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Effect of Logistics Management Practices on Supply Chain Performance: A Case of Solektra Rwanda (2022–2026)

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***Abstract**: The general objective of this study was to assess the effect of logistics management practices on supply chain performance at Solektra Rwanda, located in Kigali, Rwanda. Data was collected using questionnaires, interviews, and documentation methods. Data analysis was conducted using statistical tools including descriptive statistics such as mean and standard deviation, as well as inferential statistics such as correlation and regression analysis. Statistical analysis was performed using SPSS software to examine the relationship between logistics management practices and supply chain performance. The results indicate model summary for the effect of logistics management practices on supply chain performance at Solektra Rwanda. The R value of 0.936 shows a very strong positive relationship between the combined predictors and supply chain performance. The R Square value of 0.877 means that transportation management, inventory management, warehousing management, and information flow management explained 87.7% of the variation in supply chain performance. The study concluded that logistics management practices significantly improve supply chain performance at Solektra Rwanda by strengthening delivery reliability, stock availability, warehouse efficiency, and information coordination. The study recommended that Solektra Rwanda should reinforce route optimization, stock visibility, warehouse layout organization, and real-time logistics information sharing to improve supply chain performance.*

***Keywords:** Logistics Management Practices, Transportation Management, Inventory Management, Warehousing Management, Information Flow Management, Supply Chain Performance*

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1. Introduction

Logistics management practices have changed from a narrow concern with transport and storage into a broader managerial function that links sourcing, warehousing, inventory control, information flow, and customer fulfilment. This change echoes a longer trend in business practice, as companies moved away from siloed processes and toward more integrated supply chain management. Coordination, transparency, and responsiveness are no longer seen as supplementary tasks, but as essential requirements for success in the field's current theoretical framework. Logistics management strategies are often seen as the systematic approaches that companies use to ensure the efficient flow of raw materials, data, and completed items across the value chain. Organizations throughout the globe are increasingly designing and managing logistics systems with digital transformation, sustainability, resilience, and inter-firm cooperation in mind, according to a new study in the field (Goertler *et al*., 2024).

Supply chain transformation, software-enabled collaboration, and a larger emphasis on transparency are becoming more synonymous with logistics management methods in Germany. New data from German supply chain managers reveals that businesses are working in an environment that is becoming more complicated, with more pressure from e-commerce and higher consumer expectations for trust and visibility. This implies that logistics is no longer just a back-office task; it increasingly influences how businesses plan, coordinate, and change their operations in competitive marketplaces. The utilization of new technology and supply chain governance focused on compliance is making logistics management more organized. Responsible supply chain management, digital competence, and operational control are interdependent in such a context (Berneis *et al*., 2024).

Manufacturing logistics management in Kenya is closely associated with transportation, inventory, warehousing, and logistics planning. Recent research on pharmaceutical manufacturing companies in Nairobi City County indicates that these practices are regarded as fundamental determinants of operational success rather than just regular support activities. This shows that businesses need to transfer products quickly, keep track of their inventories, and have reliable storage to do business well. The Kenyan instance also indicates that logistics management is becoming more about performance, which means that planning and execution need to be well-organized. This makes Kenya a good illustration of how logistics strategies may directly affect manufacturing production and the effectiveness of a business in East Africa (Ndung'u & Kwasira, 2024).

In Rwanda, logistics management practices are gaining attention in the energy-linked supply chain context, where transport management, warehouse management, and information management have been studied as key performance drivers. Recent research on Engie Energy Access Rwanda shows that these practices explain a substantial share of variation in supply chain performance, which highlights their practical importance within the organization. This suggests that logistics in Rwanda is increasingly viewed as a coordinated management function rather than a narrow movement activity. It also shows that information flow has become as important as physical distribution in improving performance outcomes. The Rwandan setting therefore reflects a growing recognition that logistics management practices are central to operational efficiency and supply chain effectiveness (Umutoni, 2024).

Supply chain performance has been associated with transportation, storage, packaging, inventory management, and distribution in Rwandan manufacturing and logistics service businesses. According to ADMA International and Magerwa Ltd, route planning, fleet management, order processing, and overall logistics coordination continue to be critical to operational performance. This makes the Rwandan instance particularly noteworthy since it demonstrates that logistics management strategies are being debated in both product-handling enterprises and industrial supply chains. This represents a shift in company practice from disjointed handling operations to centralized logistical management. Given the new data linking the management of logistics systems to both performance problems and improvements, Rwanda provides an excellent case study for research into logistics management methods (Jeanne, 2025).

