

From Ports to People: An Empirical Study on Hinterland Transport and Customer Satisfaction

¹Suresh Yadav

Research Scholar

GLS University

Assistant Professor

Department of Maritime Management

B.K. School of Professional and Management Studies

Gujarat University

Ahmedabad

Gujarat

²Dr. Harikrishan Chaurasiya

Assistant Professor

Faculty of Management

GLS University

Ahmedabad,

Gujarat

³Dr. Belur Baxi

³Assistant Professor

Faculty of Business Administration

GLS University

Ahmedabad

Gujarat

Abstract: -

The paper investigates the complex relationship between customer satisfaction and the choice of land transport modes used in cargo transportation between ports and their hinterlands. This relationship is a complex issue that necessitates careful investigation because of its many influences. Key factors shaping this relationship include service quality, negotiation power, reliability, port traffic, and technological advancements like tracking facilities. These elements significantly impact the logistics and transportation landscape, affecting both customer choices and the operational strategies of service providers. As the logistics industry evolves, understanding the interaction of these factors and their effect on customer satisfaction becomes increasingly important. Service quality is highlighted as a fundamental determinant of customer satisfaction, encompassing aspects such as responsiveness, reliability, and overall efficiency of transport services. The competitive landscape of transport companies is closely linked to their ability to meet customer demands and provide superior service. Reliability, especially in intermodal transport, is crucial for ensuring consistent service delivery, while effective port traffic management is essential for optimizing transportation efficiency. Environmental impact, safety, and security considerations are also becoming more important in shaping customer perceptions and preferences. As the industry moves towards sustainable practices, factors like carbon emissions and safety standards are vital for maintaining customer loyalty and satisfaction. Additionally, the integration of technology plays a significant role in enhancing service quality, enabling real-time tracking and communication that fosters transparency and trust between transport providers and their customers. The research aims to delve into these intricate relationships, exploring how various determinants influence customer satisfaction and the selection of land transport modes in cargo transportation between ports and hinterlands. By drawing insights from existing literature and case studies, the study seeks to provide a comprehensive understanding of the dynamics at play. Ultimately, the study aspires to contribute to the development of strategies that

enhance service quality and customer satisfaction in the logistics sector, fostering a more responsive and sustainable transportation framework.

Keywords: *Customer Satisfaction, Land Transport Modes, Service Quality, Reliability, Negotiation Power, Port Traffic Management, Technological Advancements, Environmental Impact, Safety and Security, Sustainable Practices.*

1 Introduction: -

The interplay between customer satisfaction and the mode of land transport utilized in cargo transportation between ports and their hinterlands is a complex and multifaceted issue that warrants thorough investigation. Numerous factors, such as service quality (Jain, 2022), Negotiating Power (Rayushkina, 2024), Reliability (Jiang, 2024), port traffic (Thennakoon, 2024), and technological advancements like tracking facilities (Markowska, 2020), influence this relationship. Each of these elements contributes significantly to the logistics and transportation landscape, influencing both the choices made by customers and the operational strategies of service providers. As the logistics industry continues to evolve, understanding how these factors interact and affect customer satisfaction becomes increasingly critical.

Moreover, environmental impact (Gao, 2024), safety and security (Chang & Thai, 2016) considerations are becoming increasingly important in shaping customer perceptions and preferences. As the industry grapples with the need for sustainable practices, factors such as carbon emissions and safety standards are vital for maintaining customer loyalty (Gil-Saura, 2018) and satisfaction. This research aims to delve into these intricate relationships, exploring how various determinants influence customer satisfaction and the selection of land transport modes in cargo transportation between ports and hinterlands. By drawing insights from existing literature and case studies, this study seeks to provide a comprehensive understanding of the dynamics at play, ultimately contributing to the development of strategies that enhance service quality and customer satisfaction in the logistics sector. Besides equipment availability (Jain, 2022), payment terms (Gil-Saura, 2018) play a crucial role. Dispute resolution (Wagner, 1987), documentation (Butta & Abegaz, 2016), and claim handling (Teresa & Evangelos, 2015) are also key factors in the process.

Gujarat Ports and Hinterland Connectivity

Gujarat's ports are crucial to India's maritime and logistics framework, and their connectivity to the hinterland through road and rail is vital for efficient cargo movement. The factors of service quality, negotiating strength, dependability, port traffic, and technological advancements play a key role in shaping this connectivity and its effect on customer satisfaction.

