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## Article

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# Exploring the importance of the perceived value of port users: evidence from the public port system in Ecuador

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## Abstract

**Purpose** – This article aims to explore the concept of chain value of the public port system in Ecuador from the perspective of importing/exporting companies, analyzing how perceived value in the use of port services affects customer satisfaction and the intermediate links of the influence of trust and commitment on customer loyalty.

**Design/methodology/approach** – Relying on a survey of 634 Ecuadorian companies with experience in international trade as port users and a theoretical framework well-established in the literature on consumer behavior, the empirical study found evidence of a positive and significant relationship with the knowledge of chain effects.

**Findings** – The findings confirm the chain effect and reveal ways to maintain an ongoing satisfactory, trust and committed relationship with users, thereby ultimately gaining and maintaining their loyalty. The conclusions suggest how this postulate can help to close the gap referred to the effective management of port services, and point out that port managers should be concerned with a continuous in-depth understanding of the perceived value and its chain effects.

**Originality/value** – The authors add evidence of the use of the postulate of the chain of effects on these dimensions, whose applicability is very well established, tested and consensual for the doctrine in industrial marketing. In contrast, it is scarcely present in the port relationship with its users.

**Keywords** Value-satisfaction-loyalty chain, Port-marketing, Relationship-marketing, Port-customer relationship

**Paper type** Research paper

## 1. Introduction

Owing to the number of stakeholders involved, port competitiveness is a complex issue that has been studied from different perspectives (Van de Voorde and Winkelmans, 2002). This

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### JEL Classification — L9, M3, O24, O54

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study presents a framework that can enhance strategic thinking in port organizations, contributing to the strategic management of commercial port services to maximize customer value (Schellinck and Brooks, 2016). For this purpose, we investigate the loyalty of importing/exporting companies, a factor generally ignored in previous studies that usually focused on the competitiveness of port management organizations. This study tests whether the creation of loyalty toward ports is a concatenation of key variables, such as perceived value, customer satisfaction, commitment and trust in the relationship between the port management system and Ecuadorian importers and exporters of manufactured goods and services.

A highly effective approach for studying the value-loyalty process (Cronin *et al.*, 2000; Vieira, 2013; Oh and Kim, 2017) is that of assessing the chain of effects on consumer behavioral intentions in service environments. From the user's perspective, the demands include value creation (Ruiz-Martínez *et al.*, 2019), best services and effective technological changes to handle and manage commodities. However, from the supplier's perspective, customer orientation is the main goal for maintaining competitive advantages (Woodruff, 1997). The advocates of this perspective highlight different types of port services in a new and appropriate manner to compete for superior customer-value delivery.

The concept of an organization's chain value is linked to the concept of strategic thinking and it is also the starting point of strategic management. Nowadays, this concept holds an outstanding position in strategic analysis, both in the industry and service literature. Porter (2001) considered it a useful tool for understanding and analyzing the source of value for the user/client, which determines the beginning of competitive advantages. The framework developed on the basis of this construct can be beneficial for improving port efficiency, guiding the effort and strategies to adapt to service users' needs, generating greater value in the received service and consequently serving as a determining port decision criterion.

We examine the chain of value effects that is the exchange process between port services and their users by studying the relationships between perceived value (Pv), satisfaction (Sa) and loyalty. Further, we utilize satisfaction, loyalty (Lo), trust (Tr) and commitment (Co) (Pv-Sa-Tr-Co-Lo) as mediating variables. A consensus in the literature on service marketing and consumer behavior has validated the connection between the links in a chain and the effects of causal relationships (Huang *et al.*, 2017). However, it is necessary to clarify the appropriate combinations in the context of the links. Whether the positive effects of perceived value on service provision affect satisfaction and whether higher satisfaction leads to greater loyalty needs to be determined. In addition, it is also essential to assess the impact of trust and commitment in the chain of effects.

Therefore, we proposed the applicability of this chain of effects. We have not found any study that focuses on analyzing the value chain in port services; subsequently, this detected gap adds to the interest in cross-fertilizing this methodology with specialized research in port management.

To do so, we surveyed 634 senior managers using an online questionnaire. Their responses were measured on a five-point Likert scale ranging from "fully agree" (1) to "strongly disagree" (5). Using all the information obtained, we evaluated the quality of the chain model using a structural equation model. Our results found that the facilities, staff and quality of the service provided are variables that determine users' perceived value and support the chain's effect on satisfaction and the intermediate links of trust and commitment that affect loyalty. This suggests that introducing significant strategic actions could open new positions in the image of ports and provide new service interactions to improve users' perceived value. A set of opportunities may create an advantage for those who lack the capacity to manage relationships with their users. These observations have important implications for discussing and designing strategies for enhancing user loyalty and outperforming competitors.

The remainder of this paper is organized as follows. The first section discusses the conceptual framework of studies that have used multiple approaches with the hierarchical effects of Pv-Sa-Tr-Co-Lo and provides a description of the literature on port management and customer relations. The second objective is to propose, by means of cross-fertilization of ideas from other economic sectors, a hypothetical model across an overview of key constructs and hypotheses. In this section, we explain the research strategy and data sources as well as detail the statistical analysis, using a covariance-based structural equation modeling (CB-SEM) to evaluate the model. The final section discusses the implications of the port management policies.