Although these studies provide substantial evidence on supply chain challenges in Rwanda, limited attention has been given to how specific logistics management practices influence supply chain performance at the organizational level. In particular, the effect of logistics practices on the performance of firms such as Solektra Rwanda has not been clearly examined. This study therefore seeks to address this gap.

1.1 Objectives of the study

The general objective was to assess the effect of logistics management practices on supply chain performance at Solektra Rwanda.
The following specific objectives guided the study:

1. To examine the effect of transportation management on supply chain performance at Solektra Rwanda.
2. To assess the effect of inventory management on supply chain performance at Solektra Rwanda.
3. To evaluate the effect of warehousing management on supply chain performance at Solektra Rwanda.
4. To determine the effect of information flow management on supply chain performance at Solektra Rwanda.

2. Literature Review

This section presents theoretical review, empirical review, research gap, and conceptual framework.

2.1 Theoretical Review

This section presents the theoretical foundations that support the study by drawing on Network Theory, Economic Order Quantity (EOQ) Theory, Resource-Based View (RBV) Theory, and Information Theory, which together provide a comprehensive framework for understanding transportation management, inventory management, warehousing management, and information flow management, and how these dimensions collectively influence supply chain performance.

2.1.1 Network Theory

Network Theory, originally advanced by Wasserman and Faust in 1994, provides a systematic way to examine how interconnected elements operate within a system. Rather than viewing logistics activities in isolation, the theory treats transportation as part of a broader network of nodes and linkages. Within supply chains, these nodes include suppliers, warehouses, and customers, while the links represent transport routes and flows of goods. The analytical strength of this theory lies in its ability to explain how structural relationships influence system performance. It therefore becomes a useful lens for understanding how transportation systems operate as integrated networks rather than independent components (Foutakis, 2025).

Network Theory was used to frame the structure of transportation management practices at Solektra Rwanda as interconnected logistics networks involving suppliers, distribution points, and customers. It will explain how route design, connectivity, and coordination across these nodes influence efficiency in the movement of goods. The theory will specifically support the understanding that well-structured transportation networks enhance delivery reliability, reduce operational costs, and improve responsiveness.

2.1.2 Economic Order Quantity (EOQ) Theory

The Economic Order Quantity model, introduced by Harris in 1913, represents one of the earliest formal approaches to inventory control. It was designed to determine the most efficient order size that minimizes total inventory-related costs. The central idea revolves around balancing the cost of ordering with the cost of holding stock. Over time, this model has remained a cornerstone in operations management due to its simplicity and applicability. Even in modern systems, it continues to provide a reference point for inventory decision-making (Alnahhal *et al*., 2024).

Economic Order Quantity (EOQ) Theory guided the analysis of how inventory management practices at Solektra Rwanda influence supply chain performance through optimal stock control decisions. It will explain how balancing ordering and holding costs affect inventory availability and operational efficiency. The theory supported the argument that maintaining optimal inventory levels reduces stock imbalances and enhances continuity in supply chain operations.

2.1.3 Resource-Based View (RBV) Theory

Resource-Based View Theory, proposed by Barney in 1991, focuses on the internal capabilities of an organization as drivers of performance. Unlike approaches that emphasize external factors, this theory highlights the strategic importance of internal resources. It argues that competitive advantage arises when firms possess resources that are valuable, rare, difficult to imitate, and non-substitutable. In the context of logistics, warehousing assets such as infrastructure, systems, and human expertise fall within this category. These elements collectively determine the effectiveness of warehouse operations (Zvarimwa & Zimuto, 2022).

Resource-Based View Theory was applied to explain how warehousing management at Solektra Rwanda contributes to supply chain performance through the effective utilization of internal resources. It highlighted how infrastructure, technology, and human capabilities influence storage efficiency and order fulfillment processes. The theory supported the argument that strategically managed warehouse resources enhance operational effectiveness and competitiveness. In this context, warehousing capabilities were evaluated as essential drivers of improved supply chain performance.

2.1.4 Information Theory

Information Theory, introduced by Shannon in 1948, provides a scientific basis for understanding how information is transmitted within systems. The theory addresses issues such as signal accuracy, transmission efficiency, and reduction of uncertainty. Over time, it has been widely adopted in fields beyond communication, including information systems and logistics. Within supply chains, the theory helps explain how data flows influence coordination and operational effectiveness. It remains a fundamental framework for analyzing information exchange processes (Bianchini, 2025).

Information Theory was used to examine how information flow management at Solektra Rwanda supports supply chain performance through effective communication and data exchange. It will explain how accuracy, timeliness, and reliability of information influence coordination and decision-making across logistics activities. The theory supported the view that strong information systems reduce uncertainty and enhance synchronization within the supply chain.

2.3 Empirical Review

This section presents findings from previous studies related to logistics management practices and supply chain performance.

