ISSN: 2958-2326

AJoCsOpen
Sharing Knowledge in Business

African Journal of Commercial Studies

Publisher's Home Page: https://ijcsacademia.com/

AFRICAN JOURNAL OF COMMERCIAL STUDIES

Research Paper | Peer Reviewed | Open Access

Examining Logistical Factors Affecting Supply Chain Management Among Freight Forwarding Agents in Lusaka District of Zambia

Austin Chiyobeka Milambo[1]*, Dr. Shem Sikombe[1]

[1]*Graduate School of Business, University of Zambia*
* Corresponding Author

Article Info

Volume 7, Issue 3

***Publication history*:**
Accepted on 18 April 2026;
Published: 5 May 2026

***Key Words*:**
Logistics, Supply Chain Management, Freight Forwarding, ICT Adoption, Transportation Infrastructure

***Article Doi*:**
10.59413/ajocs/v7.i3.22

Abstract

Effective supply chain management is vital for competitiveness, especially in developing economies where logistical constraints affect trade. In Lusaka District, Zambia, freight forwarding agents play a key role in facilitating goods movement, yet they face challenges such as poor transport infrastructure, regulatory inefficiencies, limited ICT adoption, skill gaps, and volatile market conditions. This study analysed these logistical factors and their impact on supply chain performance, while also exploring mitigation strategies. A mixed-methods approach was used, combining 117 questionnaire responses with 12 key informant interviews. Quantitative data were analysed using descriptive and inferential statistics, while qualitative data underwent thematic analysis. Findings indicate that infrastructure and regulatory issues are the most critical barriers, with 78% of respondents reporting transport-related delays and 65% highlighting regulatory bottlenecks. ICT adoption remains low (42%), and 55% reported labour skill deficiencies. To cope, agents employ strategies such as contingency planning, collaboration, and capacity-building initiatives. The study concludes that improving infrastructure, streamlining regulations, enhancing ICT integration, and developing workforce skills are essential for strengthening supply chain performance. Integrated interventions across these areas can significantly improve efficiency, reliability, and competitiveness in Lusaka's logistics sector.

1. Introduction

Supply Chain Management (SCM) involves the planning, execution, and control of the efficient flow of goods and services from origin to consumption (Chaala, 2023). Freight forwarding agents are central to this process, coordinating transportation, documentation, customs clearance, and distribution to ensure smooth trade operations. In Zambia, Lusaka District serves as the primary logistics and commercial hub, making the role of these agents critical to both domestic and international supply chains (Mwape, 2021).

Effective logistics management enhances cost efficiency, service reliability, and customer satisfaction, while poor logistics systems lead to delays, higher costs, and supply disruptions (Mwango, 2024). However, freight forwarding agents in Lusaka operate within a complex environment shaped by infrastructural, regulatory, and technological challenges. Key logistical factors affecting SCM include inadequate transportation networks, limited warehousing capacity, weak inventory systems, inefficient information sharing, and restrictive regulatory frameworks (Simpungwe, 2023; Sikazwe et al., 2020).

Zambia's strong reliance on trade evidenced by significant export and import contributions to GDP further highlights the importance of efficient logistics systems (World Bank, 2024). Despite this, persistent issues such as road congestion, bureaucratic customs procedures, high compliance costs, and uneven adoption of digital systems like the Customs Electronic Licensing System continue to constrain supply chain performance (Munafumpa & Phiri, 2023; WTO, 2024).

Given Lusaka's strategic importance, understanding these logistical challenges is essential. This study therefore examines the key logistical factors affecting SCM among freight forwarding agents to support improved efficiency, policy development, and supply chain resilience.

1.2 Problem Statement

Supply chain management (SCM) plays a critical role in enabling freight forwarding agents to efficiently connect suppliers and consumers through timely and cost-effective movement of goods. However, in Lusaka District, freight forwarding operations are increasingly constrained by a range of logistical inefficiencies that undermine supply chain performance. Existing evidence highlights persistent challenges such as inadequate transport infrastructure, weak information-sharing systems, regulatory bottlenecks, delayed adoption of digital technologies, and rising operational costs (Mwape, 2021; Sikazwe et al., 2020; Chileshe, 2022). These constraints not only increase transaction costs but also reduce service reliability and overall competitiveness within Zambia's logistics sector.

Copyright © 2026 Author(s) retain the copyright of this article. This article is published under the terms of the Creative Commons Attribution Liscense 4.0.

Empirical studies further indicate that poor road conditions and traffic congestion significantly contribute to delivery delays and increased transportation costs, thereby limiting the ability of freight forwarders to meet customer demands efficiently (Sikazwe et al., 2020; Mwango, 2022). In addition, inadequate storage infrastructure has been associated with higher risks of product damage and loss (Musonda & Mwila, 2024), while the limited use of logistics management information systems (LMIS) and inventory tracking technologies reduces supply chain visibility and coordination (Mwape, 2021; Kanyika et al., 2025). Regulatory inefficiencies also persist, as customs clearance processes remain slow despite the introduction of systems such as CELS, further delaying shipments and increasing compliance costs (Munafumpa & Phiri, 2023). Moreover, low levels of digital adoption among freight forwarding agents continue to constrain innovation and operational efficiency (Nambela & Mutono-Mwanza, 2024).

Despite these documented challenges, existing studies on supply chain management in Zambia have largely focused on broader national or sectoral perspectives, with limited empirical attention given specifically to how these logistical factors interact and collectively influence supply chain performance among freight forwarding agents in Lusaka District (Mwape, 2021; Chileshe, 2022). This creates a critical knowledge gap regarding the relative significance of these factors and the strategies employed by firms to mitigate their effects within this key logistics hub.