## 2. Literature review

### 2.1 *The effect of perceived value on Sa-Tr-Co-Lo*

The current and future impacts of port services on international trade are important because they offer a set of logistics services and other value-added activities beyond the traditional concept of interchange between maritime and land transport nodes. This postulate has led to the emergence of a framework in which ports fit different strategies in their field of specialization and diversification of services, re-evaluating some to the detriment of others. The user's demand greater efficiency in the management and services offered (e.g. the need for ports with greater depth, the availability of modern infrastructure and equipment, or the use of effective connections for the handling and movement of goods). In contrast to this current mainstream perspective, port services need to objectively determine this value, which is perceived subjectively by users. In fact, this has gained scholarly attention in recent decades (Zeithaml, 1988; Woodruff, 1997). Mostly, the research has aimed to determine the potential influence on the value created for the service user (Martelo *et al.*, 2013).

Studies on value chain relationships have focused on identifying the factors that determine long-term successful relationships (Vieira, 2013; Oh and Kim, 2017; Balci *et al.*, 2019). Rust and Oliver (1994) were the main precursors. The interest in measuring the relationships between each element supports distinct interactions in a wide diversity of disciplines. Studies on the chain of relationships have examined diverse models of economics, ethics, management and social justice (Kohtamäki *et al.*, 2019) and the different possible links between perceived value in the service and its impact on customer/user loyalty. Value creation is a complex phenomenon. Most authors agree on its multidimensionality when studying the consumer's perceived value (Gallarza *et al.*, 2017). Also, results on the association between their different dimensions, for instance, cognitive elements (consumer information and knowledge on a product or service's characteristics, functions, price, quality, etc.) and affective elements (consumers' feelings and emotions regarding a product or service) (Sweeney and Soutar, 2001), and other normative elements related to the social and economic environment (Ruiz-Martínez *et al.*, 2019), and their effects on loyalty remain ambiguous.

While scholars have developed several models, there is great consensus among those who affirm the existence of causal links between quality, perceived value, and satisfaction (i.e. O'Cass and Ngo, 2011) and not the opposite (Gallarza *et al.*, 2017) and their effects on loyalty (Huang *et al.*, 2017). However, there is little consensus on the number and nature of relevant dimensions involved in the multidimensionality of consumer value. Therefore, it is important to identify the variables in the chain that are the antecedents and consequences. This will enable us to examine and confirm the applicability of the effect chain (Pv-Sa-Tr-Co-Lo) in other epistemological fields, expanding the extensive body of work that characterizes the value of services and attempting to refine its impact on customer satisfaction and loyalty. It is important to explain how loyalty decisions are a significant factor in increasing user relationship performance and how they affect the policy and strategic implications of the port system (Caliskan and Esmer, 2019).

Others have defended the direct relationship between quality and satisfaction and between quality and loyalty. In fact, some studies have also placed satisfaction before value (Hu *et al.*, 2009; Chen *et al.*, 2017). Some authors established a structure of relationships between variables, where perceived value and satisfaction influence trust, satisfaction and trust influence commitment (Goaill *et al.*, 2014), and satisfaction, trust and commitment influence loyalty (Lai, 2014; Vera, 2016; Yaqub *et al.*, 2019). However, the most general trend is to use comparative models to corroborate the existence of a reverse chain of links (Vieira, 2013; Gallarza *et al.*, 2017).

Examining perceived value is extremely useful for researching consumer behavior. This was identified by strengthening the theoretical loyalty framework among researchers. It has also provided practitioners with a guide for strategic marketing management, especially in market segmentation, differentiation, the search for competitiveness and product or service positioning (Gil-Saura *et al.*, 2018).

Rust and Oliver (1994) pioneered means-end chain methodology. They analyzed the effects on the relationships in this chain, as confirmed by Vieira (2013) and Oh and Kim (2017). Furthermore, studies in strategic marketing that focus on the service management model called the service profit chain (Heskett *et al.*, 1994) validate the consistency of the relationship between quality (external and internal), customer and employee satisfaction, and loyalty. However, one of the more comprehensive and detailed approaches covering a wide range of relevant components for the first link in the chain was carried out by Sweeney and Soutar (2001) based on the framework proposed by Sheth *et al.* (1991). These authors analyzed functional value (price/value ratio and performance quality), social value and emotional value in correspondence with Holbrook's dimensions (Holbrook, 2006): excellence, efficiency, status, esteem, entertainment, aesthetics, ethics and spirituality. In our opinion, Sweeney and Soutar's (2001) approach is more comprehensive for studying the effects of the perceived value of the first link. Their scale was adapted to measure the global value perceived in the use of port services through 15 items grouped into three dimensions: (1) the functional value of port facilities, (2) the functional value of the professionalism of port staff and (3) the functional value of the quality of the service received.

Our proposal characterizes the perceived value of service to explain its impact on satisfaction, which is the next link in the chain. The different dimensions of perceived value play a fundamental role in users' decisions and are considered as antecedent evaluations of customer satisfaction. The classic SERVQUAL model is a benchmark for its innovative contribution and was later redesigned by other authors who studied the quality of service (Cronin *et al.*, 2000). To estimate future intentions to be loyal, we believe that perceived value is the first step in measuring customer satisfaction because it clarifies the balance between customer expectations and perception. The barometers of customer satisfaction, the American index of customer satisfaction (Fornell *et al.*, 1996), the Norwegian barometer (Andreassen and Lervik, 1999) and the European index of customer satisfaction (ECSE Technical Committee, 1998) were based on this link to measure the quality of national production in the productive fabric and as a tool to define competitive strategies in the economic policies of these countries. Contemporary contributions have added the social dimension of perceived value (the influence of norms, values and social image) as an innovative component in shaping global satisfaction judgments.

