

THE IMPACT OF SUSTAINABLE SERVICE QUALITY ON CUSTOMER SATISFACTION AND LOYALTY IN AIR CARGO LOGISTICS: EVIDENCE FROM VIETNAM'S GLOBAL VALUE CHAINS VIETNAM

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ABSTRACT

The study examined how sustainable service quality impacts customer satisfaction and customer loyalty within air cargo logistics in Vietnam's global supply chain. Anchored in the triple bottom line principles, sustainable service quality is modeled through economic environmental and social dimensions. Data from 300 firms using international air cargo services were analyzed using SPSS 27.0 and AMOS 24.0. Findings demonstrate that each aspect of sustainable service quality has a significantly positive influence on both customer satisfaction and customer loyalty; in addition to the relative influence of environmental and social service quality on both factors. Customer satisfaction also contributes to customer loyalty although its effect is relatively modest. The study enriches logistics service quality literature by incorporating sustainability and offers managerial implications for enhancing long term relationships in global value chains.

Keywords: Sustainable service quality, air cargo logistics, customer satisfaction, customer loyalty, triple bottom line, global value chains.

1. INTRODUCTION

Air cargo logistics plays a critical role in global value chains by enabling the fast and reliable transportation of high-value, time-sensitive, and perishable goods across international markets. Air freight constitutes less than one percent of international trade by volume; however, it is responsible for over thirty-five percent of international trade value. The fact that a relatively small percentage of global trade by volume generates such a high percentage of global trade value, highlights the importance of air freight for major industries including electronics, pharmaceuticals, fashion, and fresh food exports [1]. Owing to its advantages in speed, security, and operational flexibility, air cargo logistics has become an indispensable component of export-oriented production networks.

Vietnam has emerged as a prominent manufacturing and exporting economy within global value chains, supported by strong inflows of foreign direct investment and trade integration. According to the World Trade Organization, Vietnam's merchandise exports reached approximately USD 355 billion in 2023, with a large proportion comprising high-value and time-sensitive products that rely heavily on air cargo logistics services [2]. Air cargo demand grew more than 10% year-over-year in Asia-Pacific during 2021-2022; IATA reports structural changes are occurring globally in supply chain sourcing [1].

Beyond operational performance, sustainability considerations are increasingly shaping logistics service evaluation in global value chains. Multinational buyers and lead firms are

placing growing emphasis on environmental and social criteria, including carbon emission reduction, fuel efficiency, labor standards, safety practices, and ethical business conduct, when selecting and retaining logistics service providers [3]. As a result, service quality in air cargo logistics can no longer be assessed solely based on economic efficiency and operational reliability, but must also incorporate environmental and social dimensions.

Despite this shift, empirical research on air cargo logistics service quality remains limited, particularly in emerging economies. While extant literature has predominantly emphasized conventional logistics service quality or approached sustainability through regulatory and operational lenses, it has largely overlooked the direct impact of sustainable service quality on customer satisfaction and loyalty [4]. To address this gap, the current study investigates the structural linkages among these factors within the air cargo logistics sector, utilizing empirical data from Vietnam's global value chains. In addition to providing practical insights for logistics service providers who are interested in creating stronger and more long-term customer relationships, and improving their competitive advantage through the use of sustainable service quality. This study will also provide additional theoretical contributions to the logistics service quality and sustainability literature by utilizing a triple bottom Line perspective.

2. THEORETICAL BACKGROUND

2.1. Conceptual and Theoretical Foundations

2.1.1. Service quality in air cargo logistics

Among the various determinants of supply chain success, service quality is considered to be an important factor when considering performance and relationship outcomes in air cargo logistics, especially within Business-to-Business (B2B) Contexts. It reflects customers' overall evaluation of a logistics service provider's ability to deliver reliable, timely, and secure transportation services for high-value and time-sensitive shipments. Prior studies identify on-time delivery, cargo safety, operational reliability, and information accuracy as core attributes shaping perceived service quality in air cargo logistics [5]. In addition, effective information exchange and coordination reduce uncertainty and enhance customer satisfaction in outsourced logistics relationships [6]. Empirical evidence further suggests that superior service quality supports long-term cooperation and customer loyalty within global value chains [7].