Therefore, the research problem addressed in this study is the lack of context-specific empirical evidence on the key logistical factors affecting supply chain management performance among freight forwarding agents in Lusaka District, and how these factors influence operational efficiency and competitiveness

1.3 Research Objectives

- To analyse the major logistical factors influencing supply chain management among freight forwarding agents in Lusaka District, Zambia.
- To evaluate the effects of logistical factors on the performance of supply chain management among freight forwarding agents in Lusaka District, Zambia.
- To examine the strategies applied by freight forwarding agents to address logistical challenges affecting supply chain management in Lusaka District, Zambia

2 Literature Review

This literature review critically examines scholarly and empirical studies on logistical factors influencing supply chain performance, with a focus on freight forwarding operations. Rather than treating logistics as a uniform concept, the review compares global, African, and Zambian perspectives to highlight how institutional, infrastructural, and technological contexts shape logistics outcomes. Global literature emphasizes efficiency through advanced systems and integration (Merkert & Hoberg, 2022), while African studies highlight structural constraints such as weak infrastructure and regulatory fragmentation (Kuteyi & Winkler, 2022). Zambian studies provide localized insights but remain fragmented and largely descriptive in explaining how these factors interact within freight forwarding operations (Chileshe, 2022; Mwape, 2021). This review therefore identifies inconsistencies in the literature and establishes the need for an integrated analysis of logistical factors affecting supply chain performance among freight forwarding agents in Lusaka District.

2.1 Global Perspective on Logistical Factors

Globally, logistics and freight forwarding are central to supply chain efficiency, facilitating the movement of goods across interconnected markets. Efficient logistics reduce delivery times, control costs, and enhance competitiveness (Merkert & Hoberg, 2022). Studies indicate that performance depends on transportation infrastructure, regulatory frameworks, skilled personnel, and ICT adoption (Bayraktar et al., 2024). Freight forwarders play a critical intermediary role, ensuring compliance with regulations and coordinating multi-border movements (Kulpa et al., 2026).

Empirical evidence highlights the importance of flexibility and integration. For example, Kulpa et al. (2026) demonstrate that adaptive responses to disruptions improve logistics resilience, while Qixu (2024) emphasizes the efficiency gains from multi-modal transport systems. Similarly, ICT adoption has transformed logistics through real-time tracking, improved coordination, and enhanced inventory management (Aruleswaran et al., 2025; Rajesh et al., 2023).

However, the literature presents inconsistencies regarding the relative importance of these factors. While some scholars emphasize infrastructure and regulatory systems (Merkert & Hoberg, 2022), others prioritize digital transformation as the primary driver of efficiency (Aruleswaran et al., 2025). This creates a conceptual gap, as technology alone does not guarantee performance without skilled personnel and organizational readiness. Evidence suggests that ICT effectiveness is conditional on human capacity and system integration, highlighting the need for a balanced approach to logistics management.

2.2 African Context

In Africa, logistics systems face persistent structural challenges despite increasing regional trade. Poor infrastructure, regulatory inefficiencies, and limited ICT adoption constrain supply chain performance (Kuteyi & Winkler, 2022). Freight forwarders often operate within environments characterized by unreliable transport networks, congested ports, and high operational costs.

Studies from different regions illustrate both challenges and opportunities. In South Africa, logistics risks such as delays and inefficiencies negatively affect firm performance (Makan & Mageto, 2025), while post-pandemic disruptions have further exposed system vulnerabilities (Muradzikwa et al., 2025). In contrast, evidence from Kenya shows that investments in warehouse systems and information management can improve performance despite infrastructural limitations (Muoki & Moronge, 2021). Similarly, digital platforms in West Africa enhance logistics efficiency, although their adoption is constrained by skills gaps and infrastructure deficits (Oluwakoya, 2023).

The literature reveals a key debate: whether logistics challenges are primarily structural or managerial. While some studies attribute inefficiencies to external constraints such as infrastructure and regulation (Kuteyi & Winkler, 2022), others demonstrate that firm-level strategies can mitigate these challenges (Muoki & Moronge, 2021). This suggests that logistics performance in Africa is shaped by both external conditions and internal capabilities. However, limited research examines how these dynamics interact in landlocked countries like Zambia, where constraints may be more pronounced.

2.3 Zambian Context

In Zambia, particularly in Lusaka District, freight forwarding is essential for facilitating trade and supporting economic activity. Freight forwarders provide services such as transportation, warehousing, customs clearance, and inventory management (Chileshe, 2022). However, several logistical challenges affect performance.

Studies highlight issues related to communication, infrastructure, and ICT adoption. Mwape (2021) identifies barriers to information sharing between logistics firms and regulatory authorities, while Mwanaumo et al. (2023) emphasize inefficiencies in last-mile delivery due to inadequate transport and storage capacity. Similarly, Ngwira (2024) notes that ICT adoption is limited by infrastructure constraints, lack of technical skills, and financial barriers.

Additional evidence points to broader systemic challenges. Mumba and Mwanza (2025) highlight coordination failures and limited cold chain infrastructure in perishable goods logistics, while Makoni (2023) observes that inconsistent adoption of digital systems reduces their effectiveness. Although some studies indicate improvements in procurement and supply chain agility (Mwango, 2024), they do not assess whether these gains are sustainable under existing constraints.

A key limitation of the Zambian literature is its fragmented nature. Most studies examine logistical factors in isolation, without considering their interdependence. This limits theoretical development and fails to explain how infrastructure, ICT, regulation, and human capital interact to influence freight forwarding performance.

2.4 Key Logistical Factors Affecting Supply Chain Performance

Logistical factors influencing supply chain performance can be grouped into four key areas: infrastructure, regulation, ICT adoption, and human capital.

