
| RESEARCH ARTICLE

Does Transportation Function Influence Supply Chain Management Performance: A Case of Agricultural Firms Listed at the Nairobi Securities Exchange

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| ABSTRACT

The strength of a nation's agricultural sector has been determined to have a significant impact on its social and economic growth. In Kenya, Vision 2030 emphasized the need for effective production planning to enhance efficiency, sustainability, and competitiveness. The goal of supply chain management (SCM) is to balance cost, quality, quantity, and time while increasing the effectiveness of material, product, and information flows. The objective of the study was assessing the influence of transportation management function on the supply chain management of agricultural firms listed at the Nairobi Securities Exchange. A cross-sectional descriptive survey design was used in the research to target 156 workers from six listed agricultural companies. Questionnaires, interviews, and document analysis were used to gather data, which was then examined using regression models, correlation, and descriptive statistics. The results showed that transportation management explained 15.7% of the variation in performance and had a positive and substantial effect on SCM ($B = 0.446$, $p < 0.001$). The study concluded that transport management is a strategic driver of SCM performance in agricultural firms. It enhances efficiency through terminal operations, strengthens interconnectivity, adds value, and links warehouse activities. The study recommends that, Production firms should invest in efficient and reliable transport systems to enhance supply chain connectivity.

| KEYWORDS

Transportation, Supply Chain Management and Performance.

| ARTICLE INFORMATION

ACCEPTED: May 13, 2026

PUBLISHED: June 06, 2026

DOI: <https://doi.org/10.61424/rjbe.v4i2.848>

1. Introduction

Transportation can be defined as the set of actions encompassing the shipment of commodities or finalized products from suppliers to a facility, as well as to warehouses and sales sites (Kenyon & Meixell, 2011). The inclusion of transportation in the supply chain is justified by its significant role in enhancing the value of goods by efficiently moving products from their current location to a more favorable destination (Laird, 2012). According to several studies (Atos, 2012; Kenyon, 2011; Xiande, 2008; Hausman, 2005; Gunasekaran, 2003), transportation has been identified as a significant element in logistics operations, serving as the connecting link between various isolated activities. According to Tsen, Yue, and Taylor (2005), the most significant economic activity inside company logistics systems was identified.

The increasing complexity and interconnectivity of global transportation networks and supply chains have driven the development and refinement of advanced technologies to facilitate their operations. Murray (2017) asserts that the rationale for implementing transport management is the recognition that transportation costs may constitute a significant portion of overall logistics expenditure.

The problem of resilient load planning for trains in intermodal container terminals was further investigated by Bruns et al. (2013). The primary objective of load planning is to optimize the allocation of load units to wagons within a train, maximizing train usage while minimizing terminal setup and transit costs. In their study, Garca et al. (2013) employ a novel hybrid methodology that integrates operations research (OR) methodologies with artificial intelligence (AI) search methods. This combination enables the delivery of high-quality solutions to complex multimodal transport challenges, leveraging the strengths of both approaches. The methodology was implemented in a practical scenario with a prominent Spanish firm that operates a multimodal transportation system.

1.2 Statement of the Problem

Maximizing the flow of materials, goods, and information throughout the supply chain while accounting for variables like cost, quality, quantity, and time is the goal of supply chain management. In compliance with international organization standards, this includes strategic planning to identify the most effective transportation routes, ideal warehousing techniques and facilities, and suitable packaging processes (International organization standards, 2007).

Compared to other businesses, logistics planning is a far more complex process. Examples of factors that could complicate logistical planning and transportation include seasonality in material production, the need for conditioned transit and storage, and quality deterioration (Grievink et al., 2002). The importance of supply chain management and innovations for the agri-food industry has been acknowledged by scholars recently (Folkers and Koehorst, 1997; Omta, 2004; Taylor, 2006; Van der Vorst and Beulens, 2002; Van der Vorst et al., 2005; Van Duren and Sparling, 1998; Westgren, 1998).

It is evident from earlier research that logistical functions result in inconsistent findings. Tan's (2002) study, for instance, highlighted the importance of implementing supply chain practices (SCPs) to meet consumer demands. Tan cited successful businesses as proof of the existence and efficacy of SCPs, such as Amazon.com, Tesco, Dell Computer, and Toyota. The usage characteristics of supply chain activities may have a significant causal relationship with corporate performance. It is crucial to remember, nonetheless, that the aforementioned study did not specifically examine the inefficiencies in logistical functions or whether they impair performance, which is mainly caused by logistical problems.

