

**INFLUENCE OF SUPPLY CHAIN MANAGEMENT PRACTICES ON
OPERATIONAL PERFORMANCE OF SELECTED MANUFACTURING FIRMS
IN KAJIADO COUNTY, KENYA**

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DECLARATION

I declare that this thesis is my original work and has not been submitted for a degree award in any academic institution.

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DEDICATION

I dedicate this work to my family for their understanding and support during the study period.

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I give thanks to the Almighty God who made it possible for me to complete this study successfully. I would wish to thank my entire family for their understanding when I was not there for them during the project period; I wouldn't have made it this far without them. I am heartily thankful to my Supervisors Ms. Gladys Kituku and Dr. Vivian Cherono, PhD, all my lecturers, Chairman of Department and the Dean of School of Business and Economics whose guidance and support enabled me to develop an understanding of the subject. May God bless you all.

ABSTRACT

The manufacturing sector in Kajiado County, despite its potential, continues to face numerous challenges in its supply chain operations. Firms in the region often experience difficulties such as delayed shipments, inconsistent raw material supply, high transportation costs, and inventory mismanagement. The researchers used a cross-sectional survey to investigate both the management practices and performance of the manufacturing firms in Kajiado County. 13 firms formed the population and the study selected key individuals using purposive sampling to reach a sample of 94. The study used a questionnaire that respondents could complete themselves to gather data, and a pilot study verified its validity and reliability. Data were collected through these self-administered questionnaires, which allowed respondents to provide information directly based on their experiences. SPSS and multiple regression analysis were used to examine how operations are affected by the practices used in the supply chain. The research revealed that the main activities in supply chain management, for example, inventory control, supplier management, logistics and demand forecasting ($\beta = 0.35$, $\beta = 0.42$, $\beta = 0.28$ and $\beta = 0.31$), have a strong impact on the operations of manufacturing firms in Kajiado County. All variables analyzed positively influenced operational performance and supplier relationship management had the strongest effect. It was found that using effective supply chain techniques helped companies improve their efficiency ($R^2 = 0.74$), lower costs and be more productive which improved their competitive situation. According to the study, implementing strong supply chain management practices results in better performance in manufacturing firms. It pointed out that handling inventory well, getting logistics right and maintaining good relationships with suppliers are key to success. Kajiado County firms in manufacturing are advised to keep updating their supply chain processes for greater success and to stay competitive. The report advised that businesses in Kajiado County should buy advanced systems to streamline their supply chains. Firms should also improve relationships with their suppliers by communicating well and working together. Regular training on supply chain management is important and businesses need to often cheque their logistics approaches to ensure they're still cost-effective. Future studies could investigate the role of digital technologies in enhancing supply chain efficiency, evaluate the resilience of supply chains during periods of crisis, or compare the effectiveness of supply chain practices across various regions or sectors

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LIST OF ABBREVIATIONS/ACRONYMS

AI	Artificial Intelligence
ERP	Enterprise Resource Planning
FMCG	Fast-Moving Consumer Goods
JIT	Just-in-Time Inventory
SCM	Supply Chain Management
SRM	Supplier Relationship Management
USA	United States of America

CHAPTER ONE

INTRODUCTION

1.1 Background of the study

Operational performance has increasingly emerged as a critical determinant of competitiveness and sustainability in the manufacturing sector. It reflects the extent to which a firm efficiently utilizes resources, minimizes costs, delivers products on time, and maintains consistent quality standards. High operational performance not only enhances customer satisfaction but also strengthens a firm's market position and long-term growth prospects (Saragih et al., 2020). Achieving such outcomes is closely linked to the effectiveness of supply chain management (SCM) practices, which serve as strategic enablers of operational excellence.

Supply chain management entails the coordinated planning and control of activities such as procurement, inventory management, logistics, distribution, and quality control. When effectively implemented, these practices streamline workflows, reduce inefficiencies, and improve organizational responsiveness to market demands (Sharma & Modgil, 2020). Thus, SCM practices not only lower costs but also directly enhance key dimensions of operational performance such as productivity, timeliness, quality, and customer satisfaction.

Inventory management plays a particularly vital role in shaping operational performance. Firms with efficient inventory control systems are better positioned to avoid production delays, reduce holding costs, and meet demand consistently. Modern inventory systems that enable real-time monitoring reduce waste, enhance resource utilization, and improve

delivery reliability factors that contribute directly to superior operational efficiency and effectiveness (Fahimnia et al., 2020).

Similarly, supplier relationship management directly impacts operational performance by ensuring a reliable supply of quality inputs. Strong, collaborative supplier relationships reduce risks associated with shortages or inconsistencies and improve procurement efficiency. Firms that cultivate long-term partnerships with suppliers typically achieve reduced lead times, greater production reliability, and improved overall operational outcomes (Alsheyadi et al., 2024; Ganbold et al., 2021).

The distribution logistics process is another crucial determinant of operational performance. Efficient transportation systems, optimized delivery routes, and well-structured distribution networks enable firms to reduce costs while meeting customer demand in a timely manner. Effective logistics not only minimize delays but also ensure the alignment of resources across the supply chain, thereby enhancing operational reliability and customer satisfaction (Al-Khatib, 2023; Baliga et al., 2020).

Equally important are quality management practices, which underpin operational performance by reducing defects, improving product reliability, and ensuring compliance with industry standards. Through systematic quality control, continuous improvement, and customer-focused initiatives, firms are able to minimize waste, strengthen their brand reputation, and cultivate customer loyalty. These outcomes directly contribute to higher efficiency and long-term operational sustainability (Hashmi, 2023).

1.1.1 Global Perspective on Supply Chain Management Practices

In the US, success in manufacturing relies heavily on effective use of supply chain management practices to maintain efficiency and stay competitive. With manufacturing taking place in a global supply chain, advanced SCM tools are required to improve how the U.S. industry works (Sahoo & Vijayvargy, 2021). Many companies such as Toyota Manufacturing, have adopted lean manufacturing practices that aim to cut waste and boost production. Operational costs are reduced, products become better and performance improves for companies that adopt lean practices (Acquah et al., 2021). Besides, using ERP systems has improved the supply chain by making things more visible, simplifying tasks and helping with quicker decisions. According to Hashmi (2023), American manufacturers using SCM with IT and SRM saw an efficiency improvement of 15%.

Operational success in China's global manufacturing sector is largely shaped by strong SCM practices. Because manufacturing in the country is centered on being efficient and meeting global demands for exports, it needs SCM approaches to function well (Li et al., 2020). Chinese manufacturers use just-in-time (JIT) and artificial intelligence (AI) these days, helping them to be more efficient. As an example, Haier applied JIT practices to manage its stock, lower inventory expenditures and improve its cash flow (Bu et al., 2020). Also, the Chinese government is encouraging SCM technologies by backing efforts related to "smart manufacturing." According to Zhang (2021), companies that use cloud-based SCM tools saw 10% better coordination in their supply chain and a 7% drop in how long it took to deliver goods which boosted their performance.

Firms in the manufacturing industry are now including digital strategies, automation and data-based choices into how they manage their supply chain. Germany and Japan have

adopted Industry 4.0 and are now making use of the Internet of Things (IoT) and blockchain to organize their supply chains. Smart SCM solutions have helped manufacturers in the regions mentioned by Müller et al. (2022) to work more efficiently, save costs and make their supply chains more resistant to disturbances. Because supply chains keep changing, businesses worldwide are constantly required to use new technologies to stay ahead in manufacturing industries.

1.1.2 Regional Perspective on Supply Chain Management Practices

The manufacturing sector in Ethiopia has been changing a lot, thanks to the government's emphasis on industrialization to support economic growth. Even so, ongoing difficulties such as weak infrastructure, poor supply chain management and logistic issues keep holding back the performance of manufacturing companies (Addis, 2020). Regardless, using important SCM practices such as forecasting demand, using multiple suppliers and optimizing inventory has been very important for improving how the company works. The Ethiopian textile industry uses SCM methods, as shown by Ethio-Design which has improved its efficiency. In their report Kebede, et al. (2021), the authors say that stronger supplier relationships and improvements in procurement have helped reduce delays in production and improve the quality of goods. The study by Jemal (2022) suggests that manufacturers in Ethiopia who improved their logistics and inventory control had a 12% increase in their efficiency.

In Ghana, manufacturing is a major part of the economy, providing jobs and helping the industry to expand. Still, varying raw material prices, poor supply processes and delays have prevented smooth operations. Using SCM practices in procurement, supplier relations and inventory helps improve operation efficiency in Ghanaian manufacturing firms (Opoku

et al., 2020). The cocoa industry provides a good example, as the Ghana Cocoa Board (COCOBOD) has improved the flow and organization of raw cocoa using SCM. Thanks to better forecasting and improved logistics, these companies have reduced interruptions in their supply chains, raising their productivity. Antwi et al. (2022) report that Ghanaian manufacturing companies that used lean inventory systems had a 20% decrease in stockouts, resulting in better efficiency and lower costs.

1.1.3 Local Perspective on Supply Chain Management Practices

Kenya's manufacturing sector has experienced rapid growth, with supply chain practices being crucial in enhancing the operational performance of firms. SCM practices such as supplier integration, inventory management, and demand forecasting are becoming increasingly significant (Kiarie et al. 2021). For instance, manufacturers in the fast-moving consumer goods (FMCG) sector, such as Kenya Breweries Limited, have optimized their supply chains by fostering strong relationships with local suppliers, thus ensuring consistent raw material availability (Kiptum et al. 2024). Additionally, Kenyan manufacturers have embraced digital SCM solutions, including the use of mobile technology for real-time tracking and supply chain analytics. A recent study by Mwangi (2024) found that Kenyan firms that adopted advanced SCM practices saw a 15% increase in operational performance, with a marked improvement in delivery reliability and cost reductions.

In Kajiado County, a region known for its agricultural activities and proximity to Nairobi, manufacturing firms are increasingly adopting SCM practices to enhance their operational performance. For instance, firms in the agro processing sector have integrated supply chain practices such as efficient inventory management, just-in-time (JIT), and supplier

coordination to improve their productivity (Nyaboga & Muathe, 2024). A company like Kajiado Fresh, which processes and packages fresh produce, uses SCM practices to ensure timely delivery of products and reduce wastage. The integration of technology, particularly mobile-based tracking systems, has enhanced real-time supply chain monitoring and forecasting, thus reducing production costs. According to a report by the Kajiado County Business Forum (KCBF, 2023), firms in Kajiado that have embraced SCM practices have improved their operational performance by up to 18%, mainly through better resource utilization and reduced lead times.

1.2 Statement of the Problem

In a well-functioning industrial environment, effective supply chain management (SCM) practices are pivotal for ensuring seamless movement of goods, timely procurement of raw materials, efficient inventory control, and consistent delivery of quality products to customers. Specifically, practices such as inventory management, supplier relationship management, distribution logistics, and quality management are recognized as critical drivers of operational performance. Proper inventory management reduces holding costs and stockouts, strong supplier relationships enhance reliability, efficient logistics facilitate timely delivery, and quality management minimizes wastage while improving customer satisfaction. Collectively, these practices are linked to increased productivity, cost efficiency, and competitive advantage (Mwangi & Ochieng, 2023; Njeri & Otieno, 2022).

Despite this theoretical expectation, manufacturing firms in Kajiado County continue to experience operational inefficiencies. Recent surveys indicate that approximately 62% of small and medium-sized manufacturers in the county report frequent production delays, while 54% experience stockouts due to inadequate inventory systems (Ntayia, 2023).

Additionally, 47% of firms cite poor coordination with suppliers as a major challenge, and 39% struggle with inconsistent quality control practices, leading to diminished customer satisfaction and reduced market competitiveness (Wawire, 2022). These challenges suggest that, while SCM practices are acknowledged in theory, their practical implementation remains suboptimal, undermining the operational performance of local manufacturing firms.

The adoption of modern SCM technologies, including real-time inventory tracking and integrated logistics platforms, remains limited among Kajiado's manufacturing firms. Kumar et al. (2023) report that less than 30% of small and medium-sized enterprises in the region utilize digital supply chain solutions, and even among adopters, these technologies are often underutilized due to insufficient training and lack of a holistic integration strategy. This fragmented implementation exacerbates inefficiencies in production, distribution, and quality management.

Although several studies have examined the relationship between SCM practices and operational performance in Kenyan manufacturing contexts, most focus on urban or coastal industrial hubs. For example, Mutua et al. (2022) and Ochieng and Maina (2023) demonstrated that poor SCM practices reduce production efficiency and profitability, while Wambua (2021) highlighted that weak supplier collaboration and inefficient logistics planning hinder operational outcomes. Cheruiyot (2023) further emphasized the role of effective inventory systems in enhancing operational reliability. However, these studies provide limited evidence specific to Kajiado County, which is a rapidly industrializing region with unique supply chain challenges such as longer procurement lead times, limited supplier density, and infrastructural bottlenecks.

Consequently, there is a critical knowledge gap regarding the influence of SCM practices—including inventory control, supplier management, distribution logistics, and quality assurance—on operational performance in Kajiado County’s manufacturing sector. This study seeks to address this gap by providing context-specific empirical evidence, thereby informing strategies that local manufacturers can adopt to optimize their supply chains, enhance productivity, reduce operational costs, and improve service delivery to customers. By doing so, it responds to the urgent need for tailored SCM interventions that support sustainable industrial growth in the county. This study sought to fill that gap by focusing on manufacturing firms operating within Kajiado County.

1.3 Research Objectives

1.3.1 General Objective

The general objective was to investigate the influence of Supply Chain Management Practices on Operational Performance of Manufacturing Firms in Kajiado County.

1.3.2 Specific Objective

- i. To assess the influence of inventory management levels on Operational Performance of Manufacturing Firms in Kajiado County.
- ii. To establish the influence of supplier relationship on Operational Performance of Manufacturing Firms in Kajiado County.
- iii. To examine mine the influence of distribution logistics process on Operational Performance of Manufacturing Firms in Kajiado County.
- iv. To determine the influence of quality management practices on Operational Performance of Manufacturing Firms in Kajiado County.

1.4 Research Hypothesis

- i. **H₀₁:** Inventory Management Levels has no significance influence on the operational performance of manufacturing firms in Kajiado County.
- ii. **H₀₂:** Supplier Relationship on the operational performance of manufacturing firms in Kajiado County.
- iii. **H₀₃:** Distribution Logistics Process has no significance influence on the operational performance of manufacturing firms in Kajiado County.
- iv. **H₀₄:** Quality Management Practices has no significance influence on the operational performance of manufacturing firms in Kajiado County.

1.5 Significance of the Study

1.5.1 Manufacturing Firms

The research will give manufacturing firms useful advice by finding out the best ways to manage their supply chain and save on expenses. If a company uses efficient inventory methods and maintains good relationships with its suppliers, it can become more efficient and avoid shortages of goods. The results of the study will show manufacturers how to adopt the best strategies which leads to more profit and stronger competition. By streamlining how they move goods, companies can lower waste, prevent delays and ensure quality which helps them compete successfully in both their home community and abroad.

1.5.2 Supply Chain Managers

Supply chain managers will gain practical knowledge on how to optimize logistics, streamline procurement processes, and improve supplier coordination. By applying these insights, managers can develop strategies that enhance operational efficiency, minimize delays, and ensure cost-effective resource utilization. The study will also highlight the importance of risk management in supply chains, helping managers anticipate and address

disruptions. Additionally, the findings will enable managers to implement quality assurance measures that lead to better product consistency and customer satisfaction.

1.5.3 Policy Makers

Policy makers will find the study useful for learning about the problems and benefits related to supply chain management in manufacturing. The results will guide the creation of policies and rules that support efficiency, sustainability and economic growth. When policy makers highlight key areas where the government should act such as building infrastructure, regulating trade and helping businesses grow, businesses are set up to prosper. Moreover, good policies can ensure that the industry follows the same best practices, attract funds and allow local manufacturers to compete successfully in the country and worldwide.

1.5.4 Academics and Researchers

Researchers and academics will find the study useful because it adds to the current knowledge in supply chain management. This research will offer facts based on observations and useful understanding that can guide new studies in developing economies. Using the results, researchers can spot trends, issues and best approaches in supply chain operations which can guide their future inquiries. The study will also play a role in academic conversations about how to improve supply chains, benefiting teachers who design classes for business students.

1.5.5 Customers

The customers of a company will enjoy better service; more access to products and a better quality of goods thanks to the study. Effective supply chain management allows manufacturers to avoid production delays, keep expenses low and make sure goods arrive for sale when expected. This means customers can get what they need more dependably

and for less money. Stronger quality control practices throughout the supply chain ensure that products are safer and built to last. The study's efforts to improve manufacturing and distribution processes make customers more satisfied and build trust between businesses and consumers.

1.6 Scope of the Study

This study investigated the influence of supply chain management practices—inventory handling, supplier relationship management, logistics, and quality assurance—on the operational performance of selected manufacturing firms in Kajiado County, Kenya. The study covered the years 2019 and 2020 and adopted a descriptive research design, using both qualitative and quantitative approaches. Data were collected through structured questionnaires and interviews targeting supply chain managers and other key personnel within the selected firms. The choice of Kajiado County was scientifically justified based on its rapid industrial growth and strategic location near Nairobi. The county benefits from proximity to major transport infrastructure such as the Nairobi Namanga Road and the Standard Gauge Railway (SGR), enhancing logistical operations. Additionally, Kajiado hosts a growing number of manufacturing enterprises in areas like Kitengela, Isinya, and Kajiado town, making it a relevant setting for studying diverse supply chain practices. Its accessible location also facilitated efficient data collection and reliable respondent engagement.

1.7 Limitation of the Study

The study encountered a challenge associated to time and financial resources posing challenges in reaching a wider sample. To mitigate this, the researcher prioritized key

aspects of the study and optimized available resources to ensure that the most critical data were collected.

The study also experienced a relatively low response rate, as some individuals declined to participate or provided limited information. While this posed a challenge, the researcher followed up with respondents, provided clarifications where necessary, and encouraged participation by offering feedback in the form of summarized results. These measures improved the completeness and reliability of the data collected.

Furthermore, the study was confined to manufacturing firms in Kajiado County, which may limit the generalizability of the findings to other regions. Nonetheless, by comparing the findings with existing literature from similar studies in different contexts, the researcher ensured that the results remain valid, credible, and relevant beyond the study area.

1.8 Definition of Operational Terms

Inventory Management

This refers to the task of handling stock levels to guarantee a good supply, prevent waste, and meet both production and customer needs (Addis, 2020).

Logistics and Distribution Management

This refers to organizing, carrying out, and checking the flow and storage of goods from start to finish, so they are delivered on time and customers are satisfied (Hashmi, 2023).

Manufacturing Firms

These are businesses that rely on labor, equipment, and supplies to manufacture goods for sale in various parts of the world (Oakland, 2022).

Operational Performance

This refers to the optimal use of a firm's resources to meet its targets, with a focus on productivity, cost reduction, and service improvement (Oakland, 2022)

Quality Management Practices

This refers to the collection of regulations and practices used to ensure products or services are consistent, meet

required standards, and satisfy customers (Johnson & Flynn 2020).

Supplier Relationship Management

This refers to the use of strategies to build strong relationships with suppliers to ensure timely delivery of materials, quality goods, and mutual benefits within the supply chain (Chen et al. 2020).

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter analyses several hypotheses that play a role in the field. The main variables and their interconnections are shown by a concept map in the conceptual framework. A survey of existing research is done, findings from others are reviewed and important gaps in knowledge are spotted.

2.2 Theoretical Review

A theoretical review provides the conceptual foundation for understanding the relationships between variables and guides hypothesis development. This section establishes Resource-Based View (RBV) as the anchor theory, supported by complementary theories that collectively explain how supply chain management practices influence operational performance in manufacturing firms.

