AÑO 31 NO. 113, 2026
ENERO-MARZO

AÑO 31 NO. 113, 2026
ENERO-MARZO

Revista Venezolana de Gerencia

UNIVERSIDAD DEL ZULIA (LUZ)
Facultad de Ciencias Económicas y Sociales
Centro de Estudios de la Empresa

ISSN 1315-9984

Como citar: Fuentes, S.-P., Enamorado, J. A., y Rodríguez-Burgos, K. (2026). Tecnologías de comunicación y paz: soberanía epistemológica en gobernanza indígena. *Revista Venezolana De Gerencia*, *31*(113), e3111321. https://doi.org/10.52080/rvgluz.31.113.21

Universidad del Zulia (LUZ)
Revista Venezolana de Gerencia (RVG)
Año 31 No. 113, 2026, e3111321
Enero-Marzo
ISSN 1315-9984 / e-ISSN 2477-9423

Can sustainable practices and value enhance loyalty in maritime sector? An analysis of their discriminatory capacity*

Justavino-Castillo, Milva Eileen**
Gil-Saura, Irene***
Fuentes-Blasco, María****
Moliner-Velázquez, Beatriz*****

Abstract

This paper analyzes customer loyalty toward their main shipping service provider based on sustainable practices and logistics value. Surveys were conducted with managers in Panama's maritime sector, collecting 140 responses evaluated using Automatic Interaction Detection (AID). The study aimed to identify which sustainability (economic, social, environmental) and logistics value (productivity, quantification, importance) dimensions influence loyalty. Three customer segments with different loyalty levels were found. Economic, social sustainability and productivity were key factors in B2B relationships. Segments also varied by business type and provider choice. Results indicate that varying perceptions of value and sustainability shape loyalty. Shipping companies should tailor services to meet client needs. Regular evaluations of customer perceptions are recommended to improve strategic alignment and loyalty.

Keywords: sustainable practices; value; B2B long-term relationship; maritime transport; segmentation.

Recibido: 09.06.25 **Aceptado**: 17.09.25

* This work was supported by the State Research Agency of the Spanish Ministry of Science and Innovation under Grant PID2020-112660RBI00/ AEI / 10.13039 / 501100011033; Consolidated Research Teams of the Regional Council of Innovation, Universities, Science and Digital Society under Grant AICO2021/144/GVA; and the Special Research Actions of the University of Valencia under Grant UV-INV-AE-1553911. We thank the National Research System of Panama (SNI).

** PhD in Marketing. Technological University of Panama, Panama. E-mail: milva.justavino@utp.ac.pa. ORCID: https://orcid.org/0000-0002-3348-1977. Scopus Author ID: https://www.scopus.com/authid/detail.uri?authorId=57226318430.

*** PhD in Economic and Business Sciences. University of Valencia, Valencia, Spain. E-mail: irene.gil@uv.es. ORCID: https://orcid.org/0000-0002-5758-0806. Scopus Author ID: https://www.scopus.com/authid/detail.uri?authorId=26430896600

**** PhD in Economic and Business Sciences. Pablo de Olavide University, Seville, Spain. E-mail: mfuebla@upo.es. ORCID: https://orcid.org/0000-0002-7082-7068. Scopus Author ID: https://www.scopus.com/authid/detail.uri?authorId=57195383537

***** PhD in Economic and Business Sciences. University of Valencia, Valencia, Spain. E-mail: beatriz.moliner@uv.es. ORCID: https://orcid.org/0000-0003-0357-749X. Scopus Author ID: https://www.scopus.com/authid/detail.uri?authorId=36125275800.

¿Pueden las prácticas sostenibles y el valor mejorar la lealtad en el sector marítimo? Un análisis de su capacidad discriminatoria

Resumen

Este artículo analiza la lealtad de los clientes hacia su principal proveedor de servicios de transporte marítimo, basada en prácticas sostenibles y valor logístico. Se realizaron encuestas a gerentes del sector marítimo en Panamá, recolectando 140 respuestas que se analizaron mediante Detección Automática de Interacciones (DAI). El estudio buscó identificar qué dimensiones de sostenibilidad (económica, social, ambiental) y valor logístico (productividad, cuantificación, importancia) influyen en la lealtad. Se encontraron tres segmentos de clientes con distintos niveles de lealtad. La sostenibilidad económica y social, junto con la productividad, fueron factores clave en relaciones B2B. Los segmentos también variaron según el tipo de empresa y la elección del proveedor. Los resultados indican que las diferentes percepciones de valor y sostenibilidad moldean la lealtad. Las empresas navieras deben adaptar sus servicios para satisfacer las necesidades del cliente. Se recomienda evaluar regularmente las percepciones de los clientes para mejorar la alineación estratégica y la lealtad.

Palabras clave: prácticas sostenibles; valor; relación B2B a largo plazo; transporte marítimo; segmentación.

1. Introduction

Shipping involves moving goods among key actors, with maritime transport handling 80% of global cargo (United Nations Conference on Trade and Development [UNCTAD], 2024). Intense competition has led shipping companies to build long-term customer relationships through alliances and vertical integration (Caliskan & Esmer, 2020; Balci et al., 2019). Managing these relationships is complex, making segmentation essential for B2B customer retention.

While transport in consumer markets has gained attention, maritime sector research is limited due to market complexity and fewer, closer customers (Gil-Saura et al., 2015). Segmentation should include subjective variables tied to perceptions of supplier relationships. Sustainable shipping practices drive customer loyalty, as neglecting them risks losing customers to greener competitors (Yuen et al., 2018; Jozef et al., 2019). Sustainability criteria increasingly influence shipping tenders. Maritime logistics create value through efficiency, effectiveness, and relevance, with on-time delivery crucial for loyalty (Amin et al., 2021). Value arises when shippers' expectations and service costs align (Gil-Saura et al., 2010).