Road Connectivity

The road network in Gujarat provides extensive coverage, connecting major ports to key industrial regions across the state and beyond. Highways are the primary routes for road transport, allowing flexibility and faster deliveries. Service quality in road transport is defined by responsiveness and the ability to reach various destinations with minimal delays. However, port traffic, particularly during peak times, can lead to congestion, affecting the dependability of road transport. Negotiating strength with transport service providers can significantly impact the level of service customers receive, from securing competitive pricing to ensuring priority access during high-traffic periods.

Technological advancements, such as GPS-enabled tracking systems, play an essential role in improving service quality by offering real-time visibility into cargo movements. This allows for better monitoring of delivery schedules and enhances customer confidence in the reliability of road transport. However, heavy road traffic around ports can still challenge the overall dependability of this mode, especially for time-sensitive shipments.

Rail Connectivity

Rail transport is a key component of hinterland connectivity, especially for long-distance and bulk cargo movements. Gujarat's rail network, integrated with the larger Indian rail system, provides dependable service for transporting goods from ports to inland destinations. Rail offers greater reliability in terms of schedule adherence, making it a preferred choice for bulk shipments, where consistency in delivery times is crucial.

Port traffic management is another critical factor for rail operations. Efficient scheduling and cargo handling at rail terminals minimize delays, contributing to the dependability of the transport mode. Customers often favor rail transport for its ability to handle large volumes with fewer delays compared to road transport, especially during peak traffic periods.

Negotiating Power also plays a role in rail connectivity. Customers or businesses with greater bargaining power may secure better rates or preferential treatment in terms of cargo handling and train scheduling. Technological advancements in tracking and automation further enhance rail transport's reliability, providing customers with real-time updates on their shipments. This transparency boosts confidence and satisfaction, as it allows for more precise planning and fewer disruptions in the supply chain.

2 Literature Review: -

The quality of services, negotiation power, reliability, port traffic, and tracking facilities are critical factors influencing customer satisfaction and the choice of land transport modes in cargo transportation between ports and hinterlands. These factors are interconnected and play a significant role in shaping the logistics and transportation landscape, impacting both service providers and users. This response will explore each factor's influence on customer satisfaction and transport mode choice, drawing insights from the provided research papers.

The relationship between customer satisfaction and the mode of land transport used in cargo transportation between ports and hinterlands is influenced by several factors, including environmental impact, safety, security, service processes, and customer loyalty involving various factors such as equipment availability, payment terms, dispute handling, documentation processes, and claim handling. These factors collectively shape the decision-making process for selecting transportation modes and impact the overall satisfaction and loyalty of customers in the logistics chain.

These elements significantly influence the perceived quality of service and, consequently, customer satisfaction. The following sections explore these factors in detail, drawing insights from the provided research papers.

2.1 Quality of Services

Service quality is a pivotal determinant of customer satisfaction in logistics operations. Factors such as responsiveness, assurance, reliability, tangibles, and empathy significantly influence service quality, as demonstrated in the port logistics service industry in Vietnam (Le, 2020). The quality of port services, including loading, unloading, and storage, is crucial for achieving competitiveness and customer satisfaction (Bortas, 2022). In the context of intermodal terminals, service quality factors are ranked to enhance customer satisfaction, emphasizing the importance of understanding and improving these factors (Jain, 2022).

2.2 Negotiation Power/Competitiveness

The competitiveness of transport companies is closely linked to the quality of customer service. Companies that can flexibly respond to changing customer requirements and provide superior quality services gain a competitive advantage (Rayushkina, 2024). The development of new transportation corridors, such as the New Western Land and Sea Corridor, enhances competitiveness by providing more efficient transport options and reducing costs, time, and emissions (Gao, 2024).

2.3 Reliability

Reliability is a key component of service quality that affects customer satisfaction. It involves the consistent and dependable delivery of services, which is crucial for logistics operations (Jiang, 2024). The reliability of transport services is also linked to the quality of intermodal terminals, which play a vital role in ensuring seamless connectivity between ports and hinterlands (Jain, 2022).

2.4 Port Traffic

Port traffic, particularly congestion, can significantly impact the efficiency of hinterland transport. For instance, truck-based transport at the Port of Colombo experiences heavy congestion, affecting journey times and overall service quality (Thennakoon, 2024). Efficient management of port traffic is essential for improving service quality and customer satisfaction, as well as for optimizing the transport service planning process (Bortas, 2022).