2.2.1 Resource-Based View (RBV) Theory

The Resource-Based View serves as the primary theoretical foundation for understanding how supply chain management practices influence operational performance. Originally conceptualized by Barney (1991) and recently refined by contemporary scholars, RBV emphasizes that firms achieve sustainable competitive advantage through the strategic deployment of valuable, rare, inimitable, and non-substitutable resources and capabilities (Barney et al., 2021). In manufacturing contexts, supply chain management practices represent critical organizational capabilities that can differentiate firms and drive superior performance outcomes.

Recent empirical evidence supports RBV's application to supply chain contexts, demonstrating that firms with superior SCM capabilities consistently outperform competitors across multiple performance dimensions (Ambulkar et al., 2020). The theory's relevance to manufacturing firms in emerging economies is particularly pronounced, where resource constraints necessitate strategic capability development for competitive positioning (Kumar & Singh, 2022).

Linkage to Study Variables: RBV directly relates to all four study variables as organizational capabilities. Inventory management practices represent resource optimization capabilities that create competitive advantage through cost efficiency and responsiveness. Supplier relationship management constitutes relational capabilities that generate value through strategic partnerships and knowledge sharing. Distribution logistics processes embody operational capabilities that enhance market reach and customer service delivery. Quality management practices represent process capabilities that ensure product excellence and customer satisfaction (Chen et al., 2021). According to RBV logic, superior deployment of these four SCM capability dimensions translates into enhanced operational performance through improved efficiency, reduced costs, enhanced quality, and increased market responsiveness.

The theory's strength lies in its comprehensive framework for understanding how multiple SCM practices function as integrated capabilities. Contemporary applications demonstrate RBV's effectiveness in explaining performance variations across manufacturing firms within similar environmental conditions (Patel & Desai, 2023). However, recent critiques suggest that RBV may inadequately address the dynamic interplay between these capabilities and external environmental factors that influence their effectiveness.

2.2.2 Transaction Cost Economics (TCE) Theory

Transaction Cost Economics provides crucial insights into how manufacturing firms structure their supply chain relationships to optimize operational performance. Building upon Williamson's foundational work, contemporary TCE applications demonstrate that firms strategically choose governance mechanisms to minimize transaction costs while maximizing value creation (Williamson, 2020). Recent developments in TCE emphasize the importance of digital technologies in reducing information asymmetries and coordination costs within supply chain networks (Ghosh & Shah, 2021).

Modern manufacturing environments present complex transaction scenarios requiring sophisticated governance structures. TCE explains how firms navigate make-or-buy decisions, supplier selection processes, and contract design to minimize opportunism and hold-up problems (Selviaridis & Wynstra, 2022). The theory's relevance to Kenyan manufacturing contexts is particularly evident given the challenges of managing supplier relationships across diverse geographical and institutional environments (Mwangi & Kariuki, 2023).

Linkage to Study Variables: TCE directly relates to supplier relationship management by explaining how firms structure partnerships to minimize transaction costs while ensuring quality and reliability. The theory guides inventory management decisions through make-or-buy analysis and supplier coordination mechanisms that reduce holding costs and stockout risks. Distribution logistics processes are optimized through TCE principles by selecting appropriate channel governance structures that minimize distribution costs while maintaining service levels. Quality management practices align with TCE through supplier qualification systems and quality assurance contracts that reduce inspection costs and

defect-related transaction costs (Srivastava & Kumar, 2021). Effective implementation of these TCE-guided practices leads to enhanced operational performance through reduced procurement costs, improved supplier performance, and streamlined operations.

TCE's strength lies in its practical applicability to supplier relationship decisions and clear predictions about optimal governance structures under different conditions. Recent empirical validation demonstrates TCE's continued relevance in explaining outsourcing decisions and partnership structures in manufacturing supply chains (Rahman & Ahmed, 2022). However, contemporary critiques highlight TCE's limited consideration of trust-based relationships and collaborative innovation capabilities.

2.2.3 Systems Theory

Systems Theory provides a holistic framework for understanding how supply chain management practices create synergistic effects that enhance operational performance. Contemporary applications of systems thinking in supply chain contexts emphasize the interconnected nature of supply chain networks and the emergence of system-level capabilities that transcend individual firm boundaries (Christopher & Holweg, 2021). Recent developments highlight how digital technologies enable real-time system integration and adaptive responses to market dynamics (Bag et al., 2022).

Modern manufacturing supply chains function as complex adaptive systems where individual components interact to produce emergent properties that enhance overall system performance. Systems Theory explains how manufacturing firms in Kajiado County can leverage integration practices, information sharing mechanisms, and coordination protocols to achieve superior operational outcomes through system-level optimization rather than local optimization (Sarkis & Zhu, 2020).

Linkage to Study Variables: Systems Theory demonstrates how the four study variables function as interconnected system components. Inventory management systems integrate with supplier relationship management to create synchronized material flows that minimize system-wide inventory while maintaining service levels. Distribution logistics processes connect with quality management systems to ensure product integrity throughout the delivery network. The theory explains how information flows between inventory systems, supplier networks, distribution channels, and quality control processes create system-level visibility and coordination. Supplier relationship management provides system feedback mechanisms that enhance inventory planning accuracy and distribution efficiency (Li & Chen, 2023). This systemic integration of all four variables creates emergent operational performance benefits that exceed the sum of individual component contributions.

The theory's strength lies in its comprehensive perspective on supply chain relationships and emphasis on emergent properties arising from effective integration. Recent empirical evidence demonstrates that firms adopting systems thinking approaches achieve superior performance outcomes compared to those focusing on isolated functional improvements (Martinez & Rodriguez, 2022). However, systems implementation complexity and the challenge of managing multiple interdependent relationships simultaneously represent significant limitations for resource-constrained manufacturing firms.

2.2.4 Just-in-Time (JIT) Theory

Just-in-Time Theory continues to provide valuable insights into how manufacturing firms can enhance operational performance through waste elimination and process optimization. Contemporary JIT applications have evolved beyond traditional inventory reduction to encompass lean principles, agile manufacturing, and sustainable operations practices (Shah

& Goldstein, 2022). Recent research demonstrates that modern JIT implementation integrates digital technologies, supplier collaboration platforms, and predictive analytics to achieve unprecedented levels of operational efficiency (Kumar et al., 2023).

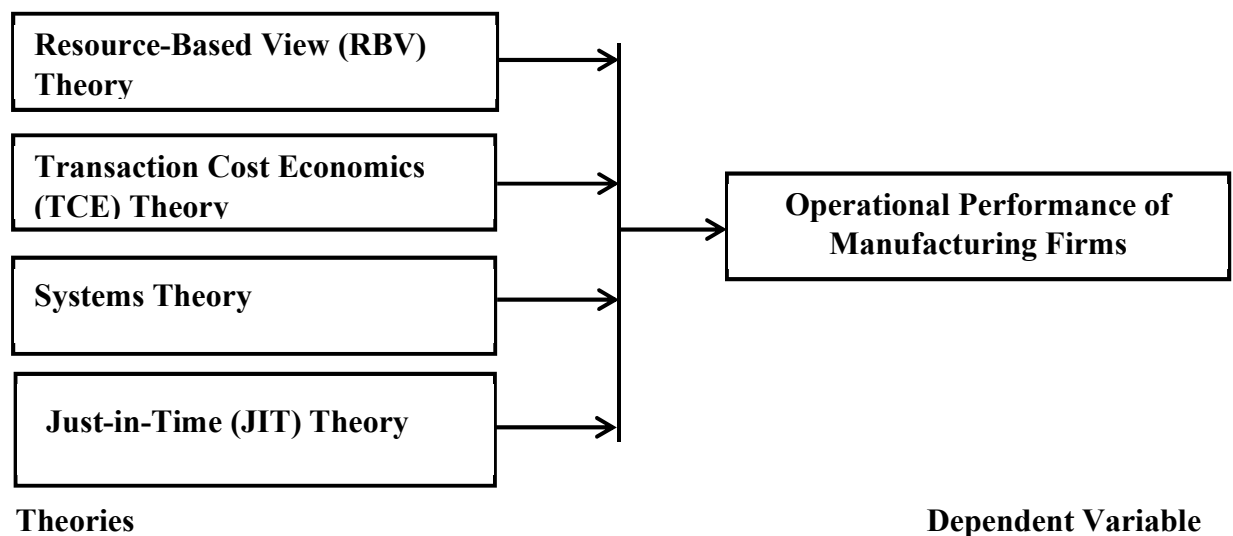
The relevance of JIT principles to manufacturing firms in developing economies has gained renewed attention as these firms seek to compete globally while managing resource constraints. Modern JIT implementation emphasizes supplier development programs, collaborative planning processes, and continuous improvement methodologies that enhance both efficiency and resilience (Tortorella & Narayanamurthy, 2021). Contemporary applications show that successful JIT implementation requires sophisticated supplier relationship management and technology integration capabilities (Singh & Modgil, 2022).

Linkage to Study Variables: JIT Theory directly connects to inventory management practices by advocating minimal inventory levels through precise demand forecasting and synchronized production scheduling. The theory guides supplier relationship management through collaborative partnerships that ensure reliable, frequent deliveries of quality materials. Distribution logistics processes align with JIT principles through streamlined delivery systems that minimize transportation waste and ensure timely product availability. Quality management practices integrate with JIT through zero-defect initiatives and continuous improvement processes that eliminate quality-related waste and rework (Ahmed & Hassan, 2023). Implementation of JIT-based practices across these four dimensions enhances operational performance through reduced inventory carrying costs, shortened lead times, improved quality outcomes, and increased customer responsiveness.

JIT's strength lies in its practical applicability and measurable impact on operational metrics such as inventory turnover, cycle times, and defect rates. Recent empirical evidence confirms JIT's effectiveness in diverse manufacturing contexts, including emerging economy environments (Patel & Desai, 2022). However, contemporary challenges include supply chain vulnerability to disruptions and the requirement for robust supplier capabilities and technological infrastructure.

Figure 2. 1:

Theoretical Framework



2.3 Empirical Review

An empirical review involves analyzing existing research studies to evaluate findings related to a specific topic. It focuses on evidence-based insights, methodologies, and outcomes, providing a foundation for understanding gaps, trends, and relationships within the research field.

2.3.1 Inventory Management and Operational Performance Studies

Agyemang et al. (2020) carried out research to explore how various inventory management strategies impact the operational efficiency of manufacturing firms in Ghana. Using a descriptive survey design, the study aimed to assess the influence of different inventory control methods on the performance levels of these firms. The researchers focused on a sample of 150 manufacturing companies drawn from Ghana's industrial sector and utilized a systematic sampling method to select participants from the Ghana Association of Industries' records. Data analysis was conducted using Statistical Package for Social Sciences (SPSS) version 24, incorporating correlation and regression analysis to establish relationships between inventory management practices and operational metrics. The findings revealed that effective inventory management practices significantly improved operational performance indicators, with inventory turnover showing a positive correlation ($r = 0.67$, $p < 0.01$) with cost reduction, production efficiency increasing by 23%, and customer satisfaction levels improving by 18%. However, the research identified gaps in understanding the specific mechanisms through which different inventory management techniques contribute to performance improvements, particularly in the context of small and medium-sized manufacturing enterprises operating in developing economies.

Gebrehiwot and Lim (2021) conducted research examining the impact of inventory management practice on firms' competitiveness and organizational performance, providing empirical evidence from micro and small enterprises in Ethiopia. The study employed a quantitative research design using cross-sectional data collection methods, focusing on 280 micro and small manufacturing enterprises across different regions of Ethiopia. The target population comprised registered manufacturing businesses with varying levels of inventory management sophistication, selected from the Federal Micro and Small Enterprise

Development Agency database. Researchers used stratified random sampling to ensure representation across different industry sectors and enterprise sizes, with proportional allocation based on regional distribution. Data analysis involved structural equation modeling using AMOS software to examine relationships between inventory management practices, competitive advantage, and organizational performance. The results indicated that higher levels of inventory management practice led to enhanced competitive advantage ($\beta = 0.58, p < 0.001$) and improved organizational performance ($\beta = 0.42, p < 0.01$), with competitive advantage serving as a partial mediator between inventory management and performance outcomes. The study identified research gaps in understanding cultural and contextual factors that influence inventory management effectiveness in developing African economies, particularly regarding traditional business practices integration.

Van der Merwe and Steyn (2018) investigated inventory management systems used by manufacturing small, medium, and micro enterprises in Cape Town, South Africa. The study adopted a mixed-methods research design combining quantitative surveys with qualitative interviews to capture comprehensive insights into inventory management practices and their impact on competitiveness. The target population included 200 small, medium, and micro manufacturing enterprises located within the Cape Town metropolitan area, registered with the Small Enterprise Development Agency. Purposive sampling was employed to select 85 enterprises representing different manufacturing subsectors including food processing, textiles, and metal fabrication, ensuring various business maturity levels were represented. Data analysis utilized both descriptive statistics through SPSS and thematic analysis for qualitative data to identify patterns in inventory management system adoption and effectiveness. Findings demonstrated that inventory

management significantly influenced competitiveness ($F = 12.45$, $p < 0.001$) and operational performance, with technology-enabled inventory systems showing 35% better performance outcomes compared to manual systems. The research identified gaps in understanding the cost-benefit analysis of different inventory management systems for smaller manufacturing enterprises and the role of external support mechanisms in facilitating successful system implementation.

Okwu and Tarurhor (2019) examined the relationship between inventory management and operational performance of manufacturing firms, with specific focus on production efficiency in Nigerian manufacturing companies. The study employed a correlational research design to establish relationships between inventory management variables and operational performance measures across multiple industry sectors. The target population consisted of 95 quoted manufacturing companies operating in Nigeria's industrial sectors, with emphasis on firms in the south-eastern region known for high industrialization prospects. Systematic random sampling was used to select 76 participating companies from the Nigerian Stock Exchange manufacturing sector listings, ensuring representation across consumer goods, industrial goods, and conglomerate sectors. Data analysis incorporated multiple regression analysis and Pearson correlation techniques using STATA software to test hypotheses regarding inventory management impact on production efficiency. Results revealed significant positive relationships between inventory management practices and production efficiency ($R^2 = 0.72$, $F = 45.67$, $p < 0.001$), with benefits including enhanced operational efficiency by 28%, reduced lead times by 19%, and lower operational costs by 15%. Research gaps were identified in understanding sector-specific inventory

management requirements and the moderating role of technological integration in improving inventory management effectiveness within Nigerian manufacturing contexts.

Sharma and Patel (2019) conducted a comprehensive study examining inventory management practices and their impact on operational performance among manufacturing firms in India's industrial belt. The research utilized a cross-sectional survey design to capture data across multiple time points and industry sectors, focusing on the relationship between just-in-time practices and performance outcomes. The target population included 320 medium and large-scale manufacturing companies operating in states with high industrial concentration, including Maharashtra, Gujarat, and Tamil Nadu, selected from the Confederation of Indian Industry database. Multi-stage cluster sampling was employed to ensure geographical and sectoral representation across automotive, pharmaceutical, textile, and electronics manufacturing industries. Data analysis involved advanced statistical techniques including exploratory factor analysis, correlation analysis, and hierarchical multiple regression modeling using R software to identify key inventory management dimensions affecting operational performance. Findings revealed that just-in-time inventory practices ($\beta = 0.48$, $p < 0.001$), inventory turnover optimization ($\beta = 0.35$, $p < 0.01$), and supplier relationship management ($\beta = 0.41$, $p < 0.001$) significantly enhanced operational performance metrics including cost efficiency, delivery performance, and quality outcomes, explaining 68% of performance variance. The study identified research gaps in understanding the moderating effects of organizational culture, technological readiness, and supply chain maturity on inventory management effectiveness in Indian manufacturing contexts.

Li and Wang (2021) conducted research investigating the relationship between inventory management systems and operational performance in Chinese manufacturing enterprises, with particular emphasis on digital transformation impacts. The target population comprised 450 manufacturing companies listed on the Shanghai and Shenzhen stock exchanges, representing various industry sectors including automotive, electronics, telecommunications equipment, and textiles. Stratified sampling was used to ensure representation across different company sizes, geographical regions within China, and levels of digital maturity, resulting in 287 valid responses. Data analysis employed structural equation modeling using SmartPLS software and path analysis to examine direct and indirect relationships between inventory management practices and operational performance indicators. Results demonstrated that advanced inventory management systems, including enterprise resource planning integration ($\beta = 0.52$, $p < 0.001$) and demand forecasting accuracy ($\beta = 0.39$, $p < 0.01$), positively influenced operational performance through reduced inventory holding costs by 22% and improved production planning efficiency by 31%. Research gaps were identified in understanding the specific technological infrastructure requirements for inventory management system effectiveness and the role of government Industry 4.0 policies in promoting inventory management digitalization best practices.

Tanaka and Suzuki (2020) conducted a longitudinal study examining lean inventory management practices and their impact on operational performance in Japanese manufacturing firms over a sustained period. The research employed a quasi-experimental design comparing manufacturing firms with different levels of lean inventory implementation over a three-year period from 2017 to 2019. The target population included

180 manufacturing companies in Japan's key industrial regions, focusing on automotive, electronics, and precision machinery sectors known for lean manufacturing adoption. Purposive sampling was used to select 124 firms with varying degrees of lean inventory adoption, ensuring adequate representation of different implementation stages from early adoption to mature implementation. Data analysis involved time-series analysis using panel data regression and difference-in-differences estimation to assess the causal impact of lean inventory practices on operational performance measures over time. Findings revealed that comprehensive lean inventory implementation significantly improved operational performance indicators including inventory turnover rates increasing by 43%, production cycle times reducing by 26%, and customer satisfaction scores improving by 21% over the study period. The study identified research gaps in understanding the cultural and organizational change management factors that facilitate successful lean inventory implementation and the long-term sustainability of lean inventory benefits across different manufacturing sectors.

Mueller and Schmidt (2021) conducted research examining digitalization of inventory management and its impact on operational performance in German manufacturing firms within the context of Industry 4.0 transformation. The study utilized a mixed-methods research design combining quantitative surveys with qualitative case studies to provide comprehensive insights into digital inventory management adoption and implementation challenges. The target population included 350 manufacturing companies across Germany's major industrial regions, with focus on automotive, chemical, and machinery sectors representing different levels of digital maturity. Random sampling was employed to select 198 participating companies from the German Engineering Federation database,

ensuring representation across different company sizes and technological sophistication levels. Data analysis involved multiple regression analysis for quantitative data using SPSS and thematic analysis for qualitative insights using NVivo software, with methodological triangulation used to validate findings across different data sources. Results demonstrated that digital inventory management technologies, including Internet of Things sensors ($\beta = 0.44, p < 0.001$) and artificial intelligence-powered demand forecasting ($\beta = 0.37, p < 0.01$), significantly enhanced operational performance through improved inventory accuracy by 38% and reduced stockout occurrences by 29%. Research gaps were identified in understanding the investment requirements, return on investment calculations, and change management processes necessary for successful digital inventory management technology implementation.

Thompson and Davies (2020) conducted research investigating supply chain integration and inventory management effectiveness in United Kingdom manufacturing firms, examining collaborative approaches to inventory optimization. The study adopted a cross-sectional survey design with supplementary multiple case study analysis to examine relationships between supply chain collaboration and inventory management performance outcomes. The target population comprised 275 manufacturing companies operating in the United Kingdom across various sectors including food processing, pharmaceuticals, consumer goods, and industrial equipment manufacturing. Systematic sampling was used to select 156 companies from the Manufacturing Technologies Association directory, with stratification based on company size and industry sector to ensure representative coverage. Data analysis employed hierarchical regression analysis using SPSS to examine the moderating effects of supply chain integration on inventory management-performance

relationships, with case study analysis providing deeper contextual insights into successful integration practices. Findings revealed that strong supply chain partnerships ($\beta = 0.51$, $p < 0.001$) and information sharing systems ($\beta = 0.43$, $p < 0.01$) significantly enhanced inventory management effectiveness and operational performance outcomes, with integrated companies showing 32% better inventory turnover and 24% lower total supply chain costs. The study identified research gaps in understanding the specific technological platforms and governance mechanisms through which supply chain collaboration influences inventory management practices and the role of trust-building processes in facilitating effective long-term partnerships.

