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Influence of Logistics Service Quality, Delivery Reliability, and Price on Customer Satisfaction with Customer Service as Mediator and Logistic Service Recovery as Moderator in Freight Forwarding Industry

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ABSTRACT
The growing competition in the logistics industry, particularly in freight forwarding, requires companies to deliver superior services that meet customer needs and expectations. This research aims to assess the conditions of Logistics Service Quality, Delivery Reliability, Price, Customer Service, Logistic Service Recovery, and Customer Satisfaction at PT Silkargo; analyze the effects of Logistics Service Quality, Delivery Reliability, and Price on Customer Satisfaction; examine the mediating role of Customer Service; and evaluate the moderating role of Logistic Service Recovery in the proposed research model. A quantitative explanatory design was applied using purposive sampling to collect responses from PT Silkargo customers. Data were obtained through a Likert-scale questionnaire and analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) to test direct, mediating, and moderating relationships among variables. The results show that Logistics Service Quality, Delivery Reliability, and Price significantly influence Customer Satisfaction, while Customer Service significantly mediates the relationships between those antecedents and Customer Satisfaction. Logistic Service Recovery significantly moderates the relationships between Logistics Service Quality and Customer Satisfaction, as well as between Price and Customer Satisfaction, but does not significantly moderate the relationship between Delivery Reliability and Customer Satisfaction. These findings indicate that, in the context of B2B lubricant distribution, customer satisfaction is threshold-based, where reliability and service quality function as necessary conditions rather than sources of competitive advantage.

INTRODUCTION

The rapid growth of international trade and the increasing demand for the distribution of high-value industrial products, such as lubricants in the automotive, manufacturing, and energy sectors, have significantly strengthened the role of freight forwarding companies as a critical node in the global logistics system. Freight forwarders are no longer limited to the physical movement of goods, but are also responsible for ensuring the reliability of logistics processes through timeliness, document accuracy, cargo security, and consistent service quality until products reach the end customers (Adin et al., 2021; Balaji & Yoganandan, 2024; Yanuar & Siregar, 2023). Lubricant products, in particular, possess sensitive physical and chemical characteristics that require strict handling and storage procedures. Any deviation in logistics operations may lead to product degradation and ultimately disrupt customer trust in business-to-business (B2B) relationships (Balaji & Yoganandan, 2024). Moreover, freight forwarding

operations involve a high level of complexity compared to other service sectors, as they require the simultaneous integration of physical flows, information flows, and financial flows across the supply chain.

The operational complexity of freight forwarding also exposes companies to higher logistics risks, particularly in handling lubricant cargo (Fauziah & Nugroho, 2022; Hair et al., 2019; Zeithaml et al., 2018). These risks include physical damage caused by improper stacking or vibration, contamination from moisture and dust particles, documentation mismatches, and variability in maritime schedules that may extend lead times. In a B2B context, disruptions in logistics flows can trigger production downtime, operational delays, and financial losses for industrial customers. Therefore, the ability of service providers to proactively manage logistics risks becomes a key determinant in shaping customer perceptions of service quality and operational reliability. This highlights the importance of developing a robust logistics system that is not only efficient but also resilient to uncertainties (Hartanto & Yusuf, 2021; Kline, 2016; Kotler & Keller, 2016).

Recent Indonesian evidence shows that logistics customer service significantly improves logistics performance and customer retention, indicating that interaction quality remains a central mechanism linking logistics operations to customer outcomes (Nasrudin et al., 2025). In modern logistics, customer perception is not solely influenced by price or service attributes, but also by measurable logistics performance. Indicators such as on-time delivery (OTD), document accuracy, schedule reliability, cargo condition upon arrival, and responsiveness of information have become critical parameters in evaluating service effectiveness. Consistent operational performance enables industrial customers to reduce uncertainty, maintain production continuity, and minimize costs associated with delays or damages. Logistics service quality reflects the customer's perception of service interaction and support processes, while operational performance such as delivery reliability represents a distinct dimension that directly impacts service outcomes and customer satisfaction (Lestiani, 2022). Thus, logistics performance metrics serve as the foundation of perceived service quality and play a crucial role in shaping customer satisfaction.

