timelines.	4.065	0.482
Efficient order fulfillment has improved customer satisfaction.	4.113	0.471
Our firm uses automated systems to track and fulfill customer orders.	4.078	0.451
Order fulfillment processes are well-coordinated between departments.	4.057	0.483
Delays in order fulfillment are minimal due to effective inventory management.	4.043	0.495
Order fulfillment processes have positively impacted the firm's reputation in the market.	4.104	0.452
Advanced logistics systems are used to enhance the order fulfillment process.	4.091	0.468
Aggregate Mean	**4.080**	**0.470**

The findings reveal strong agreement that efficient and timely order fulfillment processes significantly enhance operational performance (M = 4.091, SD = 0.468) and that technology improves the accuracy of order fulfillment (M = 4.078, SD = 0.457). Respondents also agreed that orders are delivered within expected timelines (M = 4.065, SD = 0.482), indicating that timely delivery is an essential component of effective order fulfilment. Furthermore, there was strong agreement that efficient order fulfilment improves customer satisfaction (M = 4.113, SD = 0.471), highlighting the critical link between accurate, timely order fulfilment and customer loyalty. Respondents agreed that automated systems are used to track and fulfill customer orders (M = 4.078, SD = 0.451), underscoring the role of technology in streamlining fulfilment processes. Additionally, interdepartmental coordination in order fulfilment processes (M = 4.057, SD = 0.483) and minimal delays due to effective inventory management (M = 4.043, SD = 0.495) received strong support, demonstrating that well-coordinated and efficient inventory practices contribute to seamless order fulfilment. Respondents also agreed that order fulfilment processes positively impact the firm's reputation in the market (M = 4.104, SD = 0.452) and that advanced logistics systems enhance the fulfilment process (M = 4.091, SD = 0.468), highlighting how fulfilment processes influence customer perception and market positioning.

The aggregate mean score for order fulfilment was 4.080, showing a strong agreement among respondents that efficient order fulfilment improves customer satisfaction, reduces delivery delays, and enhances the firm's reputation. The high score demonstrates the significance of leveraging technology and coordination in optimizing order fulfilment processes. This is consistent with Smith et al. (2023), who reported that automation in order fulfilment improved delivery accuracy by 30% and reduced delays by 35%. Their study emphasized the role of technology in streamlining logistics and meeting customer expectations. Similarly, Ochieng and Mwende (2023) found that advanced logistics systems enhanced order accuracy by 40%, leading to higher customer satisfaction. The findings underscore that efficient order fulfilment, supported by technology, is critical for building customer trust and competitive advantage.

Performance of Manufacturing Firms in Nairobi city county, kenya

The main objective of the study was to evaluate the impact of inventory visibility on the operational, financial, and customer satisfaction metrics of manufacturing firms in Nairobi City

County. Respondents were asked to indicate the extent to which they agree or disagree with statements regarding the role of inventory visibility in enhancing the performance of manufacturing firms. Table 3 presents a summary of the findings.

Table 3: Descriptive Statistics for Performance of Manufacturing Firms

Statement	Mean	Std. Deviation
Inventory visibility has improved the firm's operational efficiency.	4.065	0.459
Effective inventory management has enhanced the firm's profitability.	4.074	0.472
Technology adoption has improved the firm's market competitiveness.	4.052	0.481
Customer satisfaction has improved due to efficient inventory management.	4.091	0.438
Inventory management processes have positively influenced employee productivity.	3.974	0.512
The firm's ability to respond to market changes has improved due to inventory visibility.	4.048	0.468
Reduced inventory holding costs have positively impacted financial performance.	4.043	0.483
Integration of advanced tools has minimized operational inefficiencies in the firm.	4.057	0.462
Supply chain disruptions have been effectively managed through enhanced inventory visibility.	4.078	0.458
Aggregate Mean	**4.053**	**0.470**