This study uses loyalty-based segmentation with subjective criteria to identify sustainable practice dimensions

(economic, social, environmental) and logistics value (productivity, quantification, importance) from a Triple Bottom Line perspective. It presents: an introduction; conceptual framework on loyalty, sustainability, and value; methodology using AID tree regression for segmentation; segmentation results; discussion, and conclusions with limitations and future research directions.

2. Theoretical Framework

Customer loyalty is fundamental to establishing and maintaining strong business relationships, particularly in competitive and dynamic sectors like maritime transport (Caliskan & Esmer, 2020). Loyalty is typically understood from two primary perspectives: behaviorally, as the result of repeated transactions, and attitudinally, reflecting emotional attachment and trust (Gil-Saura et al., 2010). In business-to-business (B2B) contexts, it often stems from long-term collaboration and the co-creation of value (Moliner-Velázquez et al., 2014). In container shipping, loyalty contributes to superior firm performance and competitive advantages in commoditized markets (Balci et al., 2019; Yuen et al., 2018). It also enhances positive behaviors such as repurchase intention, price tolerance, and favorable word-of-mouth (Shin et al., 2017; Yuen et al., 2016).

Theoretical foundations such as institutional theory and perceived value theory help explain the drivers of loyalty. Institutional theory highlights how coercive, mimetic, and normative pressures influence organizational strategies (Van Hoang & Vo, 2023), while perceived value theory examines how customers evaluate the trade-off between the benefits and costs of services. Adapting to evolving expectations is critical in this context. Customer segmentation based on preferences and perceptions enables tailored services that foster long-term relationships (Justavino-Castillo et al., 2023; Vega et al., 2021). In this framework, the present study examines how sustainability practices and the perceived value of logistics services shape customer loyalty and segmentation in maritime transport.

Regarding sustainability, it has emerged as a strategic priority for shipping firms aiming to build customer loyalty (Yuen et al., 2018; Tseng et al., 2021). Defined by the United Nations (1987, p. 43) as “meeting the needs of the present without compromising the ability of future generations to meet their own needs,” sustainability includes three interrelated dimensions, environmental, economic, and social, under the Triple Bottom Line framework (Elkington, 1997). Although sustainability communication is increasingly important, many firms still lack the marketing tools to communicate their efforts effectively (Van Hoang & Vo, 2023). Customers, as critical stakeholders, tend to favor providers who demonstrate environmental and economic responsibility and demand greater transparency and accountability across supply chains (Yuen et al., 2020). Successfully integrating sustainability into operations strengthens long-term partnerships and enhances mutual value (Shin et al., 2017). Loyalty increases when customers perceive environmental care and practical service benefits, especially through timely delivery and visible eco-friendly initiatives (Yuen et al., 2018; Jozef et al., 2019).

In this sense, environmental sustainability has become increasingly important amid the intensification of shipping activity due to globalization

(Jozef et al., 2019). Although maritime transport is more efficient than other modes, container shipping still accounts for over 70% of door-to-door emissions and approximately 3% of global greenhouse gases (Van den Berg & De Langen, 2017; UNCTAD, 2024). In response, the International Maritime Organization (IMO) has set a goal of 5–10% zero-emission fuels by 2030 (IMO, 2024). Regulatory and societal pressures to reduce pollutants such as SOx, NOx, and marine hazards have led customers to value firms adopting cleaner fuels, energy-efficient technologies, and digital tools that improve environmental performance and service quality (George et al., 2024; Shin et al., 2017; Yuen et al., 2018).

In addition, economic sustainability focuses on generating long-term economic value while aligning with social and environmental goals (Camilleri et al., 2023). In maritime logistics, this includes investments in cost control, infrastructure, market access, and competitive performance (UNCTAD, 2015). Firms that fail to invest in these areas often face service disruptions and rising operational costs (Benamara et al., 2019). In contrast, those that implement sustainable practices—such as online booking systems or efficient cargo handling—are better positioned to retain customers by offering reliable and cost-effective services (Shin et al., 2017; Jozef et al., 2019; Yuen et al., 2018).

In relation to social sustainability, it addresses human capital development, workplace safety, labor rights, and community engagement. According to Dyllick and Hockerts (2002), it is achieved when organizations enhance social and human capital. Firms that show genuine commitment to social issues often build stronger customer loyalty, particularly among stakeholders who value ethics and corporate responsibility (Yuen et al., 2018). However, perceptions of social responsibility vary: while employees prioritize working conditions, shareholders may emphasize financial returns, leading to differing interpretations.

Beyond sustainability, the perceived value of logistics services is central to customer loyalty. This value emerges from the synergy between logistics and marketing functions, where logistics ensures efficient movement of goods, services, and information (Caliskan & Esmer, 2020). Rooted in equity theory, perceived value reflects the customer's evaluation of benefits relative to costs (Gil-Saura et al., 2010; Novack et al., 1995). These benefits may include timeliness, service customization, accurate information, and fair pricing (Mentzer et al., 1997; Grace & Lo Iacono, 2015). Firms aim to amplify these benefits while minimizing customer costs to strengthen loyalty. Gil-Saura et al. (2010) argue that customers assess logistics value based on productivity, significance, and measurable results.

With regard to service productivity, it involves balancing efficiency, effectiveness, and capacity to meet business and customer goals (Grönroos & Ojasalo, 2004). In shipping, productivity is enhanced by reduced delivery times, lower operational costs, and improved responsiveness (Caliskan & Esmer, 2020). Digitalization plays a key role, enabling greater energy efficiency, service quality, and profitability (Raza & Woxenius, 2023). As the industry becomes more standardized and alliance-driven, customers evaluate not just prices but also service features and reliability (Yuen et al., 2018). Offering differentiated services with enhanced

attributes positively impacts loyalty (Balci et al., 2019).