Green et al. (2008) investigated the relationship between best practices in logistics and the overall performance of US-based large-scale businesses. The researchers concluded that a company's overall performance is significantly affected by the application of logistical techniques, especially in terms of timeliness, responsiveness, and delivery capabilities. The firm's marketing success, including its impact on average sales growth and trade effectiveness, is directly influenced by these factors. Regarding the improper or insufficient use of logistical functions, Kenyan agricultural enterprises have significantly benefited.

Objective: To assess the influence of transportation management function on the supply chain management performance of agricultural firms listed at the Nairobi Securities Exchange.

Hypothesis, H₀1: There is no significant effect of transportation management function on the supply chain management performance of agricultural firms listed at the Nairobi Securities Exchange.

2. Literature Review

2.1 *Transportation and Its Effect on Supply Chain Management*

The supply chain network in the manufacturing industry comprises transportation modes such as shipping by vessels and trucks, as well as railway lines spanning multiple countries. The aforementioned network transports goods from the manufacturing phase through intermediaries to distribution hubs and ultimately to end consumers (Kinisa, 2019). The occurrence of any disturbances within the global supply chain can have a substantial adverse impact on operational efficiency, quality maintenance, profitability, and customer satisfaction. Various factors, such as product availability uncertainty, demand fluctuations, transportation challenges, market volatility, and the political climate, can contribute to unfavorable events. To effectively replicate a supply chain design issue, it is essential to consider the intricacies of supply chain dynamics and to employ data aggregation methods suitable for handling large datasets (Saad, Udin, & Hasnan, 2014).

In a comprehensive analysis of research on transportation management and supply chain performance, Tseng, Yue, and Taylor (2005) examined the significance of transportation within the logistics chain. Their findings revealed that transportation plays a pivotal role in logistics by connecting the various activities within the chain. The effectiveness of transportation services significantly impacts logistics performance. The research demonstrated that transportation and logistics systems are interdependent, as the effective management of logistics requires the use of transportation for its operations. Furthermore, a well-functioning logistics system can improve traffic conditions and advance transportation infrastructure. Optimizing transportation efficiency has significant potential to enhance the overall performance of logistics systems, as transportation is the most substantial cost component within these interconnected systems. Transportation plays a vital role within the logistics system, with its operations permeating all sectors of the logistical process. Optimal utilization of a sophisticated logistics strategy requires its integration with transportation systems.

Chan and Zhang (2011) examined how supply chain performance was affected by cooperative transportation management in a separate study. The foundation of collaborative transportation management (CTM) is the active participation of various supply chain participants, including trading partners and carriers. According to the study's findings, supply chain management inefficiencies can be reduced while physical distribution flexibility is increased through the successful application of CTM. The study's conclusions also suggest that implementing Collaborative Transportation Management could yield significant cost savings for the company, improve service quality, address variations in delivery demand (delivery lead time), and increase the carrier's flexibility through adjustable capabilities.

Kyusya (2015) evaluated the impact of logistics outsourcing on operational efficiency in Kenya's shipping industry. Forty-two Kenyan marine businesses made up the research population. Descriptive and inferential statistics were used to analyze the data. The results of the study show that the operational success of businesses and transportation management is positively correlated. The study recommended that cross-functional teams for transportation companies and service providers develop a culture of logistics outsourcing. The vehicle routing problem (VRP) and its numerous expansions have been studied, as seen by the literature now in publication. However, despite the notable growth of intermodal transportation over the last 10 years, there is a dearth of empirical research on the extent to which intermodal transportation improves efficiency and reduces costs, especially in Kenya.

Choosing the best routes for foreign shipments via multimodal networks is a major operational problem in the intermodal industry that Chang (2008) investigated. A multi-objective, multimodal, multi-commodity flow problem with time frames and concave costs is formulated, and an efficient heuristic approach is suggested.