The following drivers of loyalty that primarily enhance a customer's evaluation of an exchange should have a stronger effect on attitudinal loyalty than on behavioral loyalty. In this study, we considered the inclusion of trust and commitment in the chain. These two dimensions are not new to the doctrine of industrial marketing, but are essential for the success of the supplier-client relationship (Anderson, 1995; Berry, 2002; Ferro *et al.*, 2016). Extant literature has debated the key position of trust as a determinant of loyalty (Bitner, 1995), and whether it is an antecedent of satisfaction or its consequence. Studies have

confirmed the influence of perceived value and satisfaction on trust and commitment (Lai, 2014). In general, the models that have examined the effect chain show that the inclusion of trust and commitment in the chain better fits the data.

Finally, loyalty is the last link in the chain. In the fields of economics and management, this construct has emerged from key findings and has implications for researchers and practitioners. Several studies have investigated the value of brand-keeping or attract new customers. Further, studies on relationship marketing (Anderson, 1995; Ferro *et al.*, 2016), industrial marketing (Berry, 2002) and strategic marketing through the work of the Harvard Business School or the contributions of Heskett *et al.* (1994) and Han *et al.* (2008) have made an important contribution to measuring the relationship between a manufacturer and retailer with a given customer, shedding light on the relative importance of the different dimensions that significantly influence loyalty.

This study contributes to a better understanding of the loyalty effects system (Pv-Sa-Tr-Co) to define strategies and tactics that positively affect the key determinants of loyalty. To accomplish this, it is useful to analyze the service marketing literature because it focuses on the user perspective; that is, it looks for a better understanding of the perceptions and kinds of services that help users achieve their organizational goals. In addition, service marketing and management literature concentrates on value creation as a distinctive competence. Thus, we used this approach to offer a general conceptual framework for examining the chain of loyalty and the statistical confirmation of the set of hypothetical relationships. This study is theoretically new in the field and has practical implications for improving port competitiveness.

### *2.2 Changes in relationships between port users and port services*

Port policy has a strategic nature, so it is necessary to ensure that it adheres to sustainable development conditions. However, since a port's operation is usually subject to competitive market rules, port authorities develop a mechanism for analyzing the effectiveness of services and evaluating the needs and desires of users. Currently, ports have surpassed the classic function of the interchange between sea and land transport. Modern ports have become logistics centers that carry out different types of activities to increase the added value of companies. Regarding port elections, several authors have written about the progressive integration of ports into supply chains. More studies continue to focus on the relationship between shipper choices and the chain system to minimize the total logistics cost and maximize the value for both customers and suppliers (Magala and Sammons, 2015).

New port dynamics require a management system and designing indicators to measure governance performance using integrated management models. Another stream of literature considers the concept of sustainability in ports in a wider sense, integrating social, economic and environmental dimensions (Denktas-Sakar and Karatas-Cetin, 2012). Satisfying the different interests in supply chain management is a regular concern for stakeholders (suppliers, customers and logistics service providers). This suggests that ports should be managed through strategic management and marketing strategies (Van der Lugt *et al.*, 2013; Schellinck and Brooks, 2016).

Other important bodies of research on management have emerged over the years, focusing on the analyses of competitiveness (Kaliszewski *et al.*, 2020). Some studies have proposed strategic management models for specific decision-making regarding efficiency in the functional scheduling of port systems. This model supports the prediction and evaluation of performance (Cimpeanu *et al.*, 2017). Other studies have discussed the implementation process of a strategic management system at the top management level in business, looking at strategic measures in addition to traditional financial measures to get a view of performance, and how a holistic system works for managing strategy in these organizations

(Subhan and Ghani, 2008; Aparisi *et al.*, 2009). A good example of this topic can be found in Verhoeff (1981): ports compete with one another at different operational levels.

Recently, other studies have analyzed the most efficient ways to achieve the long-term competitiveness of a port system by considering customer relationship management. The authors highlighted the need to develop value for users by analyzing their customers' demands and designing segmentation strategies (Magala and Sammons, 2015). A series of studies focusing on satisfaction have supported the convergent and discriminant validity of the different scales. For instance, some studies have used the quality of service as the most influential factor affecting satisfaction (Thai, 2016; Caliskan and Esmer, 2019), and pay special attention to the effect of perceived value on the efficiency and quality of services (Gil-Saura *et al.*, 2015). Others have explored this from a political dimension and their effects on the regional economy (Deng *et al.*, 2013). Cronin *et al.* (2000) demonstrated the influence of functional values (resource, outcomes, process, management), while Yeo *et al.* (2015) added social factors, such as image perception and social responsibility, to the analysis. Another set of studies focused on chain effects and found a positive relationship between satisfaction and loyalty in the context of port services (Chang and Thai, 2016; Gil-Saura *et al.*, 2018), as well as between commitment, trust, satisfaction and loyalty (Jang and Kim, 2012). The above-mentioned studies are similar to the present work in that they show the growing significance of marketing strategies in port organizations.