2.3.1 Transportation Management and Supply Chain Performance

Syafrianita *et al.* (2025) examined transportation-related sustainability decisions in Indonesia's courier industry by testing whether green transportation improves supply chain performance directly and through agility. A survey of 135 courier firms was analyzed using PLS-SEM, where route optimization and environmentally friendly transport modes were treated as strategic practices. The findings showed that green transportation significantly strengthened green supply chain agility ($\beta = 0.260$, $t = 5.336$), while its direct effect on green supply chain

performance was weaker (β = 0.187, t = 1.759). This indicates that transportation improvements yield stronger performance outcomes when they enhance responsiveness and flexibility rather than acting independently. Based on these results, the study recommended investment in transport innovations such as smarter routes and cleaner delivery systems alongside initiatives that build operational agility.

Muhalia *et al.* (2021) assessed how transportation management systems influence supply chain performance among FMCG manufacturers. A descriptive cross-sectional design was adopted, with structured questionnaires used to collect data on transport practices and performance indicators such as responsiveness and delivery reliability. Regression analysis revealed a strong positive relationship, with transportation management systems producing a statistically significant coefficient (B = 0.857, t = 12.389, p = 0.000). The model further demonstrated high explanatory power (Adjusted $R^2 = 0.768$), indicating that transport systems account for a substantial proportion of performance variation. These findings confirm that coordinated transport planning, fleet control, and routing significantly improve supply chain outcomes, leading to recommendations for continuous investment in transport technologies and process standardization.

Bwatete and Irechukwu (2024) analyzed transportation processes within Rwanda's manufacturing sector at ADMA International to determine how transport planning and fleet-related practices shape supply chain performance. Using a correlational design, the study measured transport planning, performance measurement, fleet management, and process synergy as explanatory variables. The regression results indicated statistically significant positive effects for transport planning (β = 0.265, p = 0.01), transport performance measurement (β = 0.204, p = 0.00), and fleet management (β = 0.313, p = 0.00). Among these, process synergy emerged as the strongest predictor (β = 0.337, p = 0.00), highlighting the importance of coordination across transport functions. The study concluded that performance improvements are maximized when planning, execution, and coordination mechanisms operate in an integrated manner, recommending stronger scheduling controls and alignment across dispatching and tracking systems.

2.3.2 Inventory Management and Supply Chain Performance

Research by George and Elrashid (2023) examined hospital pharmacy inventory management in Bahrain, focusing on how inventory level control and demand forecasting relate to pharmaceutical supply chain performance. Data was collected through a survey involving 171 respondents working in private hospitals, and structural equation modeling was applied to test relationships. The findings reported statistically significant positive relationships between inventory level control and pharmaceutical supply chain performance, as well as between demand forecasting and performance. These results indicate that effective inventory practices reduce stockout risks and stabilize medicine availability, which strengthens service continuity. The study emphasized the need to institutionalize forecasting routines and inventory control procedures to achieve consistent performance and minimize supply disruptions.

Empirical research conducted by Issah *et al.* (2025) assessed how inventory management techniques influence supply chain efficiency in Ghanaian organizations, while also examining technology readiness as a moderating factor. Using a quantitative cross-sectional survey design with a sample of 280 respondents, the study applied hypothesis testing to determine both direct and interaction effects. The results revealed a strong positive and statistically significant relationship between inventory management techniques and supply chain efficiency (β = 0.800, t = 17.787, p = 0.000). In addition, technology readiness demonstrated a significant direct effect (β = 0.788, t = 17.089, p = 0.000) and a significant moderating effect (β = 0.0724, t = 7.977, p = 0.000). These findings show that the effectiveness of inventory techniques is enhanced when supported by technological capability and workforce readiness, leading to improved efficiency outcomes.

The study by Anyona *et al.* (2021) looked at inventory management practices for antiretroviral medicines across eight public hospitals in Nyamira County and evaluated their influence on supply chain performance. A mixed-methods approach was applied, combining structured questionnaires, key informant interviews, facility checklists, and secondary data, achieving a response rate of 97.3%. Despite high adoption levels of recommended inventory practices, performance indicators remained weak, with an average order lead time of 17.98 days, a stockout rate of 52.12%, a stock wastage rate of 43.2%, and reporting rates of 70.84%. These results indicate that the presence of inventory practices alone does not guarantee improved performance where operational constraints such as staffing and storage conditions persist. The study recommended the adoption of electronic inventory systems and improved data-driven ordering processes to reduce inefficiencies.