An initial attempt to develop an analytical framework for planning rail-truck intermodal transportation of hazardous materials was put out by Vermaa and Verter (2010). They accomplish this by developing an objective optimization model that reflects current field practices and attempts to schedule and manage intermodal shipments efficiently. The delivery times that clients choose have a significant impact on the model's routing decisions. Train load

optimization in intermodal container terminals was studied by Bruns and Knust (2012). The goal is to minimize terminal setup and transit expenses while optimizing the distribution of load units to railway wagons to improve train usage.

Gitahi and Ogollah (2014) define transportation as a part of logistics that includes the actual movement of goods along the supply chain. Back, Tinnila, and Rajahonska (2010) state that there has been a recorded attempt to improve services and cut costs, which led to the division of the previously multipurpose operations provided by trucking and transport companies. The idea behind cut-rate trucking is to provide specialized services at a lower cost. At the same time, tasks such as final assembly, warehousing, and packing are seen as providing value.

According to Kenyon and Meixell (2011), Mwangangi (2016) defines transportation as the processes involved in transferring commodities and finished goods throughout the supply chain, particularly from suppliers to facilities. Laird (2012) asserts that transportation contributes significantly to the supply chain, increasing the value of commodities by making them easier to reach key markets. Since it links many businesses, transportation is an essential part of the logistics process, as stated by Atos (2012).

3. Methodology

A cross-sectional descriptive survey design was used in the research to target 156 workers from six listed agricultural companies. Questionnaires, interviews, and document analysis were used to gather data, which was then analyzed using descriptive statistics, Pearson's correlation and Regression model.

4. Findings and Discussions

4.1 Transport Management on Supply Chain Management

4.1.1 Descriptive Statistics

The objective of the study was to assess the influence of transportation management function on the supply chain management of agricultural firms listed at the Nairobi Securities Exchange. The data is summarized in Table 4.1

Table 4.1: Descriptive Statistics of Transport Management on Supply Chain Management

Statement	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
Transportation management in the supply chain enhances value for goods and items	67(50.4%)	39(29.3%)	3(2.3%)	13(0.8%)	11(8.3)
Transportation management in the supply chain serves as a connecting link between isolated activities	59(44.4%)	35(26.3%)	11(8.3%)	20(15.0%)	8(6.0%)
Transportation management acts as an economic activity inside a company logistics system	58(43.6%)	34(25.6%)	21(15.8%)	18(13.5%)	2(1.5%)
Transportation management increases complexity and interconnectivity of supply chain networks	58(43.6%)	52(39.1%)	11(8.3%)	6(4.5%)	6(4.5%)

Transportation management enhances warehouse productivity through coordination of the warehouse activities	53(39.8%)	48(36.1%)	19(14.3%)	9(6.8%)	4(3.0%)
Transportation management acts as a point of terminal management thus enhancing efficiency and effectiveness.	66(49.6%)	45(33.8%)	9(6.8%)	5(3.8%)	8(6.0%)
Transportation management integrates the loading planning system thus enhancing continuity of activities in the supply chain.	51(38.3%)	53(39.8%)	11(8.3%)	10(7.5%)	8(6.0%)

The study revealed that transportation management plays a critical role in enhancing the value of goods and items within the supply chain. A majority of respondents, 67 (50.4%) strongly agreed and 39 (29.3%) agreed, indicating that 79.7% of participants recognize transportation management as a key contributor to value addition. Only a small proportion of respondents disagreed or were neutral, suggesting a strong consensus on its importance in improving product value during movement and delivery processes.

The findings further indicate that transportation management serves as a vital connecting link between isolated activities in the supply chain. Specifically, 59 (44.4%) of respondents strongly agreed and 35 (26.3%) agreed, totaling 70.7% agreement. This demonstrates that respondents perceive transportation as an integrative function that ensures coordination among various supply chain activities. Similarly, transportation management was identified as an economic activity within the company's logistics system, with 69.2% of respondents either agreeing or strongly agreeing. This highlights the recognition of transportation as a cost-effective function that contributes to the overall efficiency of supply chain operations.