2.1.2. Sustainable service quality in logistics services

Logistics services - Sustainable service quality is theoretically based on the triple bottom line perspective; this theory views sustainability as the integration of economic, environmental, social dimensions of organization performance [8], [9]. From this theoretical viewpoint, logistics service quality extends beyond operational efficiency and cost effectiveness to incorporate environmental responsibility and social accountability throughout service delivery. Economic service quality reflects reliability and value creation, environmental service quality captures efforts to minimize ecological impacts, while social service quality relates to labor standards, safety, and ethical conduct. The three dimensions are integrated as a comprehensive theoretical foundation for assessing the service quality in logistics services based on sustainability-oriented perspectives [10], [11]

2.1.3. Customer satisfaction in B2B logistics services

Customer satisfaction in business-to-business logistics services is commonly defined as customers' overall evaluative judgment of a service provider's performance relative to prior expectations [12]. In B2B contexts, satisfaction is predominantly shaped by cognitive assessments of service reliability, responsiveness, and value creation rather than emotional responses alone. Effective logistics service performance reduces operational uncertainty,

enhances coordination efficiency, and strengthens perceived value for business customers. Customer satisfaction has been shown throughout the literature on logistics to act as a key relational mechanism by linking service quality to longer-term relationship results such as trust, commitment, and continuity in outsourcing arrangements for logistics [13].

From a theoretical perspective, customer satisfaction is also conceptualized as a mediating mechanism between service quality and customer loyalty within relationship marketing theory [12], [13]. Service quality influences customers' cognitive evaluation of service performance, which subsequently shapes their satisfaction and, in turn, their intention to maintain long-term relationships with service providers. In B2B logistics contexts, where decision-making is rational and performance-oriented, this mediating role becomes particularly relevant, as firms rely on satisfaction as an intermediate evaluation before forming loyalty intentions [14], [15]. Therefore, customer satisfaction is expected to function as a key explanatory mechanism linking sustainable service quality to customer loyalty in air cargo logistics.

2.1.4. Customer loyalty in global value chain relationships

Customer loyalty in global value chain relationships refers to a buyer's intention to maintain long-term cooperation with a service provider despite alternative options. In business-to-business logistics contexts, loyalty is not limited to repeat transactions but reflects relational commitment, trust, and resistance to switching within interdependent supply networks [14]. Global value chains are characterized by high coordination requirements and governance mechanisms, which make stable logistics partnerships strategically valuable [16]. Prior studies suggest that loyalty in such settings is reinforced when service providers consistently deliver value and align with buyers' sustainability and relational expectations [16], [17].

2.2. Empirical research

2.2.1. Empirical studies

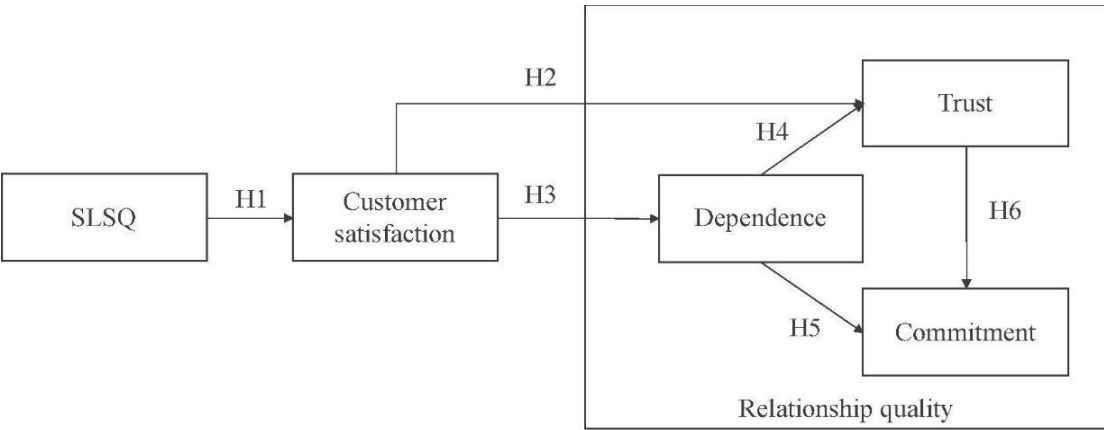


Figure 1. Research model of Ali et al.(2022) [4]

Source: Ali et al, 2022 [4]

Ali et al. [4] researched about “Assessing the impact of sustainable logistics service quality on relationship quality: Survey-based evidence in Egypt”. A company's logistics services have a significant role in developing the customer relationship within its supply chain and helps an enterprise to develop and sustain competitive advantages over time. In order to provide empirical evidence of the effects of sustainable logistics service quality (SLSQ), this study developed the SLSQ scale and used the survey data collected from Small and Medium-Sized Enterprises (SMEs) in Egypt to examine the effect of SLSQ on customer satisfaction and relationship quality. A quantitative approach was applied, utilizing structural equation

modeling (SEM) and mediation analyses using the maximum likelihood estimation method to test the established relationships based on 421 responses from SMEs in Egypt. The results clearly show that customer satisfaction with SLSQ positively affects the second-order dimensions of relationship quality. Additionally, the indirect effects of customer satisfaction on dependence, trust, and commitment were confirmed, demonstrating that dependence and trust are vital mediators in building relationship quality. This study provides recommendations to LSPs operating in developing countries such as Egypt, and contributes to the development of our knowledge of how relationship quality can be generated through its mechanisms. Finally, the results are compared to the literature of the past and then discussed in terms of their limitations, and possible avenues for further study.