From a service marketing perspective, customer satisfaction is defined as the result of the comparison between initial expectations and the actual performance of the service received (Kotler & Keller, 2016). In the logistics sector, Logistics Service Quality (LSQ) is considered a fundamental factor influencing customer experience. Dimensions such as reliability, timeliness, cargo security, documentation accuracy, and responsive communication have been empirically proven to enhance customer satisfaction and loyalty in B2B logistics services (Ellitan, 2023). Furthermore, studies in the Indonesian logistics sector indicate that superior logistics services can create added value and reduce uncertainty in supply chain operations (Purwoko, 2025). These findings underline the strategic importance of service quality as a competitive advantage in the freight forwarding industry.

One of the key determinants of customer satisfaction in logistics services is delivery reliability, which refers to the consistency of service providers in fulfilling delivery promises in terms of time, route, condition, and agreed service specifications. In freight forwarding operations, delivery reliability encompasses vessel and trucking schedules, lead time stability, stuffing and unstuffing accuracy, minimal route deviations, and assurance that goods arrive in proper condition. Variability in shipping schedules, port congestion, and operational

disruptions can significantly reduce delivery reliability. Recent studies have shown that delivery reliability has a direct impact on customer satisfaction and loyalty, particularly in B2B contexts where customers rely heavily on supply continuity to sustain production processes (Hossain, 2023; Asawawibul, 2025). Therefore, consistent and timely delivery performance serves as a critical value proposition in differentiating freight forwarding companies in a competitive market.

In addition to operational performance, price also plays a significant role in shaping customer satisfaction. In logistics services, price represents both an economic value indicator and a signal of service quality. A mismatch between the price charged and the perceived value of the service can lead to dissatisfaction and negatively influence repurchase decisions (Asawawibul, 2025). Consequently, transparent and competitive pricing structures are essential to meet customer expectations and maintain long-term business relationships in the freight forwarding industry.

However, the relationship between delivery reliability, service quality, and price with customer satisfaction is not always direct. Customer service (CS) plays a crucial mediating role in translating technical and operational performance into perceived service experiences. Customer service functions include communication, shipment coordination, problem resolution, and proactive complaint handling. Empirical evidence suggests that competent customer service significantly enhances customer satisfaction and trust in logistics services (Purwoko, 2025). This highlights the importance of incorporating customer service as a mediating variable in analyzing customer satisfaction models within the logistics sector.

Furthermore, the complex nature of logistics operations makes them highly susceptible to service failures, such as delivery delays, cargo damage, and documentation errors. If not managed properly, these failures can lead to severe customer dissatisfaction and potential switching behavior. Therefore, Logistic Service Recovery, through prompt responses, effective communication, and appropriate compensation, becomes a critical moderating variable that can strengthen or weaken the relationship between service attributes and customer satisfaction (Gani, 2024). In some cases, effective recovery efforts can even enhance customer satisfaction beyond pre-failure levels (Balaji & Yoganandan, 2024). This emphasizes the strategic importance of recovery mechanisms in maintaining service excellence.

The urgency of this research is further supported by empirical industry data. The Indonesian freight and logistics market is projected to reach USD 131.2 billion in 2025 and grow to USD 178.1 billion by 2030, with a compound annual growth rate (CAGR) of approximately 6.29% (Mordor Intelligence, 2024). Maritime transportation, as the backbone of domestic logistics, accounts for around 78% of total freight forwarding revenue. Additionally, domestic sea cargo volume reached 242.1 million tons in the first half of 2025, reflecting a 22.40% increase compared to the previous year (BPS, 2025). These trends indicate an increasingly dynamic and complex logistics environment.

At the same time, the Indonesian lubricant market is projected to grow from 1.20 billion liters in 2025 to 1.38 billion liters by 2030, with a CAGR of approximately 2.74% (Mordor Intelligence, 2024). This growth is driven by the expansion of the automotive sector, manufacturing activities, and infrastructure development. As a result, the demand for reliable and high-quality lubricant distribution continues to increase, further emphasizing the strategic role of freight forwarding services in ensuring product integrity throughout the supply chain.

Based on the theoretical framework, empirical findings, and industry data, this study aims to analyze the influence of logistics service quality, delivery reliability, and price on customer satisfaction, with customer service as a mediating variable and logistic service recovery as a moderating variable in freight forwarding companies within the lubricant distribution sector (Nirmala & Pertiwi, 2020; Oktaviani et al., 2021; Prasetyo et al., 2021). This research is expected to contribute to the development of logistics service quality literature and provide practical insights for companies to enhance competitiveness, retain key customers, and optimize operational performance in lubricant supply chains (Sumarna & Siregar, 2024).