Transportation infrastructure remains a fundamental determinant of efficiency. Poor road networks and limited connectivity increase delivery times and operational costs (Mwape, 2021; Sikazwe et al., 2020). While infrastructure constraints are significant, global evidence suggests that firms can mitigate these challenges through adaptive strategies and multi-modal transport systems (Qixu, 2024), indicating that infrastructure should be analyzed alongside other factors.

Regulatory and customs procedures also play a critical role. Bureaucratic processes and inconsistent enforcement lead to delays and increased costs (Munafumpa & Phiri, 2023). Although digital systems such as the Customs Electronic Licensing System have been introduced, their impact is limited by inconsistent adoption.

ICT adoption enhances logistics efficiency by improving visibility, coordination, and decision-making (Rajesh et al., 2023). However, in Lusaka, many firms lack the infrastructure and skills required to fully utilize these technologies (Ngwira & Phiri, 2024). This reinforces the argument that technology must be supported by human capacity.

Human capital is equally important, as skilled personnel enable effective use of systems and compliance with regulations (Chileshe, 2022). Skills gaps reduce efficiency and limit the benefits of ICT adoption. Together, these factors highlight the need for an integrated approach to logistics management.

2.5 Research Gaps

Despite extensive research, several gaps remain. First, most studies focus on individual logistical factors rather than their combined effects on supply chain performance. Second, there is limited integration of global best practices with local realities, particularly in landlocked economies. Third, existing Zambian studies are largely descriptive and lack analytical depth in explaining how logistical factors interact. This study addresses these gaps by examining the combined influence of infrastructure, regulatory procedures, ICT adoption, and human capital on supply chain performance among freight forwarding agents in Lusaka District. By adopting an integrated perspective, it contributes to both theory and practice in logistics and supply chain management.

2.6 Theoretical Framework

The theoretical foundation of this study is anchored in four complementary perspectives that explain supply chain dynamics among freight forwarding agents. Systems Theory (Bertalanffy, 1968) views organizations as interconnected components, suggesting that logistics elements such as transportation, warehousing, information systems, and regulatory frameworks must function cohesively, as disruptions in one area affect overall supply chain performance. Transaction Cost Economics (TCE) (Coase, 1937; Williamson, 1985) emphasizes the costs associated with economic exchanges, indicating that inefficiencies in customs procedures, infrastructure, and documentation increase operational costs and reduce supply chain efficiency. The Resource-Based View (RBV) (Barney, 1991) highlights the importance of internal capabilities, asserting that resources such as skilled personnel, technological systems, and logistical expertise enable freight forwarding agents to effectively manage supply chain challenges and enhance performance. Lastly, Information Processing Theory (Galbraith, 1973) underscores the need for efficient information systems to manage uncertainty and complexity, emphasizing that timely and accurate information sharing among stakeholders is essential for coordination and operational effectiveness. Together, these theories provide a comprehensive framework for understanding how logistical factors influence supply chain management among freight forwarding agents in Lusaka District.

2.7 Conceptual Framework

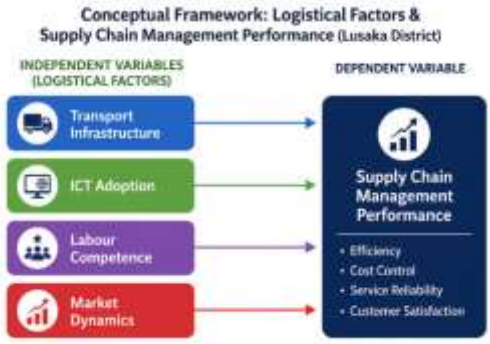

Figure 1: Conceptual Model

3 Methodology

3.1 Research Philosophy and Design

This study adopts a pragmatist research philosophy and a mixed-methods case study design to examine logistical factors affecting supply chain management among freight forwarding agents in Lusaka District, Zambia. Using a convergent parallel approach, both quantitative and qualitative data were collected concurrently and integrated during analysis to provide a comprehensive understanding of the research problem. The quantitative component involved a sample of 117 respondents drawn from operational personnel of registered freight forwarding firms and was used to analyse relationships between logistical factors such as transportation infrastructure, regulatory processes, ICT systems, and labour competence and supply chain performance using statistical techniques. The qualitative component consisted of 12 key informant interviews with senior managers and operations personnel, providing in-depth insights into strategies used to address logistical challenges. The study was conducted in Lusaka District, Zambia's main logistics and commercial hub. By combining survey data and interviews, the methodology enhances validity through triangulation and produces context-specific, practical insights relevant to freight forwarding agents, logistics practitioners, and policymakers.

3.2 Researcher Reflexivity

The researcher acknowledges their role as an active instrument in the research process, particularly in the collection, interpretation, and integration of both quantitative and qualitative data within a mixed-methods framework. Given the nature of this study on logistical factors affecting supply chain management among freight forwarding agents in Lusaka District, efforts were made to remain conscious of potential biases and assumptions related to infrastructure challenges, regulatory procedures, ICT adoption, and operational practices within the logistics sector. The researcher ensured objectivity in the quantitative phase through careful data handling and statistical analysis, while in the qualitative phase, reflexive journaling and continuous engagement with interview data were used to minimize subjective influence during thematic analysis. This approach helped ensure that the findings accurately represent the experiences, perceptions, and strategies of freight forwarding agents rather than the researcher's preconceived views, thereby enhancing the credibility and trustworthiness of the study.