### 3. Method

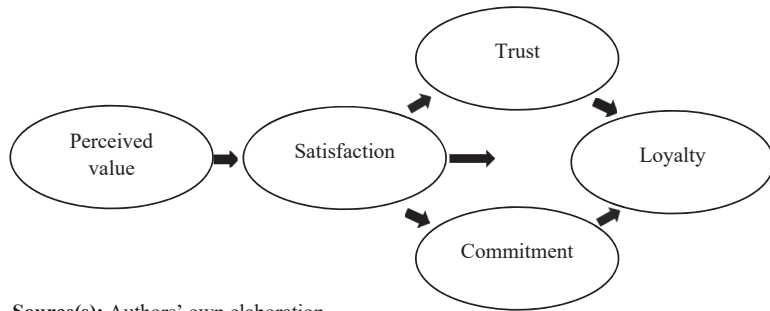
#### 3.1 Research question and hypothesis

The hierarchical model used in this study to examine the interrelationships between Pv-Sa-Tr-Co-Lo in the context of port services is based on the cross-fertilization of ideas in other disciplines, such as management, marketing and economics. Forming an overall value of chain-effect perception in this field facilitates the understanding of users' decisions. It also aids in the definition and development of strategies and tactics for the management of port services, for example, to fight the growing competition between ports. While the literature recognizes their effects on industrial customers, the connections between variables in these types of services remain unexplored.

The central argument of this study is to analyze loyalty by investigating the importers and exporters' perceived value. This involves examining the various benefits and sacrifices they experience while sending their goods through the available ports, as well as their interaction with port authorities, including shipping practices and services provided by their usual port and other alternative ports.

The literature review shows that the benefits of sustainable shipping practices can be divided into facilities, personnel, and quality. Thus, this study proposes segmenting them in order to define and create a construct for perceived value. The model specifies a network of hypotheses linking the Pv-Sa-Tr-Co-Lo constructs (see Figure 1). Each hypothesis is supported by a number of important contributions of relevant theoretical and empirical works on the study of customer value (e.g. perceived value theory, marketing theory, theory of value, psycho-economic theories and value-based theory of the firm).

- H1.* Perceived value directly and positively affects user satisfaction among corporate and industrial port customers.
- H2a.* User satisfaction directly and positively affects trust among corporate and industrial port customers.
- H2b.* User satisfaction directly and positively affects port commitment among corporate and industrial customers.



Source(s): Authors' own elaboration

Figure 1.  
Proposed model

H3a. Trust directly and positively affects customer loyalty among corporate and industrial customers.

H3b. Commitment directly and positively affects customer loyalty among corporate and industrial customers.

### 3.2 Regional context

This study focuses on Ecuadorian companies with experience in international trade and port usage. Ecuador's port system includes both public and private terminals. This analysis focused on public commercial ports (Bolivar, Guayaquil, Manta and Esmeraldas). In the regional classification of South American and Caribbean countries, the port of Guayaquil is positioned at a commendable seventh position considering the throughput measure Twenty-foot Equivalent Unit (TEU) 2018, compared to the positions of Bolivar (60th), Esmeraldas (70th) or Manta (118th) (CEPAL, 2019). In 2019, in Ecuador, the export–import figures of Guayaquil port 71.95% of imports c.i.f. and 63.41% of exports f.o.b. according to the data of the Ecuador National Customs Service (Gobierno de Ecuador, 2019a, b) far exceeded those of the other three public ports (Table 1). This indicates that Guayaquil port has 43% throughput and 74% traffic (Gobierno de Ecuador, 2017).

According to the figures of the National Service of Ecuador, which uses information from the National Customs Service of Ecuador as a source, the number of exporting companies in the last ten years has been between 3,000 and 3,700 companies, most of which are small and medium size companies with exports below 300 million dollars. The volume of throughput reflects an important intensity of energy products and services, especially oil and its derivatives, contributing 52.55% of the total free onboard export value. Agri-food was also a relevant economic area (27.09%). Instead, imports are more disaggregated between the manufacturing sectors and related services. This explanation is consistent with the large

Ports	Imports		Exports	
	(Millions \$)		(Millions \$)	
Guayaquil – maritime	10.745.64	63.41%	11.129.76	71.95%
Manta	1.292.50	7.63%	383.60	2.48%
Esmeraldas	445.60	2.63%	26.31	0.17%
Bolivar	36.64	0.22%	755.83	4.89%
Other non-Maritime	4.425.09	26.11%	3.173.00	20.51%
Total	16.945.48	100.00%	15.468.50	100.00%

Table 1.  
Movements of  
merchandise in the  
public ports of Ecuador

Source(s): Based on Gobierno de Ecuador (2019)



number of companies in the commerce and service sectors, as listed in [Table 2 \(Gobierno de Ecuador, 2018\)](#). We believe that our survey sample covers almost all foreign company sites and most domestic company sites.

### 3.3 Sample and data

This study is based on 634 companies across various sectors and sizes. The selected companies were located in Ecuador, considering the proportional presence of companies in the province. For the selection of productive sectors, the National Classification of Economic Activities was used as a reference, which is based on the International Standard Industrial Classification of Economic Activities and defines the major economic sectors in which companies are classified. We selected a strategic sample of companies that demanded port services and have had a relationship with the ports. The companies were chosen from the public directories of importers and exporters published on the websites of the Ecuadorian port authorities. Data were collected from staff members responsible for purchasing decisions in terms of import-exports, and those who worked directly with or had knowledge regarding the relationship maintained by contracting port services, and directly controlled these types of services. Initial contact was made by telephone, offering online access to the questionnaire.

[Table 3](#) summarize the profile of the companies surveyed and compares different variables, such as the total number of employees, the participation of foreign capital, the approximate annual turnover, the number of employees in the port management department, etc. Regarding the relationship with ports, our sample included more companies with an export-import department, a turnover higher than 20 million dollars and national sources of capital.

### 3.4 Variables

Based on the literature review, we selected significant variables for this study. First, we revisited Pv-Sa-Lo, a well-established postulate that measures the impact of customer satisfaction in the service industry, but added Tr-Co. When examining perceived value, most attributes are related to facilities, staff and quality. Specifically, this latent variable was the result of aggregating each group of independent variables. The research constructs and measurement items for this study are provided in the Appendix. This includes a synoptic summary of the different levels of latent variables, as well as the set of items used in the survey for the various dimensions.