Although previous studies have examined the relationship between logistics service quality and customer satisfaction in various logistics contexts (Thai, 2013), as well as the effects of delivery reliability and price on customer satisfaction and loyalty (Banomyong & Supatn, 2011), most of these studies have focused on direct relationships between variables. Limited research has explored the integrated model that simultaneously incorporates mediation and moderation mechanisms. Furthermore, studies specifically addressing the integration of Logistics Service Quality, Delivery Reliability, and Price with Customer Service as a mediator and Logistic Service Recovery as a moderator in the context of B2B lubricant distribution remain scarce. Given the unique characteristics of lubricant logistics, such as long-term contracts, high safety standards, and the risk of production downtime, this study seeks to fill this research gap by proposing a comprehensive analytical framework that integrates operational performance, service quality, and interaction mechanisms in freight forwarding services (Lestari & Hidayat, 2022; Lestiani, 2022; Nasrudin et al., 2025).

This research aims to assess the condition of the variables of Logistics Service Quality, Delivery Reliability, Price, Customer Service, Logistic Service Recovery, and Customer Satisfaction at PT Silkargo, analyze the influence of the three independent variables on Customer Satisfaction, test the role of Customer Service mediation, and evaluate the role of Logistic Service Recovery moderation. Theoretically, this study enriches the literature on logistics service management by integrating operational, economic, relational, and corrective variables in one comprehensive model framework, and confirms that B2B customer satisfaction is threshold-based where reliability and service quality are necessary conditions. Practically, this research provides strategic input for PT Silkargo and other freight forwarding companies in increasing competitiveness, retaining customers, optimizing operational performance, and developing a transparent pricing policy and structured service recovery system.

Based on the theoretical framework and prior empirical findings, the following hypotheses are proposed: H1 suggests that Logistics Service Quality has a significant positive effect on Customer Satisfaction. H2 posits that Delivery Reliability has a significant positive effect on Customer Satisfaction. H3 asserts that Price has a significant positive effect on Customer Satisfaction. H4 indicates that Customer Service has a significant positive effect on Customer Satisfaction. H5 proposes that Customer Service mediates the relationship between Logistics Service Quality and Customer Satisfaction. H6 suggests that Customer Service mediates the relationship between Delivery Reliability and Customer Satisfaction. H7 indicates that Customer Service mediates the relationship between Price and Customer Satisfaction. H8 asserts that Logistic Service Recovery moderates the relationship between Logistics Service Quality and Customer Satisfaction. H9 proposes that Logistic Service Recovery moderates the

relationship between Delivery Reliability and Customer Satisfaction. Lastly, H10 posits that Logistic Service Recovery moderates the relationship between Price and Customer Satisfaction.

METHOD

This study used an analytical method with a quantitative causal non-comparative design to examine the relationships among variables (Sugiyono, 2018). The research was conducted at Silkargo, a company operating in the lubricant sector, focusing on its customers as respondents. The study took place from December 2025 to February 2026.

The research instrument used was a structured questionnaire developed based on 25 indicators and distributed by Google Forms. Prior to data collection, the instrument was tested for validity and reliability on 30 respondents. The sampling technique followed the SEM-PLS guideline, requiring a minimum of 125 respondents (5 × 25 indicators). Data were collected through questionnaires and analyzed using appropriate statistical techniques to test the proposed model.

RESULT AND DISCUSSION

Outer Structural Model

Partial Least Squares Structural Equation Modeling (PLS-SEM) is utilized to examine the proposed research framework in two sequential phases: evaluation of the measurement model (outer model) and assessment of the structural model (inner model). The outer model is employed to test construct reliability and validity, ensuring that each indicator properly represents its corresponding latent construct. After confirming the adequacy of the measurement model, the structural model is analyzed to evaluate the proposed hypotheses.

Convergent validity is considered satisfactory when indicator loadings are ≥ 0.70 and the Average Variance Extracted (AVE) exceeds 0.50. Discriminant validity is assessed using the Fornell-Larcker criterion, which requires that the square root of AVE for each construct be greater than its correlations with other constructs. Reliability is established when both composite reliability and Cronbach's alpha values are above 0.70.