Finally, measuring logistics value involves assessing how well cost savings and service improvements are transferred to customers. According to Porter (1985), cost leadership is a core differentiation strategy. Logistics firms must reduce internal costs in ways that directly benefit the customer (Servera-Francés et al., 2008; Bonamigo et al., 2022). Price fairness, payment flexibility, and discount structures influence how customers perceive value (Linh et al., 2019). Given that pricing remains a key criterion in carrier selection (Van den Berg & De Langen, 2017; UNCTAD, 2024), customer loyalty in maritime transport ultimately depends on a complex interplay of sustainability, logistics value, service innovation, and the firm's ability to adapt to evolving customer expectations.

3. Research methodology

To meet the research objective, a structured questionnaire was administered to managers in Panama responsible for hiring shipping companies. It included validated scales measuring sustainability (Shin et al., 2017), perceived logistics value (Servera-Francés et al., 2008), and loyalty (Shin et al., 2017), using a 7-point Likert scale (see Appendix). The survey also collected company and relationship data. Based on secondary sources (LEGISCOMEX, MICI, Colón Free Trade Zone, APAC), 140 valid responses were obtained (57.9% response rate). Most respondents were freight forwarders (53.6%), with an average of 15.8 years in the sector. Key services included logistics (67.9%), transport (59.3%), and storage (57.1%), with operations primarily in North, Central, and South America. Average supplier relationship duration was 7.9 years. The fieldwork was carried out between November 2022 and March 2023.

Table 1
Sample profile

Variable	Number	%	Variable	Number	%
Business Type			*Number of employees*		
Exporter	18	12.9	1-25	65	46.4
Importer	31	22.1	26-50	40	28.6
Freight forwarder	75	53.6	>50	35	25.0
Re-exporters	16	11.4			
Activity (multiple response)			*Time with the main shipping service provider*		
Logistics	95	67.9	< 1 year	5	3.6
Transport	83	59.3	1-4 years	56	40.0
Storage	80	57.1	5-9 years	47	33.6
Distribution	70	50.0	≥ 10 years	32	22.9
Customs Trade	53	37.9			
Time in the maritime sector			*Activity zone (multiple response)*		
1-5 years	36	25.7	North America	85	60.7
6-10 years	40	28.6	Central America	83	59.3

Cont... Table 1

11-15 years	19	13.6	South America	69	49.3
16-20 years	12	8.6			
>20 years	33	23.6			

The measurement instrument consisted of scales reflecting managers' perceptions of their main service provider. Before assessing their discriminatory power, dimensionality and psychometric properties, reliability and validity, were analyzed. Dimensionality was examined using exploratory factor analysis (EFA) with eigenvalues >1 and Varimax rotation (Hair et al., 2006), conducted in IBM SPSS Statistics 29. Sampling adequacy was verified via the Kaiser-Meyer-Olkin (KMO) test and Bartlett's test of sphericity (Table 2).

Table 2
Items used to measure sustainability practices, perceived value, and loyalty

Variable	Dimension	Items	SL (t-value)
Sustainability practices (Shin *et al.*, 2017)	Economic and Social sustainability practices	My main shipping company's economic activities contribute to the economic growth of the society to which it belongs.	0.737*** (11.69)
		My main shipping company tries to enlarge employment from the local community.	0.745*** (13.65)
		My main shipping company expands its fleet by ordering new ships	0.714*** (10.41)
		My main shipping company encourages cooperation with regional communities and educational institutions	0.786*** (18.23)
		My main shipping company carries out its corporate social responsibility in proportion to its sales	0.756*** (12.16)
		My main shipping company supports additional education for its staffs.	0.840*** (25.23)
		My main shipping company encourages its staffs to involve in the voluntary activities in the community.	0.776*** (17.07)
		My main shipping company adheres to a high standard of disclosure and social responsibility reporting	0.828*** (27.42)
		My main shipping company donates to charitable organizations.	0.714*** (8.43)
	Environmental sustainability practices	My main shipping company reduces CO2 emissions by slow steaming of its fleet	0.802*** (18.76)
		My main shipping company suitably manages ballast water to protect the oceans from environment pollutions.	0.857*** (33.61)
		My main shipping company duly complies to international standards set up by the International Maritime Organization.	0.698*** (9.48)
		My main shipping company pays much attention environment protection	0.814*** (17.51)
		My main shipping company utilizes environmentally friendly materials and equipment.	0.831*** (19.62)
		My main shipping company adopts environmentally friendly shipbuilding designs	0.841*** (22.03)

Cont... Table 2

Perceived Logistics Value (Serve-ra-Francés *et al.*, 2008)	Logistics service pro-ductivity	We are happy with the level of logistics service that this provider offers us.	0.884*** (34.93)
		Improving logistics service is a high priority in our company.	0.843*** (11.25)
		We communicate to the supplier that the logistics service has exceeded our expectations.	0.809*** (13.40)
		We constantly try to reduce the overall logistics cost.	0.770*** (7.66)
	Importance of logistics service	Logistics adds value to the relationship with this supplier and gives this supplier a competitive advantage.	0.827*** (15.28)
		We increase orders when the level of logistics service offered is equal to or higher than our expectations.	0.871*** (20.54)
		The top management of the company is aware of the cost implica-tions of changes in the logistics service.	0.808*** (10.23)
		For our clients, logistics adds value to our company and provides it with a competitive advantage.	0.818*** (14.16)
	Quantification of logistics value	We measure and quantify the elements of the logistics service.	0.915*** (32.37)
		We can express the value of logistics quality measurements in dollars.	0.868*** (12.20)
Loyalty (Shin *et al.*, 2017)		I will recommend the services of my main shipping company to other companies.	0.918*** (40.74)
		I will deliver positive word of mouth about the service of my main shipping company to other companies	0.914*** (36.35)
		It is beneficial to keep the trade connection with my main shipping company.	0.819*** (10.67)
		I will extend or renew the contract with my main shipping company in the future.	0.877*** (27.42)
		I have a strong sense of loyalty to my main shipping company.	0.891*** (43.55)