**3.4.1 Independent variables.** Four factors were developed to assess the measurement model: perceived value, satisfaction, trust and commitment. Three sub-factors were used for perceived value: (1) facilities (seven items), staff (four items) and service quality (four items). This explained 65.38% of the total variance. The items were adapted from [Sweeney and Soutar's \(2001\)](#) approach. The items for satisfaction (three items) were adapted from [Cronin et al. \(2000\)](#), and the items for trust (four items) and commitment (three items) were adopted from [Ferro et al. \(2016\)](#). All items were measured using a five-point Likert scale ranging from "strongly disagree" to "strongly agree." The classification variables were included at the end of the questionnaire.

Economic activity	No. companies	% total
Agriculture, forestry and fishing	93.336	10.38
Industry	77.337	8.60
Construcción	30.826	3.43
Commerce	314.127	34.93
Services	383.582	42.66
Total	899.208	100.00

**Source(s):** Based on Gobierno de Ecuador (2018)

**Table 2.**  
Companies active  
according to economic  
activity (2018)

	<i>n</i>	%
<i>Staff responsible titles</i>		
Exports	387	61.0
Sales	86	13.6
Administration	53	8.4
Office	31	4.9
Management	30	4.7
Others	47	7.4
<i>Participation of foreign capital</i>		
Yes, more than 50%	39	6.2
Yes, between 10 and 50%	50	7.9
Yes, less than 10%	22	3.5
No	523	82.5
<i>Approximate annual billing amount</i>		
2,400,000\$ or less	26	4.1
Between 2,400,001 and 10,000,000\$	100	15.8
Between 10,000,001 and 20,000,000\$	120	18.9
More than 20,000,000\$	388	61.2
<i>Approximate annual amount of exports</i>		
2,400,000\$ or less	119	18.8
Between 2,400,001 and 10,000,000\$	282	44.5
Between 10,000,001 and 20,000,000\$	201	31.7
<i>Approximate total number of workers</i>		
Less than 10 employees	566	89.3
Between 10 and 49 employees	68	10.7
<i>Number of workers in the port management department</i>		
One worker	53	25.9
Two or three workers	114	55.6
Four or five workers	35	17.1
Six or more workers	3	1.5

**Table 3.**  
Repondents' details

**Source(s):** Authors' own elaboration

*3.4.2 Dependent variables.* For the dependent variable, we used a construct formed by aggregating four items. These items capture different aspects of loyalty. This construct was measured using the four-item scale developed by [Zeithaml et al. \(1996\)](#). The questions and their codification into the loyalty dimension probed the different aspects of this concept. The purpose was to assess whether managers had a positive experience with ports, whether they were willing to share their positive experiences with others, and whether they would encourage other companies to trade with a particular port.

#### 4. Results

In this section, we describe the main steps in applying the statistical techniques according to the data source and our hypotheses. First, we used a confirmatory factor analysis as an intermediate step to validate the structure of the latent variables and to justify our interpretation of the independent and dependent variables. Second, we explain our decision to use SEM and the exploration that justifies our proposed model. Third, the substantive results of the analysis are presented in the final step of the study, providing insights into the relationships between the variables and supporting the proposed hypotheses.

4.1 *Confirmatory factor*

The measurement items and scale development were conducted in two steps.

First, we conducted exploratory and confirmatory factor analyses to identify the common factors underlying companies' perceived value ratings. This allowed us to explore whether the data were suitable for factor analysis. In the exploratory analysis, we checked the factorability of the correlation matrix which displays coefficients over 0.30, Bartlett's test of sphericity which showed that the variables were not independent ( $\chi^2 (105) = 4,606.77, p < 0.001$ ), and the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.921. Finally, internal consistency was studied. The Cronbach's alpha coefficient values for the factors were greater than 0.8, indicating very high reliability (Table 4).

This indicated that the factor analysis of the correlation matrix was correct. We then extracted the factors using principal component analysis. The factors were rotated using orthogonal varimax rotation to facilitate factor interpretation and produce uncorrelated factors. Through this process, perceived value emerged as the latent construct from the 15 associated variables and the three factors of quality, staff and facilities (Table 5). The estimated parameters were statistically significant ( $p < 0.05$ ) and the factor loads presented values higher than 0.5, confirming that all the indicators were satisfactorily saturated and based on Tanaka (1993) measures of fit ( $\chi^2$ , goodness of fit index [GFI], Adjusted goodness of fit index (AGFI), normalized fit index [NFI], CFI and Root Mean Square Error of Approximation (RMSEA)). The subsamples were random and suitable for checking the fit level of the measurement model (Table 6).