For the structural model evaluation, the magnitude and significance of relationships among constructs were determined through T-values, P-values, and R-squared (R^2) statistics. Following the commonly accepted two-tailed test at the 5% significance level, a relationship is considered statistically significant when the T-value exceeds 1.96 and the P-value is below 0.05. R^2 values of 0.75, 0.50, and 0.25 indicate substantial, moderate, and weak explanatory power, respectively. As presented in Table 1, the PLS-SEM findings demonstrate that all indicators satisfy the criteria for convergent validity, with loadings ≥ 0.70 and AVE ≥ 0.50, indicating strong internal consistency and adequate inter-item correlations within each construct.

Table1. Validity and Reliability of the variables

Construct	Indicator	FcL	Cb_α	Cmp_RI	AVE
Customer Service			.909	.936	.787
	CS1	.863			
	CS2	.808			
	CS3	.93			

	CS4	.94			
Customer Satisfaction			.933	.953	.835
	CSAT1	.951			
	CSAT2	.951			
	CSAT3	.94			
	CSAT4	.805			
Delivery Reliability			.947	.959	.825
	DR1	.932			
	DR2	.907			
	DR3	.855			
	DR4	.915			
	DR5	.93			
Price			.918	.942	.804
	PR1	.851			
	PR2	.948			
	PR3	.868			
	PR4	.915			
Service Quality				.945	.810
	SQ1	.912			
	SQ2	.931			
	SQ3	.821			
	SQ4	.932			
Service Recovery				.930	.770
	SR1	.778			
	SR2	.871			
	SR3	.928			
	SR4	.924			

FcLd = Factor Loading; Cb_α = Cronbach's alpha;Cmp_Rl = Composite Reliability; A_V_E = AVE

Source: Primary data processed using SmartPLS 4.0, 2026

Table 2 shows that all constructs demonstrate square root of AVE values that exceed the correlations among constructs. This indicates that each construct explains its own indicators more effectively than it explains other constructs. Therefore, discriminant validity based on the Fornell-Larcker criterion is confirmed.

Table 2. Fornell - Larcker

Construct	√AVE	Correlation Range
CS	0,887	0,159–0,819
CSAT	0,914	0,186–0,545
DR	0,908	0,213–0,819
PR	0,897	0,075–0,793
SQ	0,900	0,113–0,717
SR	0,877	0,075–0,213

Source: Primary data processed using SmartPLS 4.0, 2026

Inner Structural Model Results

The analysis was then extended to the evaluation of the inner model, beginning with the assessment of goodness of fit (GoF) to determine the structural model's overall ability to explain the relationships among latent constructs. As shown in table 3, the R^2 values indicate that the Customer Satisfaction variable demonstrates a moderate level of explanatory power, while Customer Service falls within the strong category. This suggests that the exogenous variables adequately explain the variance of the endogenous variables at PT Silkargo. The Q^2 values for both endogenous constructs exceed 0.35, indicating strong predictive relevance. Therefore, the model possesses substantial predictive capability in explaining the behavior of the endogenous variables within the research context. The SRMR value of 0.073 indicates that the model fits well. This finding suggests that the structural model has appropriately represented the empirical data.

Table 3. Goodness of Fit models

No	Parameter	CS	CSAT	Criteria
1	R^2	0,734	0,476	Strong / Moderate
2	Q^2	0,571	0,393	Big predictive relevance
3	SRMR	0,073	0,073	Fit

Source: Primary data processed using SmartPLS 4.0, 2026

To determine the statistical significance of each proposed relationship, a two-tailed test at the 5% significance level was applied, using the criteria of T-statistics greater than 1.96 and P-values below 0.05. As presented in Table 4, most of the hypothesized relationships are supported, while Hypothesis 4 and Hypothesis 9 are not supported under the applied two-tailed significance threshold.

Table 4. Hypothesis Testing Conclusion

No	Hypothesis	Result	Conclusion
1	H1: SQ → CSAT (+)	p=0,000; t=12,953; β=0,315	Accepted
2	H2: DR → CSAT (+)	p=0,002; t=2,965; β=0,112	Accepted
3	H3: PR → CSAT (+)	p=0,000; t=5,383; β=0,181	Accepted
4	H4: CS → CSAT (+)	p=0,025; t=1,955; β=0,076	Rejected
5	H5: CS mediates SQ → CSAT	p=0,006; t=2,525; β=0,023	Accepted
6	H6: CS mediates DR → CSAT	p=0,007; t=2,444; β=0,053	Accepted
7	H7: CS mediates PR → CSAT	p=0,005; t=2,588; β=0,027	Accepted
8	H8: SR moderates SQ → CSAT	p=0,002; t=2,944; β=0,183	Accepted
9	H9: SR moderates DR → CSAT	p=0,236; t=0,720;	Rejected