SL: Standardized loadings
***:p-value<0.001

Reliability and validity (convergent and discriminant) were then tested through a confirmatory factor analysis (CFA) using Partial Least Squares (PLS) regression in SmartPLS 4 (Ringle et al., 2022), with 5,000 bootstrap resamples (Henseler et al., 2009). Reliability was assessed using Cronbach's alpha (Cronbach, 1951), composite reliability (Werts et al., 1974), and average variance extracted (AVE) (Fornell & Larcker, 1981). Validity was confirmed through AVE > 0.5 (Hair et al., 2019), the Fornell-Larcker criterion, and the HTMT ratio (Henseler et al., 2015). Once validated, the scales were used to examine segment-level differences in the company-provider relationship. The AID decision tree, a nonparametric method based on one-way ANOVA and F-statistics, identified how sustainability and logistics value dimensions explain customer loyalty (Luque, 2000; Kass, 1980).

4. Results intersection between Sustainability and Logistics: Determining Factors of Loyalty

The following section presents the results obtained regarding the intersection between sustainability and logistics as determining factors of loyalty.

4.1. Measurement instrument validation

According to the results shown in Table 2, the scales reach optimal levels of reliability and internal consistency (Economic and Social sustainability practices: Cronbach's α=0.909; composite reliability (CR)=0.916; Environmental sustainability practices: Cronbach's α=0.894; CR=0.898; Logistics service productivity: Cronbach's α=0.847; CR=0.875; Quantification of the logistics value: Cronbach's α=0.746; CR=0.768; Importance of logistics service: Cronbach's α=0.887; CR=0.889; Loyalty towards the preferred shipping company: Cronbach's α=0.930; CR=0.934).

All of the latent factors achieve Cronbach's Alpha and Composite Reliability values higher than 0.7 (Anderson & Gerbing, 1988). The observable variables have significant and high standardised factor loading (>0.7 and t-value>2.58, see Appendix) and average variance extracted (AVE) for each scale shown in Table 3 is higher than 0.5 (Fornell & Larcker, 1981), concluding that the measurement scales are endowed with convergent validity. Moreover, the correlation between each pair of latent constructs is lower than the square root of AVE (Fornell & Larcker, 1981) and the heterotrait-monotrait ratios of correlations (HTMT) were below 0.9 (Henseler *et al*., 2015), confirming the discriminant validity.

Table 3
Descriptive statistics, internal consistency, and measurement scale correlations

	Mean	SD	α	CR	AVE	1.*	2.	3.	4.	5.	6.
1. Economic and Social sustainability practices	5.47	0.94	0.909	0.916	0.580	**0.761**	*0.784*	*0.721*	*0.644*	*0.695*	*0.657*
2. Environmental sustainability practices	5.38	1.13	0.894	0.898	0.654	0.689	**0.809**	*0.660*	*0.565*	*0.640*	*0.588*
3. Logistic service productivity	5.91	0.90	0.847	0.875	0.685	0.639	0.576	**0.828**	*0.735*	*0.709*	*0.822*
4. Quantification of the logistics value	5.74	1.04	0.746	0.768	0.796	0.536	0.467	0.575	**0.911**	*0.873*	*0.621*
5. Importance of logistic service	5.88	0.94	0.887	0.889	0.690	0.628	0.574	0.603	0.794	**0.830**	*0.629*
6. Loyalty	5.95	1.00	0.930	0.934	0.782	0.618	0.552	0.748	0.718	0.568	**0.884**

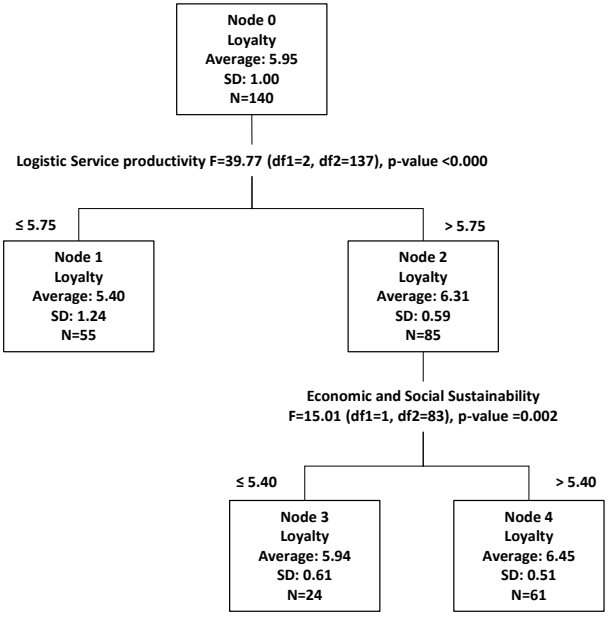
SD: standard deviation; α: Cronbach's Alpha; CR: composite reliability; AVE: average variance extracted. *: *Values along the main diagonal show the square root of the AVE (in bold). Values below the diagonal represent the correlations between latent constructs; values above the diagonal show the HTMT ratios (in italics)*

4.2. Predictive and post-hoc segmentation analysis (AID analysis)

After validating the measurement scales, an AID analysis was performed to identify which sustainability and logistics value dimensions best explain loyalty to the main service provider. Using ANOVA at each step, the algorithm selects the most discriminatory variables and defines cut-off points based on the F-statistic.

As shown in diagram 1, the initial node (Node 0) presents a mean loyalty score of 5.95 ± 1.00 for the overall sample. The first split, based on logistics service productivity (F = 39.77***, p < 0.01), separates the sample into two groups: Node 1 includes 55 companies with low productivity perception (≤ 5.75), showing lower loyalty (5.40 ± 1.24); Node 2 includes 85 companies with higher productivity perception (> 5.75), showing greater loyalty (6.31 ± 0.59). Node 2 is further segmented by perceptions of economic and social sustainability (F = 15.01***, p = 0.002), using a 5.40 cut-off point. This creates Node 3 with 24 companies reporting lower sustainability perception and loyalty of 5.94 ± 0.61, and Node 4 with 61 companies showing higher sustainability perception and the highest loyalty (6.45 ± 0.51). In summary, logistics service productivity emerges as the most significant predictor of loyalty, and when combined with positive perceptions of sustainability practices, customer loyalty is further enhanced.