4.2 *Structural equation modeling (SEM)*

Second, we utilized SEM and chose a CB-SEM to test the five hypotheses, observing the relationships between construct loyalty and the predictor variables (perceived value, satisfaction, trust and commitment). As Anderson (1995) suggested, a two-step procedure was used to test the model: the measurement model and the structural model. Two criteria

	Communalities	Facilities	Factor Staff	Quality
FA1	0.564	0.625		
FA2	0.61	0.729		
FA3	0.639	0.787		
FA4	0.6	0.725		
FA5	0.632	0.75		
FA6	0.786	0.831		
FA7	0.636	0.76		
ST1	0.642		0.408	
ST2	0.693		0.492	
ST3	0.634		0.734	
ST4	0.737		0.831	
QU1	0.805			0.882
QU2	0.814			0.886
QU3	0.587			0.757
QU4	0.796			0.434
Eigenvalues		3.97	2.56	2.34
% Explained variance		26.49	20.31	18.57
% Accumulated explained variance		26.49	46.80	65.38
KMO		0.921		
Bartlett's test of sphericity	Aprox. Chi-cuadrado = 4,606.7, gl = 105, $p < 0.001$			
Cronbach's Alpha		0.808	0.843	0.917

Source(s): Authors' own elaboration

**Table 4.** Structure coefficients including community, factor loading and other reliability measures

were used to test discriminant validity. First, the average variance extracted (AVE) square root (Fornell and Larcker, 1981) for each construct was verified to be greater than the correlation between that construct and the others. Second, the cross-load matrix was analyzed, confirming that the indicators for each dimension were more correlated with its construct than with the other constructs.

After the reliability and validity of the measurement model were tested, the structural model could be evaluated. To evaluate this, the coefficient of determination ( $R^2$ ) of the endogenous variables and the significance of the paths were calculated (Hair et al., 2017). Figure 2 shows the estimates of the proposed causal relationships, together with the coefficient of determination  $R^2$  corresponding to each of the endogenous variables. The results indicate that the model supports all the proposed hypotheses.

After analyzing and testing the reliability and validity of the measurement model, the structural model was evaluated. The results indicate that the model supports all the proposed hypotheses. All endogenous constructs of the model, with  $R^2$  values ranging from 0.37 to 0.63, show acceptable levels of predictiveness suggesting a positive overall assessment of the nomological validity of the research model. In relation to the links between the endogenous variables, the chain of effects between constructs in a B2B environment (Pv-Sa- Tr-Co-Lo) is endorsed (and therefore, all our hypotheses are accepted). The results confirm that the model has a positive and significant effect on Vp and Sa. The higher the Vp, the greater the satisfaction. Also, these variables have the strongest link ( $\beta = 0.14$ ;  $p = 0.001$ ;  $R^2 = 0.59$ ).

Based on this first connectivity, the model confirmed the indirect relationship between Sa and Lo using trust and commitment as mediators; both have an indirect and positive effect for the connection Sa→Tr→Lo ( $\beta = 0.189$ ;  $p = 0.001$ ;  $R^2 = 0.41$ ) and the link Sa→ Co→ Lo ( $\beta = 0.188$ ;  $p = 0.002$ ;  $R^2 = 0.37$ ), calculated multiplying  $R^2$  overlapping effect (for instance, Sa→Tr→Lo ( $\beta = 0.189 = 0.59*0.32$ )). The direct link between Sa and Lo ( $\beta = 0.190$ ;  $p = 0.001$ ) is also positive but somewhat weaker than with the moderating variables. The main results reported indirect linkages. In other studies, conducted in the B2B context, Tr and Co

**Table 5.**  
Assessment of the measurement model: principal components using varimax (orthogonal)

	$\alpha$	$\rho_c$	AVE	Facilities	Staff	Quality	Satisfaction	Trust	Commitment	Loyalty
Facilities	0.83	0.84	0.63	0.78 <sup>†</sup>						
Staff	0.86	0.74	0.59	0.26 <sup>‡</sup>	0.80					
Quality	0.80	0.79	0.62	0.32	0.64	0.77				
Satisfaction	0.86	0.84	0.65	0.40	0.46	0.47	0.79			
Trust	0.79	0.69	0.86	0.35	0.52	0.51	0.60	0.93		
Commitment	0.83	0.83	0.61	0.39	0.13	0.29	0.24	0.28	0.81	
Loyalty	0.80	0.92	0.74	0.34	0.18	0.32	0.77	0.52	0.30	0.86

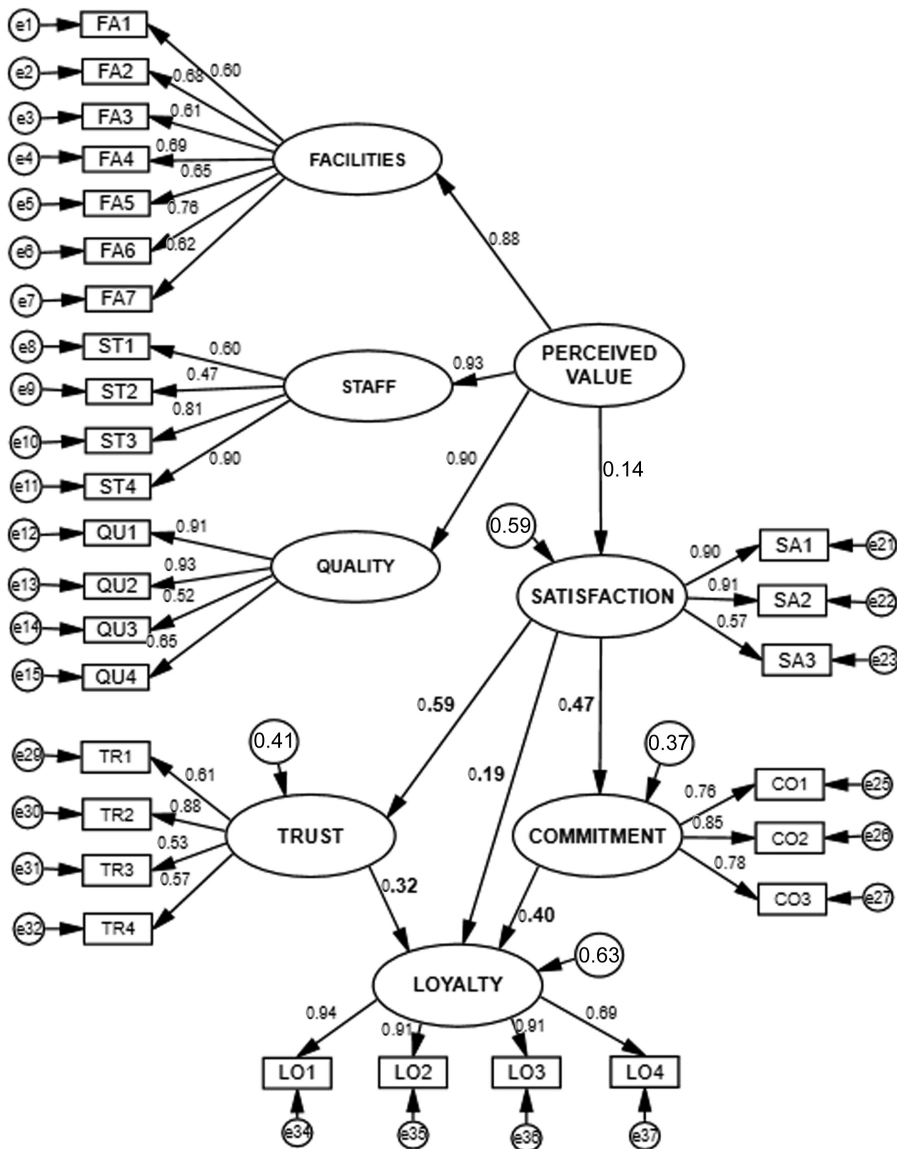
**Note(s):**  $\alpha$ : Cronbach's Alpha  $\rho_c$ : Composite reliability. AVE: Average Variance Extracted. <sup>†</sup>Square root of the AVE on the diagonal. <sup>‡</sup>Correlations between the constructs below the diagonal