		β=0,053	
10	H10: SR moderates PR → CSAT	p=0,014; t=2,202; β=0,125	Accepted

β = Path Coefficients; t = T Statistics; p = P Value

Source: Primary data processed using SmartPLS 4.0 with bootstrapping procedure (5,000 subsamples), 2026

The results for Hypothesis 9 indicate that Logistic Service Recovery does not moderate the relationship between Delivery Reliability and Customer Satisfaction, as reflected by a p-value of 0.236. This suggests that service recovery efforts do not alter the strength of the impact of delivery reliability on customer satisfaction. At PT Silkargo, customers place greater emphasis on reliable delivery performance than on recovery actions taken after service disruptions. This finding implies that delivery reliability is considered a fundamental service expectation. Therefore, Logistic Service Recovery does not function as a moderator in this relationship, highlighting customers' high expectations regarding delivery reliability.

All constructs were examined for potential multicollinearity using Variance Inflation Factor (VIF) values, and the results showed that all VIF scores were below the recommended threshold of 5. This indicates that collinearity does not significantly distort or inflate the parameter estimates. In addition, factor loadings exceeding 0.90 confirm strong convergent validity. This research also employs effect size (f^2) to assess the magnitude of each exogenous variable's contribution to the endogenous variable. The f^2 value reflects the change in R^2 when a specific exogenous construct is removed from the model, with benchmarks categorized as small (0.02), medium (0.15), and large (0.35). Hence, f^2 provides an indication of the practical importance of relationships within the structural model.

The effect size analysis reveals that Delivery Reliability on Customer Service has the largest f^2 value, falling within the medium category, suggesting that delivery reliability plays a relatively substantial role in shaping customer service quality at PT Silkargo. Conversely, the smallest f^2 value is found in the interaction between Logistic Service Recovery and Delivery Reliability on Customer Satisfaction. This implies that, in the context of PT Silkargo, service recovery does not significantly enhance or diminish the impact of delivery reliability on customer satisfaction.

This research model incorporates a mediating variable; therefore, it is necessary to conduct an indirect effect test to examine whether the mediator significantly mediates the indirect relationship between the exogenous and endogenous variables. In this analysis, the indirect effect is considered statistically significant if the p-value is less than 0.05.

Table 5. Indirect effect analysis

Indirect Path	p-value	β	Conclusion
SQ → CS → CSAT	0,006	0,023	Sig
DR → CS → CSAT	0,007	0,053	Sig
PR → CS → CSAT	0,005	0,027	Sig

Source: Primary data processed using SmartPLS 4.0 (mediation analysis), 2026

The results of the indirect effect analysis indicate that Customer Service significantly mediates the relationships between Logistic Service Quality, Delivery Reliability, and Price on Customer Satisfaction, with p-values of 0.006, 0.007, and 0.005, respectively. These findings suggest that improvements in service quality, reliable delivery, and fair pricing enhance customer satisfaction indirectly by strengthening the performance of customer service. At PT Silkargo, high service quality facilitates more effective customer handling, reliable delivery reduces complaints and supports smoother service processes, and fair pricing fosters more positive customer perceptions toward service interactions. Collectively, these indirect effects reinforce the total impact of the exogenous variables on customer satisfaction, highlighting the critical role of customer service as a significant and practically relevant mediating mechanism in the structural model.

The moderating variable in this study is Logistic Service Recovery. This variable is employed to examine whether it strengthens or weakens the relationship between the independent variables and Customer Satisfaction. The moderating effect explains how service recovery conditions influence the strength of the relationships among the variables. Moderation can either enhance or diminish the direct effects. This analysis is essential to better understand service dynamics both under normal operational conditions and in situations where service disruptions occur.