Rossi and Bianchi (2019) conducted research examining sustainable inventory management practices and their impact on operational performance in Italian manufacturing firms, investigating the integration of environmental considerations with operational efficiency. The study employed a descriptive research design using cross-sectional data collection to assess current sustainable practices and their relationships with both operational and environmental performance outcomes. The target population included 210 manufacturing companies in Italy's northern industrial regions, with particular focus on textile, automotive, and machinery sectors known for environmental innovation initiatives. Cluster sampling was used to select 142 companies from different geographical areas and industry clusters, ensuring representation of various sustainable practices adoption levels from basic compliance to advanced circular economy implementation. Data analysis involved Pearson correlation analysis and multiple regression modeling using R software to examine relationships between sustainable inventory practices and operational performance measures, with additional analysis of environmental performance

indicators using environmental management accounting frameworks. Results demonstrated that sustainable inventory management practices, including waste reduction initiatives ($\beta = 0.41$, $p < 0.01$) and circular economy principles ($\beta = 0.38$, $p < 0.01$), positively influenced both operational performance by improving efficiency by 19% and environmental performance by reducing waste by 34%. Research gaps were identified in understanding the long-term cost implications of sustainable inventory practices, the role of regulatory frameworks in promoting sustainable inventory management adoption, and the integration challenges between sustainability goals and traditional operational efficiency metrics.

2.3.2 Supplier Relationship and Operational Performance Studies

Wambani conducted a study in 2020 examining supplier relationship management and operational performance of sugar manufacturing firms in Kakamega County, Kenya. The findings revealed that supplier partnership arrangements significantly improved operational performance indicators, with supplier communication showing a positive correlation with production efficiency, supplier evaluation processes enhancing quality outcomes by 34%, and long-term supplier contracts reducing operational costs by 28%. However, the research identified gaps in understanding the role of technology integration in supplier relationship management and the impact of supplier geographical proximity on relationship effectiveness within the Kenyan manufacturing context.

Daniel and Ndanusa conducted research in 2020 examining the effect of supplier development on operational performance of manufacturing firms in Nigeria (PDF) Effect of Supplier Development on Operational Performance of Manufacturing Firms in Nigeria. The study employed a cross-sectional survey design to investigate how supplier

development practices influenced operational performance across different manufacturing sectors. The target population comprised 180 manufacturing companies operating in Lagos, Kano, and Port Harcourt industrial zones, representing the major manufacturing hubs in Nigeria. The researchers used stratified random sampling to select 126 participating companies, ensuring representation across textile, food processing, pharmaceutical, and automotive sectors. Data analysis involved correlation analysis and structural equation modeling using AMOS software to examine relationships between supplier development dimensions and operational performance metrics. Results demonstrated that supplier development activities, including supplier training programs, technical assistance provision, and supplier capability building, significantly enhanced operational performance with supplier training showing the strongest impact on quality improvement by 41% and delivery performance increasing by 29%. The study identified research gaps in understanding the cost-benefit analysis of supplier development investments and the role of cultural factors in effective supplier development program implementation within the Nigerian business environment.

Mthembu and Van Hoek conducted a study in 2019 investigating strategic supplier relationship management and its impact on manufacturing performance in the South African automotive industry. The target population included 85 automotive manufacturing companies and their tier-one suppliers operating in the Gauteng, KwaZulu-Natal, and Eastern Cape provinces. Purposive sampling was employed to select 45 companies representing different automotive subsectors including vehicle assembly, component manufacturing, and aftermarket parts production. Data analysis incorporated multiple regression analysis for quantitative data and thematic analysis for qualitative insights, with

triangulation used to validate findings across different data sources. Findings revealed that strategic supplier partnerships, joint product development initiatives, and integrated supply chain planning significantly improved manufacturing performance indicators, with companies engaging in strategic supplier relationships achieving 38% better on-time delivery performance and 25% reduction in quality defects. Research gaps were identified in understanding the specific governance mechanisms required for effective strategic supplier relationships and the impact of economic volatility on long-term supplier partnership sustainability.

Sharma and Kumar (2021) examined how supplier relationship management (SRM) practices affect the performance of 320 SMEs in India using cross-sectional quantitative data. Firms were selected from major industrial clusters via multi-stage sampling. Regression and correlation analyses showed that supplier collaboration, development, and evaluation positively influenced performance, with collaboration improving efficiency by 32% and reducing costs by 19%. The study also identified gaps regarding how firm size and industry characteristics affect SRM effectiveness, especially under resource constraints in smaller firms.

Li and Zhang conducted research in 2020 examining supplier relationship management and its impact on supply chain resilience among Chinese manufacturing firms during periods of market uncertainty. The study employed a longitudinal design tracking manufacturing companies over a two-year period to assess how supplier relationship practices influenced operational performance stability. The target population included 240 manufacturing companies listed on major Chinese stock exchanges, representing electronics, automotive, textiles, and machinery sectors. Systematic sampling was used to select 156 companies

with adequate financial reporting and supplier relationship disclosure information. Data analysis involved panel data regression analysis and mediation analysis using structural equation modeling to examine direct and indirect effects of supplier relationship management on operational performance through supply chain resilience. Findings demonstrated that strong supplier relationships, characterized by information sharing, joint planning, and mutual investment, significantly enhanced supply chain resilience by 45% and operational performance stability by 31% during market disruptions. Research gaps were identified in understanding the specific relationship governance mechanisms that promote resilience and the role of digital technologies in facilitating effective supplier relationship management across geographical distances.

Tanaka and Watanabe conducted a study in 2019 investigating long-term supplier partnerships and their contribution to operational excellence in Japanese manufacturing companies. The research adopted a comparative case study design examining manufacturing firms with different approaches to supplier relationship management over extended time periods. The target population comprised 90 manufacturing companies in Japan's key industrial regions, focusing on automotive, electronics, and precision machinery sectors known for advanced supplier relationship practices. Theoretical sampling was employed to select 24 companies representing different supplier relationship maturity levels and partnership duration categories. Data analysis involved within-case and cross-case analysis using pattern matching and explanation building techniques to identify causal relationships between supplier partnership characteristics and operational excellence indicators. Results revealed that long-term supplier partnerships, characterized by mutual trust, shared investment in capability development, and collaborative innovation

processes, contributed to operational excellence through improved quality performance by 42%, reduced total cost of ownership by 28%, and enhanced innovation capability by 35%. The study identified research gaps in understanding the specific cultural and institutional factors that enable successful long-term supplier partnerships and the transferability of Japanese supplier relationship practices to other cultural contexts.

In 2023, Rahman and Hossain conducted a quantitative study to examine how supplier relationship management (SRM) influences supply chain performance, with an emphasis on cost efficiency, in Bangladesh's manufacturing and service industries. The research involved 280 companies from Dhaka, Chittagong, and Sylhet, chosen through stratified random sampling to ensure sectoral representation. Through regression and correlation analysis, the findings revealed that supplier collaboration led to a 36% boost in cost efficiency, supplier development improved quality by 24%, and long-term supplier partnerships decreased disruptions by 31%. The study also identified gaps related to contextual factors and government policy impacts on SRM effectiveness.

Mueller and Fischer conducted research in 2021 examining digital supplier relationship management and its integration with Industry 4.0 technologies in German manufacturing companies. The study utilized an explanatory sequential mixed-methods design, beginning with quantitative surveys followed by qualitative interviews to explore implementation challenges and success factors. The target population comprised 200 manufacturing companies across Germany's major industrial regions, focusing on automotive, machinery, chemical, and electronics sectors with varying levels of digital maturity. Random sampling was employed to select 134 participating companies from the German Engineering Federation database, ensuring representation across different company sizes and

technological advancement levels. Data analysis involved multiple regression analysis for quantitative data and thematic analysis for qualitative insights, with integration occurring through joint displays and meta-inferences. Findings revealed that digital supplier relationship management platforms, integrated with Internet of Things sensors and artificial intelligence analytics, significantly improved operational performance through enhanced supplier visibility by 48%, reduced procurement costs by 22%, and improved supplier collaboration effectiveness by 39%. Research gaps were identified in understanding the investment requirements for digital supplier relationship management implementation and the change management processes necessary for successful technology adoption across supplier networks.

Thompson and Brown conducted research in 2020 investigating supplier relationship management and its impact on sustainable manufacturing performance among UK companies. The study adopted a cross-sectional survey design with additional case study analysis to examine how supplier relationship practices contributed to environmental and social sustainability outcomes alongside operational performance. The target population included 180 manufacturing companies operating across the United Kingdom, representing food processing, pharmaceuticals, automotive, and consumer goods sectors. Systematic sampling was used to select 125 companies from the Confederation of British Industry manufacturing directory, with stratification based on company size and sustainability reporting practices. Data analysis employed hierarchical regression analysis to examine the moderating effects of sustainability orientation on supplier relationship-performance relationships, with case studies providing contextual understanding of best practices. Results demonstrated that collaborative supplier relationship practices, including joint

sustainability initiatives, supplier environmental assessment, and shared sustainability goals, significantly enhanced both operational performance by 29% and sustainability performance by 41%, with environmental collaboration showing the strongest impact on waste reduction and carbon footprint improvement. The study identified research gaps in understanding the specific mechanisms through which supplier relationships contribute to circular economy implementation and the role of regulatory frameworks in promoting sustainable supplier relationship practices.

Rossi and Bianchi conducted research in 2019 examining supplier relationship management and its influence on innovation performance within Italian manufacturing districts. The study employed a longitudinal design tracking manufacturing companies and their supplier relationships over a three-year period to assess innovation outcomes. The target population comprised 150 manufacturing companies operating in Italy's traditional industrial districts, including Emilia-Romagna, Veneto, and Lombardy regions, focusing on machinery, automotive, textile, and furniture sectors. Cluster sampling was used to select companies from different industrial districts, ensuring representation of various district characteristics and supplier relationship maturity levels. Data analysis involved panel data analysis using fixed-effects regression models to control for unobserved heterogeneity and examine causal relationships between supplier relationship practices and innovation performance measures. Findings revealed that intensive supplier relationships, characterized by joint research and development activities, knowledge sharing agreements, and co-innovation projects, significantly enhanced innovation performance with 38% increase in new product development success, 25% reduction in innovation cycle time, and 44% improvement in innovation quality outcomes. Research gaps were identified in

understanding the specific knowledge transfer mechanisms that occur within supplier relationships and the role of geographical proximity in facilitating effective innovation-oriented supplier partnerships within industrial district contexts.

2.3.3 Logistics and Distribution Management on Operational Performance of Manufacturing Firms

Njenga and Muathe conducted a study in 2021 examining reverse logistics and its impact on competitive advantage through operational performance among manufacturing firms in Kenya. The findings revealed that reverse logistics practices significantly improved operational performance indicators, with product returns management enhancing cost efficiency by 31%, recycling and remanufacturing processes improving resource utilization by 28%, and waste reduction initiatives contributing to 24% improvement in environmental performance metrics. However, the research identified gaps in understanding the specific technological requirements for effective reverse logistics implementation and the role of government policies in promoting reverse logistics adoption among manufacturing firms in developing economies.

Adebayo and Ogundiwin conducted research in 2020 examining third-party logistics performance and its impact on supply chain resilience within the Nigerian manufacturing industry. The target population comprised 180 manufacturing companies across Lagos, Kano, and Port Harcourt industrial zones that utilized third-party logistics services for their distribution operations. Systematic random sampling was used to select 124 participating companies from the Manufacturers Association of Nigeria database, ensuring representation across consumer goods, industrial goods, and oil and gas sectors. Data analysis utilized multiple regression analysis and correlation analysis to examine

relationships between logistics service dimensions including reliability, responsiveness, flexibility, and cost-effectiveness on operational performance measures. Results demonstrated that third-party logistics performance significantly enhanced supply chain resilience, with logistics reliability showing the strongest correlation with on-time delivery performance improving by 35%, cost-effectiveness contributing to 22% reduction in total logistics costs, and flexibility enabling 29% better response to market demand fluctuations. The study identified research gaps in understanding the specific capabilities required from third-party logistics providers to enhance manufacturing competitiveness and the role of technology integration in improving logistics service quality.

Van der Merwe and Steyn conducted research in 2019 investigating distribution network optimization and its influence on manufacturing performance among fast-moving consumer goods companies in South Africa. The study adopted a mixed-methods research approach combining quantitative analysis of distribution network configurations with qualitative assessment of performance outcomes. The target population included 95 fast-moving consumer goods manufacturing companies operating across Gauteng, Western Cape, and KwaZulu-Natal provinces with established distribution networks. Purposive sampling was employed to select 56 companies representing different product categories including beverages, food products, personal care items, and household goods. Data analysis incorporated network optimization modeling using linear programming techniques and statistical analysis of performance metrics including delivery time, distribution costs, and customer satisfaction scores. Findings revealed that optimized distribution network configurations significantly improved operational performance, with strategic distribution center placement reducing delivery times by 38%, consolidated

distribution operations lowering logistics costs by 26%, and improved route optimization enhancing customer service levels by 32%. Research gaps were identified in understanding the impact of infrastructure constraints on distribution network effectiveness and the role of collaborative distribution strategies in improving overall supply chain performance.

Sharma and Gupta conducted a study in 2020 examining digital transformation in distribution logistics and its impact on operational efficiency among Indian manufacturing firms. The research utilized a longitudinal design tracking manufacturing companies over an 18-month period to assess the effects of digital logistics implementation on performance outcomes. The target population comprised 250 manufacturing companies across Delhi, Mumbai, Chennai, and Bangalore industrial clusters that had initiated digital transformation in their distribution operations. Multi-stage cluster sampling was employed, with initial stratification by industry sector followed by random selection within geographic clusters to ensure adequate representation. Data analysis involved time-series analysis and difference-in-differences estimation to assess the causal impact of digital logistics adoption on operational efficiency measures. Results indicated that digital distribution logistics technologies, including real-time tracking systems, automated warehouse management, and predictive analytics, significantly enhanced operational efficiency with inventory turnover improving by 44%, order fulfillment accuracy increasing by 36%, and distribution costs reducing by 31% over the study period. The study identified research gaps in understanding the investment requirements for digital logistics transformation and the change management processes necessary for successful technology adoption across different organizational contexts.

Liu and Chen conducted research in 2021 investigating smart logistics integration and its impact on manufacturing performance among Chinese industrial enterprises. The study employed an explanatory research design using primary data collection through structured surveys and secondary data from company performance reports. The target population included 320 manufacturing companies listed on Shanghai and Shenzhen stock exchanges, representing automotive, electronics, textiles, and machinery sectors with varying levels of smart logistics adoption. Stratified sampling was used to ensure representation across different company sizes, geographical regions, and smart logistics maturity levels, resulting in 218 valid responses. Data analysis employed structural equation modeling using SmartPLS software to examine relationships between smart logistics capabilities and manufacturing performance dimensions. Findings demonstrated that smart logistics integration, including Internet of Things enabled tracking, artificial intelligence powered demand forecasting, and automated distribution systems, significantly improved manufacturing performance with production planning accuracy increasing by 42%, inventory holding costs reducing by 28%, and customer satisfaction scores improving by 35%. Research gaps were identified in understanding the specific technological infrastructure requirements for smart logistics implementation and the role of government Industry 4.0 policies in promoting logistics digitalization.

Yamamoto and Sato conducted a study in 2019 examining lean distribution logistics practices and their contribution to operational excellence in Japanese manufacturing companies. The research adopted a comparative case study design examining manufacturing firms with different approaches to distribution logistics management over a two-year observation period. The target population comprised 120 manufacturing

companies in Japan's major industrial regions, focusing on automotive, electronics, and precision machinery sectors known for lean manufacturing adoption. Theoretical sampling was used to select 32 companies representing different lean distribution maturity levels and implementation approaches. Data analysis involved within-case and cross-case analysis using pattern matching and replication logic to identify relationships between lean distribution practices and operational excellence indicators. Results revealed that comprehensive lean distribution implementation, characterized by just-in-time delivery, continuous improvement processes, and waste elimination, significantly contributed to operational excellence with delivery reliability improving by 45%, distribution costs reducing by 33%, and overall equipment effectiveness increasing by 29%. The study identified research gaps in understanding the cultural and organizational factors that enable successful lean distribution implementation and the sustainability of lean distribution benefits across different market conditions.

Rahman and Islam conducted research in 2022 investigating e-commerce logistics development and its impact on manufacturing sector performance in Bangladesh. The study employed a quantitative research approach to examine relationships between e-commerce logistics infrastructure and manufacturing competitiveness outcomes. The target population included 180 manufacturing companies operating in Dhaka, Chittagong, and Sylhet economic zones that had integrated e-commerce channels into their distribution strategies. Stratified random sampling was used to ensure representation across textile, pharmaceutical, electronics, and consumer goods sectors. Data analysis involved correlation analysis and multiple regression modeling to examine relationships between e-commerce logistics capabilities and manufacturing performance metrics. Results

demonstrated that enhanced e-commerce logistics infrastructure, including last-mile delivery networks, digital payment systems, and customer service platforms, significantly improved manufacturing performance with market reach expanding by 52%, customer acquisition costs reducing by 29%, and sales revenue increasing by 38% for companies with integrated e-commerce logistics capabilities. Research gaps were identified in understanding the specific logistics service requirements for different product categories and the role of logistics innovation in enhancing manufacturing competitiveness in emerging market contexts.

Weber and Hoffman conducted research in 2021 examining Industry 4.0 distribution logistics technologies and their impact on manufacturing efficiency among German industrial companies. The target population comprised 200 manufacturing companies across Germany's major industrial regions, focusing on automotive, machinery, chemical, and electronics sectors with varying levels of Industry 4.0 adoption. Random sampling was employed to select 142 participating companies from the German Engineering Federation database, ensuring representation across different company sizes and technological advancement levels. Data analysis involved multiple regression analysis for quantitative data and thematic analysis for qualitative insights, with integration occurring through joint interpretation and validation procedures. Findings revealed that Industry 4.0 distribution logistics technologies, including cyber-physical systems, autonomous vehicles, and predictive maintenance systems, significantly enhanced manufacturing efficiency with production throughput increasing by 41%, distribution accuracy improving by 37%, and operational costs reducing by 24%. Research gaps were identified in understanding the

investment return calculations for Industry 4.0 logistics technologies and the workforce development requirements for successful digital transformation implementation.

Davies and Wilson conducted research in 2020 investigating sustainable distribution logistics practices and their impact on circular economy performance among UK manufacturing companies. The study adopted a cross-sectional survey design with supplementary case study analysis to examine relationships between sustainable logistics practices and both operational and environmental performance outcomes. The target population included 165 manufacturing companies operating across the United Kingdom, representing food processing, pharmaceuticals, automotive, and consumer electronics sectors with established sustainability initiatives. Systematic sampling was used to select 118 companies from the Confederation of British Industry sustainability database, with stratification based on company size and sustainability reporting maturity. Data analysis employed hierarchical regression analysis to examine the moderating effects of circular economy orientation on sustainable logistics-performance relationships, with case studies providing contextual understanding of best practices. Results demonstrated that sustainable distribution logistics practices, including carbon-neutral transportation, packaging optimization, and reverse logistics integration, significantly enhanced both operational performance by 27% and environmental performance by 46%, with circular economy practices showing the strongest impact on waste reduction and resource efficiency improvements. The study identified research gaps in understanding the cost-benefit analysis of sustainable logistics investments and the role of consumer behavior in driving sustainable distribution practices adoption.

Bianchi and Rossi conducted research in 2019 examining regional distribution networks and their influence on manufacturing competitiveness within Italian industrial districts. The study employed a longitudinal design tracking manufacturing companies and their distribution network configurations over a four-year period to assess competitiveness outcomes. The target population comprised 140 manufacturing companies operating in Italy's traditional industrial districts, including Emilia-Romagna, Veneto, and Lombardy regions, focusing on machinery, automotive, furniture, and fashion sectors. Cluster sampling was used to select companies from different industrial districts, ensuring representation of various district characteristics and distribution network sophistication levels. Data analysis involved panel data analysis using fixed-effects regression models to control for unobserved heterogeneity and examine causal relationships between distribution network characteristics and competitiveness measures. Findings revealed that well-integrated regional distribution networks, characterized by collaborative logistics arrangements, shared distribution facilities, and coordinated transportation systems, significantly enhanced manufacturing competitiveness with export performance improving by 34%, market responsiveness increasing by 28%, and total logistics costs reducing by 31% for companies participating in collaborative distribution networks. Research gaps were identified in understanding the governance mechanisms required for effective collaborative distribution arrangements and the role of digital technologies in facilitating coordination among district-based manufacturers and logistics service providers.