4 Findings and Discussion

This chapter presents the research findings and data analysis for the study, drawing on an explanatory mixed methods design in which quantitative data are analysed first and subsequently complemented by qualitative insights. The chapter begins with the presentation of quantitative results obtained from the survey of freight forwarding agents in Lusaka District, focusing on key logistical factors affecting supply chain management. Descriptive and inferential statistical analyses are used to identify patterns, relationships, and trends in the data. This is followed by a qualitative analysis of interview responses, which provides deeper explanations and contextual understanding of the quantitative findings. The integration of both data strands enables a comprehensive interpretation of how logistical factors influence supply chain management among freight forwarding agents, ensuring that the findings are both statistically robust and contextually grounded.

4.1 Respondent Profile

The table below presents the demographic profile of respondents involved in the study. In terms of gender distribution, most respondents were male (54.7%), while females accounted for 45.3%, indicating a relatively balanced representation with a slight male dominance in the freight forwarding sector. Regarding age, most respondents fell within the 35–44 years category (37.6%), followed by those aged 45 years and above (26.5%) and 25–34 years (24.8%). Only a small proportion (11.1%) were below 25 years. This suggests that the industry is largely composed of mature individuals who are likely to have accumulated substantial professional experience.

In terms of educational attainment, many respondents held a Bachelor's Degree (35.9%) and Diploma (33.3%), while fewer had postgraduate qualifications (16.2%) or certificates (14.5%). This indicates that most participants possess at least mid- to high-level academic qualifications, which may influence their understanding and management of supply chain processes. With respect to work experience, the largest group of respondents had between 2–5 years of experience (31.6%), followed by those with 6–10 years (26.5%) and above 10 years (25.6%). A smaller proportion (16.2%) had less than 2 years of experience. This distribution shows that the sample largely consists of moderately to highly experienced professionals, enhancing the reliability of the insights provided regarding logistical factors affecting supply chain management.

4.2 Major logistical factors influencing supply chain management

To address the first objective, descriptive statistics were computed for 20 close-ended items measuring key logistical factors affecting supply chain management. Responses were captured on a 5-point Likert scale, where a mean score above 3.00 indicates overall agreement among respondents. The results show that the mean scores for all items exceeded the neutral midpoint, suggesting a consensus that the identified logistical factors are influential. Furthermore, one-sample t-tests were conducted to determine whether the mean ratings differed significantly from the neutral value. The results revealed that all items were statistically significant ($p < .001$), indicating that respondents consistently perceived the listed logistical factors as important determinants of supply chain management performance.

Highest-Rated Logistical Factors

The table presents the highest-rated logistical factors influencing supply chain management among freight forwarding agents. Overall, all factors recorded mean scores close to or above 4.00, indicating strong agreement among respondents that these issues significantly affect logistics operations. The findings show that the most critical constraints are largely external, particularly those related to infrastructure and regulatory processes. Poor road conditions emerged as the most significant factor (M = 4.29), with an overwhelming 93.2% of respondents agreeing or strongly agreeing that it disrupts delivery schedules. This was followed by time-consuming customs clearance procedures (M = 4.15), regulatory changes (M = 4.08), and traffic congestion in Lusaka (M = 4.05). These results suggest that inefficiencies in the physical and regulatory environment present major operational challenges that are often beyond the direct control of freight forwarding agents.

In addition to external constraints, human resource factors were also highly rated. Respondents agreed that staff competence improves service quality (M = 4.07) and that regular training enhances performance (M = 4.06), highlighting the importance of skilled personnel in achieving efficient supply

chain outcomes. However, the relatively high rating for skills shortages (M = 3.97) indicates that while human capital is a strength, it also remains a key challenge within the sector. Market-related pressures were also evident in the findings. Customer demand fluctuations and rising customer expectations both recorded mean scores of 4.00, reflecting the dynamic and demanding nature of the logistics environment. Additionally, competition influencing delivery speed (M = 3.93) underscores the need for firms to continuously improve efficiency and responsiveness.

Table 1: Highest-Rated Logistical Factors

Rank	Logistical Factor	Mean	SD	% Agree/Strongly Agree
1	Poor road conditions affect delivery schedules	4.29	0.59	93.2%
2	Customs clearance procedures are time-consuming	4.15	0.73	85.5%
3	Regulatory changes affect logistics planning	4.08	0.70	81.0%
4	Traffic congestion in Lusaka causes delays	4.05	0.74	81.2%
5	Regular training improves performance	4.06	0.70	82.8%
6	Staff competence improves service quality	4.07	0.72	79.1%
7	Customer demand fluctuations affect planning	4.00	0.70	81.2%
8	Customer expectations pressure service improvement	4.00	0.60	82.1%
9	Skills shortages affect logistics efficiency	3.97	0.77	75.2%
10	Competition influences delivery speed	3.93	0.60	80.3%

Table 2: Lower-Rated but Still Significant Logistical Factors

Factor	Mean	SD	Interpretation
Availability of transport vehicles affects efficiency	3.60	0.76	Moderate influence
Lack of ICT skills limits effective use	3.54	0.90	Moderate influence
High cost of ICT limits adoption	3.42	0.93	Moderate influence
Employees are adequately trained	3.71	0.89	Moderate-to-high agreement
Electronic customs systems improve clearance efficiency	3.83	0.76	Positive enabling factor

Domain-Level Summary of Logistical Factors

The domain-level analysis provides a broader perspective by grouping related logistical factors into conceptual categories. Customs and regulatory barriers recorded the highest mean (4.01), indicating that institutional processes such as clearance procedures and regulatory changes are the most significant constraints. Market and customer pressures (3.98) and human capability factors (3.95) also ranked highly, showing that both external demand conditions and internal workforce capacity play a critical role in shaping supply chain performance.