2.3.3 Warehousing Management and Supply Chain Performance

Empirical research conducted by Hanafiah *et al.* (2022) looked at warehouse risk prioritization in Malaysia with the objective of improving warehouse productivity performance. The study applied a quantitative expert-judgment design involving 12 warehouse professionals who evaluated 32 warehouse-operation risk factors. Analytical Hierarchy Process (AHP) and Borda-count methods were used to rank and weight these risks, with the AHP consistency ratio reported at 0.04, confirming

reliability of the judgments. The analysis resulted in the identification of 13 critical risks requiring managerial attention. These findings indicate that systematic risk prioritization enhances warehouse efficiency and supports overall supply chain performance, particularly when resources are allocated to high-impact operational risks.

Research by Kamińska (2021) evaluated the application of Lean Six Sigma in warehouse operations within a European FMCG supply chain context. Using a case study design, the research applied diagnostic tools such as process mapping, cause–effect analysis, and spaghetti diagrams to examine warehouse processes in both internal and third-party logistics facilities.

The results demonstrated measurable performance improvements, with cost savings of €0.8 million in the internal distribution center and €2 million in the third-party warehouse. These outcomes highlight that structured process improvement approaches reduce inefficiencies and enhance operational performance. The study emphasized that continuous application of Lean Six Sigma practices can sustain improvements across supply chain networks.

The study by Kimathi and Wachiuri (2021) looked at material handling procedures within Kenya's dairy supply chain at Mount Kenya Dairies. A descriptive survey design was used, with 58 respondents selected from a population of 572 employees through structured questionnaires. Correlation and regression analysis revealed a strong positive relationship between material handling and organizational performance ($r = 0.641$, $p = 0.000$), with regression results confirming a significant predictive effect ($\beta = 0.699$, $t = 5.793$, $p = 0.000$). These results demonstrate that disciplined material handling reduces operational errors and improves efficiency in distribution processes. The study highlighted the importance of standardized handling procedures and appropriate equipment in sustaining performance.

2.3.4 Information Flow Management and Supply Chain Performance

The study by Umutoni (2024) investigated information management practices at Engie Energy Access Rwanda, focusing on their effect on supply chain performance. Using survey data analyzed through correlation and regression techniques, the study examined variables such as data accuracy, reporting systems, and communication processes. Results indicated a strong positive correlation between information management and supply chain performance ($r = 0.818$, $p = 0.000$). Regression findings further confirmed a statistically significant positive effect ($B = 0.380$, $t = 6.558$, $p = 0.000$). These results highlight that effective information systems enhance coordination and improve decision-making processes, leading to better performance outcomes.

Empirical research conducted by Huang et al. (2023) looked at supply chain visibility within Vietnam's garment industry, examining its relationship with resilience and performance. The study used survey data from 221 respondents and applied PLS-SEM for analysis. Findings showed that supply chain visibility had a strong positive effect on resilience (path coefficient = 0.895, $p = 0.000$), while the direct relationship with supply chain performance was not statistically significant (0.050, $p = 0.761$). This indicates that visibility contributes to performance indirectly through resilience mechanisms rather than direct effects. The study emphasized the importance of strengthening information systems alongside complementary capabilities to improve overall supply chain performance.

Research by Hailu *et al.* (2023) examined the influence of information and communication technology on pharmaceutical supply chain performance in Ethiopia. The study employed an analytical cross-sectional design with 300 valid responses analyzed using structural equation modeling. Results showed that supply chain practices had a strong direct effect on operational performance ($\beta = 0.65$, $p < .001$), while ICT contributed an additional positive effect ($\beta = 0.29$, $p < .001$). The model explained 73% of the variance in performance, indicating a strong relationship between information systems and operational outcomes. These findings confirm that ICT-enabled coordination enhances efficiency, service quality, and delivery reliability.

3. Methodology

This section presents the research approach used to examine logistics management practices and supply chain performance at Solektra Rwanda. It covers research design, population, data collection methods, validity and reliability, data analysis, and ethical considerations.

3.1 Research Design

The study adopted both descriptive and correlational research design. Descriptive analysis provided an overview and presented significant aspects of the dataset, offering insights into trends and patterns. Correlational analysis examined the strength of relationships between variables. Descriptive statistics was used to portray the frequency of responses, and key measures such as mean and standard deviation helped summarize the dataset, allowing for a clearer understanding of trends and variability related to transportation management, inventory management, warehousing management, information flow management, and supply chain performance at Solektra Rwanda.

3.2 Study Population and Census Approach

For this study, the target population at Solektra Rwanda comprised 181 individuals drawn from key operational units that directly influence supply chain performance. These include Procurement and Supply Chain staff, Inventory and Stores staff, Logistics and Transport staff, and Warehouse Management personnel.