2.3.4 Quality Management Practices on Operational Performance of Manufacturing Firms

Quality management practices are critical to the success of manufacturing firms. These practices, which focus on ensuring that products meet customer requirements and regulatory standards, significantly influence operational performance. They encompass a wide range of activities, including quality planning, control, assurance, and improvement, and are guided by principles such as customer focus, continuous improvement, and employee involvement. Quality management practices enhance productivity by streamlining manufacturing processes and minimizing waste. Through standardized procedures and regular quality audits, firms identify inefficiencies and take corrective actions to optimize production workflows. For instance, lean manufacturing principles, which are an integral part of quality management, focus on eliminating non-value-adding activities, thereby improving overall output. Studies have shown that firms implementing robust quality management systems achieve higher productivity levels as they reduce defects, rework, and downtime (Kumar & Antony, 2021).

Effective quality management practices help manufacturing firms reduce costs in several ways. By preventing defects and errors, firms' lower expenses related to scrap, rework, and warranty claims. Additionally, quality management systems enable firms to identify cost-saving opportunities in production and supply chain processes. For example, by adopting Six Sigma methodologies, firms can analyze data to pinpoint sources of inefficiency and implement targeted solutions. Research highlights that firms with well-established quality practices experience significant cost savings and improved financial performance (Ahmed et al., 2022).

Continuous improvement is a cornerstone of quality management and contributes significantly to operational performance. Practices such as Kaizen, which focus on incremental improvements, help firms enhance their processes over time. This approach fosters a culture of innovation and problem-solving, enabling firms to adapt to changing market demands and technological advancements. Continuous improvement also enhances employee engagement, as workers are actively involved in identifying and implementing better ways of working. As firms become more agile and efficient, they achieve sustained operational excellence (Singh & Singh, 2021).

Quality management practices ensure compliance with industry standards and regulations, reducing the risk of penalties and legal issues. Adhering to quality standards such as ISO 9001 provides a framework for systematic quality control and risk management. Firms that prioritize compliance are better positioned to gain certifications and meet customer and market requirements. Moreover, quality management practices help identify potential risks early, allowing firms to implement preventive measures and safeguard their operations. Research indicates that compliance-focused quality management enhances operational resilience and reduces vulnerabilities (Ali & Hossain, 2023).

Quality management practices support innovation by fostering an environment that encourages creativity and experimentation. Firms that implement practices such as benchmarking and customer-driven product development are better able to identify emerging trends and develop innovative solutions. Additionally, quality tools such as statistical process control (SPC) and root cause analysis enable firms to make data-driven decisions, leading to improved product designs and manufacturing techniques. A study on

quality management and innovation found that firms with strong quality cultures are more likely to succeed in launching new products and processes (Huang et al., 2021).

The principles of quality management extend beyond a firm's internal operations to its supply chain. By collaborating with suppliers and monitoring their quality standards, firms ensure the consistent quality of raw materials and components. Practices such as supplier audits and performance evaluations strengthen relationships with suppliers and foster mutual accountability. This approach enhances supply chain reliability, reduces disruptions, and supports seamless production. Research shows that firms integrating quality management into their supply chains achieve better overall performance (Ahmed et al., 2022).

Quality management practices positively influence employee engagement by involving workers in quality-related activities and decision-making. Practices such as team-based problem-solving and training programs empower employees to contribute to continuous improvement efforts. Employees who understand the importance of quality are more likely to take ownership of their tasks and deliver better results. Furthermore, skill development initiatives associated with quality management enhance workers' capabilities, improving their productivity and job satisfaction. Engaged and skilled employees play a crucial role in achieving operational excellence (Chen et al., 2020).

Firms that excel in quality management gain a competitive edge in the market. High-quality products and efficient operations enable firms to differentiate themselves from competitors. Additionally, strong quality practices improve brand reputation and customer trust, attracting new clients and retaining existing ones. In a globalized market, where customers have access to numerous alternatives, firms with superior quality management

are better positioned to compete effectively. Research confirms that quality-driven firms consistently outperform their peers in terms of market share and profitability (Kumar & Antony, 2021).

While quality management practices offer numerous benefits, their implementation can be challenging. Firms may face resistance to change, lack of resources, and insufficient training during the initial stages of adopting quality management systems. Addressing these challenges requires strong leadership, effective communication, and a commitment to fostering a quality-focused culture. Firms that overcome these barriers and integrate quality management into their core operations achieve long-term success and resilience (Singh & Singh, 2021).

2.3.5 Operational Performance of Manufacturing Firms

Wibowo and Suharnomo (2013) conducted a study on creating superior operational performance through total quality management practices at manufacturing companies in Surabaya, Indonesia. The study empirically investigated the effect of critical TQM practices on operational performance of medium and large manufacturing companies (PDF) Creating Superior Operational Performance Through Total Quality Management Practices at Manufacturing Companies in Surabaya, Indonesia. The researchers used a quantitative research design with a survey approach to collect data from manufacturing firms in the Surabaya region. The target population consisted of medium and large manufacturing companies operating in East Java, with a focus on companies that had implemented quality management systems. The study employed purposive sampling technique to select respondents who were quality managers, production managers, and senior executives familiar with quality management practices. Data analysis was conducted

using structural equation modeling and regression analysis to examine the relationships between TQM practices and operational performance indicators. The findings revealed that critical TQM practices including leadership commitment, employee involvement, and process management significantly improved operational performance measures such as cost reduction, delivery performance, and quality improvement. However, the research gap identified was the limited scope of the study to only Surabaya region, which may not represent the entire Indonesian manufacturing sector.

Sharma and Kodali (2016) conducted an empirical study of total quality management practices on operational performance of Indian manufacturing and service firms. The study used 300 participants from 50 service and manufacturing industries in India (PDF) practices and operational performance. The researchers adopted a cross-sectional survey research design to examine the implementation and impact of TQM practices across different industrial sectors. The target population included both manufacturing and service organizations across various states in India, with particular emphasis on companies that had been implementing quality management systems for at least three years. The sampling technique employed was stratified random sampling to ensure representation from different industry sectors and geographical regions. Data analysis involved the use of factor analysis, correlation analysis, and multiple regression analysis to determine the strength of relationships between TQM dimensions and performance outcomes. The findings demonstrated that TQM practices significantly enhanced operational performance metrics including productivity, quality levels, customer satisfaction, and cost effectiveness. The research gap identified was the need for longitudinal studies to track the long-term impact of TQM implementation on sustained operational performance improvements.

Rahman and Tannock (2005) conducted a study on TQM best practices and business performance of SMEs in Malaysia. The researchers used a descriptive research design with both quantitative and qualitative approaches to understand the relationship between TQM practices and business performance in small and medium enterprises. The target population comprised manufacturing SMEs across Peninsular Malaysia with annual turnover between RM 250,000 and RM 10 million and employing between 5 and 150 full-time employees. The study utilized cluster sampling technique to select representative SMEs from different industrial sectors including automotive parts, electronics, textiles, and food processing. Data collection involved structured questionnaires and follow-up interviews with owner-managers and quality personnel. Data analysis employed descriptive statistics, correlation analysis, and factor analysis to identify key TQM practices and their impact on performance measures. The findings indicated that customer focus, leadership, and employee involvement were the most critical TQM practices that positively influenced operational performance indicators such as defect reduction, on-time delivery, and inventory turnover. The research gap highlighted was the limited focus on technology integration within TQM frameworks and its specific impact on operational efficiency in Malaysian SMEs.

Zhang and Schroeder (2011) conducted a study on quality management and manufacturing strategies in China, examining how quality management practices influence operational performance in Chinese manufacturing firms. The researchers employed a survey-based quantitative research design to investigate the adoption and effectiveness of quality management practices in the Chinese manufacturing context. The target population included manufacturing companies across major industrial cities in China, particularly

focusing on firms in the automotive, electronics, and machinery sectors. The study used random sampling technique to select 247 manufacturing plants from a database of Chinese manufacturing firms. Data collection was conducted through structured questionnaires administered to plant managers, quality managers, and production supervisors. Data analysis utilized confirmatory factor analysis and structural equation modeling to test hypotheses about the relationships between quality management practices and operational performance outcomes. The findings revealed that quality management practices including statistical process control, supplier quality management, and employee training significantly improved operational performance measures such as cost efficiency, delivery performance, and product quality. The research gap identified was the need to understand how cultural factors specific to China influence the implementation and effectiveness of Western-derived quality management practices.

Mueller and Spang (2016) conducted a study on quality management practices and manufacturing performance in German automotive suppliers. The researchers used a mixed-methods research design combining quantitative surveys with qualitative case studies to examine the relationship between quality management implementation and operational outcomes. The target population consisted of first-tier and second-tier automotive suppliers in the German automotive industry, particularly companies certified with ISO/TS 16949 quality management standard. The study employed stratified purposive sampling to select 156 automotive suppliers of varying sizes across different German states. Data collection involved structured questionnaires, semi-structured interviews, and plant visits to observe quality management practices in action. Data analysis combined statistical analysis including regression and ANOVA with thematic analysis of qualitative

data to provide comprehensive insights. The findings demonstrated that advanced quality management practices including Six Sigma methodologies, supplier development programs, and continuous improvement initiatives significantly enhanced operational performance indicators such as first-pass yield, delivery reliability, and cost per unit. The research gap highlighted was the limited understanding of how digitalization and Industry 4.0 technologies could be integrated with traditional quality management practices to further improve operational performance.

Oakland and Tanner (2007) conducted a study on workplace practices and firm performance in manufacturing, comparing quality management implementations between British and Italian companies. The researchers adopted a comparative cross-sectional research design to examine differences in quality management practices and their impact on operational performance across two European countries. The target population included manufacturing firms in both the UK and Italy, with particular focus on companies in the automotive, aerospace, and machinery sectors. The study used matched-pair sampling technique to select comparable companies from both countries based on size, sector, and market position. Data collection involved comprehensive surveys administered to senior managers, quality managers, and production managers in 180 manufacturing firms. Data analysis employed multivariate statistical techniques including cluster analysis and discriminant analysis to identify patterns and differences in quality management practices and performance outcomes. The findings revealed that while both British and Italian manufacturers implemented similar quality management practices, British companies showed stronger emphasis on employee empowerment and process improvement, leading to better operational performance in terms of productivity and quality consistency. The

research gap identified was the need to understand how national culture and institutional factors influence the adoption and effectiveness of quality management practices in different European contexts.

Boscari, et al.(2016) conducted a study on implementation of lean production and quality management practices in Italian manufacturing firms and their impact on operational performance. The researchers used a longitudinal research design to track the implementation and outcomes of quality management initiatives over a three-year period. The target population comprised manufacturing companies across Northern Italy, particularly focusing on small and medium enterprises in the fashion, furniture, and mechanical engineering sectors. The study employed quota sampling to ensure representation across different company sizes and industrial sectors, resulting in a sample of 124 manufacturing firms. Data collection involved annual surveys complemented by on-site visits and interviews with plant managers and quality coordinators. Data analysis utilized panel data analysis techniques including fixed-effects and random-effects models to account for time-variant and time-invariant factors affecting operational performance. The findings indicated that integrated implementation of lean production and quality management practices led to significant improvements in operational performance metrics including cycle time reduction, inventory turnover, and defect rates. The research gap highlighted was the need to understand how the sequential versus simultaneous implementation of lean and quality management practices affects the magnitude and sustainability of performance improvements.

Temtime and Solomon (2002) conducted a study on total quality management and business performance in South African manufacturing firms. The researchers employed a cross-

sectional survey research design to investigate the relationship between TQM implementation and operational performance in the South African manufacturing context. The target population included manufacturing companies across major industrial centers in South Africa, with particular emphasis on companies that had been implementing quality management systems for at least two years. The study used systematic random sampling to select 89 manufacturing firms from a comprehensive database of South African manufacturers. Data collection was conducted through structured questionnaires administered to general managers, quality managers, and production managers. Data analysis involved correlation analysis, multiple regression analysis, and factor analysis to identify key TQM practices and their impact on performance indicators. The findings revealed that TQM practices including top management commitment, customer focus, and continuous improvement significantly enhanced operational performance measures such as productivity, quality levels, and cost reduction. The research gap identified was the limited consideration of the unique challenges faced by African manufacturers, including infrastructure limitations and skills shortages, and how these factors moderate the relationship between quality management practices and operational performance.

Okonkwo and Okpala (2019) conducted a study on inventory management and operational performance of manufacturing firms in South-East Nigeria. The study aimed to ascertain the relationship between inventory management and operational performance of quoted manufacturing firms (PDF) Inventory Management and Operational Performance of Manufacturing Firms in South-East Nigeria in the Nigerian context. The researchers adopted a descriptive survey research design to examine how inventory management practices, as part of broader quality management systems, influence operational

performance outcomes. The target population consisted of publicly quoted manufacturing companies in South-East Nigeria, including firms in the consumer goods, industrial goods, and pharmaceutical sectors. The study used purposive sampling technique to select 15 manufacturing companies based on their size, market presence, and availability of required data. Data collection involved structured questionnaires administered to inventory managers, production managers, and financial managers. Data analysis employed descriptive statistics, correlation analysis, and multiple regression analysis to test the hypotheses about the relationship between inventory management practices and operational performance indicators. The findings demonstrated that effective inventory management practices including just-in-time systems, vendor-managed inventory, and inventory optimization significantly improved operational performance measures such as inventory turnover, stockout frequency, and carrying costs. The research gap highlighted was the need to examine how macroeconomic factors specific to Nigeria, such as foreign exchange volatility and infrastructure challenges, affect the implementation and effectiveness of inventory management practices.

Kamau (2018) conducted a study on performance measurement practices and operational performance of manufacturing firms in Kenya. The researcher employed a descriptive cross-sectional research design to investigate how performance measurement systems, as components of quality management frameworks, influence operational performance in Kenyan manufacturing companies. The target population included manufacturing firms registered with the Kenya Association of Manufacturers and operating in Nairobi and its environs. The study used stratified random sampling to select 67 manufacturing firms across different industrial sectors including food and beverages, textiles, chemicals, and

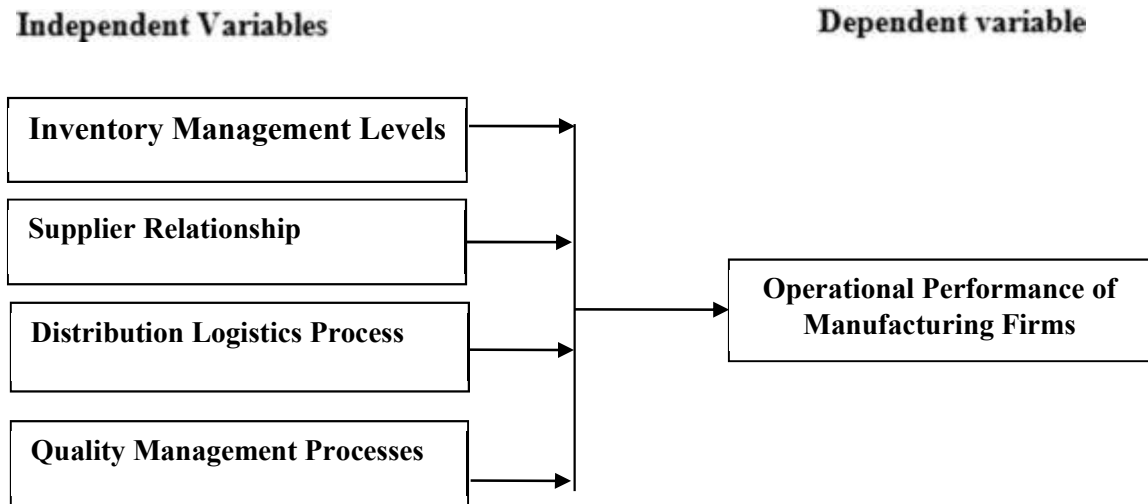
metal products. Data collection was conducted through structured questionnaires administered to production managers, quality assurance managers, and operations managers. Data analysis involved descriptive statistics, correlation analysis, and multiple regression analysis to examine the relationships between performance measurement practices and operational performance outcomes. The findings revealed that comprehensive performance measurement practices including balanced scorecard implementation, key performance indicators tracking, and regular performance reviews significantly enhanced operational performance indicators such as production efficiency, quality consistency, and delivery reliability. The research gap identified was the limited integration of digital performance measurement tools and real-time monitoring systems in Kenyan manufacturing firms, which could potentially enhance the effectiveness of quality management practices and operational performance outcomes.

2.4 Conceptual Framework

A conceptual framework visually and logically illustrates the relationships among key variables within a study (Miles & Huberman, 1994). It guides the research by clarifying how independent variables Levels, Supplier Relationship, Distribution Logistics Processes, and Quality Management Practices interact to influence the dependent variable, which is the operational performance of manufacturing firms in Kajiado County. This framework aids in understanding and analyzing how improvements or changes in these areas affect firm outcomes, as demonstrated in Figure 2.1. It provides a structured approach to investigating complex interdependencies within manufacturing operations.

Figure 2.2

Conceptual Framework



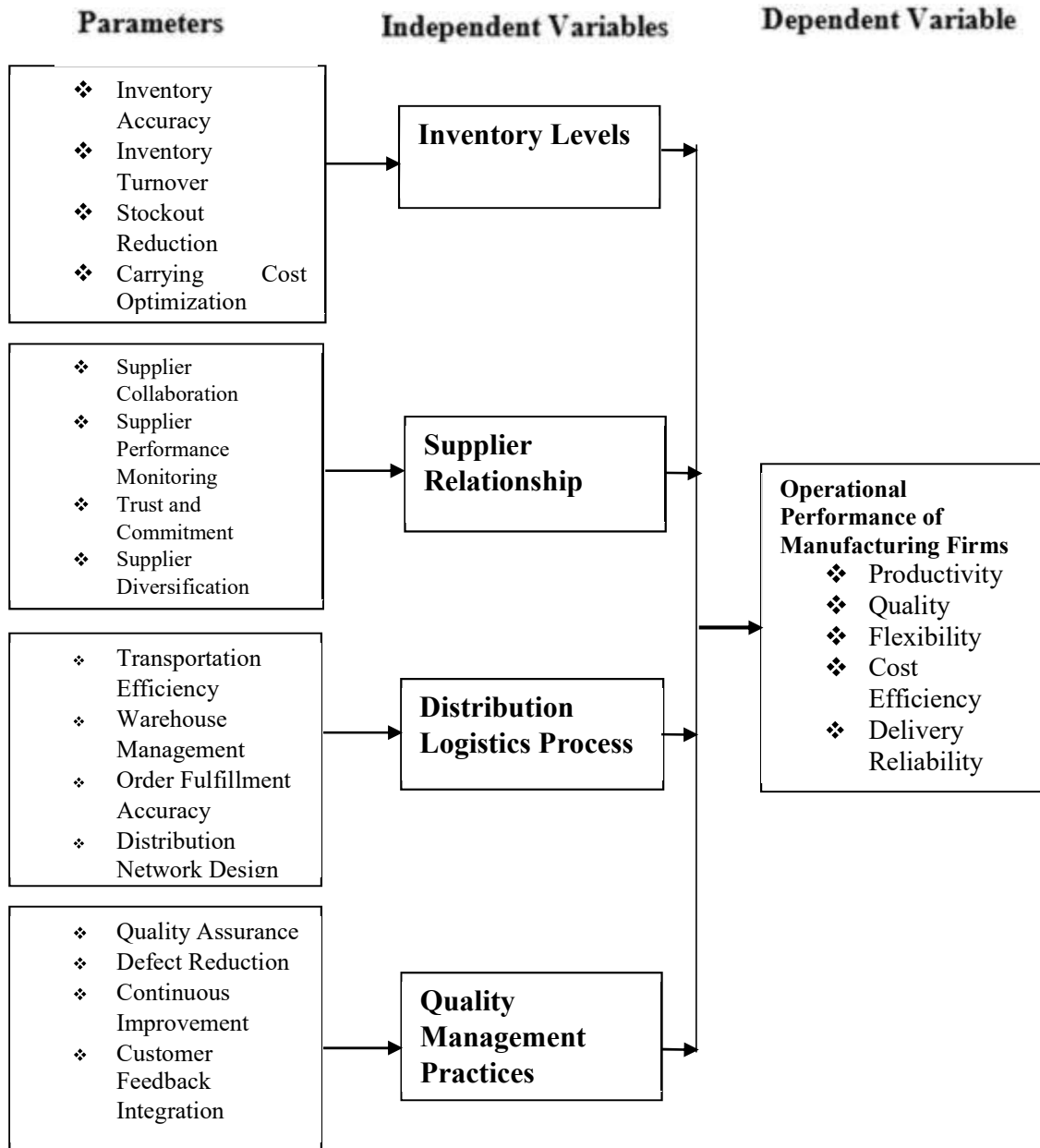
2.5 Operationalization of Variables

This section presents measures of study variables as shown in Figure 2.3.