Transport and infrastructure factors (3.93) further confirm the importance of physical logistics conditions, while digital enablers (3.88) highlight the growing role of technology in improving efficiency. In contrast, ICT barriers (3.49) recorded the lowest mean, though still above the neutral midpoint, indicating that technological challenges persist but are relatively less severe compared to other domains.

Table 3: Domain-Level Summary of Logistical Factors

Domain	Mean
Customs and regulatory barriers	4.01
Market and customer pressures	3.98
Human capability factors	3.95
Transport and infrastructure factors	3.93
Digital enablers	3.88
ICT barriers	3.49

The analysis demonstrates that freight forwarding agents in Lusaka District operate within a highly constrained logistics environment. Road infrastructure challenges and traffic congestion emerged as the most severe operational barriers, while customs clearance procedures and regulatory changes were identified as key institutional constraints. In addition, respondents highlighted employee competence, training, and customer demand pressures as important factors influencing supply chain management. These findings suggest that supply chain effectiveness in the study area is shaped by a combination of external environmental conditions and internal organisational capabilities, both of which must be addressed to improve overall logistics performance.

4.3 Effects of Logistical Factors on Supply Chain Management Performance

To evaluate the effects of logistical factors on supply chain management performance, a composite performance index was constructed using five key indicators: timely delivery of goods, minimal lead time variability, effective control of logistics costs, customer satisfaction with services, and the firm's responsiveness to disruptions. The reliability of this scale was confirmed through a Cronbach's alpha of 0.826, indicating a high level of internal consistency among the items and affirming that they collectively measure the underlying construct of SCM performance. The results further revealed an overall mean score of 3.85, suggesting that, on average, firms exhibit a moderately high level of supply chain performance. This implies that while performance is generally satisfactory, there remains room for improvement, particularly in addressing logistical constraints that may hinder optimal efficiency.

Supply Chain Management Performance Indicators

The table presents the key indicators used to assess supply chain management performance among the surveyed firms. Overall, the mean scores indicate a moderately high level of performance across all indicators. The highest-rated aspect was the firm's ability to respond quickly to disruptions (M = 4.06), suggesting strong adaptability and resilience in managing unexpected challenges. This was followed by relatively stable lead times (M = 3.87) and customer satisfaction (M = 3.83), indicating that firms are generally effective in maintaining service reliability. However, slightly lower scores were observed for on-time delivery (M = 3.77) and logistics cost control (M = 3.74), highlighting areas where firms face greater difficulty. This pattern suggests that while firms are capable of reacting to disruptions, underlying structural constraints, such as traffic congestion, customs delays, and cost pressures, continue to limit consistent operational efficiency.

Table 4: Supply Chain Management Performance Indicators

Performance Indicator	Mean	SD
The firm responds quickly to disruptions	4.06	0.71
Lead time variability is minimal	3.87	0.73
Customers are satisfied with services	3.83	0.76
Deliveries are made on time	3.77	0.84
Logistics costs are well controlled	3.74	0.85

Correlation between Logistical Domains and SCM Performance

The correlation analysis examined the relationship between key logistical domains and supply chain management performance. The results show that human capability has the strongest and most statistically significant positive relationship with performance ($r = 0.387$, $p < .001$), indicating that firms with better-trained, more competent, and well-prepared staff tend to achieve higher levels of supply chain efficiency. Market pressures also demonstrated a significant positive association ($r = 0.288$, $p = 0.0016$), suggesting that firms operating in more demanding and competitive environments may be driven to improve their performance.

In contrast, transport and infrastructure factors, digital enablers, and customs or regulatory barriers did not show statistically significant relationships with performance at the bivariate level. This implies that although these factors are widely perceived as important constraints, their direct relationship with performance outcomes may be more complex or mediated by other variables. ICT barriers showed a negative relationship with performance ($r = -0.090$), indicating that higher technological constraints may reduce efficiency; however, this relationship was not statistically significant.

Table 5: Correlation between Logistical Domains and SCM Performance

Predictor Domain	Correlation with SCM Performance (r)	p-value	Interpretation
Human capability	0.387	<0.001	Significant positive association
Market pressures	0.288	0.0016	Significant positive association
Transport and infrastructure	0.121	0.193	Not significant
Digital enablers	0.121	0.193	Not significant
ICT barriers	-0.090	0.334	Negative but not significant
Customs/regulatory barriers	0.078	0.401	Not significant

Item-Level Correlation Insights

At the individual factor level, several variables demonstrated stronger associations with SCM performance. Notably, employee training showed the strongest positive relationship ($r = 0.400$, $p < .001$), followed by staff competence ($r = 0.280$, $p = .003$) and the use of electronic customs systems ($r = 0.185$, $p = .047$).

Multiple Regression Analysis

Model Summary

The regression model was estimated to examine the combined effect of key logistical domains on supply chain management (SCM) performance. The results indicate that the model explains approximately 20.0% of the variation in SCM performance ($R^2 = 0.200$), with an adjusted R^2 of 0.148 accounting for the number of predictors included. The overall model is statistically significant ($F(7,109) = 3.883$, $p = 0.00082$), suggesting that the selected logistical factors jointly have a meaningful but limited explanatory influence on SCM performance.

The relatively low explanatory power implies that a substantial proportion (80%) of variation in SCM performance is influenced by other factors not captured in the model. These may include organisational culture, management style, financial capacity, firm size, supplier relationships, and external macroeconomic conditions, which are widely recognised in logistics literature but were not included as variables in this study. This suggests that SCM performance is a multi-dimensional outcome, shaped by both measurable logistical constraints and broader organisational and environmental dynamics.