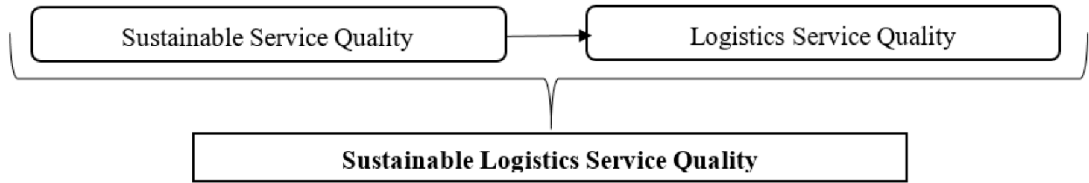


Figure 2. Sustainable logistics service quality (SLSQ) theoretical framework [18]

Source: Ali, Melkonyan & Gruchmann, 2021 [18]

Ali et al. [18] researched about “Developing a Sustainable Logistics Service Quality Scale for Logistics Service Providers in Egypt”. Sustainability is increasingly recognized as a key element of both corporate financial performance and environmental stewardship in the global supply chain, and as such, has become an essential metric to assess the performance of corporations through their entire supply chain. In order to be able to offer customers environmentally friendly and reliable services, Logistics Service Providers (LSPs) need to incorporate sustainable practices into their business models. Therefore, this research investigates how LSPs in Egypt contribute to the fulfillment of Egypt's strategic goals for sustainability of the logistics sector until 2030. In addition to providing a new framework for Sustainable Logistics Service Quality (SLSQ), this research developed a SLSQ scale based on an exhaustive review of Sustainable Service Quality (SSQ) and Logistics Service Quality (LSQ) scales from relevant literature. To tailor that the SLSQ scale was suitable for the regional needs, semi-structured interviews were completed with several Egyptian LSPs; in addition, the researchers applied the Q-sorting method to confirm the validity of the measurement constructs of the SLSQ scale. The results presented in this research provide a solid basis for assessing the quality of services provided by LSPs in Egypt. This research also contributes to the development of the theoretical body of knowledge concerning the measurement of service quality for LSPs in emerging markets and has practical implications for companies operating in Egypt, since the research results can be used to create metrics that meet Egyptian regulatory requirements. Furthermore, the findings of this research are discussed in relation to existing literature and potential research directions for future studies.

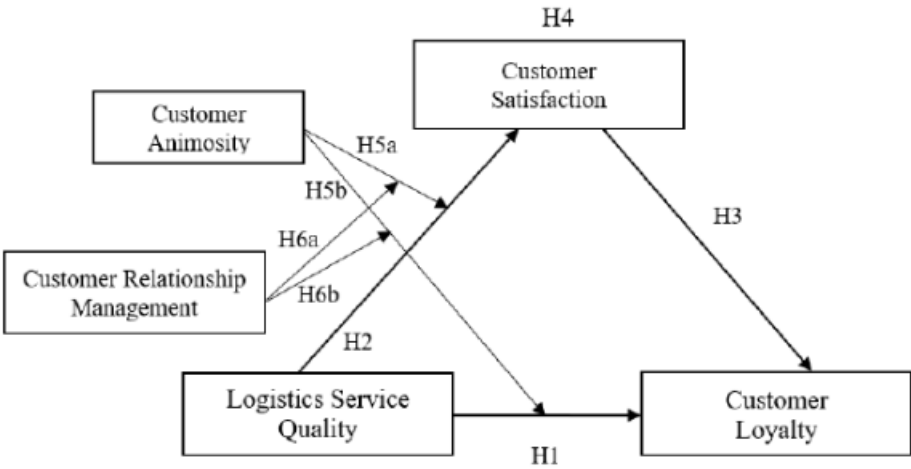


Figure 3. Research model of Yoganandan et al. (2024) [7]

Source: Yoganandan et al., 2024 [7]

Yoganandan et al. [7] researched about “Service quality, customer satisfaction and loyalty in the freight forwarding industry: the moderating role of animosity and CRM”. The purpose of this study is to investigate how both Competitive Advantage (CA) and customer relationship management (CRM) act as moderators in the relationship between logistics service quality (LSQ) and customer satisfaction (CSAT), with CSAT acting as a mediator; all of which affect Customer Loyalty (CL) among exporters in India. Given the current environment of high levels of political and economic uncertainty throughout the world—caused largely by regional conflict and the resulting strain on the highly competitive freight forwarder industry—the researchers used data from 240 Indian exporters to conduct their analysis.