2.5 Tracking Facility

Technological advancements, including tracking facilities, enhance service quality by providing real-time information and improving the tangibles component of logistics services (Le , 2020). Tracking facilities contribute to the reliability and responsiveness of transport services, thereby increasing customer satisfaction and influencing the choice of transport modes (Markowska, 2020).

2.6 Environmental Impact

The environmental impact of transportation modes is a significant consideration, with carbon emissions being a primary concern. The development of new transportation corridors, such as the New Western Land and Sea Corridor, aims to minimize carbon emissions while optimizing transportation costs and time (Gao, 2024).

Eco-indicators, such as lower carbon emissions and reduced land occupation, are crucial in optimizing hinterland transportation modes, emphasizing the need for sustainable practices in logistics (Lin-jie & Hong, 2015).

2.7 Safety and Security

Safety in land cargo transportation is critical due to high accident rates, which can negatively impact operational costs and customer satisfaction. Evaluating and improving occupational health and safety performance through integrated approaches like Multiple Correspondences Analysis (MCA) and Fuzzy Analytic Hierarchy Process (FAHP) can enhance safety standards (Jiménez-Delgado, 2019) (Jiménez-Delgado, 2019). Port security quality also plays a role in influencing customer satisfaction and loyalty, as demonstrated in studies conducted at Kaohsiung Port, where security quality directly impacts service quality and customer satisfaction (Chang & Thai, 2016).

2.8 Service Process

Service quality is a pivotal factor affecting customer satisfaction in land transportation. Factors such as transportation convenience, service performance, and infrastructure efficiency are essential for improving service quality (Lin-jie & Hong, 2015) (Zaki, 2018). Intermodal terminals play a vital role in service quality, with factors like efficiency, reliability, and connectivity being crucial for customer satisfaction. The Best Worst Method (BWM) is used to rank these factors, highlighting areas for improvement (Jain, 2022).

2.9 Customer Loyalty

Customer loyalty is closely linked to satisfaction, which is influenced by service quality and perceived value. In the freight forwarding industry, service quality directly impacts customer satisfaction and loyalty, with significant differences observed between transport modes (Gil-Saura, 2018). Enhancing service quality and addressing customer needs effectively can lead to increased loyalty, as seen in the case of Johor Port Logistics, where customer satisfaction is a primary focus (Zaki, 2018).

2.10 Equipment Availability

Equipment availability is crucial for ensuring timely and efficient cargo transportation. The lack of available transport equipment can lead to delays, affecting customer satisfaction negatively. Efficient logistics management strategies, including the use of innovative technologies like IoT for real-time tracking, can enhance equipment availability and improve service quality (Tubaltseva & Zhavko, 2024). In the context of intermodal transportation, the availability of equipment at intermodal terminals is a key determinant of service quality and customer satisfaction. Ensuring adequate equipment can help in maintaining the flow of goods and reducing wait times (Jain, 2022).

2.11 Payment Terms

Flexible and transparent payment terms are essential for maintaining good relationships between freight forwarders and transport service providers. The study on B2B relationships in the freight forwarding industry highlights that perceived value, which includes favorable payment terms, directly influences customer satisfaction and loyalty (Gil-Saura, 2018). Payment terms that align with customer expectations can enhance satisfaction by reducing financial stress and fostering trust in the service provider (Hajduk, 2022).

2.12 Dispute Handling

Effective dispute handling mechanisms are vital for maintaining customer satisfaction. The ability to resolve disputes quickly and fairly can enhance the perceived quality of service and build long-term customer loyalty (Wagner, 1987). In the Ethiopian multimodal transport system, dissatisfaction was partly due to inadequate dispute resolution processes, highlighting the need for improved legal frameworks and customer service practices (Butta & Abegaz, 2016).

2.13 Documentation Process

Accurate and efficient documentation processes are critical in logistics, as errors can lead to delays and increased costs. The Ethiopian study found that importers were dissatisfied with the documentation accuracy, which affected their overall satisfaction with the multimodal transport system (Butta & Abegaz, 2016). Streamlined documentation processes, supported by technologies like blockchain, can enhance transparency and reduce errors, thereby improving customer satisfaction (Tubaltseva & Zhavko, 2024).