Table 6. Moderation Effect Test Results

Moderating Variable	Moderated Path	Moderation p-value	Direct Effect p-value	Type of Moderation
SR	SQ → CSAT	0,002	0,000	Strengthen
SR	PR → CSAT	0,014	0,000	Strengthen
SR	DR → CSAT	0,236	0,002	No Moderating Effect

Source: Primary data processed using SmartPLS 4.0 (moderation analysis), 2026

The moderation test results indicate that Logistic Service Recovery (SR) significantly strengthens the relationships between Logistic Service Quality and Customer Satisfaction ($p = 0.002$) and between Price and Customer Satisfaction ($p = 0.014$), as evidenced by positive moderation coefficients. This implies that when PT Silkargo effectively handles service failures, the positive impact of service quality and price perception on customer satisfaction becomes stronger. Effective recovery efforts enhance overall service perceptions, reduce customer sensitivity to price, and maintain satisfaction even when disruptions occur. However, SR does not moderate the relationship between Delivery Reliability and Customer Satisfaction ($p = 0.236$), suggesting that delivery reliability is viewed as a fundamental expectation that is not influenced by recovery efforts. Overall, the moderation results show that Logistic Service Recovery does not uniformly strengthen all relationships in the model. Instead, its moderating effect is significant only in the relationships between Logistics Service Quality and Customer Satisfaction, and between Price and Customer Satisfaction, while its interaction with Delivery Reliability is not significant.

Table 7. Total Effect

Variable endogenous	Variable exogenous	Total Impact	They dominate
CSAT	SQ	0,307	SQ
	DR	0,175	
	PR	0,213	
	CS	0,110	
	SR	0,225	

Source: Primary data processed using SmartPLS 4.0, 2026

Total effects represent the combined direct and indirect influences of the independent variables on the endogenous variable. The analysis indicates that Logistic Service Quality is the most dominant factor affecting Customer Satisfaction at PT Silkargo, exerting both direct and indirect effects through customer service. This suggests that customers place the greatest importance on the core performance of logistics services. Although price and service recovery also contribute, their impact is comparatively weaker. Therefore, enhancing logistics service quality should be the company's primary strategic focus to achieve the greatest improvement in customer satisfaction.

In conclusion, although the model demonstrates strong explanatory power and statistically significant relationships, the findings should be interpreted with caution. The solid theoretical foundation, rigorous measurement validation, and meaningful effect size analysis support the practical significance of the results. However, the use of a cross-sectional design, the possibility of response bias, and high correlations among constructs suggest the need for future longitudinal or experimental research to confirm causal relationships and enhance generalizability.

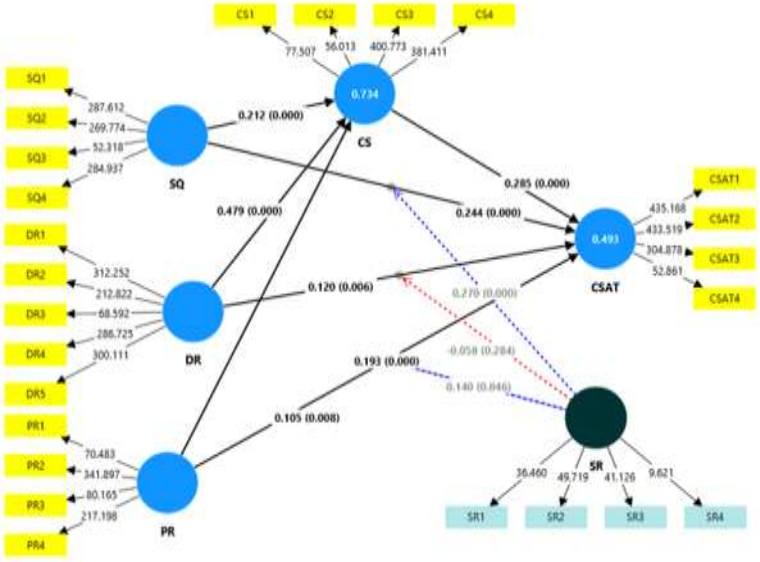

Figure 1. Overview of the Structural Model Based on Bootstrapping Results

Source: Primary data processed using SmartPLS 4.0 (bootstrapping procedure with 5,000 subsamples), 2026

The findings of this study demonstrate that Logistics Service Quality (LSQ), Delivery Reliability (DR), and Price (P) exert significant positive effects on Customer Satisfaction

(CSAT) within the freight forwarding context. Although Customer Service (CS) shows a positive coefficient, its direct effect on Customer Satisfaction should be interpreted with caution based on the applied two-tailed significance threshold. Among these predictors, Logistic Service Quality emerges as the most dominant determinant of satisfaction, underscoring its central role in shaping customers' evaluative judgments. Consistent with SERVQUAL theory, service quality functions as the primary antecedent of satisfaction, as customers assess reliability, responsiveness, accuracy, and consistency in logistics operations. When service performance meets or exceeds expectations, satisfaction increases; conversely, service deficiencies directly reduce evaluative outcomes. These findings reinforce the strategic imperative for logistics firms to prioritize operational excellence, standardization, and continuous quality monitoring.