Diagram 1
Classification tree to explain and segment loyalty



In order to check if there were significant differences between the segments in the evaluations of the different aspects, an analysis of variance was carried out. The results, collected in Table 4, show how one of the dimensions of value and one dimension of sustainability make it possible to segment the sample into three significantly different groups. According to these results, we can conclude that segment 1, a group of companies with the lowest significant level of logistics service productivity (5.15±0.96), presents significantly lower average values than the rest of the segments in the other two value dimensions (Quantification of the logistics value=5.26±1.18 and Importance of the logistics service=5.52±0.96), and in the two sustainability dimensions (economic and social sustainability=4.99±1.00 and environmental sustainability=4.88±0.99). Furthermore, the segment of 61 companies (segment 3) that has the best perception of logistics service productivity (6.41±0.35) and economic and social sustainability practices (6.15±0.40) rates environmental sustainability practices (5.94±0.81) and importance of the logistics service (6.30±0.47) significantly higher than the other two groups.

Table 4
Average value by segment and differences between groups

	Sg. 1 N=55 (39.3%)	Sg. 2 N=24 (17.1%)	Sg. 3 N=61 (43.6%)	F	Difference between segments[a]
Loyalty	5.40 (1.24[b])	5.94 (0.61)	6.45 (1.00)	20.11***	1-2; 1-3; 2-3
Economic and Social sustainability practices	4.99 (1.00)	4.86 (0.59)	6.15 (0.40)	48.06***	1-3; 2-3
Environmental sustainability practices	4.88 (0.99)	4.96 (0.79)	5.94 (0.81)	23.98***	1-3; 2-3
Logistic Service productivity	5.15 (0.96)	6.40 (0.33)	6.41 (0.35)	61.38***	1-2; 1-3
Quantification of the logistics value	5.26 (1.18)	5.71 (0.81)	5.70 (0.70)	11.15***	1-3
Importance of the logistics service	5.52 (0.96)	5.88 (0.71)	6.30 (0.47)	12.30***	1-3; 2-3

[a]: The Tukey-b post-hoc test was used to verify the existence of significant differences between the five types of segments. Only the statistically significant differences between groups, at least at the 95% are shown.`[b]: Standard deviations are shown in parentheses.
***: p-value<0.01

To better understand the profiles of the three resulting segments, contingency tables were used to cross-reference company characteristics. As shown in Table 4, significant differences emerged regarding business type, years in the maritime sector, and activity type.

Table 4
Description of the segment profiles

		Sg. 1 N=55 (39.3%)	Sg. 2 N=24 (17.1%)	Sg. 3 N=61 (43.6%)	^{2}(df) (p-value)
Business Type	Exporter	18.2%	12.5%	8.2%	11.03* (6) (0.088)
	Importer	27.3%	25.0%	16.4%	
	Freight forwarder	40.0%	45.8%	68.9%	
	Re-exporters	14.5%	16.7%	6.6%	
Time in the maritime sector	1-5 years	34.5%	20.8%	19.7%	16.94*** (8) (0.031)
	6-10 years	21.8%	16.7%	39.3%	
	11-15 years	14.5%	16.7%	11.5%	
	16-20 years	5.5%	25.0%	4.9%	
	More than 20 years	23.6%	20.8%	24.6%	
Number of employees	1-25	47.3%	54.2%	43.3%	3.74 (4) (0.443)
	26-50	23.6%	20.8%	36.7%	
	>50	29.1%	25.0%	20.0%	
Logistic Activities	Yes	58.2%	66.7%	77.0%	4.74* (2) (0.094)
	No	41.8%	33.3%	23.0%	
Transport Activities	Yes	45.5%	62.5%	70.5%	7.64** (2) (0.022)
	No	54.5%	37.5%	29.5%	
Storage Activities	Yes	50.9%	62.5%	60.7%	1.46 (2) (0.482)
	No	49.1%	37.5%	39.3%	
Distribution activities	Yes	47.3%	66.7%	45.9%	3.24 (2) (0.198)
	No	52.7%	33.3%	54.1%	
Customs traders	Yes	63.6%	54.2%	77.0%	4.88* (2) (0.087)
	No	36.4%	45.8%	23.0%	
Time with the main shipping service provider	<1 year	3.6%	4.3%	3.3%	2.18 (6) (0.902)
	1-4 years	41.8%	30.4%	42.6%	
	5-9 years	30.9%	34.8%	36.1%	
	≥ 10 years	23.6%	30.4%	18.0%	
Activity zone: Central America	Yes	60.0%	70.8%	54.1%	2.02 (6) (0.365)
	No	40.0%	29.2%	45.9%	
Activity zone: North America	Yes	58.2%	58.3%	63.9%	0.47 (2) (0.791)
	No	41.8%	41.7%	36.1%	
Activity zone: South America	Yes	43.6%	45.8%	55.7%	1.83 (2) (0.400)
	No	56.4%	54.2%	44.3%	

*: p-value<0.1; **: p-value<0.05

As it is shown in table 4, the first segment (55 companies) reports the lowest scores in predictor variables and loyalty. It includes a higher proportion of large import/export firms (27.3% and 18.2%) with shorter market experience (34.5% active ≤5 years) and a notable presence in non-transport activities like distribution and customs trading, mainly in North and Central America.