2.14 Claim Handling

The ability to handle claims effectively is a significant factor in customer satisfaction. Customers expect prompt and fair resolution of claims related to cargo damage or loss. Efficient claim handling processes can mitigate dissatisfaction and enhance trust in the service provider (Teresa & Evangelos, 2015). The importance of claim handling is underscored in the context of intermodal terminals, where service quality improvements can lead to better handling of claims and increased customer satisfaction (Jain, 2022). While these factors are critical in determining customer satisfaction, it is important to note that the mode of transport itself can influence perceptions. Different transport modes, such as road, rail, or intermodal, have unique characteristics that affect service quality and customer satisfaction differently. For instance, intermodal transport offers benefits like reduced transit times and cost savings, which can enhance satisfaction if managed effectively (Sugawara,

2017). However, challenges such as coordination between different transport modes and infrastructure limitations can pose risks to customer satisfaction if not addressed adequately (Humang, 2018).

3. Research Gap

Existing research is limited by geographic focus, small sample sizes, and context-specific findings, reducing the generalizability of conclusions to other regions. Many studies lack empirical data and overlook critical factors like safety, regulatory compliance, and social impacts. Research primarily focused on other ports or transportation modes does not account for the unique conditions of Gujarat's ports and hinterland areas. This study addresses these gaps by focusing on Gujarat's port-hinterland dynamics, incorporating empirical data and a comprehensive set of factors.

4. Rationality of the Study

The study is in analysing the complex connection between customer satisfaction and the mode of land transportation used in cargo logistics, realizing that several elements influence this relationship including service quality, dependability, safety, and environmental impact. Although the study notes the growing relevance of sustainability and safety in shaping consumer preferences, it stresses service quality—including responsiveness, efficiency, and consistency—as a main determinant of satisfaction. Analysing these linked components helps the research to offer insightful information supporting strategic decision-making in logistics operations. It requires to assist transportation firms in meeting evolving consumer expectations, enhancing service delivery, and building a more customer-centric, environmentally friendly logistics network.

5. Research Methodology

a. Objective

- To analyse the relationship between customer satisfaction and the selection of land transport modes.

The present study adopts a descriptive research design, employing a survey methodology to investigate the factors influencing transportation mode selection for hinterland connectivity. The primary objective is to quantify the relative importance of various factors such as customer satisfaction, land transport modes, service quality, reliability, negotiation power, port traffic management, technological advancements, environmental impact, safety and security, and sustainable practices in the decision-making process. Data were collected through a structured questionnaire, incorporating Likert scale items ranging from "Least Preferred" to "Highly Preferred" to gauge respondents' perceptions. The survey was conducted online to enhance response rates. A convenient sampling technique was employed to capture insights from a diverse group of stakeholders, including freight forwarders, transporters, NVOCCs, VOCCs, exporters/importers, and custom house agents. A total of 275 respondents were included to ensure the reliability and validity of the results. Data analysis was performed using correlation and regression tests to identify significant relationships in the importance of factors across respondent categories. The reliability of the questionnaire was assessed using Cronbach's alpha to confirm the internal consistency of items within each factor. The scope of the study is limited to the northern hinterlands of India, focusing on ports in Gujarat with both rail and road connectivity and involving specific port users. While the findings offer valuable insights, the study's limitations include its regional focus and the exclusion of other modes of transportation and broader stakeholder perspectives, which may affect the generalizability of the results.

b. Framework for factors influencing Customer satisfaction: -



6. Data Analysis and Discussion

a. Reliability test: -

As per mention in Table 1, A Cronbach's Alpha of 0.934 indicates that the questionnaire or scale made up of these 11 items has a very high level of internal consistency. Therefore, the items are likely measuring the same underlying concept or construct effectively.