To determine if the relationships hypothesized were supported, the researchers conducted Confirmatory Factor Analysis (CFA) using AMOS software. Additionally, the researchers used the Hayes PROCESS macro for inferential statistical analysis. Specifically, Models 4 and 12 were run to test the indirect (mediation) and indirect (moderated-mediation) effects. The empirical results support the direct relationships between LSQ, CSAT and CL, further supporting the critical mediating effect of CSAT. Also, the results show that CA and CRM are significant moderators of the LSQ-CSAT and LSQ-CL paths. As such, the study supports an examination of marketing communications and operational framework changes to improve sensitivity to customer needs. Overall, these findings represent strong theoretical contributions to the body of knowledge in logistics management, as well as useful recommendations for managerially-based decision making.

Meng et al. [5] researched about “Criteria for services of air cargo logistics providers: How do they relate to client satisfaction”. This current study investigates factors that determine client satisfaction in relation to logistics outsourcing. Specifically this study focuses on how clients evaluate service criteria for air cargo service providers as they relate to their subjective evaluations of those services. This study conceptualizes and empirically validates the "service criteria" construct, establishing robust measurement scales with sound psychometric properties. Our findings identify five critical dimensions of service criteria—delivery, knowledge innovation, service value-add, information, and performance satisfaction—alongside four pillars of client satisfaction: reliability, agility, customization, and flexibility. In addition, the results show a statistically significant relationship exists between service provider criteria and total client satisfaction.

2.2.2. Research gaps and hypothesis development

Prior studies have demonstrated that service quality influences customer satisfaction and customer loyalty for logistics and air freight services [5], [19]. Recent research has incorporated sustainability by conceptualizing logistics service quality through economic, environmental, and social dimensions [20], [18]. However, empirical evidence remains limited in the context of air cargo logistics, particularly within Vietnam’s global value chains. Additionally, prior research has not extensively studied the mediating effect of customer satisfaction on the relationship between sustainable service quality dimensions and customer loyalty.

From a theoretical perspective, customer satisfaction serves as an intermediate evaluative mechanism linking service quality to loyalty outcomes in B2B contexts [12], [13]. Moreover, environmental and social dimensions may exert stronger effects due to increasing ESG requirements and governance pressures in global value chains [16].

Therefore, this study proposed a model where economic, environmental and social service quality influences customer satisfaction and customer loyalty and that customer satisfaction acts as a mediator.

H1: Economic service quality has a positive influence on customer satisfaction in air cargo logistics.

H2: Environmental service quality has a positive influence on customer satisfaction in air cargo logistics.

H3: Social service quality has a positive influence on customer satisfaction in air cargo logistics.

H4: Economic service quality has a positive influence on customer loyalty in air cargo logistics.

H5: Environmental service quality has a positive influence on customer loyalty in air cargo logistics.

H6: Social service quality has a positive influence on customer loyalty in air cargo logistics.

H7: Customer satisfaction has a positive influence on customer loyalty in air cargo logistics.

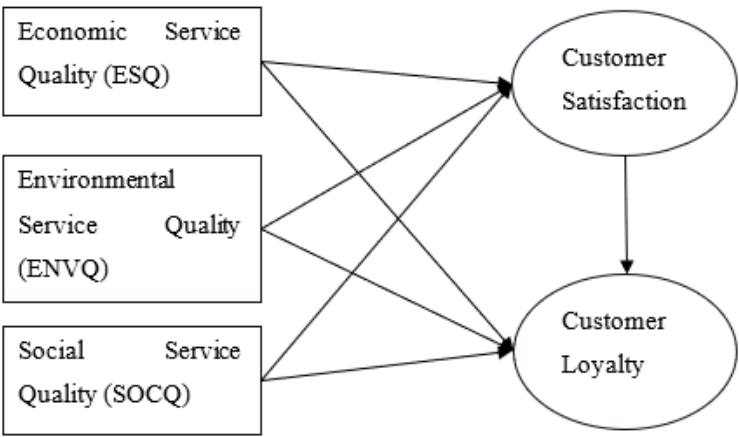


Figure 4. Proposed research model

Source: Study Authors, 2026

3. METHODOLOGY

3.1. Research design

This study utilizes an explanatory research design with a quantitative methodology to examine the relationship between sustainable service quality, customer satisfaction, and customer loyalty in air cargo logistics. The survey methodology for collecting primary data was utilized to gather data from business customers who are utilizing air cargo logistics services as part of Vietnam's global value chains. Utilizing this type of design allows researchers to test hypothesis related to causal relationships between latent constructs. This design is appropriate for testing hypothesized causal relationships among latent constructs and is widely used in logistics and service quality research.