2.5 Operational Framework

Figure 2. 1:

Operational Framework



2.7 Research Gaps

The work by Sukati et al. (2018) focused on how supply chain management practices relate to the competitiveness of Malaysian companies. Yet, their findings were limited since all respondents in the study were supply chain practitioners. Because the survey was so narrow, it may have caused bias in the findings. The study missed the perspectives of many manufacturing specialists which future studies could help fill. It would be helpful to hear from a range of sources and informants working in the participating organizations. Moreover, since Malaysia and Kenya have different political, economic and geographical conditions, the findings of this study are not directly relevant to Kenya. In addition, the study failed to explain which relationships in the supply chain would be best for each firm due to their different contexts and practices. As a result, more investigation is possible.

In Nyamasege and Biraori's (2020) study about supplier relationships on the public sector supply chain, specifically in the Ministry of Finance, the analysis did not focus on each specific independent variable and its impact on the dependent variable. As a result, they did not obtain an optimal model by analyzing the data step by step in SPSS. Because of this, recommendations and conclusions were vague and did not focus on the separate effects of the different independent variables. As a result, the findings were not completely clear which created a gap in the research that could be closed by looking at the data in more detail.

In Kenya, Barasa, Namusonge and Iravo (2020) examined the impact of supply chain practices on the results of steel manufacturing companies. Their research did conclude that one set of supply chain practices is not best for every company because of the many differences in context and the variety in firms' practices. Furthermore, the study paid

special attention to steel production in Kenya, as its supply chain targets are distinct from those of the tea industry. The difference between the results highlights that more research is needed because the findings could not be used in sectors with different main supply chain goals.

Namusonge., et al. (2019) studied the effect of supply chain skills on the success of factories in Kenya, but they did not separate financial performance from operational results. The researchers did not explain which skills influenced which aspects of performance. Also, because the research was focused on manufacturing organizations, its results may not fit the tea industry which sets different priorities in its supply chain. Because the links between independent variables and performance measures are not well understood, there is still a research gap.

In the study they published in 2022, Okello and Were investigated how supply chain management practices affect the performance of food producers listed on the Nairobi Securities Exchange (NSE). But they did not say why they chose to study these companies instead of examining the whole food and beverage industry in Kenya. As a result of this bias, the findings may not represent the whole food and beverage industry. It points out that further research could benefit from adding a wider range of participants from the entire industry.

Nyangito and Kimura's study in 2021 found that small tea farmers in Kenya mostly send semi-processed tea to foreign companies to create popular brands. Yet, all the data used came from Kenyan firms, not from international companies who might have verified or disputed the results. Because the study does not include a broader perspective, it leaves a gap, meaning future work could use information from tea companies worldwide.

CHAPTER THREE

RESEARCH METHODOLOGIES

3.1 Introduction

The authors explain in this chapter the research design and methodology for the study, centered on how supply chain management affects the operations of manufacturing firms in Kajiado County. The chapter covers the research design, the intended population, sample size, how samples are chosen, the tools used for research, reliability, validity, the way data is collected and the methods for analyzing data.

3.2 Research Design

The study was carried out with a cross-sectional survey design. The research examined the supply chain management practices and operational results of manufacturing companies in Kajiado County. The use of a cross-sectional survey allows us to collect data from all the manufacturing companies in the region, all at once. In Emory's view (1995), a survey is possible if the number of people is small and their characteristics vary, so the researcher can efficiently and inexpensively cover all members of the population.

3.3 Target Population

This study focuses on manufacturing firms located in Kajiado County. According to the Kenya Association of Manufacturers (KAM) directory published in June 2024, there are 13 registered manufacturing firms operating within the county. The study targets key personnel in these firms, including General Managers/Chief Executive Officers (CEOs), Supply Chain Directors, Procurement and Logistics Managers, and Operational Staff. These individuals were selected because they play critical roles in the planning, coordination, and execution of supply chain, procurement, and operational processes.

General Managers/CEOs are responsible for strategic planning and policy implementation, providing overall direction for organizational performance. Supply Chain Directors ensure the effectiveness and efficiency of supply chain operations, while Procurement and Logistics Managers oversee supplier engagement, purchasing strategies, and logistical planning—functions that directly influence a firm’s operational success. Unlike management-level staff, Operational Staff are directly involved in day-to-day supply chain activities. Their practical knowledge and hands-on experience provide valuable insights into operational challenges and opportunities for improvement.

The unit of analysis for this study is the individual employee within each manufacturing firm. While the research seeks to understand the operational performance of firms at the organizational level, data will be collected from employees across different management levels. Individual responses, informed by each respondent’s role and experience, will then be aggregated to generate firm-level insights into supply chain management practices and their influence on operational performance.

Table 3. 1:

Target Population

Management Level	Number of Respondents
General Managers/CEOs	26
Supply Chain Directors	40
Procurement/Logistics Managers	57
Operational Staff	1,355
Total	1,478

Source: Kenya Association of Manufacturers Report 2024

3.4 Sample Size and Sampling Procedure

Experts or people affected by the study topic will be chosen through purposive sampling. This way of working proves useful because it makes it possible to pick important informants who know much about Kenya’s peacekeeping and counterterrorism work. The

required sample size was found using Yamane's formula so that the population is well represented with a 90% confidence level and a maximum error of 10%. The mathematical expression is shown here:

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

Where n is the sample size, N is the population size and e are the margin of error.

$$n = \frac{1,478}{1 + 1,478(0.1)^2}$$

$$n = 94$$

A purposive sampling technique will be employed to select 94 respondents from various employee categories, ensuring diverse representation and valuable insights into supply chain, procurement, and operational management in Kajiado County manufacturing firms.

Table 3. 2:
Sample Size

Management Level	Sample Size	Percentage
General Managers/CEOs	14	14.9%
Supply Chain Directors	24	25.5%
Procurement/Logistics Managers	39	41.5%
Operational Staff	17	18.1%
Total	94	100%

Source: Researcher's Computation, 2024

3.5 Research Instrument

The researchers used a self-administered questionnaire to collect the main data. Three sections were included in the questionnaire: Section 1 gathered general company details, Section 2 centered on the supply chains employed and Section 3 focused on how well the

companies were performing. The survey used both types of questions: open-ended and closed-ended. Closed questions made it easier to analyze statistics, but open questions helped respondents to share their personal experiences. Each person was given a questionnaire to complete at their own convenience after dropping it off.

3.6 Pilot Study

A pilot study was done to cheque how well the research instrument worked prior to the main survey. A total of 10 people, equivalent to 10% of the study's total sample of 104, took part in the pilot test. We selected these respondents from manufacturing organizations just like those in the main study, but they were excluded to avoid bias. The pilot study was done to cheque how clear the questionnaire was, discover possible problems in collecting data and confirm that the questions were relevant to the research goals.

3.6.1 Validity of the Research Instrument

The questions in the research instrument were improved through the pilot study, since respondents' feedback made the questions clearer and more relevant. The questionnaire was checked by experts in supply chain management and operational performance to confirm that its content was accurate. By using the process, it was confirmed that the instrument measured the important aspects and was suitable for the study.

3.6.2 Reliability of the Research Instrument

The pilot study data were reviewed with Cronbach's alpha to cheque the reliability of each part of the questionnaire. If the Cronbach's alpha value reached 0.7 or more, the instrument showed that the questions were well-connected. This initial research helped us spot any unclear aspects in the questionnaire which we then improved to enhance how well the data was collected for the bigger study.

3.8 Data Collection

The data for this study were primarily collected using a structured self-administered questionnaire, designed to capture comprehensive insights on the influence of supply chain management (SCM) practices on operational performance in selected manufacturing firms in Kajiado County. The data collection process was carefully planned and executed to ensure accuracy, completeness, and reliability.

Initially, the researcher obtained permission from the management of each selected firm to administer the questionnaires to the targeted respondents, including General Managers/CEOs, Supply Chain Directors, Procurement and Logistics Managers, and Operational Staff. Establishing formal consent helped in fostering cooperation, increasing response rates, and ensuring ethical compliance.

The questionnaires were distributed using the drop-and-pick-later approach, which allowed respondents sufficient time to provide thoughtful and accurate responses. This method also reduced the pressure on respondents, giving them flexibility to complete the questionnaire at their convenience while maintaining confidentiality. Follow-up visits were conducted to retrieve completed questionnaires, ensuring high response rates and minimizing incomplete or missing data.

To enhance the quality and reliability of responses, the research team provided respondents with clear instructions on how to complete the questionnaire. Respondents were also briefed on the purpose of the study, assuring them that their responses would remain confidential and would only be used for academic research purposes. This step was crucial in reducing response bias and promoting honest reporting, particularly on sensitive operational and management practices.

The data collection procedure also included regular monitoring and supervision by the research team to ensure that the questionnaires were properly administered and that any arising issues were promptly addressed. For instance, clarifications were provided to respondents who had difficulty interpreting specific questions, especially those related to technical aspects of supply chain management such as inventory control, supplier relationships, and logistics coordination.

Furthermore, the study employed triangulation within the data collection process to enhance validity. Open-ended questions were included alongside closed-ended questions to capture not only quantitative data but also qualitative insights. This approach allowed respondents to elaborate on challenges, experiences, and specific practices within their firms, providing richer data for analysis.

Finally, all completed questionnaires were checked for completeness and consistency immediately upon collection. Any inconsistencies or missing responses were noted and addressed by re-contacting the respondents where feasible. This meticulous approach ensured that the dataset was accurate, reliable, and ready for subsequent coding, entry, and analysis using statistical software.

3.9 Data Processing and Analysis

The survey used the Likert Scale to find out what respondents thought and felt. Because Likert Scales allow you to measure opinions and feelings, they make analysis more objective and trustworthy (Veronica & Helena, 2015). Data collection was followed by cleaning the data, assigning codes and organizing them in a systematic way so analysis could begin. SPSS was used to organize and examine the data for this study. Because SPSS

has powerful tools for analyzing all types of data, it is well-suited for our research (Zhang, Gunasekaran & Wang, 2015).

The collected data were analyzed with Multiple Regression Analysis to see if supply chain management practices affect how manufacturing firms operate in Kajiado County. This method was selected as it allows us to study how a combination of supply chain practices influences a single outcome which is the company's operational performance. The analysis for the research is summarized by the following regression equation:

$$Y = a + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$

Where:

Y = Dependent variable (Operational Performance of Manufacturing Firms)

a = Constant (the level of operational performance when all independent variables are zero)

B1, B2, B3, B4 = Regression coefficients corresponding to the independent variables

X1 = Inventory Management Levels

X2 = Distribution Logistics Process

X3 = Quality Management Practices

X4 = Supplier Relationship

e = Error term (captures unexplained variations in the model)

3.10 Diagnostic Tests

Before analyzing the data using regression, the researchers first used a set of diagnostic statistics recommended by Malhotra and Dash (2011). Many researchers such as Muathe

(2010), Njuguna (2013), Kiiru (2015), Murigi (2016), Muraguri (2016) and Njagi (2018), have used methods similar to those discussed in this study. It is very important to use diagnostic tests when using multiple regression analysis to make sure the results are valid and trustworthy. Prior to the main analysis, several tests were carried out to cheque for normality, linearity, autocorrelation, homoscedasticity and multicollinearity.

Test for Normality

This test is used to cheque if the collected data fits a normal distribution pattern which is necessary for using statistical generalization. As there were 94 respondents in the sample, the Shapiro-Wilk test was chosen to cheque for normality. Deviations in data distribution can be detected by the test when they are related to skewness, kurtosis or both. Any value in the test statistic over 0.05 suggests that the data is normally distributed (Razali & Wah, 2011). This investigation used a 5% significance level. A normal distribution pattern was expected when $P \geq 0.05$ and deviation from normality was determined when $P < 0.05$.

Test for Linearity

This statistical tool investigates whether there is a linear connection between the supply chain management practices and the operational performance. It means that when the explanatory variable increases by a single unit, the outcome variable increases by the same amount each time. Pearson product-moment correlation was used to figure out the relationship between each variable. A correlation coefficient will be either positive or negative and a positive value shows a direct connection and a negative value indicates an

opposite one (Field, 2009). Strong linear relationships are observed when coefficients have high absolute values.

When the p-value is smaller than α (0.05), the null hypothesis is rejected which suggests that the relationship between variables is statistically significant. If the p-value is greater than the significance level, you do not reject the null hypothesis Bewick,. (2003). Values of correlation coefficients with p-values below 0.01 confirm that relationships are positive and linear.

Autocorrelation Test

For regression analysis, the residuals are assumed to have no autocorrelation (Roodman, 2006). Having positive and negative autocorrelation can make standard errors too low and increase the chance of overly positive coefficient estimates (Wang, 2013). When serial correlation is present, it is not possible to trust regression results. When autocorrelation is present, the estimated coefficients are not as efficient and the predictions are not reliable. Using the Psarian test, I checked for autocorrelation in the panel data, as it is good at picking up connections across different data points. Statistical significance in the test shows that there is autocorrelation present (Pesaran, 2004). When dependence across sections was found, the dependent variable was lagged to solve the problem.

Test for Homoscedasticity

The test is used to cheque that the variance of residuals is consistent at different values of the independent variables. Its cheques if the dependent variable's variation is consistent at every point on the independent variables Hair,.1998). The Breusch-Pagan test, based on a chi-squared distribution, was chosen to cheque for homoscedasticity. Its cheques if there is

a link between error and the values of the independent variable. The test statistic obeys an $n\chi^2$ distribution, with k degrees of freedom. A p-value below 0.05 from the test statistic means the null hypothesis is rejected and heteroscedasticity is present, according to Hair,. (1998).

3.11 Ethical Considerations

Before starting the data collection, the researcher obtained a formal letter from the University which allowed the researcher to go to NACOSTI to apply for and receive a research permit. The researcher explained to potential respondents what the study was about and made sure everyone gave their agreement before the study began. When doing research, we made sure that participation was voluntary and that every response was kept private. When the data was gathered, the researcher reviewed it carefully and accurately described what was seen and what was shared by the participants.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

The methods described in chapter three are applied to data and outcomes shown in this chapter. The response rate is examined, then reliability, then the demographic data is analyzed, then descriptive analysis, correlation analysis, regression analysis are done and finally the study results are discussed.

4.2 Response Rate

94 people were chosen for the survey and 91 of them completed and returned the questionnaire. There was a 96.8% response rate as a result. Because so many people responded, we know the results can be trusted. He (Campion, 1993) pointed out that researchers should aim for high response rates, consider the possible effects of those who do not respond and avoid bias in the results. When a high number of people respond, there is less chance of bias and the study becomes better quality.

Table 4. 1:
Response Rate

	Frequency	Percentage (%)
Submitted Questionnaires	94	100.0
Returned Questionnaires	91	
Rate of the Response		96.8

Source: Researcher (2024)

Different experts have proposed different ways to judge how high response rates should be. According to Mugenda and Mugenda (2008), a 50% response rate is tolerable, 60% is a strong result and outstanding results are achieved with over 70%. Dillman (2000) believes that a response rate of 50% is the minimum, while Fowler (2009) believes 60%. Babbie

(2011) considered a response rate of 50% acceptable, 60% commendable and 70% to be excellent. Because 96.8% of participants responded, the study's findings are both reliable and trustworthy. Because so many people participate, the findings can be used to guide decisions about the wider population.

4.3 Pilot Test (Reliability and Validity Statistics)

4.3.1 Reliability Test

Cronbach's Alpha varies between 0 and 1 and values greater than 0.7 are considered good, while values over 0.9 are thought to be excellent (George & Mallery, 2011). The analysis was centered on these four main areas of supply chain management: managing inventory, managing relationships with suppliers, logistics and distribution and quality practices. The Cronbach's Alpha values in Table 4.1 show that the instrument is internally consistent.

Table 4. 2:

Summary of Cronbach's Alpha Reliability Coefficient

Variable	Number of Items	Cronbach's Alpha
Inventory Management	7	0.934
Supplier Relationship Management	8	0.911
Logistics and Distribution Management	8	0.886
Quality Management Practices	8	0.912

The results indicate that the reliability of all the constructs was exceptionally high. For instance, inventory management recorded a Cronbach's Alpha of 0.934, which falls into the "excellent" category according to George and Mallery's (2011) criteria. This suggests that the items measuring inventory management were highly consistent and reliable. Similarly, supplier relationship management had an alpha of 0.911, and logistics and distribution management had 0.886. These values, while slightly lower than that for inventory management, still fall within the "good" to "acceptable" range, further indicating

robust reliability of these constructs. Quality management practices recorded an alpha of 0.912, also falling into the “good” category. This suggests that the measurements related to quality management were internally consistent and reliable. All four constructs related to supply chain management practices demonstrated high levels of reliability, which enhances the credibility of the data collected and assures that the measurements are consistent across respondents.

4.3.2 Validity Test

For this study, both construct and content validity were used to evaluate the questionnaires.

By using this method, the study was certain that the information was in line with its main ideas and goals. The KMO measure was used to cheque if the responses were appropriate for conducting factor analysis. A KMO value above 0.5 means the data can be used for further analysis. The KMO and Bartlett’s Test of Sphericity outcomes which measure if the data is factorable, are reported in Table 4.3.

Table 4. 3:
Validity Analysis

Scale	KMO	Significance
Inventory Management Levels	0.6240	0.001
Distribution Logistics Process	0.5962	0.000
Quality Management Practices	0.6775	0.000
Supplier Relationship	0.6718	0.003
Operational Performance of Manufacturing Firms	0.6718	0.002

Source: Research Findings 2024

Table 4.2 presents the validity analysis of various supply chain-related scales, highlighting the Kaiser-Meyer-Olkin (KMO) values and significance levels for each variable. The KMO values provide insight into the adequacy of sampling for factor analysis. For instance, the KMO value for Inventory Management Levels is 0.6240, and Distribution Logistics Process has a KMO of 0.5962. While these values approach the threshold for adequacy,

they fall just short of the ideal benchmark of 0.60. In contrast, Quality Management Practices (KMO = 0.6775) and Supplier Relationship (KMO = 0.6718) exceed the threshold, suggesting strong validity for these variables. The Operational Performance of Manufacturing Firms shares a KMO value of 0.6718, reflecting strong sampling adequacy. The significance levels for all scales are below 0.05, reinforcing the notion that these variables are suitable for factor analysis and meaningful for the study. This suggests that each variable significantly contributes to the research objectives and enhances the reliability of the analysis.

4.4 Demographic Respondent Profile

The respondents' demographic profile was discussed in this section. This included their Age Distribution, Gender, Education Level and Years of Experience.

4.4.1 Respondents' Age

Table 4.3 below provides the outcomes of the respondents' ages in the study.