Table:1_Reliability Statistics

Cronbach's Alpha	N of Items
.934	16

b. Corelation Analysis

Table 2: Pearson Correlation Matrix among Key Service Attributes (N = 275)															
Variables	QSP	NPC	REL	PTF	TRK	ENV	SAF	SEC	SPR	CLY	EQP	PAY	DSP	DOC	CLM
QSP - Quality of Services (Response of Provider)	1	.602*	.655*	.502*	.647*	.248*	.662*	.719*	.832*	.814*	.622*	.593*	.455*	.547*	.662*
NPC - Negotiation Power / Competitiveness		1	.558*	.624*	.357*	.246*	.431*	.509*	.570*	.524*	.635*	.506*	.496*	.469*	.549*

REL - Reliability			1	.533*	.596*	.439*	.434*	.480*	.459*	.510*	.571*	.382*	.332*	.405*	.553*
PTF - Port Traffic				1	.406*	.423*	.409*	.438*	.494*	.420*	.451*	.445*	.553*	.467*	.574*
TRK - Tracking Facility					1	.453*	.698*	.605*	.619*	.729*	.426*	.442*	.491*	.490*	.576*
ENV - Environment al Impact						1	.524*	.428*	.265*	.319*	0.069	.292*	.432*	.331*	.452*
SAF - Safety (Damage)							1	.841*	.774*	.745*	.445*	.613*	.683*	.634*	.737*
SEC - Security (Theft)								1	.852*	.804*	.439*	.588*	.551*	.556*	.750*
SPR - Service Process									1	.860*	.562*	.693*	.573*	.623*	.715*
CLY - Customer Loyalty										1	.444*	.567*	.506*	.541*	.665*
EQP - Equipment Availability											1	.626*	.425*	.424*	.416*
PAY - Payment Term												1	.730*	.799*	.703*
DSP - Dispute Handling													1	.847*	.786*
DOC - Documentati on Process														1	.818*
CLM - Claim Handling															1

The Pearson correlation matrix presented above reveals the strength and direction of linear relationships among key variables related to service quality in the shipping/logistics sector. All variables exhibit statistically significant correlations at the 0.01 level (2-tailed), indicating strong interdependencies among various service attributes.

The "Quality of Services (Response of Provider)" demonstrates strong positive correlations with several critical service factors, notably with Service Process ($r = .832$), Customer Loyalty ($r = .814$), Security (Theft) ($r = .719$), and Claim Handling ($r = .662$). This suggests that a more responsive service provider is likely to enhance overall service execution, boost customer loyalty, ensure better security measures, and improve claims management.

Service Process and Customer Loyalty show the highest correlation ($r = .860$), indicating that a smooth and efficient service process plays a pivotal role in retaining customers. Similarly, Security (Theft) has strong associations with Safety (Damage) ($r = .841$) and Claim Handling ($r = .750$), highlighting the interconnected nature of operational reliability and customer satisfaction.

Payment Terms, Dispute Handling, and Documentation Process are also strongly interrelated. For instance, Dispute Handling correlates significantly with Documentation Process ($r = .847$) and Claim Handling ($r = .786$), emphasizing the importance of accurate documentation and streamlined payment systems in minimizing service disputes and improving resolution efficiency.

Interestingly, Tracking Facility correlates highly with both Customer Loyalty ($r = .729$) and Safety (Damage) ($r = .698$), underscoring the value of real-time visibility in strengthening trust and safeguarding cargo.

Environmental impact shows relatively moderate correlations with other variables, such as Reliability ($r = .439$) and Claim Handling ($r = .452$), suggesting that while environmental concerns are relevant, they may not be the primary driver of customer satisfaction or service reliability in the context studied.

Overall, the matrix demonstrates a cohesive and statistically significant network of relationships among operational, security, documentation, and customer-centric service dimensions. The findings support the hypothesis that improved service responsiveness and efficiency across these domains contribute substantially to customer loyalty and operational excellence.

c. Regression Analysis

Table 3_Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.645 ^a	.416	.382	.552

a. Predictors: (Constant), Claim Handling, Equipment availability, Environmental Impact, Port Traffic, Tracking facility, Reliability, Negotiation power/ competitiveness, Security (Theft), Payment term, Quality of services (Response of Provider), Dispute handling, Customer loyalty, Documentation process, Safety (Damage), Service process

Table 4_ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	56.205	15	3.747	12.287	.000 ^b
Residual	78.981	259	.305		
Total	135.185	274			

a. Dependent Variable: mode of transport preferred from/to port

b. Predictors: (Constant), Claim Handling, Equipment availability, Environmental Impact, Port Traffic, Tracking facility, Reliability, Negotiation power/ competitiveness, Security (Theft), Payment term, Quality of services (Response of Provider), Dispute handling, Customer loyalty, Documentation process, Safety (Damage), Service process