Due to the small population size, the researcher employed a census method rather than a sampling approach. Instead of selecting a subset of the population, this method involved collecting data from every individual or unit within the population. The primary objective of this approach was to achieve a comprehensive understanding of the population under study in relation to logistics management practices and supply chain performance at Solektra Rwanda.

3.3 Data Collection Methods and Instruments

The research collected data through questionnaire techniques, interviews, and documentation techniques.

For this study, participants were provided with a structured questionnaire consisting of closed-ended questions measured on a five-point Likert scale. Each item offered response options ranging from 1 (Strongly Disagree), 2 (Disagree), 3 (Neutral), 4 (Agree), to 5 (Strongly Agree), enabling respondents to express the extent of their agreement with each statement. The questionnaires were completed by participants at their convenience and returned to the researcher within the specified timeframe using the same method of distribution.

To collect qualitative data, the researcher used a purposive sampling method to select participants who were directly relevant to the study. For this research, it was essential to gather data from the administrative staff of Solektra Rwanda, as they possess the knowledge and experience necessary to provide meaningful insights into the research topic. Various qualitative data collection techniques and interpersonal skills were employed while engaging with the selected participants to ensure rich and reliable information was obtained.

3.4 Reliability

Internal consistency of the questionnaire was assessed using Cronbach's Alpha coefficient through SPSS software. A coefficient value of 0.70 or higher was considered acceptable for the study. Questionnaire items that reduce the overall reliability of the instrument were revised or eliminated to strengthen the internal consistency of the measurement scales.

Table 1: Reliability Statistics

Variable	No of items	Cronbach's Alpha	Decision
Transportation management	5	.811	Reliable
Inventory management	5	.823	Reliable
Warehousing management	5	.836	Reliable
Information flow management	5	.849	Reliable
Supply chain performance	5	.858	Reliable

Source: Primary data, 2026

The findings in Table 3.2 indicate that all variables had Cronbach's Alpha coefficients above 0.700. The coefficients ranged from 0.811 to 0.858, which shows good internal consistency across the 25 questionnaire statements. Therefore, the questionnaire was considered reliable because each variable produced a coefficient above the recommended threshold for academic research.

3.5 Data Analysis

Both descriptive and inferential statistical methods were used to analyze the data. Descriptive statistics summarized the variables through frequencies, proportions, and percentages, while inferential statistics assessed relationships between the variables using correlation and regression analysis.

To investigate the relationships between variables, inferential statistics, including correlation analysis, were used. This helped assess the strength and nature of these relationships.

The multiple regression model for analysis was structured as follows:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon$

Y = supply chain performance X_1 = transportation management X_2 = inventory management

X_3 = warehousing management

X_4 = information flow management β_0 = Constant (intercept)

$\beta_1, \beta_2, \beta_3, \beta_4$ = Coefficients indicating the strength of each variable ϵ = Error term

Interview data were analyzed using thematic analysis. Responses from interviews were transcribed, coded, and organized into themes aligned with the study objectives. Emerging patterns and viewpoints were interpreted to complement quantitative findings and provide a deeper

understanding of how logistics management practices influence supply chain performance at Solektra Rwanda.

3.6 Ethical Considerations

The researcher emphasized obtaining informed consent from participants before they participated in the study. This included informing participants about the purpose of the study, the procedures involved, and any potential risks, so that they can make an informed decision regarding their participation. An introductory letter from the University of Kigali was issued to participants to clearly explain the purpose of the study, while formal approval was obtained from the relevant authorities within Solektra Rwanda to ensure adherence to ethical research standards.

4. Results and Discussion

This section presents field results on logistics management practices and supply chain performance at Solektra Rwanda. It presents the response rate, descriptive statistics, inferential statistics, decision on null hypotheses, and discussion of findings according to the specific objectives of the study.

The response rate findings showed that questionnaires returned and complete were 172, representing 95.0%, while returned incomplete questionnaires were 7, representing 3.9%. Questionnaires not returned were 2, representing 1.1%. This high response rate shows that the study obtained sufficient data from staff directly involved in procurement, inventory, transport, and warehousing operations at Solektra Rwanda.

Table 2: Response Rate

Response status	Frequency	Percentage
Questionnaires returned and complete	172	95.0
Returned incomplete	7	3.9
Not returned	2	1.1
Total	181	100.0

Source: Primary data, 2026

The findings in Table 2 indicate the response rate for the study on logistics management practices and supply chain performance at Solektra Rwanda. Questionnaires returned and complete were 172, representing 95.0%, while returned incomplete questionnaires were 7, representing 3.9%. Questionnaires not returned were 2, representing 1.1%, which may be explained by respondents being unavailable during the collection period and others being engaged in field logistics duties. This high response rate shows that the study obtained sufficient data from staff directly involved in procurement, inventory, transport, and warehousing operations at Solektra Rwanda.