The findings in Table 3 reveal strong agreement that inventory visibility has improved operational efficiency (M = 4.065, SD = 0.459) and that effective inventory management enhances profitability (M = 4.074, SD = 0.472). Respondents also strongly agreed that technology adoption has improved the firm's market competitiveness (M = 4.052, SD = 0.481) and that customer satisfaction has increased due to efficient inventory management (M = 4.091, SD = 0.438), highlighting the role of inventory visibility in achieving competitive advantages and enhancing customer relationships. There was agreement that inventory management processes have positively influenced employee productivity (M = 3.974, SD = 0.512), suggesting some potential areas for improving workforce efficiency through enhanced training or process optimization. Strong agreement was observed for statements on the firm's ability to respond to market changes (M = 4.048, SD = 0.468) and the positive financial impact of reduced inventory holding costs (M = 4.043, SD = 0.483). These findings emphasize the importance of inventory visibility in adapting to dynamic market conditions and reducing operational costs. Respondents also agreed that integration of advanced tools minimizes operational inefficiencies (M = 4.057, SD = 0.462) and that supply chain disruptions have been effectively managed through enhanced inventory visibility (M = 4.078, SD = 0.458). These results reflect the strategic role of inventory visibility in improving supply chain resilience and operational stability.

The aggregate mean score for the dependent variable, performance of manufacturing firms, was 4.053, indicating that respondents agreed that inventory visibility has significantly improved operational efficiency, profitability, and customer satisfaction. The findings also show that inventory visibility enhances responsiveness to market changes and minimizes operational inefficiencies. These findings align with Leung et al. (2022), who demonstrated that improved inventory visibility reduced inefficiencies by 22% and enhanced customer responsiveness. Similarly, Otieno and Kamau (2023) reported that technology-driven inventory systems improved financial performance and enabled firms to respond effectively to market

dynamics. The aggregate mean underscores that inventory visibility is a critical enabler of manufacturing performance, fostering operational optimization and financial sustainability.

Correlation Analysis

The study computed Correlation analysis to determine the strength and the direction of the relationship between the variables being studied. If the correlation values are r = ±0.1 to ±0.29 then the relationship between the two variables is small, if it is r = ±0.3 to ±0.49 the relationship is medium, and when r= ±0.5 and above there is a strong relationship between the two variables under consideration. Table 4 presents the findings obtained.

Table 4: Correlation Analysis

		Performance	ICT Integration	Order Fulfillment
Performance of Manufacturing Firms	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	123		
ICT Integration	Pearson Correlation	.784**	1	
	Sig. (2-tailed)	.001		
	N	123	123	
Order Fulfillment	Pearson Correlation	.727**	.266	1
	Sig. (2-tailed)	.021	.278	
	N	123	123	123

The correlation coefficient between ICT integration and performance of manufacturing firms was r = 0.784, p < 0.05, indicating a strong positive relationship. This implies that the adoption of ICT tools such as ERP systems and advanced analytics significantly enhances inventory visibility, reduces operational costs, and improves decision-making processes in manufacturing firms. The strong relationship demonstrates that ICT integration is a critical enabler of operational efficiency and supply chain optimization. This finding is supported by Okafor and Adebayo (2022), who found that ICT integration enhanced data sharing and reduced inventory discrepancies by 25% in Nigerian SMEs. Similarly, Moyo and Khumalo (2023) reported that ICT adoption improved inventory coordination by 35% and reduced lead times by 20% in South African manufacturing firms. The strong positive correlation underscores the importance of ICT integration in streamlining inventory management and enhancing overall firm performance.

The correlation coefficient between order fulfillment and performance of manufacturing firms was r = 0.727, p < 0.05, indicating a strong positive relationship. This suggests that efficient and timely order fulfillment processes, supported by technology and interdepartmental coordination, significantly enhance customer satisfaction, operational efficiency, and the firm's reputation. The significant relationship highlights the role of effective logistics systems in ensuring seamless order delivery and meeting customer expectations. These findings align with Dlamini and Nkosi (2022), who found that efficient order fulfillment increased customer satisfaction by 40% and reduced stockouts by 20% in South African retail firms. Similarly, Akinyi and Uche (2023) reported that timely order fulfillment improved customer retention rates by 35% and reduced supply chain costs by 25% in Nigerian FMCG firms. The strong positive correlation emphasizes that order fulfillment is a key driver of firm performance and competitive advantage in manufacturing firms.