Delivery Reliability also significantly enhances Customer Satisfaction. Reliability that manifested through punctuality, accuracy, and consistency of shipment, constitutes a core operational dimension of logistics performance. In line with reliability theory within SERVQUAL, fulfillment of promised delivery schedules strengthens trust and reduces perceived risk. Customers operating within supply chain networks are highly dependent on temporal precision; therefore, reliability directly influences satisfaction by ensuring predictability and minimizing business disruption. The results confirm that reliability is not merely a technical performance indicator but a relational asset that enhances customer confidence and long-term engagement.

Price further demonstrates a significant positive influence on satisfaction, supporting Price Fairness and Perceived Value theories. Customers evaluate pricing structures relative to the benefits received. When logistics pricing is perceived as fair, transparent, and commensurate with service value, satisfaction increases. Conversely, perceived inequity or hidden costs undermine satisfaction. Importantly, the findings indicate that pricing decisions must not be viewed solely from a cost-competitiveness perspective but from a value-communication standpoint. Perceived fairness plays a crucial role in shaping evaluative outcomes (Rahmadini et al., 2023; Saputri & Rahardjo, 2020).

Customer Service shows a positive relationship with Customer Satisfaction; however, its direct effect should be interpreted cautiously under the applied two-tailed significance threshold. Drawing upon relationship marketing and service encounter theory, customer service functions as the primary interface between technical logistics performance and customer perception. Responsiveness, empathy, and clarity of communication remain important in shaping overall customer evaluations, even when the direct statistical effect is not strongly supported. Even when core service performance is strong, ineffective customer interaction may weaken satisfaction outcomes. Thus, service encounters still play a strategic role, particularly through their mediating function in translating operational performance into perceived value.

A major contribution of this study lies in demonstrating the mediating role of Customer Service in the relationships between LSQ, DR, Price, and Customer Satisfaction. The mediation findings suggest that operational and economic factors influence satisfaction not only directly but also indirectly through relational mechanisms. First, Customer Service mediates the relationship between Logistic Service Quality and Customer Satisfaction. High-quality logistics performance becomes more meaningful to customers when effectively

communicated and supported through responsive interaction. Customer Service translates technical performance into perceived value by clarifying processes, addressing concerns, and reinforcing trust. Without this relational bridge, the positive effect of service quality may not be fully realized. Thus, Customer Service amplifies the experiential dimension of operational quality.

Second, Customer Service mediates the effect of Delivery Reliability on Customer Satisfaction. Although reliability directly influences satisfaction, its impact is strengthened when customers receive accurate, real-time information and responsive support. In situations involving delays or operational disruptions, communicative intervention mitigates dissatisfaction and preserves trust. This confirms that operational reliability and relational responsiveness must function synergistically.

Third, Customer Service mediates the relationship between Price and Customer Satisfaction. Pricing perceptions are shaped not only by numeric value but also by explanatory transparency. When Customer Service effectively communicates pricing structures and justifies service value, perceived fairness improves. Consequently, satisfaction is strengthened through enhanced perceived value. This mediation mechanism underscores that economic evaluation is socially constructed through interaction. Collectively, these mediation results reveal that Customer Service operates as a mechanistic conduit transforming operational inputs into psychological evaluations. Satisfaction in logistics services is therefore not purely outcome-based but relationally mediated.

Another significant contribution of this study concerns the moderating role of Logistic Service Recovery (LSR). Service recovery mechanisms alter the strength of relationships between operational variables and Customer Satisfaction, particularly under conditions of service failure. First, Logistic Service Recovery strengthens the relationship between Logistic Service Quality and Customer Satisfaction. When service failures occur, effective recovery characterized by speed, fairness, transparency, and accountability preserves and even enhances satisfaction. This aligns with Service Recovery Theory and the “service recovery paradox,” suggesting that well-managed recovery can reinforce positive evaluations. Thus, recovery functions as a reinforcing mechanism that sustains the impact of quality under adverse conditions.