3.2. Data collection and sampling

The proposed research model consists of five latent constructs, each measured by four observed items, resulting in a total of 20 measurement items. Hair et al. [21] recommend that minimum sample size should be determined based on the number of measurement items and model complexity. They indicate that there must be a minimum of 10 observations per item, thus the minimum sample size for this study would be 200. Additionally, Bentler & Chou [22] suggested a minimum of 5 to 10 observations per estimated parameter when conducting Structural Equation Modeling. Based on these recommendations, a sample size of 300 valid responses was obtained from businesses in Vietnam that utilize air cargo logistics services, thereby providing adequate statistical power for estimating parameters with reliability and sufficient strength to support hypothesis testing.

This study employed a purposive sampling approach, targeting firms that actively use international air cargo logistics services in Vietnam. The sample includes a mix of Vietnamese firms and foreign invested or international firms operating in Vietnam, reflecting the diverse composition of businesses participating in global value chains. Respondents were primarily managers or staff involved in logistics, supply chain, or procurement functions, ensuring that they possess relevant knowledge to evaluate service quality.

3.3. Measurement scales and variables

All of the constructs used in this research have been identified via use of a multi-item reflective scale based on prior studies of logistics service quality; sustainability; and relationship marketing. Sustainable service quality was conceptualized by way of three sub-dimensions (economic service quality, environmental service quality and social service quality) based upon the triple bottom line conceptual framework. Relational outcomes (customer satisfaction and customer loyalty) were conceptualized as a means of capturing customer evaluations and long-term cooperative intentions within Business-to-Business Logistics Relationships. In order to provide adequate content validity and construct reliability each construct has been identified via use of four items. Each item has been scaled using a five-point Likert scale (Strongly disagree to strongly agree).

3.4. Data analysis techniques

Data Analysis was completed utilizing SPSS and AMOS. SPSS was utilized in conjunction with data screening (Missing values; outliers; descriptive statistics). Internal consistency of the measurement scales were determined via Cronbach's Alpha, where an acceptable value is greater than 0.70.

The Structural Equation Model was estimated via AMOS. Confirmatory Factor Analysis (CFA) was completed to evaluate the measurement model, which included assessment of standardized factor loadings and overall model fit. Model fit was evaluated

by way of common indices (Chi square to degrees of freedom ratio; comparative fit index; root mean squared error of approximation) in order to evaluate if the proposed model effectively captured the data collected.

4. RESULTS

4.1. Descriptive statistics

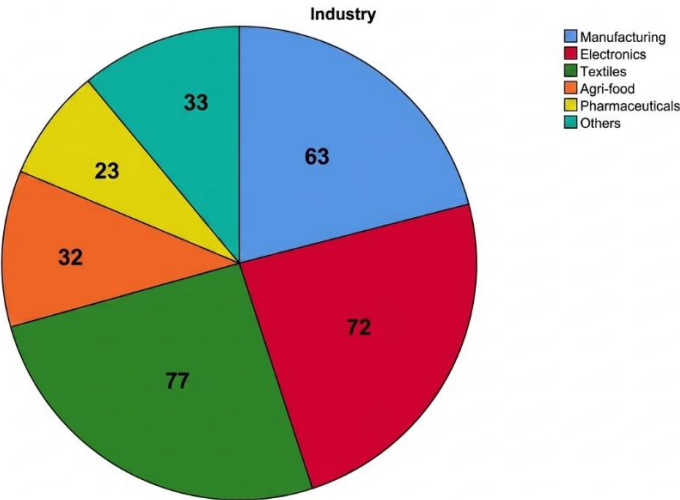


Figure 5. Industry of respondents

Source: compiled by the authors

The sample consists of 300 respondents, of whom 77 (accounting for 25.7%) are from the textiles sector and 72 (accounting for 24.0%) from electronics, followed by 63 (accounting for 21.0%) in manufacturing, 33 (accounting for 11.0%) in other industries, 32 (accounting for 10.7%) in pharmaceuticals, and 23 (accounting for 7.7%) in agri food, reflecting broad industry representation within Vietnam’s global value chains.