Multiple Regression Analysis

The coefficients table provides insight into the contribution of each independent variable (ICT Integration, and Order Fulfilment) to the performance of manufacturing firms. The regression equation derived from the model helps quantify the relationship between these variables and the dependent variable. The findings are presented in Table 5.

Table 5: Beta Coefficients of Study Variables

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	.222	.027		8.222	.000
ICT Integration	.323	.068	.332	4.777	.000
Order Fulfillment	.343	.067	.356	5.104	.000
a. Dependent Variable: Performance of Manufacturing Firms					

The multiple regression equation derived from the analysis is as follows:

$$Y= 0.222 + 0.323X_1 + 0.343X_2$$

Where:

Y = Performance of Manufacturing Firms

X_1 = ICT Integration

X_2 = Order Fulfillment

The coefficient for ICT Integration is B = 0.323 (p = 0.000), indicating that a one-unit improvement in ICT integration results in a 0.323 unit increase in firm performance, holding all other variables constant. The p-value of 0.000 confirms the significance of this relationship. These findings highlight the transformative role of ICT tools, such as ERP systems and data analytics, in improving inventory visibility, decision-making, and operational efficiency. This is supported by Moyo and Khumalo (2023), who found that ICT adoption enhanced inventory coordination by 35% and reduced lead times by 20% in South African manufacturing firms. The integration of ICT systems enables seamless communication, data sharing, and real-time updates, which are critical for operational success.

The coefficient for Order Fulfillment is B = 0.343 (p = 0.000), signifying that a one-unit increase in order fulfillment efficiency results in a 0.343 unit increase in firm performance, holding other variables constant. The p-value of 0.000 confirms the high significance of this relationship. This finding emphasizes the critical role of timely and accurate order fulfillment in enhancing customer satisfaction, operational efficiency, and market reputation. The result aligns with Dlamini and Nkosi (2022), who found that efficient order fulfillment increased customer satisfaction by 40% and reduced stockouts by 20% in South African retail firms. Advanced logistics systems and interdepartmental coordination significantly contribute to achieving seamless order delivery and maintaining competitive advantages.

Conclusions

ICT integration is a critical enabler of inventory visibility and operational efficiency. The findings highlight the significant role of ERP systems and real-time data-sharing tools in reducing operational costs and improving decision-making. The study concludes that enhancing supplier integration and training employees on ICT tools are key areas for further improvement.

Efficient order fulfillment processes significantly impact customer satisfaction, operational performance, and market reputation. The study concludes that timely and accurate fulfillment processes, supported by technology and interdepartmental coordination, are critical for meeting customer expectations and maintaining competitiveness. Investments in advanced logistics systems should be prioritized to sustain these outcomes.

Recommendations

Firms should enhance ICT integration by investing in scalable ERP systems and advanced data-sharing platforms to streamline inventory processes and support decision-making. Training programs should focus on building employees' capacity to use ICT tools effectively. Additionally, firms should foster stronger supplier integration by adopting collaborative ICT platforms that enable real-time data sharing and improve supply chain coordination.

To optimize order fulfillment, firms should invest in advanced logistics systems and automated tools for tracking and processing customer orders. Interdepartmental coordination should be strengthened to minimize delays and enhance customer satisfaction. Firms should also leverage technology to improve delivery accuracy and build strong customer relationships. Continuous monitoring and evaluation of fulfillment processes are recommended to ensure sustained performance improvements

Suggestions for Further Studies

Future research should investigate the integration of emerging technologies, such as blockchain and artificial intelligence, with inventory visibility tools to assess their combined impact on manufacturing performance. Additionally, research should explore inventory visibility challenges in underrepresented regions and focus on sector-specific dynamics. Considering the R^2 value of 87.9%, future studies can also explore other factors influencing the performance of manufacturing firms to account for the remaining 12.1% of variance.

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