The second and smallest segment (24 companies) shows the highest loyalty and strongest perceptions of logistics productivity. These firms are not exporters, and most have over 16 years in the sector. They focus on distribution and logistics, with strong activity in Central America (70.8%) and long-standing relationships with their main suppliers (30.4% have worked with them for over 10 years).

Finally, the third group is the largest, consisting of 61 companies. Similar to the previous segment, it shows high loyalty towards the main shipping company and significantly higher evaluations on several predictors, particularly sustainable economic, social, and environmental practices. This segment has a notable percentage of freight forwarders (68.9%) and represents the longest tenure in the maritime sector (over 6 years). The results indicate they primarily engage in logistics and customs activities, having worked with their main shipping company for 1 to 9 years (78.7%). Like the first segment, most companies in this group operate within North America (63.9%).

To frame the statistical outcomes within a broader analytical context, we examined the distinctive characteristics of each segment and aligned them with relevant theoretical constructs. This approach enables a more nuanced interpretation of the inter-segment differences. The following discussion integrates these findings with established literature on buyer typologies, sustainability orientation, and perceived logistics value.

Regarding the segments identified in our study, the profile of Segment 2 aligns with the buyer type described by Balci & Cetin (2020) as pragmatic service buyers, who prioritize productivity and efficiency in contracting logistics services, and place less emphasis on personal or relational ties. The companies within this segment exhibited high levels of loyalty and a clear focus on logistics outcomes, particularly in terms of operational performance, which supports the validity of this typology.

Similarly, our findings reinforce the arguments presented by Langer et al. (2025), who suggest that maritime companies are increasingly incorporating sustainability criteria into their procurement decisions. This approach is no longer viewed solely as a response to external pressures but rather as a proactive strategy for value creation and differentiation in a highly competitive market.

Consistent with this, the results of Poulsen et al. (2016) further support our findings regarding Segment 3, which demonstrated a stronger appreciation for sustainable practices, economic, social, and environmental. According to Poulsen et al. (2016) containerized freight transport exhibits greater sensitivity toward sustainability compared to bulk dry cargo or tanker segments. This distinction is attributed to the commercial profile of the actors involved, who face higher reputational risks with their clients. This behavior is evident in Segment 3, composed predominantly of freight forwarders, whose intermediary role requires them to address a broad range of regulatory and commercial demands. Given their focus on containerized cargo, their position in the supply chain compels them to integrate sustainable practices as a fundamental part of their value proposition.

Finally, in line with the perspective of Maloni et al. (2016), this study underscores the value of customer segmentation in logistics as a strategic tool for understanding the diverse

motivations, needs, and behaviors of shippers. In a maritime transport environment characterized by high volatility in rates, capacity, and demand, identifying segments with distinct priorities enables the development of more targeted strategies. In particular, the findings highlight the importance of investing in logistics capabilities that are perceived as valuable by customers, which may provide shipping lines with a sustainable competitive advantage in a market where long-term relationships are becoming increasingly critical.

5. Conclusions

This research investigates the role of sustainability practices and perceived logistics value in shaping customer loyalty within the maritime transport industry. The findings reveal that loyalty levels vary significantly depending on customers' perceptions of social and environmental sustainability practices and the productivity and importance of logistics services. These results highlight the crucial role of relational and value-based factors in fostering long-term loyalty in the business-to-business (B2B) maritime sector. The research contributes to the literature by examining loyalty in a post-pandemic context, aligning with frameworks such as the Triple Bottom Line and the theory of perceived value.

The study identifies three distinct customer segments, each with different loyalty drivers and perceptions of value and sustainability. This segmentation deepens our understanding of how sustainable practices influence loyalty in global logistics, transport, and related B2B services. From a managerial perspective, the study provides actionable insights. Freight forwarders should enhance perceptions of economic and social sustainability, while re-exporters need to focus on logistics service productivity. Importers and exporters, who exhibit lower loyalty, require improvements in punctuality and service communication. Shipping companies must align their sustainability efforts with customer expectations, and regularly assessing customer perceptions will help refine their positioning and strengthen competitive strategies.

Although the objectives of this study have been met, there are several limitations that suggest avenues for future research. While this study analyzed how sustainable practices and perceived logistics value influence customer loyalty, future research should consider incorporating additional relevant variables, such as inter-organizational trust and transaction costs, to provide a more comprehensive understanding of why customers continue to choose certain companies. Furthermore, since services and the relationships between shipping companies and their clients vary according to the type of cargo, it would be appropriate to include cargo type as a variable in future analyses.

Another limitation relates to the geographic scope of the study, as survey respondents and interviewees were concentrated in a limited region. Therefore, replicating this study in other countries where maritime transport is a key driver of economic development would provide valuable insights. As Jeevan et al. (2023) emphasize, it is also important to explore the impact of global governmental policies on business decision-making. In this evolving context, marketing strategies aimed at fostering long-term relationships among agents in the maritime supply chain are developing within a new resilience framework.

Nguyen et al. (2022) conducted

a systematic literature review on disruptions in maritime supply chains, highlighting the importance of resilience and business performance within the network. Building on these findings, it is evident that strategic relationships among key actors in maritime logistics networks are complex and dynamic, necessitating analysis from a broader temporal perspective. While several studies conducted during the COVID-19 pandemic examined disruptions in maritime transport, this research provides a snapshot of customer loyalty in a stabilized environment. A comparative analysis between pandemic and post-pandemic periods would offer further insights and is recommended for future research. Finally, the majority of companies surveyed in this study were small enterprises (with fewer than 50 employees). Future research should include larger firms to assess whether company size affects loyalty toward shipping companies.