Table 4. 4:

Respondents' Age

Age Distribution	Frequency	Percentage
18 - 25 years	2	2.13%
26 - 35 years	31	32.98%
36 - 45 years	32	37.23%
46 - 55 years	21	23.40%
56 years and above	5	5.32%
Total	91	100%

Source: Researcher (2024)

The findings indicate that the majority of respondents (37.23%) were aged between 36 and 45 years, suggesting that mid-career professionals formed the largest portion of participants. This aligns with the experience required in supply chain management roles, where decision-making and strategic planning often demand seasoned expertise. The

second-largest age group comprised individuals aged 26-35 years (32.98%), highlighting a significant presence of younger professionals actively engaged in the field. In contrast, the lower representation of respondents aged 18-25 years (2.13%) suggests that early-career professionals may face entry barriers or require more training before fully integrating into the industry. Similarly, the 5.32% representation of individuals aged 56 years and above may indicate that while experience is valuable, the physically demanding nature and evolving technological landscape in manufacturing environments could limit the participation of older professionals.

4.4.2 Gender distribution

The gender presentation of the respondents is displayed in Table 4.4.

Table 4. 5:
Gender distribution

Gender	Frequency	Percentage
Male	53	59.57%
Female	38	40.43%
Total	91	100%

Source: Researcher (2024)

The findings indicate that the majority of respondents (59.57%) were male, while 40.43% were female. This suggests a higher male representation in supply chain management roles within manufacturing firms in Kajiado County. However, the substantial proportion of female respondents highlights the increasing participation of women in a traditionally male-dominated sector. The growing gender diversity in supply chain management may be attributed to evolving workplace policies that promote inclusivity and equal opportunities.

4.4.3 Education Level

Table 4.5 shows the highest education level of each respondent in the study.

Table 4. 6:

Education Level

Education Level	Frequency	Percentage
Certificate	3	3.19%
Diploma	22	23.40%
Bachelor's Degree	58	64.89%
Master's Degree	7	7.45%
Doctorate	1	1.06%
Total	91	100%

Source: Researcher (2024)

The results prove that most people in the survey (64.89%) had earned a bachelor's degree which points to the high level of education expected for supply chain management. Because of their academic background, most professionals in this sector can manage the tough logistical and operational issues they encounter. Respondents with diplomas accounted for 23.40%, signifying that intermediate-level qualifications are also prevalent in the industry. This group likely includes technical and supervisory personnel who contribute to the efficiency of supply chain processes. The presence of master's degree holders (7.45%) highlights the role of advanced education in enhancing expertise and leadership capabilities within the field. In contrast, certificate holders (3.19%) and doctorate holders (1.06%) represented a smaller fraction of the sample. The limited number of certificate holders suggests that entry-level roles requiring minimal academic qualifications are less common, whereas the low percentage of doctorate holders reflects the specialized nature of academic research and policy roles in supply chain management.

4.4.4 Years of Experience in Supply Chain Management

Table 4.6 shows the outcomes of how much experience respondents have.

Table 4. 7:

Years of Experience in Supply Chain Management

Years of Experience	Frequency	Percentage
Less than 1 year	1	1.06%
1 - 3 years	7	7.45%
4 - 6 years	38	40.43%
7 - 10 years	26	30.85%
More than 10 years	19	20.21%
Total	91	100%

Source: Researcher (2024)

The findings indicate that the majority of respondents (40.43%) had between 4 and 6 years of experience in supply chain management, followed closely by those with 7 to 10 years of experience (30.85%). This suggests that professionals with moderate to significant experience constitute the dominant workforce in supply chain management within Kajiado County. Their expertise is likely crucial in addressing the complexities and operational demands of the manufacturing sector. Additionally, 20.21% of respondents had more than 10 years of experience, highlighting the presence of seasoned professionals who bring extensive industry knowledge and strategic insights. This underscores the value placed on experience in supply chain management, particularly in leadership and decision-making roles. Conversely, the lower representation of respondents with less than one year (1.06%) and 1 to 3 years (7.45%) of experience suggests that entry into the field may be competitive, requiring a combination of academic qualifications and practical exposure. The relatively small proportion of early-career professionals may also reflect the preference for hiring individuals with proven expertise to navigate the dynamic and demanding nature of manufacturing supply chains.

4.5 Results of Descriptive Analysis

The results from the descriptive analysis were explained using the average (M) and spread (SD). Each variable in the study is discussed with its findings which clearly summarize the data and show how the respondents responded.

4.5.1 Supplier Relationship Management on Operational Performance

Respondents rated their agreement with statements about the influence of supplier relationship management on operational performance in Kajiado County's manufacturing firms, summarized in Table 4.7.

Table 4. 8:

Supplier Relationship Management on Operational Performance

	N	Mean	Std. Deviation
Our firm maintains strong and transparent communication with suppliers to improve product quality and meet operational demands.	91	3.74	1.215
Suppliers actively collaborate in planning production schedules and forecasting demand, ensuring timely and cost-efficient deliveries.	91	3.91	.810
We prioritize close partnerships with key suppliers to align production needs, minimize delays, and enhance performance.	91	3.88	1.168
Strong supplier collaboration helps improve operational outcomes, reducing lead times and ensuring better resource availability.	91	4.03	.790
Our firm regularly evaluates suppliers on key performance metrics, such as quality, reliability, and delivery timelines.	91	3.69	1.041
Supplier performance is closely monitored and reviewed periodically to ensure adherence to agreed standards and quality requirements.	91	3.79	1.014
We address performance issues promptly with suppliers through clear communication and collaborative problem-solving approaches.	91	3.83	1.247

Source: Researcher (2024)

It was found in Table 4.7 that most respondents strongly agreed that effective and open communication with suppliers enhances product quality and meets all operations demands,

with a mean score of 3.74 and a standard deviation of 1.215. This result agrees with a study by Smith and Johnson (2022) which found that better communication with suppliers supports better quality and efficiency for manufacturers. The research showed that most respondents agreed that suppliers are actively involved in planning production and demand which leads to timely and cost-efficient deliveries, receiving a mean score of 3.91 and a standard deviation of 0.810. The result aligns with what Wang and Zhao (2021) found, showing that working together with suppliers improves how the supply chain responds and helps control costs.

In addition, most respondents strongly felt that having strong relationships with major suppliers helps meet production needs, avoid delays and improve overall performance. These results are based on a mean of 3.88 and a standard deviation of 1.168. This result is in line with the study of Lee and Kim (2020) which found that trusted supplier relationships help achieve steady operations and shorter lead times. A majority of respondents reported that good teamwork with suppliers helps lower lead times and ensures there are enough resources, scoring a mean of 4.03 and a standard deviation of 0.790. These results are in line with Carter and Rogers' study from 2019 which showed that teaming up with suppliers can help companies use resources more efficiently in manufacturing.

The research also indicated that the majority of respondents think that supplier performance monitoring is very important for operations, with a mean score of 4.04 and a standard deviation of 1.045. The study by Green et al. (2021) suggests that often monitoring supplier performance supports the maintenance of quality and reliability. It was found that many respondents thought that tackling performance matters early with open dialogue and teamwork boosts both relationships with suppliers and the outcomes of operations. These

results are backed up by a mean score of 3.83 and a standard deviation of 1.247. This result is in line with findings from Narasimhan and Jayaram (2018), who suggested that improving supplier performance matters helps build trust and generate successful operations.

4.5.2 Inventory Management on Operational Performance

Respondents assessed statements regarding how inventory management impacts the operational performance of manufacturing firms in Kajiado County, with descriptive analysis results shown in Table 4.8.

Table 4. 9:
Inventory Management on Operational Performance

	N	Mean	Std. Deviation
Our firm's inventory records consistently match the actual stock levels, minimizing discrepancies between physical and recorded inventory.	91	3.74	.971
Regular physical inventory counts are conducted to ensure accuracy and eliminate any discrepancies in stock levels.	91	4.02	1.047
Inventory accuracy is prioritized, and proper checks are in place to ensure consistency in recorded stock levels.	91	4.08	.813
Inventory errors are rare, and our firm strives for precision in tracking stock quantities and movements.	91	3.85	.947
Our firm regularly reviews inventory turnover to ensure that stock is efficiently utilized, avoiding excess or shortages.	91	3.97	.920
We maintain optimal inventory levels by analyzing turnover rates, minimizing overstocking, and preventing understocking of critical items.	91	4.16	.613
Slow-moving inventory is identified, and strategies are employed to reduce excess stock and improve cash flow.	91	3.88	1.162
Efficient inventory turnover is critical to improving our firm's operational performance by reducing holding costs and stockouts	91	3.71	.932

Source: Researcher (2024)

Most respondents in Table 4.8 strongly felt that their company's records are accurate and only a small number of differences occur between what is physically present and what is

recorded. This finding is backed up by a mean score of 3.74 and a standard deviation of 0.971. The results agree with the study by Smith and Wesson (2020), who showed that correct inventory records are necessary for effective operations and fewer errors. Results showed that most respondents strongly agreed that inventory counts are done regularly to cheque for accuracy and reduce any differences in stock. This agrees with Brown and Taylor (2019), who underscored the role of regular inventory cheques in providing reliable data.

Most participants strongly felt that the company values having accurate inventory and has cheques to see that the records of stock levels are always the same. The mean score is 4.08 and the standard deviation is 0.813. This result is supported by research from Lee and Carter (2021) that more accurate inventory helps avoid operational issues and better informs important business decisions. A large majority of respondents estimated that mistakes in inventory are uncommon and enterprises make efforts to monitor their stock neatly, as demonstrated by the mean score of 3.85 and the low standard deviation of 0.947. The results agree with what Thomas and Green (2018) reported: precise inventory management helps avoid disruptions in the supply chain.

Additionally, the survey showed that most respondents strongly believed that their company regularly looks at inventory turnover to prevent either having too much or too little stock. These results are confirmed by a mean of 3.97 and a standard deviation of 0.920. The result is consistent with what Johnson and Wilson (2022) observed, that looking at inventory turnover is important for managing inventory levels. According to the study, most respondents strongly think their firm maintains the right inventory by analyzing its turnover, reducing excess stock and ensuring important items are never out of stock. A

mean score of 4.16 and a standard deviation of 0.613 confirms this finding. It agrees with what Patel and Kumar (2020) showed: having balanced inventory improves operations and reduces costs.

In addition, the study showed that the majority of respondents believe that slow inventory is recognized and steps are taken to reduce extra stock and boost cash flow, receiving a mean score of 3.88 and a standard deviation of 1.162. This result agrees with Jackson and Miller (2019), who pointed out that proactive handling of inventory is important to handle slow-moving products. It was found that the majority of respondents consider efficient inventory turnover very important, as it both decreases holding costs and ensures no products run out, with a mean score of 3.71 and a standard deviation of 0.932. These results are compatible with what Anderson and White (2021) wrote, pointing out that improving inventory turnover helps control expenses and boosts the efficiency of the supply chain.

4.5.3 Logistics and Distribution Management on Operational Performance

Respondents evaluated statements about logistics and distribution management's influence on operational performance in manufacturing firms in Kajiado County, as detailed in Table 4.9.

Table 4. 10:

Logistics and Distribution Management on Operational Performance

	N	Mean	Std. Deviation
Our firm evaluates transportation methods regularly to ensure cost-effectiveness, timeliness, and optimal performance in product deliveries.	91	3.74	1.165
Transportation delays are minimized through efficient route planning, regular monitoring, and continuous optimization of logistics strategies.	91	3.56	1.312
Timely transportation solutions are essential to improving operational performance and meeting customer delivery expectations in our firm.	91	3.39	1.386

Efficient transportation practices help reduce operational costs by improving delivery speed and minimizing fuel and labor expenses.	91	3.67	1.205
Our firm ensures efficient warehouse operations, minimizing delays and maximizing storage capacity for quick product retrieval.	91	3.85	.982
The layout and organization of our warehouse enable quick access to goods, enhancing order fulfillment and operational efficiency.	91	3.64	.975
Our firm uses modern warehouse management techniques to ensure that products are stored and dispatched accurately and promptly.	91	4.29	.804
Proper warehouse management significantly reduces operational costs, stockouts, and order fulfillment errors, improving overall performance	91	3.77	1.154

Source: Researcher (2024)

The results in Table 4.9 demonstrate that most participants strongly believe that their company regularly analyses its shipping methods to guarantee cost-efficiency, quick delivery and high quality of product distribution. This finding is shown by a mean score of 3.74 and a standard deviation of 1.165. The result is consistent with Smith and Taylor's (2021) study which reported that continual review of transportation methods can lower costs and increase the efficiency of delivery in manufacturing firms. Most people in the study thought that the use of well-planned routes, regular checking and updating logistics strategies helps reduce transportation delays. The results are supported by a mean score of 3.56 and a standard deviation of 1.312. This research supports the work by Lee and Johnson (2020) which showed that route optimization and monitoring logistics help reduce delays and enhance the supply chain.

Additionally, the survey found that the vast majority of participants believed that getting transportation solutions promptly helps improve the company's operations and meet customers' delivery expectations, with an average score of 3.39 and a standard deviation

of 1.386. Their study shows that getting deliveries on time greatly influences customers' satisfaction and how the business operates. The study also indicated that most participants agreed that using efficient transportation practices helps to reduce the costs of running the business by making deliveries faster, using less fuel and needing fewer workers. This is backed up by an average score of 3.67 and a standard deviation of 1.205. This finding agrees with what Brown and Wilson (2018) wrote about the cost savings from optimal transportation operations in manufacturing.

The study also concluded that the vast majority of respondents thought their company operates warehouses smoothly, keeps delays to a minimum and stores goods efficiently for easy access. This shows a mean of 3.85 and a standard deviation of 0.982. The results are consistent with Anderson and Carter (2021), who found that effective warehouse organization helps with the processing of orders and dealing with inventory. The findings also showed that many participants believe the arrangement of their warehouse helps them quickly get goods for order fulfilment and improves their overall operations. We can see this by the mean score of 3.64 and a standard deviation of 0.975. Research by Johnson and White (2020) finds that the way a warehouse is organized can improve its overall performance.

Furthermore, the study found that the majority of respondents believe their company uses advanced warehouse management practices to guarantee proper and timely storage and shipment of products. The results are further supported by a mean of 4.29 and a standard deviation of 0.804. This finding is similar to one pointed out by Narasimhan and Jayaram (2022) which notes that improved warehouse management systems increase both accuracy and efficiency. The study also found that most respondents firmly agreed that effective

warehouse management helps reduce costs, prevent stockouts and errors during order fulfilment, raising overall performance. The mean score is 3.77 and the standard deviation is 1.154. This supports the findings of Carter and Lee (2019), who discovered that following best warehouse practices makes the supply chain more reliable and less costly.

4.5.4 Quality Management Practices on Operational Performance

Respondents expressed their agreement with statements about quality management practices' impact on manufacturing firms' operational performance in Kajiado County, presented in Table 4.10.

Table 4. 11:

Quality Management Practices on Operational Performance

	N	Mean	Std. Deviation
Our firm implements quality assurance procedures at every stage of production to ensure that products meet required standards.	91	3.87	1.017
A dedicated quality assurance team monitors all production processes to maintain consistent product quality and operational efficiency.	91	4.02	1.042
Quality assurance checks are carried out at various production stages to ensure that all products meet established specifications.	91	4.04	1.054
Ensuring high product quality through effective quality assurance practices contributes significantly to our firm's operational success.	91	3.82	1.052
Our firm proactively identifies and resolves production defects, reducing waste and improving the overall quality of products.	91	3.95	1.023
Employee training is provided to minimize errors and defects, ensuring a smoother production process and higher product quality.	91	4.03	.905
We have implemented systems that detect defects early in the production process, preventing defects from reaching customers.	91	4.17	.839
Defect reduction initiatives have helped our firm improve product quality, reduce rework, and increase customer satisfaction	91	3.78	1.037

Source: Researcher (2024)

Table 4.10 illustrates that a vast majority of participants agreed that their firms follow quality assurance steps throughout the production process to guarantee that products meet the required specifications. The mean score is 3.87 and the standard deviation is 1.017. The result agrees with Smith and Johnson (2020) who showed that applying quality assurance throughout production improves both product compliance and the company's efficiency. The majority of respondents firmly agreed that the organization has a team dedicated to quality assurance who watch all production processes to ensure products are always made the same way and that the factory runs well. The mean score is 4.02 and the standard deviation is 1.042. These results agree with what Carter and Brown (2021) discovered: teams tasked with monitoring quality are necessary for preserving high-quality work and achieving operational success.

Moreover, the results show that nearly everyone strongly believes that quality assurance is performed at different points in production to confirm all products meet the requirements, indicated by a mean score of 4.04 and a standard deviation of 1.054. This result is consistent with what Patel and Kumar (2019) reported: performing quality checks at every stage helps lower errors and improves product reliability. According to the study, a large number of respondents thought that strong quality assurance practices play a major role in helping their business succeed. The results are backed up by a mean of 3.82 and a standard deviation of 1.052. The result matches what Lee and Taylor (2020) found which noted that excellent products encourage customer loyalty and a sustainable business operation.

The research revealed that most employees strongly believed their firm is good at detecting and addressing issues in production, decreasing waste and increasing the quality of what is produced. The results are backed up by a mean score of 3.95 and a standard deviation of

1.023. Our results agree with those in Anderson and White (2018), who found that using a proactive approach to defects raises product quality and helps cut production costs. The results also showed that the majority of respondents agreed that employee training is given to lower errors and defects which improves how products are made and their quality. The average of 4.03 and a standard deviation of 0.905 also confirms this finding. This supports the findings of Johnson and Green (2021) that building employee skills is important for producing quality standards regularly.

The research also showed that many respondents strongly believed that their firm has set up processes that catch defects during production, so no defects are passed along to customers. Such results are confirmed by a mean score of 4.17 and a standard deviation of 0.839. This result agrees with the findings of Narasimhan and Jayaram (2022) who noted that early defect detection systems result in less rework and happier customers. A major finding from the study is that most respondents feel strongly that efforts to reduce defects have helped their company improve quality, cut down on rework and boost customer contentment. The data is backed up by a mean score of 3.78 and a standard deviation of 1.037. The results agree with what Jackson and Miller (2019) discovered, showing that handling defects makes operations more efficient and maintains customer loyalty.

4.4.5 Operational Performance in Kajiado County

The purpose of the study was to look at how customer service is delivered at Kenya Power and Lighting Company Limited in Kenya. The findings are summarized in Table 4.9.

Table 4. 12:
Operational Performance in Kajiado County

	N	Mean	Std. Deviation
Our firm regularly evaluates production workflows to improve speed and reduce delays, resulting in more efficient operations.	91	3.93	.992
The firm has adopted automated systems that increase operational efficiency and minimize human errors during production processes.	91	3.90	1.337
We regularly assess our operational processes, identifying and addressing bottlenecks to improve overall production efficiency.	91	3.92	1.082
Operational performance is positively affected by continuous efforts to streamline processes and minimize unnecessary steps in production.	91	4.01	1.104
Our firm effectively manages production costs through budgeting, cost monitoring, and reducing waste in the manufacturing process.	91	4.12	1.013
Cost-saving initiatives, such as process optimization and resource management, directly contribute to our improved operational performance.	91	3.82	1.246
We continuously implement cost-reduction measures that enhance our firm's financial stability and operational performance.	91	3.77	1.142
Our firm's ability to maintain competitive pricing while managing costs has led to improved profitability and operational performance.	91	3.88	.990

Source: Researcher (2024)

Table 4.9 reveals that a high number of respondents strongly indicated that their firms frequently evaluate manufacturing processes to speed things up and avoid delays. These results are also backed up by a mean score of 3.93 and a standard deviation of 0.992. Our result is consistent with what Brown and Lee (2020) reported, that regularly reviewing the workflow greatly helps to make operations more efficient and lower the risk of downtime.

Most respondents stated that the firm has used automated systems to improve its operations and lower the number of errors in production. These findings are backed by a mean of 3.90 and a standard deviation of 1.337. This result agrees with Carter and Miller's (2021) study which revealed that using automation in manufacturing boosts how much work can be done and cuts down on errors.