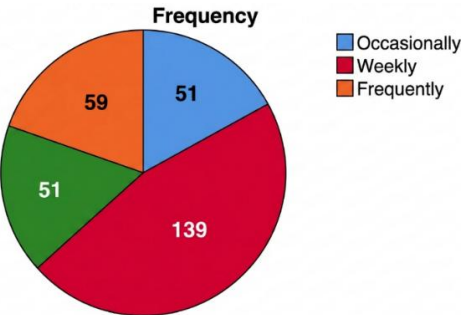


Figure 6. Frequency of using Air cargo Logistics

Source: compiled by the authors

The sample comprises 300 respondents, of whom 139 (accounting for 46.3%) use air cargo services monthly, while 59 (accounting for 19.7%) use them frequently. In addition, 51 respondents (accounting for 17.0%) report occasional usage and 51 (accounting for 17.0%) use air cargo services on a weekly basis.

4.2. Measurement model assessment

Table 1. Measurement model assessment

Construct	Items	Cronbach's Alpha	Factor Loadings	Communalities
Economic Service Quality (ESQ)	4	0.84	0.720 - 0.792	0.664 - 0.698
Environmental Service Quality (ENVQ)	4	0.826	0.695 - 0.767	0.611 - 0.731
Social Service Quality (SOCQ)	4	0.838	0.717 - 0.807	0.601 - 0.776
Customer Satisfaction (CS)	4	0.849	0.675 - 0.809	0.574 - 0.771
Customer Loyalty (CL)	4	0.816	0.647 - 0.782	0.565 - 0.797

KMO = 0.912
Bartlett's Test of Sphericity: $\chi^2 = 3061.231$, $p < 0.001$
Total variance explained = 68.60%

Source: compiled by the authors

The reliability of the measurement scales was analyzed using Cronbach's Alpha. Cronbach's Alpha for each construct showed acceptable internal consistency. For all constructs, the Cronbach's Alpha values were 0.816 or higher, which exceeded the minimum of 0.70. The corrected item-total correlation for all items was 0.56 or higher; when items were deleted, the Cronbach's Alpha for the remaining items did not show a large increase. Therefore, all items were retained for further analysis.

The exploratory factor analysis used a Principal Component Analysis with Varimax Rotation. The KMO value for the sample was 0.912, showing good sampling adequacy, and the Bartlett's Test of Sphericity was significant ($\chi^2 = 3061.231$, $p < 0.001$) which supported the use of factor analysis on this data. Based upon the Kaiser criteria, five factors were selected because they had an Eigenvalue of one or higher and explained 68.60% of the total variance. Each item had a high loading (.64 or higher) on its own scale and low cross-loadings (0.30 or lower). The communalities for each item ranged from 0.565 to 0.797, showing a good amount of shared variance between each item. These findings also support the convergent validity and factor structure of the proposed measurement model.