References

Amin, C., Mulyati, H., Anggraini, E., & Kusumastanto, T. (2021). Impact of maritime logistics on archipelagic economic development in eastern Indonesia. *The Asian Journal of Shipping and Logistics*, *37*(2), 157-164. https://doi.org/10.1016/j.ajsl.2021.01.004

Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411–423. https://doi.org/10.1037/0033-2909.103.3.411

Balci, G., Caliskan, A., & Yuen, K. F. (2019). Relational bonding strategies, customer satisfaction, and loyalty in the container shipping market. *International Journal of Physical Distribution & Logistics Management, 49*(8), 816–838. https://doi.org/10.1108/IJPDLM-02-2019-0051

Balci, G., & Cetin, I. B. (2020). Benefit segmentation of the container shipping market in Turkey. *Maritime Policy & Management*, *47*(8), 1121–1138. https://doi.org/10.1080/03088839.2020.1729436

Benamara, H., Hoffmann, J., & Youssef, F. (2019). Maritime transport: The sustainability imperative. In H. N. Psaraftis (Ed.), *Sustainable shipping: A cross-disciplinary view* (pp. 1–31). Springer International Publishing. https://doi.org/10.1007/978-3-030-04330-8_1

Bonamigo, A., Frech, C. G., & Lopes, A. C. C. (2022). Value co-creation in the B2B context: A diagnosis of knowledge management based on multiple case studies. *Journal of Business & Industrial Marketing, 37*(7), 1449–1462. https://doi.org/10.1108/JBIM-11-2020-0528

Caliskan, A., & Esmer, S. (2020). An assessment of port and shipping line relationships: The value of relationship marketing. *Maritime Policy & Management, 47*(2), 240–257. https://doi.org/10.1080/03088839.2019.1690172

Camilleri, M. A., Cricelli, L., Mauriello, R., & Strazzullo, S. (2023). Consumer perceptions of sustainable products: A systematic literature review. *Sustainability*, *15*(11), 8923.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297–334. https://doi.org/10.1007/BF02310555

Dyllick, T., & Hockerts, K. (2002). Beyond the business case for corporate sustainability. *Business Strategy and the Environment, 11*(2), 130–141.

https://doi.org/10.1002/bse.323

Elkington, J. (1997). *Cannibals with forks: The triple bottom line of 21st century business*. Capstone Publishing.

Fornell, C., & Larcker, D. F. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 39–50.

George, I. I., Nawawi, M. G. M., Mohd, Z. J., & Farah, B. S. (2024). Environmental effects from petroleum product transportation spillage in Nigeria: *A critical review. Environmental Science and Pollution Research*, *31*(2), 1719–1747. https://doi.org/10.1007/s11356-023-28860-6

Gil-Saura, I., Berenguer-Contri, G., Ruiz-Molina, M. E., & Ospina-Pinzón, S. (2015). La calidad y el valor percibido en el transporte de mercancías en España y su importancia en la segmentación de clientes. *Innovar, 25*(58), 105–123. https://doi.org/10.15446/innovar.v25n58.52436

Gil-Saura, I., Servera-Francés, D., & Fuentes-Blasco, M. (2010). Antecedents and consequences of logistics value: An empirical investigation in the Spanish market. *Industrial Marketing Management, 39*(3), 493–506. https://doi.org/10.1016/j.indmarman.2008.11.007

Grace, D., & Lo Iacono, J. (2015). Value creation: An internal customers' perspective. *Journal of Services Marketing, 29*(6–7), 560–570. https://doi.org/10.1108/JSM-09-2014-0311

Grönroos, C., & Ojasalo, K. (2004). Service productivity—Towards a conceptualization of the transformation of inputs into economic results in services. *Journal of Business Research, 57*(4), 414–423. https://doi.org/10.1016/S0148-2963(02)00275-8

Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., & Tatham, R. L. (2006). *Multivariate data analysis* (6th ed.). Pearson Prentice Hall.

Hair, J. F., Risher, J. J., Sarstedt, M., & Ringle, C. M. (2019). When to use and how to report the results of PLS-SEM. *European Business Review, 31*(1), 2–24. https://doi.org/10.1108/EBR-11-2018-0203

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modelling. *Journal of the Academy of Marketing Science, 43*(1), 115–135. https://doi.org/10.1007/s11747-014-0403-8

Henseler, J., Ringle, C. M., & Sinkovics, R. R. (2009). The use of partial least squares path modeling in international marketing. In R. R. Sinkovics & P. N. Ghauri (Eds.), *New challenges to international marketing* (pp. 277–319). Emerald Group Publishing Limited.

International Maritime Organization (IMO). (2024). IMO's work *to cut GHG emissions from ships.* https://www.imo.org/en/MediaCentre/HotTopics/Pages/Cutting-GHG-emissions.aspx.

Jeevan, J., Rahadi, R. A., Mohamed, M., Mohd Salleh, N. H., Othman, M. R., & Mhd Ruslan, S. M. (2023). Revisiting the marketing approach between seaports and dry ports in Malaysia: Current trend and strategy for improvement. *Maritime Business Review, 8*(2), 101–120. https://doi.org/10.1108/MABR-09-2020-0060

Jozef, E., Kumar, K. M., Iranmanesh, M., & Foroughi, B. (2019). The effect of green shipping practices on multinational companies' loyalty in Malaysia. *International Journal of*

Logistics Management, 30(4), 974–993. https://doi.org/10.1108/IJLM-01-2019-0005

Justavino-Castillo, M. E., Gil-Saura, I., Fuentes-Blasco, M., & Moliner-Velázquez, B. (2023). How to increase company loyalty: Using relational variables and sustainable practices to segment the maritime transport sector. *Economic Research-Ekonomska Istraživanja, 36*(2), 2142830. https://doi.org/10.1080/1331677X.2022.2142830

Kass, G. V. (1980). An exploratory technique for investigating large quantities of categorical data. *Journal of the Royal Statistical Society: Series C (Applied Statistics), 29*(2), 119–127. https://doi.org/10.2307/2986296

Langer, B., & Acciaro, M. (2025). Value creation through sustainable supplier management in maritime transport. *Transportation Research Procedia*, *82*, 1353-1368. https://doi.org/10.1016/j.trpro.2024.12.129

Linh, N. T. C., Nga, D. Q., & Trang, P. N. T. (2019). Evaluating the ability to achieve efficiency in providing services of the freight forwarding firms in Viet Nam. *International Journal of Supply Chain Management, 8*(6), 146–152.