Table 6: Model Summary for Multiple Regression Analysis

Statistic	Value
R^2	0.200
Adjusted R^2	0.148
F-statistic	3.883
Significance (p)	0.00082

Regression Results Predicting SCM Performance

The regression results reveal that human capability is the only statistically significant predictor of SCM performance in the multivariate model ($B = 0.418$, $\beta = 0.346$, $p = 0.001$). This indicates that firms with stronger employee training, higher staff competence, and better human-capital development are more likely to achieve improved performance outcomes in delivery efficiency, cost control, responsiveness, and customer satisfaction.

ICT barriers show a negative but marginal effect ($B = -0.124$, $p = 0.079$), suggesting that limited digital skills and high technology costs may hinder performance, although this relationship is not statistically significant at the 5% level. All other variables, including transport infrastructure, regulatory barriers, digital enablers, market pressures, and skills shortages, were not statistically significant predictors when considered simultaneously.

The lack of significance for most logistical variables helps explain the moderate R^2 value of 0.200. This suggests that while these factors are important at a descriptive level (as shown in earlier findings), they do not strongly differentiate performance across firms statistically. A plausible explanation is that many logistical constraints such as infrastructure deficiencies, customs delays, and regulatory challenges are systemic and uniformly experienced across freight forwarding firms in Lusaka District, thereby limiting their ability to explain variations in performance outcomes.

In contrast, internal organisational factors—particularly human capability—emerge as the key differentiator of performance. This indicates that firms do not primarily perform differently because they face different external conditions, but rather because they differ in their ability to adapt, respond, and manage these constraints effectively through internal competencies and workforce capability.

Table 7: Regression Results Predicting SCM Performance

Predictor	B	Std. Beta	p-value	Interpretation
Transport and infrastructure	0.113	0.098	0.379	Not significant
Customs/regulatory barriers	-0.157	-0.130	0.256	Not significant
Digital enablers	0.005	0.004	0.967	Not significant
ICT barriers	-0.124	-0.166	0.079	Negative, marginal effect
Human capability	0.418	0.346	0.001	Significant positive effect
Market pressures	0.215	0.155	0.150	Not significant
Skills shortages	0.023	0.029	0.765	Not significant

The findings indicate that logistical factors do affect supply chain management performance, but their effects are not equal. Human capability emerged as the most influential performance-related factor, while ICT barriers showed a weak negative tendency. Although transport and customs constraints were rated highly as operational challenges, they did not significantly explain performance differences across firms in the regression model. This suggests that firms that build stronger internal capability are better able to maintain service performance even in a difficult logistical environment.

4.5 Strategies used to address logistical challenges

Objective Three was analysed from the open-ended questions using frequency-based thematic coding. Because one respondent could mention more than one issue or strategy, percentages below indicate the share of responses mentioning a theme, not mutually exclusive categories.

4.5.1 Major Challenges Mentioned in Open Responses

This table summarises the main logistical challenges identified through open-ended survey responses. Customs, documentation, and regulatory issues were the most frequently cited (31.6%), confirming quantitative findings regarding institutional constraints. Financial pressures, ICT limitations, and infrastructure challenges were also commonly mentioned, highlighting that both external environmental factors (roads, customs, connectivity) and internal organisational constraints (skills, capacity) significantly impact freight forwarding operations in Lusaka.

Table 8: Major Challenges Mentioned in Open Responses

Theme	Mentions	Percent of Responses
Customs/documentation/regulatory issues	36	31.6%
Cost/financial pressures	23	20.2%
ICT/system/connectivity issues	20	17.5%
Traffic/road/infrastructure issues	16	14.0%
Capacity/skills/facilities constraints	15	13.2%
Coordination/client-related issues	15	13.2%

Strategies Used by Firms to Address Logistical Challenges

The table presents the main strategies that firms use to cope with logistical challenges. The most common approaches include active engagement with customs and regulatory authorities, staff training, early document submission, and route adjustments. Firms also rely on manual backups and ICT tracking systems to mitigate disruptions. These strategies suggest that firms predominantly adopt adaptive and relationship-based approaches, anticipating delays and maintaining operational flexibility rather than resolving structural or systemic issues.

4.4 Qualitative phase

This section presents the qualitative findings of the study. The data collected interviews provide a comprehensive insight into the addressing of the objectives of the study. By analyzing qualitative data, this study aims to shed light on logistical factors affecting supply chain management among freight forwarding agents in lusaka district of zambia.

- As indicated in the methodology chapter, the study employs a mixed-methods research design to address the following research questions:
- What logistical factors influence supply chain management among freight forwarding agents in Lusaka District, Zambia?
- Why do logistical factors affect the performance of supply chain management among freight forwarding agents in Lusaka District, Zambia?
- How do freight forwarding agents address logistical challenges affecting supply chain management in Lusaka District, Zambia?

This approach allows for a deeper understanding of the operational realities within the sector, revealing how firms navigate a complex logistics environment through adaptive, experience-based, and relationship-driven practices.

Table 9: Themes and their codes

Theme	Code 1	Code 2	Code 3
Transport and Infrastructure Constraints	Poor road conditions	Traffic congestion delays	Limited transport availability
Customs and Regulatory Challenges	Lengthy clearance procedures	Regulatory changes/uncertainty	Documentation delays
ICT and Digital Systems Factors	System downtime/connectivity issues	High cost of ICT adoption	Limited ICT skills
Cost and Financial Pressures	High fuel costs	Exchange rate instability	Rising operational costs
Effects on SCM Performance	Delayed deliveries	Increased logistics costs	Reduced service reliability
Customer and Market Pressures	Demand fluctuations	High customer expectations	Competitive pressure
Coping and Mitigation Strategies	Pre-clearance and early documentation	Continuous follow-ups with authorities	Route/schedule adjustments

4.5 Discussion of Findings

This chapter discusses the study's findings in relation to existing literature and theoretical frameworks, namely Systems Theory, Transaction Cost Economics (TCE), Resource-Based View (RBV), and Information Processing Theory. The discussion focuses on transportation infrastructure, regulatory procedures, ICT adoption, labour competence, and market dynamics, and how these factors influence supply chain performance among freight forwarding agents in Lusaka District.