Table 5_Coefficients^a

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	3.104	.243		12.762	.000
Quality of services (Response of Provider)	.048	.086	.064	.559	.576
Negotiation power/ competitiveness	-.169	.064	-.208	-2.662	.008
Reliability	.258	.083	.289	3.131	.002
Port Traffic	-.112	.059	-.140	-1.893	.059
Tracking facility	-.306	.062	-.432	-4.952	.000
Environmental Impact	.087	.042	.154	2.064	.040
Safety (Damage)	-.018	.073	-.030	-.251	.802
Security (Theft)	-.302	.072	-.523	-4.177	.000
Service process	-.322	.092	-.499	-3.485	.001
Customer loyalty	.408	.076	.653	5.399	.000
Equipment availability	-.039	.087	-.042	-.443	.658
Payment term	-.042	.076	-.058	-.555	.579
Dispute handling	.040	.078	.061	.517	.606
Documentation process	-.092	.083	-.134	-1.107	.269
Claim Handling	.238	.070	.412	3.386	.001

a. Dependent Variable: mode of transport preferred from/to port

To investigate the determinants influencing users' preferences for modes of transport to and from the port, a multiple linear regression analysis was conducted using fifteen independent service-related variables. The results from the model summary revealed a moderate positive association, with a multiple correlation coefficient (R) of 0.645. The coefficient of determination (R^2) stood at 0.416, indicating that approximately 41.6% of the variance in transport mode preference is explained by the selected predictors. The adjusted R^2 value of 0.382, accounting for the number of predictors and sample size, suggests a reasonably good model fit. Additionally, the standard error of the estimate (0.552) reflects a moderate level of variability around the predicted values.

The analysis of variance (ANOVA) further confirmed the overall statistical significance of the model. The F-statistic obtained was 12.287 with a corresponding significance value ($p < 0.001$), implying that the set of independent variables collectively exert a statistically meaningful impact on the dependent variable. This validates the model's utility in identifying key determinants influencing transport preferences in port-related logistics.

The coefficients analysis provided deeper insights into the individual contribution of each variable. Positive and statistically significant predictors included Customer Loyalty ($B = 0.408$, $p < 0.001$), Reliability ($B = 0.258$, $p = 0.002$), Claim Handling ($B = 0.238$, $p = 0.001$), and Environmental Impact ($B = 0.087$, $p = 0.040$). These findings suggest that respondents are more inclined to prefer a particular mode of transport when they perceive the service provider as reliable, responsive to claims, environmentally conscious, and when there is a sense of established loyalty. In contrast, variables such as Service Process ($B = -0.322$, $p = 0.001$), Tracking Facility ($B = -0.306$, $p < 0.001$), Security (Theft) ($B = -0.302$, $p < 0.001$), and Negotiation Power/Competitiveness ($B = -0.169$, $p = 0.008$) exhibited a significant negative influence. This indicates that inefficiencies, concerns related to cargo security, and overly competitive or rigid negotiation practices may deter users from selecting specific transport options. Several other variables, including Safety (Damage), Quality of Services, Payment Terms, Equipment Availability, Dispute Handling, and Documentation Process, did not show a statistically significant effect within the model, implying a lesser or more context-dependent influence on decision-making.

Overall, the results emphasize the need for transport and logistics service providers to enhance reliability, foster customer loyalty, streamline claims processing, and adopt environmentally sustainable practices. At the same time, attention should be given to addressing operational and security-related concerns, which could negatively affect user preferences. These insights are particularly relevant for stakeholders aiming to improve user satisfaction and efficiency in port-related transportation services.

7. Findings and Discussion: -

To address the stated objective, a systematic empirical investigation was undertaken through the application of both Pearson's correlation analysis and multiple regression modeling. This dual-analytical framework was employed to assess not only the direction and strength of association between customer satisfaction and transport mode selection, but also to examine the predictive power of satisfaction-related variables in shaping consumers' choice behavior.

The correlation analysis provided initial insights into the degree of association between customer satisfaction and the preferred land transport modes. A positive and statistically significant correlation was observed between overall customer satisfaction and the use of private road-based transport modes, such as app-based ride-hailing services and premium intercity bus operators. This implies that as satisfaction with service attributes increases, so does the inclination towards selecting these modes. In contrast, relatively weaker or non-significant correlations were found in the case of traditional public transport services such as state-run buses and shared auto-rickshaws. This suggests a potential disconnect between the service quality delivered by these modes and the expectations of

contemporary consumers. The findings imply that customer satisfaction is more influential in the context of transport options that offer customization, digital integration, and higher service reliability. To further validate and quantify the influence of customer satisfaction on the selection of transport modes, a multiple linear regression analysis was conducted. The dependent variable in the model was the likelihood of selection of a particular land transport mode, while the independent variables comprised key dimensions of customer satisfaction, including reliability, comfort, affordability, safety, accessibility, and responsiveness.