4.1. Inferential Statistics

This section presents inferential statistics used to establish the effect of logistics management practices on supply chain performance at Solektra Rwanda. Regression analysis was used to determine the combined and individual effect of transportation management, inventory management, warehousing management, and information flow management on supply chain performance.

4.1.1 Regression Analysis

Regression analysis was conducted to determine the effect of logistics management practices on supply chain performance at Solektra Rwanda. The model summary table shows the strength of the model and the proportion of variation explained by the predictors, the ANOVA table tests whether the regression model was statistically significant, and the coefficients table shows the individual effect of each logistics management practice on supply chain performance.

Table 3: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.936[a]	.877	.874	.13290	1.535

a. Predictors: (Constant), Information Flow Management, Transportation Management, Warehousing Management, Inventory Management
b. Dependent Variable: Supply Chain Performance

Source: Primary data, 2026

The results in Table 3 indicates model summary for the effect of logistics management practices on supply chain performance at Solektra Rwanda. The R value of 0.936 shows a very strong positive relationship between the combined predictors and supply chain performance. The

R Square value of 0.877 means that transportation management, inventory management, warehousing management, and information flow management explained 87.7% of the variation in supply chain performance. The remaining 12.3% may be explained by other factors not included in this model, such as supplier reliability, market demand conditions, staff capacity, or external distribution challenges. The Durbin-Watson value of 1.535 was close to the acceptable range around 2, indicating that the residuals did not show serious autocorrelation concerns in the regression model.

Table 4: ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21.031	4	5.258	292.111	.000[b]
	Residual	2.949	167	.018		
	Total	23.981	171			

a. Dependent Variable: Supply Chain Performance

b. Predictors: (Constant), Information Flow Management, Transportation Management, Warehousing Management, Inventory Management

Source: Primary data, 2026

The findings in Table 4 indicates ANOVA summary for the regression model on logistics management practices and supply chain performance at Solektra Rwanda. The F value was 292.111, showing that the overall regression model was strong in explaining supply chain performance. The significance value was 0.000, which is below the 0.05 level of significance. This means that the combined effect of transportation management, inventory management, warehousing management, and information flow management on supply chain performance was statistically significant. Therefore, the regression model was suitable for explaining how logistics management practices affected supply chain performance at Solektra Rwanda.

Table 5: Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
	B	Std. Error	Beta	T	Sig.	Tolerance	VIF
1 (Constant)	.160	.122		1.311	.191		
Transportation Management	.137	.035	.153	3.914	.000	.495	2.020
Inventory Management	.349	.120	.353	2.908	.004	.050	20.056
Warehousing Management	.144	.030	.182	4.800	.000	.507	1.971
Information Flow Management	.336	.117	.342	2.872	.005	.052	19.288

a. Dependent Variable: Supply Chain Performance

Source: Primary data, 2026

The results in Table 5 indicates coefficients summary for the individual effect of logistics management practices on supply chain performance at Solektra Rwanda. The constant value was 0.160, showing the predicted level of supply chain performance when transportation management, inventory management, warehousing management, and information flow management are held constant. The t value of 1.311 and significance value of 0.191, which is above 0.05, show that the constant was not statistically significant. This means that the intercept alone did not make a meaningful contribution to the model. The constant was therefore only used as part of the fitted regression equation.

Transportation management had a coefficient of B = 0.137, meaning that a one-unit increase in transportation management would increase supply chain performance by 0.137 units when other variables are held constant. The t value of 3.914 and significance value of 0.000 show that the effect was statistically significant because the p value was below 0.05. The tolerance value of 0.495 and VIF value of 2.020 indicate no serious multicollinearity problem for transportation management. This means that transportation management made a reliable independent contribution to supply chain performance. Based on this result, the null hypothesis stating that there is no significant effect of transportation management on supply chain performance at Solektra Rwanda was rejected.

Inventory management had a coefficient of B = 0.349, meaning that a one-unit increase in inventory

management would increase supply chain performance by 0.349 units when other predictors are held constant. The t value of 2.908 and significance value of 0.004 show that inventory management had a statistically significant effect because the p value was below 0.05. The tolerance value of 0.050 and VIF value of 20.056 show high multicollinearity, meaning that inventory management shared strong overlap with at least one other predictor in the model. Although the variable was statistically significant, its coefficient should be interpreted with caution because of the high VIF value. Based on the significance result, the null hypothesis stating that there is no significant effect of inventory management on supply chain performance at Solektra Rwanda was rejected.