4.3. Structural equation model

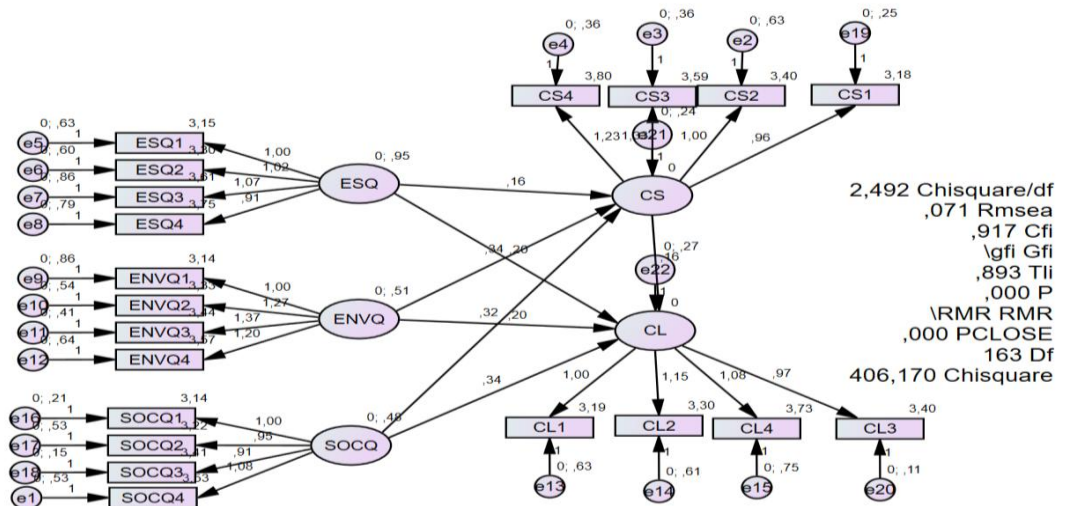


Figure 7. Structural equation model

Source: compiled by the authors

The Structural Equation Modeling (SEM) findings demonstrate that the proposed model exhibits adequate overall goodness-of-fit with the empirical data. The normed Chi-square ($\chi^2/df = 2.492$) lies well within acceptable limits, confirming a high level of model fit. The Root Mean Square Error of Approximation (RMSEA) is 0.071; this falls within the acceptable range. Additionally, the incremental fit measures were also satisfactory with CFI at 0.917, GFI at 0.893, and TLI at 0.893. The estimated structural relationships indicate that the economic, environmental and social dimensions of Sustainable Service Quality each contribute positively to Customer Satisfaction and Customer Loyalty. Furthermore, Customer Satisfaction is shown to contribute significantly to enhancing Customer Loyalty for Air Cargo Logistics Services.

Table 2. Coefficients of model

Dependent variables		Independent variable	Estimate	S.E.	C.R.	P
CS	<---	ESQ	,160	,040	3,994	***
CS	<---	ENVQ	,343	,063	5,404	***
CS	<---	SOCQ	,316	,058	5,418	***
CL	<---	ESQ	,198	,045	4,350	***
CL	<---	ENVQ	,197	,066	2,992	,003
CL	<---	SOCQ	,341	,068	5,034	***
CL	<---	CS	,163	,086	1,885	,059

Source: compiled by the authors

The structural path estimates further indicate that each of the three dimensions of Sustainable Service Quality each positively affect customer satisfaction and customer loyalty. The economic dimension of sustainable service quality is found to have a positive and statistically significant relationship with both customer satisfaction (est.= 0.160, $p < 0.001$) and customer loyalty (est. = 0.198, $p < 0.001$). The environmental dimension of sustainable service quality is found to have a significant positive relationship with customer satisfaction (est. = 0.343, $p < 0.001$) and a positive effect on customer loyalty (est. = 0.197, $p = 0.003$). Finally, the social dimension of sustainable service quality is found to have a very positive effect on both customer satisfaction (est. = 0.316, $p < 0.001$) and customer loyalty (est. = 0.341, $p < 0.001$). The path from customer satisfaction to customer loyalty was found to be positive and marginally significant (est. = 0.163, $p = 0.059$) thus indicating a weak direct relationship in the presence of the three Sustainable Service Quality dimensions.

4.4. Discussion

Building on the empirical results presented in the previous section, the findings of this study confirm prior research on sustainable logistics service quality by demonstrating that economic, environmental, and social service quality jointly influence customer satisfaction and customer loyalty in air cargo logistics. This is consistent with previous studies showing that these dimensions positively contribute to relational outcomes in B2B logistics contexts [4], [18]. Similar to Yoganandan et al. [7] and Gaudenzi et al. [6], economic service quality remains a fundamental driver of customer evaluations through reliability, on time performance, and cargo safety, which continue to be essential baseline expectations in logistics service delivery.

However, this study reveals that environmental and social service quality exert stronger effects than economic service quality, particularly on customer loyalty. As identified by Gelderman et al. [23] and Hong et al. [24], firms increasingly utilize Environmental, Social, and Governance practices to build long term relationships within global supply chains. In the

context of Vietnam's global value chains, this finding is especially meaningful as exporters are embedded in sustainability driven networks governed by multinational buyers and international standards, where compliance and transparency become mandatory conditions for participation. Environmental responsibility and socially responsible operations therefore act as credible signals of long term alignment and trustworthiness, strengthening partner selection and retention decisions.

Furthermore, the relatively modest effect of customer satisfaction on customer loyalty differs from traditional logistics studies such as Huma et al. [13], which reported a stronger satisfaction loyalty linkage. From a theoretical perspective, this weaker relationship can be explained by the structural characteristics of B2B logistics markets and global value chains, where loyalty is influenced not only by evaluative satisfaction but also by switching costs, contractual commitments, and governance mechanisms [15], [14]. In such contexts, firms are often embedded in long term coordination structures, and changing logistics providers may involve operational disruptions, renegotiation costs, and risks to supply chain stability.

As a result, customer satisfaction functions as a necessary but not sufficient condition for customer loyalty, while sustainable service quality, particularly environmental and social dimensions, plays a more decisive role in sustaining long term partnerships. These findings indicate that customer retention in air cargo logistics is increasingly shaped by strategic alignment with sustainability standards rather than by satisfaction alone. Overall, the findings suggest that for air cargo logistics providers operating in Vietnam, sustainability based service quality represents a strategic mechanism to strengthen customer retention and secure positioning within global value chains.