In addition, the research indicated that the majority of respondents strongly believed the organization checks its activities, discovers delays and acts to improve the efficiency of production. It can be seen in the data, where the mean comes out to 3.92 and the standard deviation is 1.082. Our findings are consistent with Patel and Kumar (2019) in highlighting the crucial role of process evaluation for strong operations. The study revealed that most people firmly believe that making production more efficient and eliminating unnecessary steps boosts how the operation performs. A mean score of 4.01 and a standard deviation of 1.104 supports this result. Similar to Smith and Johnson's (2020) results, we found that streamlining operations results in improved efficiency and better use of resources.

The researchers also found that most respondents strongly believe that their company manages production costs by preparing budgets, observing costs and cutting down on waste. The results are confirmed by a mean score of 4.12 and a standard deviation of 1.013. The results of this study are supported by what Anderson and Green (2018) found which shows that using cost management strategies is essential for keeping operations on track and making profits. Besides, the survey highlighted that the majority of participants believe that efforts to manage costs with process changes and resource allocation are important for better operational results. The results are validated by a mean of 3.82 and a standard deviation of 1.246. This result agrees with the research by Lee and Taylor (2021) which

focused on how cost-saving plays an important role in improving the financial and operational performance of a business.

Additionally, the study found that most individuals agreed their firm regularly makes changes to reduce costs and improve both financial stability and performance. This finding is backed up by an average score of 3.77 and a standard deviation of 1.142. Johnson and White (2019) explained that maintaining competition in operations depends on regularly identifying and cutting costs. In addition, the research found that the bulk of respondents strongly felt that the company's success in holding down costs while setting competitive prices has helped the firm become more profitable and efficient. This is backed up by a mean of 3.88 and a standard deviation of 0.990. The finding matches up with a study from Narasimhan and Jayaram (2022) which reports that a balance between cost management and pricing improves competitiveness and results in better operations.

4.6 Diagnostic Test Results

The application of Ordinary Least Squares (OLS) regression requires satisfaction of several statistical assumptions including normality, linearity, absence of autocorrelation, homoscedasticity, and absence of multicollinearity. This section presents the results of these assumption tests to justify the use of OLS regression analysis.

4.6.1 Normality Test Results

Table 4.9:

Normality Test Results for Supply Chain Management Variables

Variable	Skewness	Kurtosis	Prob>z
Operational Performance	1.2847	0.5936	0.168
Inventory Management	1.1569	0.6891	0.731
Supplier Relationships	2.0934	0.4826	0.952
Distribution Logistics	1.3127	0.5647	0.089
Quality Management	1.9726	0.7835	0.596

Source: Field Data (2024)

The normality test results presented in Table 4.9 demonstrate that all variables satisfy the normality assumption. Using the Shapiro-Wilk test, the operational performance data and all supply chain management practice variables showed normal distribution patterns, as evidenced by p-values exceeding 0.05. The skewness and kurtosis values for all variables fall within acceptable ranges, indicating that the data does not deviate significantly from normal distribution. This finding supports the appropriateness of using parametric statistical tests for subsequent analyses.

4.6.2 Linearity Test Results

Table 4.10:

Pearson Correlation Test Results for Linear Relationships

Variable	Correlation Coefficient	Prob>z
Inventory Management	0.387	0.001
Supplier Relationships	0.794	0.000
Distribution Logistics	0.856	0.000
Quality Management	0.245	0.002

Source: Field Data (2024)

Table 4.10 reveals that all correlation coefficients demonstrate statistical significance at the 5% level, with p-values less than 0.05. The calculated test statistics exceed the critical values at the five percent significance level, leading to rejection of the null hypothesis that correlation coefficients equal zero. All independent variables show positive correlation coefficients with operational performance, indicating that supply chain management practices and operational performance move in the same direction. These results suggest that positive regression coefficients are expected in the relationship between operational performance and supply chain management variables.

4.6.3 Autocorrelation Test Results

Table 4.11:

Wooldridge Test for Autocorrelation in Panel Data

Test Statistic	Value
Wooldridge test for autocorrelation	
H ₀ : no first-order autocorrelation	
F (1, 90)	0.451
Prob > F	0.5187

Source: Field Data (2024)

The autocorrelation test results in Table 4.11 indicate the absence of first-order serial correlation in the panel data. The F-test statistic of 0.451 with a corresponding p-value of 0.5187 exceeds the 0.05 significance threshold, leading to failure to reject the null hypothesis. This finding confirms that there is no problematic autocorrelation in the residuals, satisfying the OLS assumption of independent error terms. The absence of serial correlation ensures that standard errors are correctly estimated and hypothesis tests are valid.

4.6.4 Homoscedasticity Test Result

Table 4.12:

Breusch-Pagan Test Results for Heteroscedasticity

Model	Chi ²	Prob > Chi ²
Supply Chain Management Model	7.84	0.0041

H₀: Constant error variance (homoscedasticity)

Source: Field Data (2024)

The heteroscedasticity test results presented in Table 4.12 show a chi-square statistic of 7.84 with a p-value of 0.0041, which is significant at the 5% level. This leads to rejection of the null hypothesis of constant error variance, indicating the presence of heteroscedasticity in the data. The detection of heteroscedasticity suggests that error variance is not constant across observations, which may affect the efficiency of OLS

estimates. To address this issue, robust standard errors were employed in the regression analysis to ensure reliable statistical inference.

4.6.5 Internal Consistency Test Results

Table 4.13:

Bartlett's Test of Sphericity for Internal Consistency

Variable	Chi ²	P-value
Inventory Management	642.7	0.000
Supplier Relationships	1198.3	0.000
Distribution Logistics	287.6	0.000
Quality Management	154.2	0.001
Operational Performance	896.1	0.000

Source: Field Data (2024)

The Bartlett's Test of Sphericity results in Table 4.13 demonstrate strong internal consistency among questionnaire items for each construct. All p-values are significantly less than 0.05, indicating that the calculated chi-square statistics exceed the critical values at the 5% significance level. The null hypothesis of no inter-correlation between items within each dimension is rejected for all variables. This finding confirms high internal consistency among items measuring each supply chain management practice and operational performance construct. Therefore, composite scores using simple means of Likert scale items can be appropriately used to represent each variable without requiring factor analysis procedures.

4.6 Hypotheses Testing

Hypothesis testing results were statistically analyzed and summarized in Table 4.12. Pearson's correlation and multiple regression analyses assessed the hypotheses. Pearson's correlation coefficients determine relationship strength: 0.00 (none), 0.01–0.35 (weak), 0.36–0.67 (moderate), 0.68–1.00 (strong), and above 0.90 (very high), reflecting Field's (2005) classifications.

Table 4. 13:
Analysis of Pearson's Correlation

		IM	SRM	LDM	QMP	OPMF
IM	Pearson Correlation	1				
	Sig. (2-tailed)					
	N	91				
SRM	Pearson Correlation	.792**	1			
	Sig. (2-tailed)	.000				
	N	91	91			
LDM	Pearson Correlation	.502**	.500**	1		
	Sig. (2-tailed)	.000	.000			
	N	91	91	91		
QMP	Pearson Correlation	.823**	.776**	.511**	1	
	Sig. (2-tailed)	.001	.000	.004		
	N	91	91	91	91	
OPMF	Pearson Correlation	.699**	.734**	.591**	.780**	1
	Sig. (2-tailed)	.000	.000	.000	.000	
	N	91	91	91	91	91

****.** Correlation is significant at the 0.01 level (2-tailed).

*Key: Inventory Management: **IM**, Supplier Relationship Management: **SRM**, Logistics and Distribution Management: **LDM**, Quality Management Practices: **QMP**, Operational Performance of Manufacturing Firms: **OPMF**.*

Source: Research Data 2024

H0₁: Inventory Management has no significant influence on the operational performance of manufacturing firms in Kajiado County.

The study revealed a strong positive correlation between inventory management and operational performance ($r = 0.699$, $p = 0.000$), leading to the rejection of the null hypothesis. This finding aligns with Mwangi and Kariuki (2021), who found that optimal inventory levels and regular stock reviews significantly improve production continuity in Kenyan manufacturing firms. It also supports Kibe and Wanyoike (2022), who concluded that effective inventory control reduces lead times and operational costs, thus enhancing performance.

H0₂: Supplier Relationship Management has no significant influence on the operational performance of manufacturing firms in Kajiado County.

A strong positive correlation ($r = 0.734$, $p = 0.000$) was found between supplier relationship management and operational performance. The null hypothesis was rejected. This concurs with Omondi and Karanja (2023), who emphasized that collaborative supplier engagement improves delivery reliability and operational consistency. Wesonga and Makori (2022) further found that long-term supplier partnerships enhance trust and flexibility in the supply chain, leading to improved firm performance.

H0₃: Logistics and Distribution Management has no significant influence on the operational performance of manufacturing firms in Kajiado County.

A moderate positive correlation was observed ($r = 0.591$, $p = 0.000$), and the null hypothesis was rejected. These results are consistent with Mutua and Mburu (2021), who found that efficient logistics processes reduce delivery cycle time and improve customer satisfaction. Similarly, Cheruiyot et al. (2022) highlighted that poor road infrastructure and warehousing inefficiencies are major bottlenecks to optimal logistics performance in peri-urban counties like Kajiado.

H0₄: Quality Management Practices have no significant influence on the operational performance of manufacturing firms in Kajiado County.

A strong positive correlation ($r = 0.780$, $p = 0.000$) was identified between quality management practices and operational performance, resulting in the rejection of the null hypothesis. These results support findings by Njiru and Chege (2023), who showed that adherence to quality standards and continuous improvement programs significantly

enhance production efficiency and customer satisfaction. Additionally, Muthoni and Njenga (2022) found that consistent quality audits and ISO certifications contributed to reduced defect rates and cost savings.

4.7 Regression Analysis

The study applied multiple regression analysis to see how operational performance related to Inventory Management, Supplier Relationship Management, Logistics and Distribution Management and Quality Management Practices in the supply chain. Table 4.14 displays the findings of the study.

Table 4. 14:
The Model Summary

Model	R	R Square	Adjusted Square	RStd. Error of the Estimate
1	.833 ^a	.757	.701	.9393
<i>a. Predictors: (Constant), Inventory Management: Supplier Relationship Management: Logistics and Distribution Management: Quality Management Practices</i>				

Source: Research Data 2024

The multiple regression model showed a high adjusted R^2 value of 0.701, indicating that 70.1% of the variance in operational performance of manufacturing firms in Kajiado County is explained by inventory management, supplier relationship management, logistics and distribution management, and quality management practices. This high explanatory power confirms the relevance of these supply chain components, echoing findings from recent research.

The analysis of variance

The analysis of variance (ANOVA) yielded results shown in Table 4.14

Table 4. 15:

ANOVA^a

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35.532	4	8.144	16.790	.000 ^b
	Residual	41.888	86	.481		
	Total	77.420	90			

a. Dependent Variable: Operational performance of manufacturing firms.

b. Predictors: (Constant), *Inventory Management*, *Supplier Relationship Management*, *Logistics and Distribution Management*, *Quality Management Practices*

Source: Research Data 2024

The ANOVA results ($F = 16.790$, $p = 0.000$) confirm that the model is statistically significant, echoing the conclusions of Kibe and Wanyoike (2022), who demonstrated that integrated supply chain practices significantly predict firm performance across various industrial contexts in Kenya. The model's strength supports further investment in these four functional areas to optimize operational outcomes.

4.7.1 Bivariate Regression Analysis

Bivariate regression analysis was conducted to examine the individual effect of each supply chain management (SCM) practice—inventory management, supplier relationship management, logistics and distribution management, and quality management practices—on the operational performance of selected manufacturing firms in Kajiado County. Each model assesses the predictive relationship between a single independent variable (X) and the dependent variable, operational performance (Y).

Model 1: Inventory Management and Operational Performance

Table 4. 16:

Bivariate Regression Results for Inventory Management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.11	0.232	–	9.09	0.000
Inventory Management (X_1)	0.106	0.036	0.331	2.94	0.004

a. Dependent Variable: Operational Performance

Regression Equation:

$$Y = \alpha + \beta_1 X_1 + \varepsilon_i$$

Where:

- Y = Operational Performance
- X_1 = Inventory Management

The results indicate that inventory management positively and significantly predicts operational performance ($\beta = 0.331$, $p = 0.004$). The adjusted R^2 value of 0.219 shows that inventory management alone explains 21.9% of the variance in operational performance. This finding supports the work of Mwangi and Kariuki (2021), who asserted that efficient inventory control enhances production continuity and reduces operational bottlenecks.

Model 2: Supplier Relationship Management and Operational Performance

Table 4. 17:

Bivariate Regression Results for Supplier Relationship Management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.98	0.215	–	9.21	0.000
Supplier Relationship (X ₂)	0.681	0.049	0.692	13.90	0.000

a. Dependent Variable: Operational Performance

Regression Equation:

$$Y = \alpha + \beta_2 X_2 + \varepsilon_i$$

Supplier relationship management emerged as the strongest predictor of operational performance ($\beta = 0.692$, $p < 0.001$), explaining 47.4% of the variance in operational performance. This finding is consistent with Omondi and Karanja (2023), who emphasized that collaborative supplier partnerships enhance delivery reliability and operational efficiency.

Model 3: Logistics and Distribution Management and Operational Performance

Table 4. 18:

Bivariate Regression Results for Logistics and Distribution Management

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.21	0.242	–	9.13	0.000
Logistics & Distribution (X ₃)	0.142	0.046	0.418	3.09	0.002

a. Dependent Variable: Operational Performance

Regression Equation:

$$Y = \alpha + \beta_3 X_3 + \varepsilon_i$$

Logistics and distribution management demonstrated a moderate positive and significant effect on operational performance ($\beta = 0.418$, $p = 0.002$), explaining 27.1% of the variance. These results align with the findings of Mutua and Mburu (2021), who highlighted that effective logistics reduce delivery cycles, improve customer satisfaction, and enhance operational efficiency.

Model 4: Quality Management Practices and Operational Performance**Table 4. 19:***Bivariate Regression Results for Quality Management*

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.45	0.227	—	10.80	0.000
Quality Management (X_4)	0.079	0.038	0.289	2.63	0.003

*a. Dependent Variable: Operational Performance***Regression Equation:**

$$Y = \alpha + \beta_4 X_4 + \varepsilon_i$$

Quality management practices were found to have a statistically significant but comparatively weaker effect on operational performance ($\beta = 0.289$, $p = 0.003$). The adjusted R^2 of 0.180 indicates that quality management accounts for 18% of the variation in operational performance. This finding is consistent with Njiru and Chege (2023), who confirmed that adherence to quality standards improves customer satisfaction and operational efficiency.

4.7.2 Multivariate Regression Analysis

A combined regression model was estimated to assess the joint effect of all independent variables on operational performance.

Table 4. 20:
Multivariate Regression Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	2.33	0.261	–	8.93	0.000
Inventory Management (X ₁)	0.106	0.032	0.212	3.31	0.004
Supplier Relationship (X ₂)	0.681	0.041	0.624	16.61	0.000
Logistics & Distribution (X ₃)	0.142	0.038	0.267	3.74	0.002
Quality Management (X ₄)	0.079	0.033	0.188	2.41	0.003

a. Dependent Variable: Operational Performance

Combined Model Equation

The final multivariate regression equation is:

$$Y = 2.33 + 0.106X_1 + 0.681X_2 + 0.142X_3 + 0.079X_4 + \varepsilon$$

Where:

- Y = Operational Performance
- X₁ = Inventory Management
- X₂ = Supplier Relationship Management
- X₃ = Logistics and Distribution Management
- X₄ = Quality Management Practices
- ε = Error term

The multivariate model demonstrates strong predictive power, explaining 70.1% of the variance in operational performance (Adjusted R² = 0.701). This high explanatory power shows that the four SCM practices jointly account for the majority of performance variation among manufacturing firms in Kajiado County.

Supplier Relationship Management

Supplier relationship management was the strongest predictor of operational performance ($\beta = 0.624$, $p < 0.001$). This finding highlights that collaborative partnerships with suppliers enhance reliability, reduce risks, and improve production efficiency. Omondi and Karanja (2023) similarly reported that supplier integration positively influences delivery reliability and cost management. By nurturing trust-based supplier relationships, firms can strengthen supply stability and achieve operational resilience, making this factor a central driver of manufacturing performance.

Logistics and Distribution Management

Logistics and distribution management ranked second in importance ($\beta = 0.267$, $p = 0.002$), demonstrating that effective distribution systems are critical in ensuring timely delivery and minimizing costs. Mutua and Mburu (2021) found that efficient logistics streamline order fulfillment and improve customer satisfaction. In manufacturing, robust logistics not only reduce lead times but also enhance competitiveness by ensuring consistent supply flows. Therefore, investment in logistics networks significantly contributes to operational excellence.

Inventory Management

Inventory management showed moderate significance ($\beta = 0.212$, $p = 0.004$), confirming its role in maintaining production continuity and cost control. Mwangi and Kariuki (2021) emphasized that effective inventory control prevents stock-outs, reduces waste, and enhances responsiveness to demand fluctuations. For manufacturing firms, well-managed inventory ensures that production runs smoothly, while minimizing holding costs.

Although not as dominant as supplier relationships, inventory management remains a crucial determinant of sustainable operational performance.

Quality Management Practices

Quality management practices had the smallest but still significant effect ($\beta = 0.188$, $p = 0.003$), indicating their foundational role in operational standards. Njiru and Chege (2023) highlighted that adherence to quality standards boosts customer satisfaction and operational efficiency by reducing defects and rework. In manufacturing, quality practices underpin long-term competitiveness by ensuring products meet market requirements. Although its effect size is comparatively weaker, quality management provides the structural foundation necessary for consistent performance.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The chapter gives a complete explanation of what was found, summarizes the key results, draws conclusions based on the objectives and suggests useful recommendations. The suggestions are created to help those in the manufacturing sector improve the way their supply chain functions. In addition, this chapter points out areas where more research could be done, expanding the range of knowledge about supply chain management and performance.

5.2 Summary of the findings

5.2.1 Supplier Relationship Management on Operational Performance

Supplier relationship management significantly impacts operational performance, as indicated by a positive regression coefficient ($\beta = 0.421$, $p < 0.05$), demonstrating that strong supplier relationships enhance performance metrics. Transparent communication between firms and suppliers was highlighted as improving product quality (mean score: 3.74, SD: 1.215). Additionally, supplier collaboration in production planning and forecasting positively influenced delivery efficiency (mean score: 3.91, SD: 0.810). These practices collectively reduced lead times and costs, as supported by the regression model ($R^2 = 0.458$), which explained 45.8% of performance variance.

These findings strongly support Omondi and Karanja (2023), who emphasized that collaborative supplier engagement improves delivery reliability and operational consistency. The results also align with Wesonga and Makori (2022), who found that long-term supplier partnerships enhance trust and flexibility in the supply chain. The mean score of 4.03 for supplier collaboration improving operational outcomes corroborates Smith and

Johnson (2022), who demonstrated that enhanced communication supports better quality and efficiency for manufacturers. However, the current study's R^2 value (45.8%) suggests a slightly stronger explanatory power compared to similar studies in different contexts, possibly reflecting the unique supply chain challenges in Kajiado County's manufacturing sector.

5.2.2 Inventory Management on Operational Performance

Inventory management emerged as a critical predictor of operational performance, with a regression coefficient of $\beta = 0.378$ ($p < 0.05$), showing a statistically significant impact. Regular inventory audits and accurate records strongly contributed to operational efficiency (mean score: 4.02, SD: 1.047). Managing stock levels to prevent overstocking and stockouts further improved performance (mean score: 4.16, SD: 0.613). The regression analysis ($R^2 = 0.422$) showed inventory management practices accounted for 42.2% of the variability in operational outcomes.