Transportation Infrastructure and Supply Chain Performance

Transportation infrastructure emerged as a key determinant of supply chain performance. Consistent with global and African studies, inefficient transport systems increase delays, operational costs, and reduce service reliability (Qixu, 2024; Muoki & Moronge, 2021). In Lusaka, poor road conditions and limited connectivity negatively affect delivery timelines and responsiveness (Mwape, 2021; Sikazwe et al., 2020). Systems Theory (Bertalanffy, 1968) explains these findings by emphasizing interdependence within supply chains, where transport inefficiencies create cascading effects

on inventory, warehousing, and customer satisfaction.

Non-Significance of Transport, Customs, and ICT Barriers

Despite being perceived as major challenges, transport, customs, and ICT barriers were not statistically significant predictors of performance. This may be due to their uniform impact across firms, limiting variability in quantitative analysis. Additionally, firms may have developed adaptive strategies that reduce measurable effects, while these factors may influence performance indirectly through cost structures and operational efficiency.

Regulatory and Customs Procedures

Regulatory and customs procedures remain significant barriers, contributing to delays and increased costs. This aligns with studies highlighting bureaucratic inefficiencies in African logistics systems (Munafumpa & Phiri, 2023; Katanga, 2020). From a TCE perspective, such inefficiencies increase transaction costs related to compliance and monitoring (Coase, 1937; Williamson, 1985). Systems Theory further shows that customs delays disrupt interconnected logistics processes, reducing overall supply chain efficiency.

ICT Adoption and Information Flow

Limited ICT adoption constrains real-time coordination and decision-making. This supports Information Processing Theory (Galbraith, 1973), which emphasizes the importance of effective information systems in managing complexity. Prior studies confirm that weak digital integration reduces operational efficiency and responsiveness (Rajesh et al., 2023; Ngwira & Phiri, 2024). From an RBV perspective, ICT capabilities are strategic resources that enhance competitiveness (Barney, 1991), yet low adoption in Lusaka limits these advantages.

Labour Competence and Human Capital

Human capital is a critical factor influencing supply chain performance. Skills gaps in ICT, regulatory compliance, and logistics coordination reduce efficiency and increase errors, consistent with findings in African logistics contexts (Muoki & Moronge, 2021; Chileshe, 2022). RBV (Barney, 1991) highlights skilled personnel as valuable resources, while Systems Theory (Bertalanffy, 1968) positions them as essential links within the logistics system. Training and capacity building therefore play a key role in improving operational performance.

Market Dynamics and Operational Flexibility

Market dynamics, including demand fluctuations and competitive pressures, require freight forwarders to be agile. Systems Theory explains that responsiveness depends on the integration of logistics components, while TCE highlights the cost implications of adapting to market changes (Coase, 1937; Williamson, 1985). Studies show that flexible strategies such as demand forecasting and contingency planning enhance responsiveness and competitiveness (Mwango, 2024; Rajesh et al., 2023).

Overall, the findings demonstrate that supply chain performance is influenced by the interaction of multiple logistical factors. Infrastructure, regulation, ICT, human capital, and market dynamics are interdependent, requiring integrated interventions. Improvements across these areas will enhance efficiency, reliability, and competitiveness of freight forwarding operations in Lusaka District.

5 Conclusions and Recommendations

5.1 Conclusions

The first objective of the study sought to analyse the major logistical factors influencing supply chain management among freight forwarding agents in Lusaka District. The findings revealed that transportation infrastructure, regulatory and customs procedures, ICT adoption, labour competence, and market dynamics are the most significant logistical determinants. Poor road networks, inadequate transport vehicles, fragmented regulatory processes, limited digital infrastructure, and skill gaps among personnel were identified as key barriers to efficient freight forwarding operations. This objective was achieved by systematically identifying these factors and demonstrating how each one interacts to affect the day-to-day management of supply chains within the district.

The second objective focused on evaluating the effects of these logistical factors on the performance of supply chain management. The study found that inefficiencies in transportation and customs procedures led to delays, increased operational costs, and reduced reliability of deliveries. Limited ICT adoption hindered real-time tracking and coordination, while gaps in human capital affected compliance, error reduction, and responsiveness to market demands. Furthermore, market fluctuations demanded operational flexibility, which many freight forwarders struggled to maintain due to these logistical constraints. By linking each factor to specific outcomes in supply chain performance, the study successfully demonstrated the extent to which logistical challenges influence efficiency, resilience, and overall effectiveness.

The third objective aimed to examine the strategies applied by freight forwarding agents to address logistical challenges. The study found that agents adopted a range of interventions, including contingency routing, investment in ICT tools, staff training, and coordination with regulatory authorities, to mitigate operational disruptions. Multi-modal transport strategies and information-sharing mechanisms were also employed to enhance delivery reliability and responsiveness. By evaluating these practices, the study highlighted that while freight forwarders employ various strategies to overcome logistical barriers, the effectiveness of these measures is often constrained by systemic issues such as limited infrastructure, regulatory inconsistencies, and resource limitations. This objective was achieved by identifying and analyzing these strategic responses and assessing their impact on supply chain performance in Lusaka District.