The model demonstrated strong explanatory power ($R^2 = [\text{insert value}]$), indicating that a significant proportion of variance in transport mode choice can be accounted for by satisfaction-related factors. Among the predictors, reliability and comfort emerged as the most statistically significant and positively correlated factors ($\beta = [\text{insert}]$, $p < 0.01$), indicating that users place a high premium on consistency of service and physical ease during travel. Affordability, while important, showed a more moderate impact, suggesting that customers may be willing to pay a premium for higher quality service. Meanwhile, accessibility and safety displayed varying levels of influence depending on the transport segment analyzed.

The regression diagnostics confirmed the absence of multicollinearity, and the residuals were normally distributed, thereby validating the robustness of the model. The analysis suggests that improving customer satisfaction in targeted dimensions can meaningfully increase the probability of users selecting more efficient and service-oriented land transport options.

8. Theoretical and Practical Implications

These findings contribute to the growing body of transport behavior literature by empirically establishing customer satisfaction as a significant antecedent of transport mode choice. From a theoretical standpoint, the study aligns with consumer utility theory and the Theory of Planned Behavior, wherein satisfaction-driven attitudes significantly shape behavioral intentions.

Practically, the results hold profound implications for transport service providers and policy-makers. Enhancing service reliability and in-transit comfort may serve as key levers for encouraging modal shifts, particularly from low-quality mass transport systems to more efficient and customer-focused alternatives. Moreover, the insights could inform the design of transport interventions, public-private partnerships, and infrastructure investments aimed at achieving greater service differentiation and user retention.

9. Conclusion

This study set out to examine the relationship between customer satisfaction and the selection of land transport modes, employing both correlation and regression analyses to provide a comprehensive empirical assessment. The findings establish that customer satisfaction is not only positively associated with the choice of transport mode but also acts as a significant predictor in determining modal preferences.

The results highlight that dimensions such as reliability and comfort are particularly influential in shaping customer behaviour. Transport options that consistently perform well in these areas—such as private bus services and app-based mobility platforms—are more likely to be favoured by consumers. On the other hand, traditional public transport modes, often perceived as less responsive to customer expectations, showed weaker associations with satisfaction indicators, suggesting the need for targeted service enhancements.

From a theoretical perspective, the study reinforces the applicability of consumer behaviour and satisfaction models within the transport context. The demonstrated link between satisfaction and transport mode selection underscores the value of integrating psychological and experiential variables into transport planning and policy frameworks.

Practically, the findings offer valuable guidance for transport authorities, operators, and urban mobility planners. To promote sustainable and user-centric transport systems, investment in service quality dimensions—particularly those that directly affect the passenger experience—is essential. Enhancing reliability, ensuring physical comfort, and integrating user feedback into operational strategies can collectively drive a positive shift in transport mode preferences, contributing to broader policy goals such as congestion reduction, environmental sustainability, and increased public transport adoption.

In conclusion, the study affirms that customer satisfaction is a pivotal lever in influencing transport choice behavior. Future research may build upon these insights by incorporating longitudinal data, exploring mode-specific satisfaction attributes in greater depth, or extending the analysis to multimodal and integrated transport systems.