Luque, T. (2000). *Segmentación jerárquica*. Pirámide.

Maloni, M. J., Gligor, D. M., & Lagoudis, I. N. (2016). Linking ocean container carrier capabilities to shipper–carrier relationships: A case study. *Maritime Policy & Management, 43*(8), 959–975. https://doi.org/10.1080/03088839.2016.1141195

Mentzer, J. T., Rutner, S. M., & Matsuno, K. (1997). Application of the means-end value hierarchy model to understanding logistics service value. *International Journal of Physical Distribution & Logistics Management, 27*(9–10), 630–643. https://doi.org/10.1108/09600039710188693

Moliner-Velázquez, B., Fuentes-Blasco, M., & Gil-Saura, I. (2014). Value antecedents in relationship between tourism companies. *Journal of Business & Industrial Marketing, 29*(3), 215–226. https://doi.org/10.1108/JBIM-12-2011-0179

Nguyen, T. T., My Tran, D. T., Duc, T. T. H., & Thai, V. V. (2022). Managing disruptions in the maritime industry – A systematic literature review. *Maritime Business Review, 8*(2), 170–190. https://doi.org/10.1108/MABR-09-2021-0072

Novack, R. A., Langley Jr, C. J., & Rinehart, L. M. (1995). *Creating logistics value: Themes for the future*. Oak Brook, IL, United States.

Porter, M. E. (1985). *Competitive advantage*. The Free Press.

Poulsen, R. T., Ponte, S., & Lister, J. (2016). Buyer-driven greening? Cargo-owners and environmental upgrading in maritime shipping. *Geoforum*, *68*, 57–68. https://doi.org/10.1016/j.geoforum.2015.11.018

Raza, Z., & Woxenius, J. (2023). Customer-driven sustainable business practices and their relationships with environmental and business performance: Insights from the European shipping industry. *Business Strategy and the Environment*, *32*(8), 6138–6153. https://doi.org/10.1002/bse.3510

Ringle, C. M., Wende, S., & Becker, J.-M. (2022). *SmartPLS 4* [Software]. SmartPLS. https://www.smartpls.com

Servera-Francés, D., Gil-Saura, I., & Fuentes-Blasco, M. (2008). El valor logístico: una propuesta de modelo

a partir de sus antecedentes y consecuencias. *Revista Europea de Dirección y Economía de la Empresa, 7*(1), 127–150.

Shin, Y., Van Thai, V., Grewal, D., & Kim, Y. (2017). Do corporate sustainable management activities improve customer satisfaction, word of mouth intention and repurchase intention? Empirical evidence from the shipping industry. *The International Journal of Logistics Management, 28*(2), 555–570. https://doi.org/10.1108/IJLM-11-2015-0220

Tseng, P.-H., Zhou, A., & Hwang, F.-J. (2021). Northeast passage in Asia-Europe liner. *International Journal of Sustainable Transportation, 15*(4), 273–284.

United Nations. (1987). *Report of the World Commission on Environment and Development: Our common future* (Brundtland Report). United Nations General Assembly. https://www.are.admin.ch/are/en/home/media/publications/sustainable-development/brundtland-report.html

United Nations Conference on Trade and Development [UNCTAD]. (2015). *Sustainable freight transport systems: Opportunities for developing countries*. https://unctad.org/system/files/official-document/cimem7d11_en.pdf

United Nations Conference on Trade and Development [UNCTAD]. (2024). *Review of maritime transport*. https://unctad.org/publication/review-maritime-transport-2024

Van den Berg, R., & De Langen, P. W. (2017). Environmental sustainability in container transport: The attitudes of shippers and forwarders. *International Journal of Logistics Research and Applications*, *20*(2), 146–162. https://doi.org/10.1080/13675567.2016.1164838

Van Hoang, L., & Vo, H. T. D. (2023). The evaluation model of the impact of corporate social responsibility on firm performance: An empirical study in the maritime transportation of Vietnam. *Cogent Business & Management*, *10*(2), Article 2215085. https://doi.org/10.1080/23311975.2023.2215085

Vega, A., Feo-Valero, M., & Espino-Espino, R. (2021). Understanding maritime transport route choice among Irish exporters: A latent class approach. *Research in Transportation Economics, 90*, Article 101025. https://doi.org/10.1016/j.retrec.2020.101025

Wedel, M., & Kamakura, W. A. (2000). *Market segmentation: Conceptual and methodological foundations*. Springer Science and Business Media.

Werts, C. E., Linn, R. L., & Jöreskog, K. G. (1974). Intraclass reliability estimates: Testing structural assumptions. *Educational and Psychological Measurement*, *34*(1), 25–33. https://doi.org/10.1177/001316447403400104

Yuen, K. F., Thai, V. V., & Wong, Y. D. (2016). The effect of continuous improvement capacity on the relationship between corporate social performance and business performance in maritime transport in Singapore. *Transportation Research Part E: Logistics and Transportation Review*, *95*, 62–75. https://doi.org/10.1016/j.tre.2016.09.003

Yuen, K. F., Wang, X., Wong, Y. D., & Li, K. X. (2020). The role of stakeholder participation and sustainability integration in maritime transport: A structure-conduct-performance analysis. *Transport Policy*, *99*, 44–53. https://doi.org/10.1016/j.tranpol.2020.08.011

Yuen, K. F., Wang, X., Wong, Y. D., & Zhou, Q. (2018). The effect of sustainable shipping practices on shippers' loyalty: The mediating role of perceived value, trust and transaction cost. *Transportation Research Part E: Logistics and Transportation Review*, *116*, 123–135. https://doi.org/10.1016/j.tre.2018.06.002