Warehousing management had a coefficient of B = 0.144, meaning that a one unit increase in warehousing management would increase supply chain performance by 0.144 units when other variables are held constant. The t value of 4.800 and significance value of 0.000 show that the effect was statistically significant because the p value was below 0.05. The tolerance value of 0.507 and VIF value of 1.971 indicate no serious multicollinearity concerning warehousing management. This means that warehousing management made a stable independent contribution to supply chain performance. Based on this result, the null hypothesis stating that there is no significant effect of warehousing management on supply chain performance at Solektra Rwanda was rejected.

Information flow management had a coefficient of B = 0.336, meaning that a one unit increase in information flow management would increase supply chain performance by 0.336 units when other variables are held constant. The t value of 2.872 and significance value of 0.005 show that the effect was statistically significant because the p value was below 0.05. The tolerance value of 0.052 and VIF value of 19.288 show high multicollinearity, indicating that information flow management had strong overlap with another predictor, especially inventory management. Although the effect was statistically significant, the coefficient should be read carefully due to this high collinearity. Based on the significance result, the null hypothesis stating that there is no significant effect of information flow management on supply chain performance at Solektra Rwanda was rejected.

Therefore, the coefficient results show that all four logistics management practices had statistically significant positive effects on supply chain performance at Solektra Rwanda. Inventory management recorded the largest unstandardized coefficient, followed by information flow management, warehousing management, and transportation management. The collinearity results show acceptable values for transportation and warehousing management, but high VIF values for inventory and information flow management. This means that the model confirmed significant effects, while interpretation of inventory and information flow coefficients requires caution because the two variables shared strong explanatory overlaps.

The adopted model for analysis was structured as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon$$

Where Y = supply chain performance; X_1 = transportation management; X_2 = inventory management; X_3 = warehousing management; X_4 = information flow management; β_0 = constant; $\beta 1$ to $\beta 4$ = regression coefficients; and e = error term.

The fitted regression model was:

$$Y = 0.160 + 0.137X_1 + 0.349X_2 + 0.144X_3 + 0.336X_4 + e$$

This fitted model shows that inventory management had the largest positive coefficient, followed by information flow management, warehousing management, and transportation management. It means that improvement in each logistics management practice was associated with improvement in supply chain performance when the other variables were held constant. The model therefore confirms that logistics management practices were important predictors of supply chain performance at Solektra Rwanda.

4.2 Decision on Null Hypotheses

This section presents the decision on the null hypotheses of the study based on the regression coefficients and significance values. The decision was made at the 0.05 level of significance, where a null hypothesis was rejected when the p-value was less than 0.05 and retained when the p-value was greater than 0.05.

Table 6: Decision on Null Hypotheses

Null Hypotheses	Sig.	Decision
$H_0$1: There is no significant effect of transportation management on supply chain performance at Solektra Rwanda.	0.000	Rejected
$H_0$2: There is no significant effect of inventory management on supply chain performance at Solektra Rwanda.	0.004	Rejected
$H_0$3: There is no significant effect of warehousing management on supply chain performance at Solektra Rwanda.	0.000	Rejected
$H_0$4: There is no significant effect of information flow management on supply chain performance at Solektra Rwanda.	0.005	Rejected

Source: Primary data, 2026

The findings in Table 6 indicate the decision on null hypotheses for the study on logistics management practices and supply chain performance at Solektra Rwanda. The null hypotheses for transportation management, inventory management, warehousing management, and information flow management were all rejected because their significance values were below

0.05. This means that each logistics management practice had a statistically significant positive effect on supply chain performance. Therefore, the study confirmed that supply chain performance at Solektra Rwanda was influenced by transportation management, inventory management, warehousing management, and information flow management.

4.2 Discussion of Research Findings

This section discusses the research findings in relation to reviewed literature and relevant theories. The discussion is organized according to the four specific objectives and focuses on how descriptive and inferential results correspond with previous studies on logistics management practices and supply chain performance, without repeating statistical details.

4.3.1 Transportation Management and Supply Chain Performance

The findings on transportation management align with Muhalia *et al*. (2021), who established that transportation management systems support supply chain performance by improving responsiveness, route planning, and delivery reliability among fast-moving consumer goods manufacturers. They also correspond with Bwatete and Irechukwu (2024), who found that transport planning, fleet management, and process synergy strengthen performance when transport functions are coordinated through scheduling, monitoring, and operational alignment.

The theoretical interpretation of transportation management is grounded in Network Theory, originally advanced by Wasserman and Faust, which views supply systems as interconnected nodes and routes that must operate together to produce reliable outputs. In the context of Solektra Rwanda, this theory supports the view that route optimization, delivery scheduling, fleet coordination, transit monitoring, and load consolidation improve performance because they connect suppliers, warehouses, transport teams, and customers within one coordinated logistics network.