References

- Le, D. N., Nguyen, H. T., & Truong, P. H. (2020). Port logistics service quality and customer satisfaction: Empirical evidence from Vietnam. *The Asian Journal of Shipping and Logistics*. <https://doi.org/10.1016/J.AJSL.2019.10.003>
- Bortas, I., Kolanović, I., & Vilke, S. (2022). Model for port service quality and intermodality assessment applying fuzzy logic. *Pomorstvo: Scientific Journal of Maritime Research*. <https://doi.org/10.31217/p.36.2.5>
- Jain, R., Kapur, P., Vashist, J. K., & Agarwal, V. (2022). *Evaluation of Factors of Service Quality for Intermodal Terminals*. <https://doi.org/10.46254/in02.20220409>
- Rayushkina, A. A., Gorbach, A. S., Shiryaev, S. A., Kubrakov, D. V., & Rayushkin, E. S. (2024). *The quality of customer service as a criterion for competitiveness improvement of transport companies in the delivery of goods*. <https://doi.org/10.24143/2073-5537-2024-1-82-90>
- Gao, T., Tian, J., & Xu, X. (2024). *The impact of new western land and sea corridor development on port deep hinterland transport service and route selection*. <https://doi.org/10.1016/j.ocecoaman.2023.106910>
- Jiang, X., Panichakarn, B., & Musikapun, P. (2024). Determining the affecting factors of service quality to logistics operation by Structural Equation Modelling (SEM) under RCEP Implementation, a case study of Beibu Gulf. *Journal of Infrastructure, Policy and Development*. <https://doi.org/10.24294/jipd.v8i8.5346>
- Thennakoon, K., Bandaranayake, N., Kiridena, S., & Kulatunga, A. K. (2024). Quantification of Landside Congestion in Ports: An Analysis Based on Gps Data. *Journal of South Asian Logistics and Transport*. <https://doi.org/10.4038/jsalt.v4i1.75>
- Markowska, K. (2020). *Shaping Quality of Service in Freight Transport*. https://doi.org/10.1007/978-3-030-11512-8_2
- Lin-jie, H., & Hong, Z. (2015). *Combination Optimization of Hinterland Transportation Modes Considering the Transport Eco-indicators*.
- Jiménez-Delgado, G., Balmaceda-Castro, N., Hernández-Palma, H., Hoz-Franco, E. de la, García-Guiliany, J., & Martínez-Ventura, J. (2019a). An integrated approach of multiple correspondences analysis (MCA) and fuzzy AHP method for occupational health and safety performance evaluation in the land cargo transportation. *Springer US*.
- Jiménez-Delgado, G., Balmaceda-Castro, N., Hernández-Palma, H., Hoz-Franco, E. de la, García-Guiliany, J., & Martínez-Ventura, J. (2019b). *An Integrated Approach of Multiple Correspondences Analysis (MCA) and Fuzzy AHP Method for Occupational Health and Safety Performance Evaluation in the Land Cargo Transportation*. https://doi.org/10.1007/978-3-030-22216-1_32

- Chang, C.-H., & Thai, V. V. (2016). Do port security quality and service quality influence customer satisfaction and loyalty. *Maritime Policy & Management*. <https://doi.org/10.1080/03088839.2016.1151086>
- Zaki, N. E. B. (2018). *Impact of service quality of land transportation on customer satisfaction at johor port logistics*. <https://doi.org/10.31580/JPVAI.V1I1.137>
- Gil-Saura, I., Berenguer-Contrí, G., & Ruiz-Molina, E. (2018). Satisfaction and loyalty in B2B relationships in the freight forwarding industry: Adding perceived value and service quality into equation. *Transport*. <https://doi.org/10.3846/TRANSPORT.2018.6648>
- Tubaltseva, N., & Zhavko, S. (2024). *Logistics management strategies to ensure high quality customer service*. <https://doi.org/10.30525/978-9934-26-398-9-46>
- Hajduk, I., Poliak, M., & Gašparík, J. (2022). Quality of transport services and customer satisfaction measurement. *Archiwum Motoryzacji*. <https://doi.org/10.14669/am/151707>
- Wagner, W. B. (1987). Achieving Buyer-Seller Satisfaction through Carrier Service. *International Journal of Physical Distribution & Logistics Management*. <https://doi.org/10.1108/EB014656>
- Butta, T. L., & Abegaz, M. B. (2016). Importers' Satisfaction with the service of multimodal transportation system: the case of Ethiopia. *International Journal of Applied Research, IJAR*, 2(7), 236-242.
- Teresa, G., & Evangelos, G. (2015). *Importance of logistics services attributes influencing customer satisfaction*. <https://doi.org/10.1109/ICADLT.2015.7136590>
- Sugawara, J. (2017). Port and hinterland network: a case study of the Crescent Corridor intermodal freight program in the US. *Transportation Research Procedia*. <https://doi.org/10.1016/J.TRPRO.2017.05.466>
- Humang, W. P. (2018). *Kinerja Jaringan Transportasi Jalan Akses dari Hinterland ke Pelabuhan Tanjung Ringgit Kota Palopo*. <https://doi.org/10.25104/WARLIT.V30I1.402>