**Source(s):** Authors' own elaboration

**Table 6.**  
Confirmatory maximum likelihood factor analysis

	$\chi^2$ (g.l.)	P	$\chi^2$ /gl	GFI	AGFI	CFI	NFI	TLI	RMSEA (I.C. 90%)
Total	351.69 (87)	<0.001	4.04	0.97	0.97	0.97	0.95	0.96	0.043 (0.039–0.057)
Subsample 1	266.38 (87)	<0.001	3.06	0.97	0.95	0.96	0.95	0.95	0.051 (0.048–0.069)
Subsample 2	278.45 (87)	<0.001	3.20	0.97	0.95	0.95	0.95	0.94	0.046 (0.041–0.067)

**Source(s):** Authors' own elaboration



Source(s): Authors' own elaboration

Figure 2. Results of the CB-SEM analysis

contributed significantly to the formation of Lo with balanced links (Huang *et al.*, 2017). Consequently, the model was clear when assessing these hypothetical scenarios, and informed us about a chain's utility effects. The sequence of the hypotheses proposed in the model explains 59% of satisfaction, 41% of trust, 37% of commitment and 63% ( $R^2 = 0.631$ ) in the total variance of user loyalty. The various adjustment indices were adequate:  $\chi^2/df = 2.72$ , GFI = 0.966, AGFI = 0.954, CFI = 0.974, NFI = 0.966, Tucker Lewis Index (TLI) = 0.959, RMSEA = 0.039.

## 5. Discussion

Since [Cunningham and Kettlewood \(1976\)](#) revealed the first determinants of source loyalty in the freight transport market, only a few studies have analyzed these relationships in the maritime transport environment and marketing literature, and little attention has been paid to management port research. This study explored the sufficient conditions to create high customer loyalty in an acceptable contingency framework for port users. The results translate into positive behavioral intentions toward loyalty to port service with perceived high value. Consequently, it contributes to creating a chain of positive effects on satisfaction, trust and customer loyalty.

The overall analysis results corroborate recent work on chain links in the fields of industry and services. The constructs analyzed in this research have scarcely been investigated empirically in port marketing or port-customer relationships, and limited studies have dealt with similar issues. Perceived value is a determinant variable and a customer-focused antecedent of loyalty ([Kumar et al., 2013](#); [Bardauskaite, 2014](#)). In the context of port services, [Choi et al. \(2002\)](#) conducted an empirical study on quality management, shedding more light on perceived value measurement, while [Jang and Kim \(2012\)](#) proved that concepts such as satisfaction, trust, commitment and loyalty are contingent on port switching and relationship quality.

According to our results, exporters/importers consider the following as important while evaluating the service quality factors and port selection: ready availability of information on port-related activities, port location, port turnaround time, facilities available, port management, port costs and customer convenience. All these factors have direct or indirect relevance to service quality. Thus, understanding loyalty, such as in our research context, requires the consideration of the causal relationships between the determinant variables of perceived value. It also requires the consideration of the relationship between perceived value and satisfaction, as it contributes to explaining the determinants of loyalty, as recognized in the marketing literature. This is particularly important in the context of relationship-based port marketing (e.g. [Caliskan and Esmer, 2019](#)). We added trust and commitment to the causal inference, two variables historically recognized ([Anderson, 1995](#)) and accepted throughout a continuous consensus for the doctrine of marketing ([Ferro et al., 2016](#)) considering their importance for the success of the customer-supplier relationship ([Berry, 2002](#)). However, few studies have examined these two conditions in order to explain loyalty. Our meta-analyses show that the relationship is strong but reveal moderators that influence the relationship between trust and commitment ([Jang and Kim, 2012](#)).