5. CONCLUSION

5.1. Conclusions

The findings of this empirical investigation substantiate the instrumental role of sustainable service excellence in fostering customer gratification and long term retention within the context of Vietnamese air cargo operations integrated into global value networks. By adopting the triple bottom line perspective, the findings demonstrate that economic, environmental, and social service quality jointly shape customer evaluations, while environmental and social dimensions exert particularly strong influences.

Empirically, the results confirm that all proposed hypotheses from H1 to H6 are supported, indicating that each dimension of sustainable service quality positively affects both customer satisfaction and customer loyalty. In particular, environmental and social service quality show relatively stronger effects compared to economic service quality, highlighting the increasing importance of sustainability oriented practices in logistics service evaluation.

These results highlight a clear shift in B2B logistics relationships where sustainability based performance has become a core determinant of long term cooperation rather than a supplementary service attribute.

5.2. Recommendations

Based on the findings several managerial recommendations are proposed. First, air cargo logistics providers in Vietnam should prioritize environmental service quality by investing in fuel efficiency carbon reduction initiatives and compliance with international environmental standards required by global buyers. Such practices not only support sustainability goals but also strengthen customer confidence in long term partnerships. Second, firms should enhance social service quality through continuous employee training improved safety practices ethical conduct and transparent communication with customers. These actions contribute to trust

building and relational stability in complex global value chains. Third, economic service quality remains essential and managers should maintain high standards of reliability cargo safety and cost transparency while integrating sustainability objectives into core operations. Finally, industry associations and policymakers should support sustainable logistics development through clear regulatory frameworks and incentive mechanisms to improve the overall competitiveness of Vietnam's air cargo logistics sector.

5.3. Limitations and further research

This study is subject to several limitations. First, the use of a cross sectional research design limits the ability to establish causal relationships over time, as the data capture perceptions at a single point. Second, the empirical context is restricted to Vietnam, which may limit the generalizability of the findings to other emerging or developed markets with different institutional and logistics environments. Third, the reliance on self reported survey data may introduce common method bias, despite efforts to ensure data quality through questionnaire design and respondent screening.

Future research should address these limitations by employing longitudinal designs to capture dynamic changes in customer perceptions and loyalty over time. Comparative studies across different countries or regions would provide deeper insights into how institutional contexts influence sustainable service quality. Additionally, future studies could incorporate multi source data, such as combining survey responses with objective performance indicators or operational data, to reduce common method bias and improve robustness. Further research may also explore moderating variables such as switching costs, relationship duration, or governance mechanisms to better explain variations in the satisfaction loyalty relationship.

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Appendixes - Measurement scales

Construct	Code	Measurement item	Key sources
Economic Service Quality (ESQ)	ESQ1	Air cargo shipments are delivered on time as scheduled.	Elkington [8]; Meng et al. [5]
	ESQ2	Cargo handling processes ensure safety and minimize damage or loss.	
	ESQ3	Air cargo operations are reliable and consistent across shipments.	
	ESQ4	Service pricing and cost structures are transparent and predictable.	
Environmental Service Quality (ENVQ)	ENVQ1	The air cargo provider implements measures to reduce carbon emissions.	Elkington [8]; Ali et al. [18]
	ENVQ2	Environmentally friendly practices are applied in air cargo handling and operations.	
	ENVQ3	The provider complies with environmental regulations and international standards.	
	ENVQ4	Environmental performance information is transparently communicated to customers.	
Social Service Quality (SOCQ)	SOCQ1	Employees handling air cargo demonstrate adequate competence and professionalism.	Elkington [8]; Gupta & Singh [20]
	SOCQ2	Occupational health and safety standards are strictly followed.	
	SOCQ3	Business practices are ethical and socially responsible.	
	SOCQ4	Communication with customers is honest, responsive, and respectful.	
Customer Satisfaction (CS)	CS1	Overall, we are satisfied with the air cargo logistics services provided.	Oliver [12]; Gaudenzi et al. [6]
	CS2	The service performance meets our expectations for air cargo logistics.	
	CS3	The air cargo service provider performs close to our ideal expectations.	
	CS4	Choosing this air cargo provider is a correct decision for our firm.	
Customer Loyalty (CL)	CL1	We intend to continue using this air cargo logistics provider in the future.	Tsai et al. [19];

	CL2	We would prioritize this provider over alternative air cargo service providers.	Kalubanga & Namagembe [14]
	CL3	We are willing to maintain a long-term relationship with this provider.	
	CL4	We would recommend this air cargo logistics provider to other firms in our network.	