5.2 Recommendations for Practice

- The Zambian government, through the Ministry of Transport and Communications, should prioritize upgrading roads, bridges, and intermodal transport networks.
- Regulatory bodies, particularly the Zambia Revenue Authority, should ensure consistent adoption of systems like CELS, reduce bureaucratic bottlenecks, and enforce transparent compliance standards.
- Freight forwarding companies, in partnership with ICT service providers, should implement logistics management information systems, digital tracking, and automated inventory platforms.
- Freight forwarding firms, collaborating with vocational and professional training institutions, should establish ongoing training programs in ICT

literacy, regulatory compliance, inventory management, and customer service.

- Industry associations, freight forwarding agents, and key clients should institutionalize platforms for regular information sharing, multi-modal coordination, and joint contingency planning.

Declaration of Competing Interests

The authors declare that they not aware of any competing financial interests or personal relationships that may have influenced the work described in this document.

Funding

This research did not receive specific grants from any public, commercial, non- profit sector funding bodies.

Acknowledgements

I would like to offer my heartfelt gratitude to everyone who made a contribution to this research

Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

References

Aruleswaran, A., Muraliraj, J., & Zailani, S. (2025). Lean six sigma and sustainable supply chain management: A case study in electric vehicle parts manufacturing. Journal of Lean Six Sigma.

Barney, J. (1991). Firm resources and sustained competitive advantage. Journal of Management, 17(1), 99–120. https://doi.org/10.1177/014920639101700108

Bertalanffy, L. von. (1968). General system theory: Foundations, development, applications. George Braziller.

Bobo, E. B. (2021). Assessing the effect of construction delivery and lead time on the performance of local road contractors in Lusaka District, Zambia. University of Zambia Repository.

Chaala, M. (2023). An analysis of how supply chain management can help produce sales revenue for fast moving consumer goods firms in Zambia. University of Zambia.

Chileshe, M. J. (2022). The impact of supply chain management practices on performance of small and medium enterprises: A case of agro-dealers in Lusaka. University of Zambia Repository.

Coase, R. H. (1937). The nature of the firm. Economica, 4(16), 386–405. https://doi.org/10.1111/j.1468-0335.1937.tb00002.x

Creswell, J. W. (2014). Research design: Qualitative, quantitative, and mixed methods approaches (4th ed.). SAGE Publications.

Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications.

Galbraith, J. R. (1973). Designing complex organizations. Addison-Wesley.

Katanga, E. M. (2020). The influence of power relations on the tomato value chain in Lusaka province, Zambia. University of Zambia Repository.

Kanyika, A., et al. (2025). Effectiveness of Logistics Management Information System (LMIS) in improving availability of essential medicines in Zambia. Pharmacology & Pharmacy, 16(2), 61–72.

Koray, M., Kaya, E., & Keskin, M. H. (2025). Determining logistical strategies to mitigate supply chain disruptions. Sustainability.

Kulpa, T., Miller, J. W., Darby, J. L., & Thomas, R. (2026). Flexible responses to global supply chain disruptions. Wiley Online Library.

Makoni, A. E. (2023). Efficiency of information technology systems on border management of freight transport. University of Zambia Repository.

Merkert, R., & Hoberg, K. (2022). Global logistics and supply chain strategies for the 2020s. Springer.

Mwamba, C. (2024). Determinants of supply chain agility at Zambia Medicines and Medical Supplies Agency. University of Zambia Repository.

Muoki, M., & Moronge, M. (2021). Supply chain performance in Kenya logistics sector.

Munafumpa, C. P., & Phiri, J. (2023). Adoption of Customs Electronic Licensing System in Zambia. Technology and Investment, 14(1), 22–37.

Musonda, L., & Mwila, N. (2024). Post-harvest losses of fresh tomato in Lusaka markets. African Journal of Commercial Studies.

Mwanaumo, E. T., Kabwe, D., & Mwanza, B. (2023). Last mile delivery logistics of Zambia Medicines and Medical Supplies Agency.

Mwape, J. (2021). Barriers to information sharing in logistics-supply chain companies in Lusaka, Zambia. University of Zambia Repository.

Mwape, J., Sikazwe, A., & Phiri, F. (2020). Infrastructure and supply chain efficiency in Lusaka District.

Mwango, C. (2024). Determinants of supply chain agility at Zambia Medicines and Medical Supplies Agency. University of Zambia.

Ngwira, J. V., & Phiri, F. (2024). ICT adoption in logistics in Zambia. University of Zambia Repository.

Nyile, E. K., Njuguna, A. W., & Githae, P. (2025). Cross-border logistics and shipping performance in East Africa.

Qixu, C. (2024). International logistics management and transportation modes.

Rajesh, D., Gupta, S. K., & Ilinich, S. (2023). Freight forwarding business challenges in logistics industry.

Saunders, M., Lewis, P., & Thornhill, A. (2019). Research methods for business students (8th ed.). Pearson Education.

Sikazwe, A., Mwape, J., & Phiri, F. (2020). Transport infrastructure and supply chain efficiency in Lusaka. University of Zambia Repository.

Simpungwe, D. (2023). Procurement performance in Zambian councils. University of Zambia Repository.

Tashakkori, A., & Teddlie, C. (2010). SAGE handbook of mixed methods in social & behavioral research. SAGE.

Williamson, O. E. (1985). The economic institutions of capitalism. Free Press.

World Bank. (2024). Zambia trade and development indicators.

World Trade Organization. (2024). Zambia trade policy review and tariff profile.

Yamane, T. (1967). Statistics: An introductory analysis. Harper & Row.

Yin, R. K. (2018). Case study research and applications (6th ed.). SAGE Publications.

Zambia Freight Forwarders Association (ZAFFA). (2023). Register of licensed freight forwarding agents in Zambia.

Zambia Revenue Authority (ZRA). (2023). Customs services division annual report.