The study also found that transportation management increases the complexity and interconnectivity of supply chain networks, with 82.7% of respondents agreeing or strongly agreeing. This suggests that effective transportation planning and management enhance network linkages, facilitating the smooth flow of materials and information across the supply chain. Additionally, transportation management was reported to enhance warehouse productivity through better coordination of warehouse activities, as 75.9% of respondents either agreed or strongly agreed. The integration of terminal operations and loading planning systems was also seen as a critical factor, with 83.4% and 78.1% of respondents, respectively, recognizing its role in improving efficiency, continuity, and effectiveness of supply chain activities.

Overall, the results indicate that transportation management significantly influences supply chain performance in agricultural firms listed at the Nairobi Securities Exchange. It enhances value addition, promotes integration and coordination of activities, supports economic efficiency, increases network interconnectivity, and improves operational productivity. These findings underscore the importance of investing in effective transportation management strategies to optimise supply chain performance and achieve organizational objectives in the agricultural sector.

These findings align with the arguments of Kenyon and Meixell (2011) and Laird (2012), who emphasized that transportation plays a central role in logistics by facilitating the efficient movement of goods, thus enhancing product value and service delivery. Similarly, the study's findings reinforce the assertions by Tseng, Yue, and Taylor (2005) that transportation is a vital link connecting different logistical operations, and its efficiency directly influences overall supply chain performance. The positive and significant relationship observed in this study also corroborates the findings of Chan and Zhang (2011), who noted that effective transportation management, particularly through collaborative transportation models, enhances flexibility, reduces inefficiencies, and improves

service levels within supply chains. Furthermore, the results are consistent with Kyusya (2015), whose study on the Kenyan shipping industry found a positive correlation between transportation management and operational efficiency.

The significant contribution of transportation management to SCM observed in this study supports Murray’s (2017) argument that transportation costs constitute a substantial portion of logistics expenditure, and optimizing transport systems enhances cost efficiency and customer satisfaction. Additionally, the results align with Gitahi and Ogollah (2014) and Mwangangi (2016), who emphasized that transportation is a key logistical component influencing material flow, cost reduction, and operational performance. Therefore, the current findings empirically validate existing theoretical and empirical evidence, affirming that efficient transportation management through proper route planning, cost control, and integration with other logistical activities plays a pivotal role in improving supply chain efficiency, responsiveness, and competitiveness.

4.2 Correlation Analysis

Correlation analysis was conducted to determine the nature of relationship between transport management and supply chain management. The results is summarized in Table 4.2

Table 4. 2: Correlation Analysis of Transport Management on SCM

		Transportation Management	Supply Chain Management
Transportation Management	Pearson Correlation	1	.397**
	Sig. (2-tailed)		.000
	N	133	133
Supply Chain Management	Pearson Correlation	.397**	1
	Sig. (2-tailed)	.000	
	N	133	133

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

The results in Table 4.2 show a moderate, positive, and statistically significant relationship between transportation management and supply chain management ($r = 0.397, p < 0.05$). This implies that improvements in transportation planning, efficiency, cost management, and reliability are likely to enhance the overall performance of supply chain management in the organization.

The positive and significant relationship observed in this study also corroborates the findings of Chan and Zhang (2011), who noted that effective transportation management, particularly through collaborative transportation models, enhances flexibility, reduces inefficiencies, and improves service levels within supply chains.

4.3 Regression Analysis

A Simple linear regression analysis was performed to test the level of significance between the transport management and supply chain management and the results shown in Table 4.3.

Table 4. 3: Simple Linear Regression Analysis of Transport Management on SCM

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.	
	B	Std. Error	Beta			
1						
	(Constant)	.917	.185		4.951	.000
	Transportation Management	.446	.090	.397	4.948	.000

Model summary:

R=.397

R Square= .157

Adjusted R Square = .151

ANOVA:

F= 24.485

Sig. = 000

a. Dependent Variable: Supply Chain Management

Supply Chain Management Performance (Y) = $\beta_0 + \beta_1 X_1 + \epsilon_1$ Equation 4.1

Supply Chain Management Performance (Y) = $.917 + .446 X_1 + \epsilon_1$

The regression analysis results indicate that transportation management has a positive and significant influence on supply chain management (SCM) in agricultural firms listed on the Nairobi Securities Exchange. The model shows that transportation management explains 15.7% of the variation in SCM ($R^2 = 0.157$), with the relationship being statistically significant ($F = 24.485, p < 0.05$). The regression coefficient for transportation management ($B = 0.446, p < 0.05$) suggests that a unit increase in transportation management practices is associated with a 0.446 unit increase in SCM. These findings highlight that effective transportation management, including efficient routing, timely deliveries, and coordination of logistics, contributes significantly to enhancing the overall performance of supply chain operations.