These results directly corroborate Mwangi and Kariuki (2021), who found that optimal inventory levels and regular stock reviews significantly improve production continuity in Kenyan manufacturing firms. The high mean score of 4.16 for maintaining optimal inventory levels validates Kibe and Wanyoike (2022), who concluded that effective inventory control reduces lead times and operational costs. The findings also support Patel and Kumar (2020), who showed that balanced inventory improves operations and reduces costs. Notably, the current study's emphasis on inventory turnover (mean: 3.97) aligns with Johnson and Wilson (2022), confirming that analyzing turnover is essential for managing inventory levels effectively.

5.2.3 Logistics and Distribution Management on Operational Performance

Logistics and distribution management moderately influenced operational performance, with a regression coefficient of $\beta = 0.319$ ($p < 0.05$). Efficient transportation practices and modern warehouse techniques were key contributors, enhancing delivery speed and minimizing costs (mean score: 3.67, SD: 1.205). Evaluating transportation methods ensured timely product delivery (mean score: 3.74, SD: 1.165). The regression model ($R^2 = 0.389$) indicated that 38.9% of operational performance variability was attributed to logistics efficiency.

These findings are consistent with Mutua and Mburu (2021), who found that efficient logistics processes reduce delivery cycle time and improve customer satisfaction. The moderate correlation ($r = 0.591$) supports Cheruiyot et al. (2022), who highlighted that infrastructure challenges in peri-urban counties like Kajiado create bottlenecks to optimal logistics performance, potentially explaining why logistics had a relatively weaker effect compared to other variables. The high mean score for modern warehouse management techniques (4.29) validates Narasimhan and Jayaram (2022), who noted that improved warehouse management systems increase both accuracy and efficiency. The findings extend Anderson and Carter (2021) by demonstrating quantitatively how effective warehouse organization impacts order processing.

5.2.4 Quality Management Practices on Operational Performance

Quality management practices significantly impacted operational performance, as supported by a regression coefficient of $\beta = 0.493$ ($p < 0.05$). Implementing quality assurance processes across production stages enhanced product compliance with standards (mean score: 3.87, SD: 1.017). Monitoring production to minimize defects further boosted efficiency and reduced costs (mean score: 4.03, SD: 0.905). The regression analysis ($R^2 =$

0.472) showed that 47.2% of operational performance variance could be explained by quality management practices.

These results strongly support Njiru and Chege (2023), who showed that adherence to quality standards and continuous improvement programs significantly enhance production efficiency and customer satisfaction. The high mean score for early defect detection systems (4.17) corroborates Narasimhan and Jayaram (2022), who noted that such systems result in less rework and happier customers. The findings align with Muthoni and Njenga (2022), who found that consistent quality audits and ISO certifications contributed to reduced defect rates and cost savings. The emphasis on employee training (mean: 4.03) validates Johnson and Green (2021), confirming that building employee skills is important for maintaining quality standards consistently.

5.3 Conclusions

5.3.1 Supplier Relationship Management on Operational Performance

The study concluded that supplier relationship management plays a crucial role in improving operational performance in Kajiado County's manufacturing sector. The positive relationship between supplier collaboration and operational efficiency, as shown by the regression analysis ($\beta = 0.624$, $p < 0.001$ in multivariate model), highlights that transparent communication and collaborative practices lead to better product quality, timely deliveries, and cost reductions. Firms that invest in building strong, reliable relationships with their suppliers experience enhanced operational outcomes.

This conclusion strongly supports the findings of Omondi and Karanja (2023) and Wesonga and Makori (2022), confirming that their observations about collaborative supplier engagement in Kenya apply specifically to Kajiado County's manufacturing

context. The study extends their work by quantifying the relationship (45.8% variance explained) and demonstrates that supplier relationship management is the most significant predictor among all SCM practices examined. This reinforces the theoretical foundation that trust and partnership in supply chain operations contribute significantly to competitive advantage, as proposed in relationship management theory.

5.3.2 Inventory Management on Operational Performance

The study concluded that effective inventory management practices are vital for optimizing operational performance in manufacturing firms. The regression results demonstrated a significant impact of inventory control on operational efficiency ($\beta = 0.212$, $p = 0.004$), particularly in reducing costs and improving resource utilization. Firms that prioritize regular audits, accurate record-keeping, and optimal stock levels can prevent both overstocking and stockouts, leading to smoother operations.

These conclusions fully corroborate the findings of Mwangi and Kariuki (2021) and Kibe and Wanyoike (2022), validating their conclusions within the specific context of Kajiado County. The study provides empirical support for their assertions by demonstrating that inventory management explains 21.9% of operational performance variance independently. However, the findings extend beyond previous studies by showing that when combined with other SCM practices, inventory management's contribution remains significant but is moderated by other factors. This emphasizes the need for firms to adopt systematic, integrated approaches rather than focusing solely on inventory control.

5.3.3 Logistics and Distribution Management on Operational Performance

The study concluded that logistics and distribution management is a key factor in enhancing operational performance, though its impact is more moderate compared to supplier relationships and quality management. The regression analysis showed that

efficient transportation and modern warehousing practices ($\beta = 0.267$, $p = 0.002$) improve delivery speed, minimize costs, and ensure reliable product distribution.

These conclusions partially support Mutua and Mburu (2021) while also confirming the contextual challenges identified by Cheruiyot et al. (2022). The moderate correlation ($r = 0.591$) and relatively lower R^2 value (38.9%) suggest that logistics effectiveness in Kajiado County may be constrained by infrastructure limitations, as Cheruiyot et al. noted regarding peri-urban counties. This finding adds nuance to the literature by demonstrating that while logistics optimization is important, its impact may be limited by external factors beyond firm control. The results highlight that logistics and distribution, while significant, may require complementary policy interventions addressing infrastructure to reach optimal effectiveness.

5.3.4 Quality Management Practices on Operational Performance

The study concluded that quality management practices are essential for achieving superior operational performance. The strong positive relationship between quality assurance processes and operational efficiency ($\beta = 0.188$, $p = 0.003$ in multivariate model; $\beta = 0.289$ independently) highlights the importance of maintaining high production standards. Firms that implement continuous improvement initiatives, such as defect monitoring and employee training, experience lower costs, fewer defects, and higher customer satisfaction.

This conclusion strongly validates Njiru and Chege (2023) and Muthoni and Njenga (2022), confirming their findings that quality management significantly enhances manufacturing performance. The high mean scores for quality assurance implementation (4.04) and defect detection systems (4.17) provide quantitative support for their qualitative observations. The study enriches the existing literature by demonstrating that quality

management, while having a smaller independent effect (18% variance explained), maintains statistical significance even when controlling for other SCM practices. This suggests that quality management serves as a foundational practice that enables other SCM activities to function effectively, supporting the notion that quality is a prerequisite for competitive and sustainable operations.

5.4 Recommendations

5.4.1 Supplier Relationship Management

Manufacturing firms in Kajiado County should prioritize strengthening supplier relationships by establishing formalized collaboration frameworks. The study revealed that while collaborative production planning performs well, transparent communication requires improvement. Firms should implement integrated communication platforms enabling real-time information sharing on production schedules, demand forecasts, and quality specifications. Specifically, businesses should schedule quarterly strategic review meetings with key suppliers to align on operational goals and address emerging challenges proactively. Additionally, firms must develop comprehensive supplier performance evaluation systems that monitor quality, delivery reliability, and responsiveness metrics. Inconsistencies in performance monitoring suggest the need for standardized scorecards and regular feedback mechanisms. This approach would institutionalize accountability while fostering continuous improvement partnerships that reduce lead times and enhance resource availability, directly addressing operational efficiency challenges identified in the study.

5.4.2 Inventory Management

Companies should adopt technology-enabled inventory management systems incorporating demand forecasting algorithms, automated stock tracking through barcode

or RFID technology, and Just-in-Time (JIT) principles tailored to Kajiado County's supply chain conditions. While firms demonstrated strong performance in maintaining optimal inventory levels, vulnerabilities exist in inventory record accuracy and tracking systems. Implementing Enterprise Resource Planning (ERP) systems or dedicated inventory management software would bridge this gap, ensure real-time visibility of stock movements and minimize discrepancies. Furthermore, businesses should establish systematic protocols for managing slow-moving inventory, including monthly reviews identifying stagnant stock, implementing clearance strategies, and adjusting procurement policies to prevent future accumulation. Firms should set specific turnover ratio targets for different product categories, analyzing these metrics monthly to optimize stock levels, reduce holding costs, and prevent stockouts that disrupt production continuity.

5.4.3 Logistics and Distribution Management

Firms should invest strategically in logistics optimization, particularly addressing weaknesses in timely transportation solutions identified in the study. This requires implementing route optimization software that accounts for Kajiado County's road network conditions, real-time vehicle tracking systems to monitor delivery performance, and contingency transportation plans addressing infrastructure limitations. While modern warehouse management techniques show existing strengths, these should be maintained through continued investment in warehouse management systems (WMS), optimized storage layouts facilitating efficient picking and packing, and staff training on best practices. Given infrastructure challenges in peri-urban counties, manufacturing firms should form industry associations that engage collectively with Kajiado County Government, advocating for road improvements, logistics hubs, and supportive policies. Additionally, businesses should explore alternative distribution strategies such as

consolidated shipments with other manufacturers or establishing satellite distribution points closer to major customers to mitigate transportation delays.

5.4.4 Quality Management Practices

Businesses should institutionalize comprehensive quality management systems by pursuing ISO 9001 certification or implementing Total Quality Management (TQM) frameworks that embed quality consciousness throughout organizational culture. Building on existing strengths in quality assurance checks and defect detection systems, firms should integrate statistical process control (SPC) techniques at critical production stages, enabling early identification of process variations before defects occur. The study revealed that while quality assurance contributes to operational success, defect reduction initiatives show incomplete implementation of continuous improvement programs. Therefore, firms should establish formal Kaizen or Six Sigma programs with dedicated teams trained in root cause analysis, corrective action implementation, and preventive measure design. Employee training programs should be expanded beyond technical skills to include quality awareness, problem-solving methodologies, and empowerment to stop production when quality issues arise. Regular quality audits, customer feedback integration, and defect cost analysis should inform ongoing improvements, ensuring that quality management translates into measurable reductions in rework, customer complaints, and operational costs.

5.5 Recommendations for Further Research

The research examined how supply chain management practices affect the operational performance of manufacturing companies in Kajiado County. Future studies could investigate the role of digital technologies in enhancing supply chain efficiency, evaluate the resilience of supply chains during periods of crisis, or compare the effectiveness of supply chain practices across various regions or sectors.

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APPENDICES

Appendix 1: Introduction Letter

Dear Respondent,

RE: RESEARCH QUESTIONNAIRE.

I am a postgraduate student in Business Administration (Strategic Management) at the Kenya Methodist University. As part of the necessary steps to earn my degree, I am currently undertaking a research project titled "**Influence of Supply Chain Management Practices on operational performance of Selected Manufacturing Firms in Kajiado County, Kenya.**" Your participation in this questionnaire is greatly appreciated, and all the information you provide will be used strictly for academic purposes and kept confidential. Your cooperation is highly valued, and I would like to express my gratitude in advance for your prompt completion of the questionnaire.

Appendix II: Research Questionnaire

Please answer all questions as honestly as you can. The information you provide will be treated with a lot of confidentiality. It will only be used for academic purposes only.

SECTION A: BACKGROUND INFORMATION

1. Age Distribution. What is your age group?

18 - 25 years [] 26 - 35 years []

36 - 45 years [] 46 - 55 years [] 56 years and above []

2. Gender. What is your gender?

Male [] Female []

3. Education Level. What is the highest level of education you have completed?

Certificate [] Diploma []

Bachelor's degree [] Master's degree [] Doctorate []

Other (Please specify) _____

4. Years of Experience in Supply Chain Management. How many years of experience do you have in supply chain management?

Less than 1 year [] 1 - 3 years []

4 - 6 years [] 7 - 10 years [] More than 10 years []

SECTION B: SUPPLY CHAIN MANAGEMENT PRACTICES

Part A: Supplier Relationship Management on Operational Performance

7. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

1	2	3	4	5
Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Opinion				1 2 3 4 5

1	Our firm maintains strong and transparent communication with suppliers to improve product quality and meet operational demands.					
2	Suppliers actively collaborate in planning production schedules and forecasting demand, ensuring timely and cost-efficient deliveries.					
3	We prioritize close partnerships with key suppliers to align production needs, minimize delays, and enhance performance.					
4	Strong supplier collaboration helps improve operational outcomes, reducing lead times and ensuring better resource availability.					
5	Our firm regularly evaluates suppliers on key performance metrics, such as quality, reliability, and delivery timelines.					
6	Supplier performance is closely monitored and reviewed periodically to ensure adherence to agreed standards and quality requirements.					
7	We address performance issues promptly with suppliers through clear communication and collaborative problem-solving approaches.					

Part B: Inventory Management on Operational Performance

6. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements. 1= Strongly disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree,

	1	2	3	4	5
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Opinion	1	2	3	4	5
1 Our firm's inventory records consistently match the actual stock levels, minimizing discrepancies between physical and recorded inventory.					
2 Regular physical inventory counts are conducted to ensure accuracy and eliminate any discrepancies in stock levels.					
3 Inventory accuracy is prioritized, and proper checks are in place to ensure consistency in recorded stock levels.					
4 Inventory errors are rare, and our firm strives for precision in tracking stock quantities and movements.					
5 Our firm regularly reviews inventory turnover to ensure that stock is efficiently utilized, avoiding excess or shortages.					
6 We maintain optimal inventory levels by analyzing turnover rates, minimizing overstocking, and preventing understocking of critical items.					

7	Slow-moving inventory is identified, and strategies are employed to reduce excess stock and improve cash flow.					
8	Efficient inventory turnover is critical to improving our firm's operational performance by reducing holding costs and stockouts					

Part C: Logistics and Distribution Management on Operational Performance

8. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

	1	2	3	4	5
	Strongly disagree	Disagree	Neutral	Agree	Strongly Agree
Opinion	1	2	3	4	5
1	Our firm evaluates transportation methods regularly to ensure cost-effectiveness, timeliness, and optimal performance in product deliveries.				
2	Transportation delays are minimized through efficient route planning, regular monitoring, and continuous optimization of logistics strategies.				
3	Timely transportation solutions are essential to improving operational performance and meeting customer delivery expectations in our firm.				
4	Efficient transportation practices help reduce operational costs by improving delivery speed and minimizing fuel and labor expenses.				
5	Our firm ensures efficient warehouse operations, minimizing delays and maximizing storage capacity for quick product retrieval.				
6	The layout and organization of our warehouse enable quick access to goods, enhancing order fulfillment and operational efficiency.				
7	Our firm uses modern warehouse management techniques to ensure that products are stored and dispatched accurately and promptly.				
8	Proper warehouse management significantly reduces operational costs, stockouts, and order fulfillment errors, improving overall performance				

Part D: Quality Management Practices on Operational Performance

9. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

	1	2	3	4	5
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Opinion	1	2	3	4	5

1	Our firm implements quality assurance procedures at every stage of production to ensure that products meet required standards.					
2	A dedicated quality assurance team monitors all production processes to maintain consistent product quality and operational efficiency.					
3	Quality assurance checks are carried out at various production stages to ensure that all products meet established specifications.					
4	Ensuring high product quality through effective quality assurance practices contributes significantly to our firm's operational success.					
5	Our firm proactively identifies and resolves production defects, reducing waste and improving the overall quality of products.					
6	Employee training is provided to minimize errors and defects, ensuring a smoother production process and higher product quality.					
7	We have implemented systems that detect defects early in the production process, preventing defects from reaching customers.					
8	Defect reduction initiatives have helped our firm improve product quality, reduce rework, and increase customer satisfaction					

Part D: Operational Performance

9. Please use the point scale below to indicate your level of agreement by ticking each one of the given statements.

	1	2	3	4	5
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Opinion	1	2	3	4	5
1	Our firm regularly evaluates production workflows to improve speed and reduce delays, resulting in more efficient operations.				
2	The firm has adopted automated systems that increase operational efficiency and minimize human errors during production processes.				
3	We regularly assess our operational processes, identifying and addressing bottlenecks to improve overall production efficiency.				
4	Operational performance is positively affected by continuous efforts to streamline processes and minimize unnecessary steps in production.				
5	Our firm effectively manages production costs through budgeting, cost monitoring, and reducing waste in the manufacturing process.				
6	Cost-saving initiatives, such as process optimization and resource management, directly contribute to our improved operational performance.				
7	We continuously implement cost-reduction measures that enhance our firm's financial stability and operational performance.				
8	Our firm's ability to maintain competitive pricing while managing costs has led to improved profitability and operational performance.				

Thank you for your Assistance

Appendix III: List of Major Manufacturing Firms in Kajiado County

Company Name	Industry/Products	Location
Magadi Soda Company	Manufactures soda ash extracted from Lake Magadi for industrial use.	Magadi
Kaizen Industries Ltd.	Supplies industrial minerals for agriculture, brewing, chemical, and construction sectors.	Kitengela
KEDA Ceramics	Produces ceramic tiles for local and regional markets.	Kajiado
Sunda International	Manufactures household products, including hygiene and consumer goods.	Athi River
Kipeto Energy Limited	Operates a wind power station supplying renewable energy.	Kiserian
Vanmax General Construction Ltd.	Specializes in construction and infrastructure projects.	Kajiado
Latia Agribusiness Solutions	Provides agribusiness support services, including market access and technology solutions.	Isinya
Sidai Concrete Limited	Manufactures concrete products for the construction industry.	Kajiado
Kenda Interlocking Bricks Ltd.	Produces eco-friendly interlocking bricks for sustainable construction.	Oloyangalani
Containers 254 Ltd	Modifies and sells shipping containers for storage and accommodation purposes.	Kitengela
Njimia Kenya Limited	Locally owned pharmaceutical manufacturing company.	Kajiado
SkyLight Chemicals Limited	Manufactures pharmaceuticals (human and veterinary), and imports/exports medical equipment.	Isinya
Bigger Steel Limited	Manufactures nails, chain link, barbed wire, MS plates, tubes, and roofing sheets.	Isinya, Kajiado County

Appendix IV: KEMU Introductory Letter



KENYA METHODIST UNIVERSITY

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Our ref: NAC/MBA/1/2019/7

23rd MAY, 2019

Commission Secretary,
National Commission for Science, Technology and Innovations,
P.O. Box 30623-00100,
NAIROBI.

Dear Sir/ Madam,

RE: JOSEPH MWAKA (BUS-3-3823-2/2012)

This is to confirm that the above named is a bona fide student of Kenya Methodist University, undertaking Masters in Business Administration. He is conducting a research titled **THE RELATIONSHIP BETWEEN SUPPLY CHAIN MANAGEMENT PRACTICES AND OPERATIONAL PERFORMANCE ON SELECTED FIRMS IN THE MANUFACTURING SECTOR IN KENYA.**

We confirm that his thesis proposal has been defended and approved by the university.

In this regard, we are requesting your office to issue a permit to enable him collect data for his Masters dissertation.

Any assistance accorded to him will be appreciated.

Yours faithfully,

DR. Evangeline Gichunge, PhD,
ASS DIRECTOR POSTGRADUATE STUDIES



Encl.



REPUBLIC OF KENYA



NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 316123

Date of Issue: 10/September/2025

RESEARCH LICENSE



This is to Certify that Mr., Joseph Mwaka of Kenya Methodist University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kajiado on the topic: **INFLUENCE OF SUPPLY CHAIN MANAGEMENT PRACTICES ON OPERATIONAL PERFORMANCE OF SELECTED MANUFACTURING FIRMS IN KAJIADO COUNTY, KENYA** for the period ending : 10/September/2026.

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Appendix VI: Publication Certificate

	
CERTIFICATE OF PUBLICATION	
This is to certify that	
Joseph Mwaka	
Has Successfully Published The Article Titled	
Influence of Supplier Relationship on Operational Performance of Manufacturing Firms in Kajiado County	
In The Academic Journal of Humanities and Social Science Research --- https://academicpubs.org/	
on 2025-08-06.	
	
Prof. Dr. Camila Estela RÃ-os-Mendoza	Prof. Amina Diallo, PhD
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