Second, the results indicate that Logistic Service Recovery does not moderate the relationship between Delivery Reliability and Customer Satisfaction. The non-significant interaction effect suggests that service recovery efforts do not alter the strength of the relationship between delivery reliability and satisfaction. This finding implies that delivery reliability functions as a fundamental determinant of satisfaction that cannot be compensated for through recovery actions. Customers appear to prioritize consistent and punctual delivery performance over corrective efforts after service failures. In other words, reliability is perceived as a core service attribute rather than a recoverable component, indicating high customer expectations regarding delivery accuracy and timeliness. Third, Logistic Service Recovery moderates the relationship between Price and Customer Satisfaction. When customers perceive pricing concerns or service-related inequities, recovery efforts such as compensation, cost adjustment, or added value help restore perceived fairness. Drawing upon Equity Theory, recovery actions rebalance perceived input-output discrepancies. As a result,

the negative effect of unfavorable price perceptions can be attenuated through effective recovery strategies.

The present findings are consistent with Nasrudin et al. (2025), who found that stronger logistics customer service contributes directly and indirectly to customer-oriented outcomes through improved logistics performance. Overall, the moderation results show that Logistic Service Recovery does not uniformly strengthen all relationships in the model. Instead, its moderating effect is significant only in the relationships between Logistics Service Quality and Customer Satisfaction, and between Price and Customer Satisfaction, while its interaction with Delivery Reliability is not significant. This finding is consistent with previous studies highlighting that service interaction quality acts as a bridge between operational performance and customer satisfaction in logistics services (Lestiani, 2022).

This study advances service management theory by integrating operational performance (LSQ, DR), economic evaluation (Price), relational interaction (CS), and corrective mechanisms (LSR) into a unified structural framework. The results demonstrate that satisfaction is shaped by a multilayered process: direct operational effects, relational mediation, and contextual moderation through recovery mechanisms. The mediating role of Customer Service highlights that operational excellence must be relationally translated. Meanwhile, the moderating role of Logistic Service Recovery emphasizes that satisfaction is dynamic and sensitive to failure management. Thus, logistics firms must move beyond purely technical performance metrics and adopt a holistic service ecosystem perspective.

CONCLUSION

This study concludes that Customer Satisfaction at Silkargo is significantly influenced by Logistic Service Quality, Delivery Reliability, and Price. Among these variables, Logistic Service Quality is the most dominant determinant, indicating that core logistics performance remains the primary driver of customer satisfaction. Delivery Reliability and Price also have significant positive effects, confirming that punctual delivery and perceived price fairness are essential in shaping customer evaluations. Customer Service serves as a mediating mechanism that strengthens the effects of service quality, delivery reliability, and price on customer satisfaction, although its direct effect on customer satisfaction should be interpreted with caution based on the applied significance threshold. Regarding moderation, Logistic Service Recovery strengthens the relationship between Logistics Service Quality and Customer Satisfaction, as well as the relationship between Price and Customer Satisfaction. However, Logistic Service Recovery does not significantly moderate the relationship between Delivery Reliability and Customer Satisfaction, indicating that reliability is perceived as a fundamental and non-compensatory attribute. Overall, customer satisfaction is formed through a combination of operational performance, relational interaction, and selective recovery mechanisms. The findings suggest that Silkargo should prioritize continuous improvement in overall service quality, as it represents the strongest driver of customer satisfaction. Delivery reliability must be maintained as a core operational standard, since recovery efforts cannot substitute for failures in punctuality and consistency. Pricing strategies should emphasize fairness and transparency to align with customer value perceptions. Furthermore, strengthening customer service capabilities is crucial, as it helps improve satisfaction indirectly by translating operational performance and pricing into positive customer experiences. Finally, structured and

responsive service recovery systems should be institutionalized to reinforce satisfaction when service disruptions occur, while recognizing that recovery complements but does not replace fundamental service reliability. This study has several limitations that should be acknowledged. First, it was conducted within a single company, Silkargo, which limits the generalizability of the findings to other logistics firms. Second, the data were collected through self-reported questionnaires, which may introduce subjective response bias. Third, the model only included Logistic Service Quality, Delivery Reliability, Price, Customer Service, and Logistic Service Recovery, thereby excluding other potentially influential variables. Finally, the cross-sectional design restricts the ability to capture changes in customer satisfaction over time. Therefore, future research is recommended to incorporate additional variables such as customer trust, perceived value, or brand image to enrich the satisfaction model, apply longitudinal approaches to observe satisfaction dynamics before and after service improvements, and expand the research context to other logistics companies or across service industries to enhance generalizability.

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