The results align with Gitahi and Ogollah (2014) and Mwangangi (2016), who emphasized that transportation is a key logistical component influencing material flow, cost reduction, and operational performance. Therefore, the current findings empirically validate existing theoretical and empirical evidence, affirming that efficient transportation management through proper route planning, cost control, and integration with other logistical activities plays a pivotal role in improving supply chain efficiency, responsiveness, and competitiveness.

5. Summary, Conclusion and Recommendations

5.1 Summary

Transportation management was found to have a positive and significant effect on SCM. Descriptive statistics revealed that 50.4% of respondents strongly agreed and 29.3% agreed that transportation management enhances value, while 44.4% strongly agreed and 26.3% agreed that it serves as a linking function in the supply chain. Regression results indicated a coefficient of $B = 0.446, p < 0.05$, with transportation management explaining 15.7% of the variation in SCM ($R^2 = 0.157, F = 24.485$). This highlights that efficient transportation practices significantly improve supply chain performance.

5.2 Conclusion

The study concluded that transport management is a strategic driver of SCM performance in agricultural firms. It enhances efficiency through terminal operations, strengthens interconnectivity, adds value, and links warehouse activities. Although it explained a modest 19% of SCM variation, the significant predictive coefficient affirms transport as a critical enabler of operational efficiency and competitiveness.

5.3 Recommendations

Production firms should invest in efficient and reliable transport systems to enhance supply chain connectivity. This includes modern fleet management technologies, optimized routing, and integration of transport operations with warehousing and distribution. Policies promoting infrastructure development and digitalized transport management systems should also be prioritized to improve efficiency and reduce costs.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

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Artificial Intelligence (AI) Use Disclosure: The authors declare that no artificial intelligence tools were used in the preparation of this manuscript.

References

- [1] Atos, G. (2012). Transportation systems and supply chain efficiency. *Journal of Transport and Logistics*, 4(2), 45-57.
- [2] Bruns, A., Garca, M., & Lopez, J. (2013). Load planning optimization for intermodal container terminals. *Operations Research Review*, 22(3), 45-57.
- [3] Ergun, O., Kuyzu, G., & Savelsbergh, M. (2007). Reducing truckload transportation costs through collaboration. *Transportation science*, 41(2), 206-221.
- [4] Fantazy, K. A., Kumar, V., & Kumar, U. (2010). Supply management practices and performance in the Canadian hospitality industry. *International Journal of Hospitality Management*, 29(4), 685-693.
- [5] Fawcett, S. E., Ogden, J. A., Magnan, G. M., & Bixby Cooper, M. (2006). Organizational commitment and governance for supply chain success. *International Journal of Physical Distribution & Logistics Management*, 36(1), 22-35.
- [6] Flores, M., & Primo, M. A. (2008). Collaborative planning in supply chains. *Production Planning & Control*, 19(7), 701-712.
- [7] Kenyon, G. N., & Meixell, M. J. (2011). Success factors and cost management strategies for logistics outsourcing. *Journal of Management and Marketing Research*, 7, 1-10.
- [8] Kyusya, J.M. (2015). Effect of Logistics Outsourcing on Operational Performance of Shipping Industry in Kenya. University of Nairobi
- [9] Murray, A., Skene, K., & Haynes, K. (2017). The circular economy: An interdisciplinary exploration of the concept and application in a global context. *Journal of Business Ethics*, 140 (3), 369-380.
- [10] Mwangangi, P. (2016). Logistics performance and firm competitiveness in Kenya. *Journal of Supply Chain Management*, 5(2), 34-47.
- [11] Mwangangi, P. W. (2016). Influence of logistics management on performance of manufacturing firms in Kenya (Doctoral dissertation, COHred, supply chain management, JKUAT).
- [12] Saad, S., Mohamed Udin, Z., & Hasnan, N. (2014). Dynamic supply chain capabilities: A case study in the oil and gas industry. *International Journal of Supply Chain Management*, 3(2), 70-76