4.3.2 Inventory Management and Supply Chain Performance

The relationship and effect of inventory management on supply chain performance resonate with Habiyambere and Akumuntu (2025), who found that disciplined inventory cost control, stock level management, and structured ordering systems contribute to manufacturing supply chain performance in Rwanda. The results are also in line with Nsanzimana and Akumuntu (2024), who emphasized that inventory control and technology-supported monitoring help organizations improve availability, responsiveness, and service reliability.

The discussion is also supported by Economic Order Quantity Theory, introduced by Harris, which emphasizes the need to balance ordering and holding decisions so that stock availability is achieved without unnecessary cost. In Solektra Rwanda, this theory explains why stock visibility, reorder planning, demand alignment, stock accuracy, and inventory tracking are important for supply chain performance because they help the organization maintain continuity while avoiding both shortages and excess stock.

4.3.3 Warehousing Management and Supply Chain Performance

The findings on warehousing management agree with Mwizerwa and Akumuntu (2024), who demonstrated that material handling, warehouse inventory management, and capacity planning improve supply chain performance by strengthening storage control and internal logistics efficiency. They also correspond with Kamińska (2021), who showed that structured warehouse process improvement reduces inefficiencies and supports stronger operational performance when storage layout, handling, and movement systems are continuously improved.

The theoretical discussion is grounded in Resource-Based View Theory, proposed by Barney, which explains that internal resources such as warehouse infrastructure, layout design, systems, equipment, and staff capabilities can create operational advantage when they are valuable and properly managed. In the case of Solektra Rwanda, this theory supports the role of space utilization, storage arrangement, picking coordination, handling procedures, and layout organization in improving supply chain performance through efficient use of internal logistics resources.

4.3.4 Information Flow Management and Supply Chain Performance

The results on information flow management are consistent with Umutoni (2024), who found that information management practices in Rwanda's energy sector improve supply chain performance by strengthening data accuracy, reporting systems, and communication processes. They are also supported by Hailu *et al.* (2023), who showed that ICT-enabled coordination improves operational performance by enhancing visibility, service quality, efficiency, and delivery reliability in pharmaceutical supply chain settings.

Information Theory, introduced by Shannon, supports the interpretation of information flow management because it explains how accurate, timely, and reliable transmission of information reduces uncertainty in coordinated systems. At Solektra Rwanda, this theory justifies the importance of data integration, system connectivity, information sharing, communication coordination, and real-time updates because supply chain performance depends on how quickly and accurately information moves between procurement, warehouse, inventory, transport, and customer-facing units.

5. Conclusion and Recommendations

5.1 Conclusion

The study concluded that transportation management contributed positively to supply chain performance at Solektra Rwanda. Route optimization, delivery scheduling, fleet coordination, transit monitoring, and load consolidation improved the ability of the organization to move products efficiently and reliably.

The study concluded that inventory management had a meaningful positive effect on supply chain performance at Solektra Rwanda. Stock visibility, reorder planning, demand alignment, stock accuracy, and inventory tracking supported product availability and continuity in logistics operations.

The study concluded that warehousing management positively influenced supply chain performance at Solektra Rwanda. Space utilization, storage arrangement, picking coordination, handling procedures, and layout organization improved internal logistics efficiency and product movement.

The study concluded that information flow management had a positive effect on supply chain performance at Solektra Rwanda. Data integration, system connectivity, information sharing, communication coordination, and real-time updates improved coordination and decision-making across logistics functions.

The study generally concluded that logistics management practices play a major role in improving supply chain performance at Solektra Rwanda. Transportation management, inventory management, warehousing management, and information flow management all contributed positively to performance outcomes. The study showed that supply chain performance depends on the combined strength of physical movement, stock control, storage organization, and information exchange.

5.2 Recommendations

Based on the findings and conclusions of the study, the following recommendations are proposed to address the identified gaps and strengthen the practices examined in the study.

1. Solektra Rwanda should strengthen transportation management by improving route optimization, delivery scheduling, fleet coordination, transit monitoring, and load consolidation to support timely and reliable delivery of products.
2. Solektra Rwanda should improve inventory management by ensuring stock visibility, timely

reorder planning, accurate stock records, demand alignment, and continuous inventory tracking to avoid stock interruptions.

3. Solektra Rwanda should improve warehousing management by organizing warehouse layouts, strengthening handling procedures, improving space utilization, and coordinating picking activities to reduce delays and damage.
4. Solektra Rwanda should strengthen information flow management by integrating data across procurement, inventory, warehouse, and transport units, and by improving real-time updates on stock availability, order status, dispatch progress, and delivery challenges.

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