The results of this study have several implications for the management of port users. Knowledge of chain effects is important for enhancing port effectiveness. The skills of an effective administrator require strategic and management practices that are service-oriented and translate strategy into action across organizational performance in the context of complex port-user relationships.

### 5.1 Management implications

The effect chain has made it possible to operationalize dimensions that account for the existence of port-user relationships and the causes that influence them. To obtain satisfaction, loyalty and other variables, it is important that the seaport carries out corresponding monitoring of the port services offered to users of the four ports. The aspect of logistics service performance is more critical to managers; therefore, this study contributes to the body of knowledge on customer relationship management. Thus, port authorities should avoid limitations between processes and procedures in the communication of procedures both internally and with customers. Port managers participating in international logistics supply chains face various management challenges, one of which is knowing that their customers are also important in determining the efficiency of port service quality. The criteria of procedures

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or other tangibles should not be the only reference within the analysis but should also include parameters such as user service or a better understanding of customer demands.

### *5.2 Methodological implications*

We apply this methodology to a research area that is particularly relevant for illustrating the importance of loyalty in the relationship between suppliers and users of service ports. For this purpose, we used well-established postulates in other contexts and fields and the potential for cross-fertilization. The use of standard methodologies to determine the needs of users and customers will enable port organizations to generate high-quality services. Organizations such as ports that compete in a complex environment require an accurate appraisal method to explore research hypotheses and achieve organizational goals. We demonstrate how the effect chain can be systematically examined in this environment.

These results have important implications for port organizations as they provide strong indicators of the acceptance of new management models. It is necessary to highlight that this is the first study that attempts to identify the influence of the effect chain on user loyalty using concepts and methods from marketing and management theories.

### *5.3 Political implications*

This study makes several conclusions about the political factors influencing the choice of port in the Ecuadorian port system. First, it is possible to indicate potential priorities for logistical and commercial port policies and discover companies' port service needs. Second, the commercial strategy of Ecuador's ports revolved around becoming a benchmark logistics hub in the South Pacific; however, there were important differences between ports according to the movement of merchandise. Knowing the effect of the chain of loyalty is key to increasing the movement of companies towards Ecuador's ports and redistributing it inside the country. Overall, it supports equality in territorial development and optimizes the economic, environmental and social benefits of ports.

### *5.4 Future research agenda*

In future research, it would be interesting to observe and collect information on the behavior of other agents involved in maritime freight transport, such as service providers and organizations.

On the other hand, future research could explore other determining factors that can measure loyalty, such as the intensity of the relationship (years in the relationship or the effect of business volume). By doing so, we can investigate how to create greater loyalty using variables that complement those used in this study and clarify the absence of determining factors found in one of the configurations.

Conducting longitudinal studies would be interesting when considering the implementation process of a strategic management system at a Port authority. Such studies can clarify the factors that progressively influence the accumulation and impact of perceived value on loyalty.

## **6. Conclusions**

This study explored future changes in the demand for port services regarding user loyalty. The structured literature review showed that the perceived value of port facilities, professionalism of port staff, and quality of the services received are valued services that ports offer to maintain a competitive edge. However, most current studies focus only on this dimension, leaving other constructs, including satisfaction, trust, commitment and loyalty underexplored. All these variables are part of relational marketing and can be useful for port managers, considering their importance as variables that add value to the port's competitiveness. Moreover, few studies have examined the competitive advantage through

the value-creation process (De Martino *et al.*, 2015). In other words, only few studies have examined other levels of analysis explaining why ports with high technical efficiency are the best in terms of service quality (Cullinane and Wang, 2010).

This study highlighted a chain of influences that provides evidence of the conditions that support loyalty, which is a very important aspect in understanding the nature, extensity, and intensity of competitive relationships between ports. The outcomes of this study bridge some of the gaps in the public port management system by researching and proposing a conceptual management model linked with knowledge of constructs based on chain effects (Pv-Sa-Tr-Co-Lo). Specifically, this study demonstrated the following:

Customers' overall perceptions of port services are the driving forces behind their satisfaction. Emotional and social values are critical in inducing the intention to use port services. A positive and significant relationship exists between all variables used in our methodology. Seaports should strive to find ways to maintain ongoing satisfaction, trust and committed relationships with customers, thereby ultimately gaining and sustaining loyalty. Thus, driving loyalty relies largely on ensuring that port service providers create and position services that provide real satisfaction, as identified in the study's constructs.

It was discovered that a positive and significant relationship in the knowledge of chain effects (Pv-Sa-Tr-Co-Lo) creates the possibility of targeting, segmenting and positioning different users or clients using various services. Seaports desiring to build good relationships should primarily focus on knowing the needs of different customer segments (i.e. examining the essential facilities, knowledge and behavior of personnel, and the outcome of service quality).

Therefore, to remain in a competitive position, port managers can play a role in the value-creation process, and their decisions should be proactively value-driven and concerned with a continuous in-depth understanding of perceived value and their effect chain, discovering and delivering customer-perceived values to gain sustainable satisfaction and loyalty.

The analysis demonstrated its utility by providing valuable insights into the impact of the chain on user loyalty in the realm of port services. However, this study had certain limitations. This study was confined to specific ports in Ecuador. To address this issue, we propose extending this study to a broader range of regions. This serves a dual purpose: first, to furnish additional evidence supporting the application of the chain of effects in ports' relationships with users, and second, to facilitate validation and comparison across diverse regions. This expansion is essential to counteract the current scarcity of studies pertaining to port-user relationships.

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### Appendix

Num.	Var.	Likert (1–5) independent variable	Perceived value
<i>Facilities</i>			
A1.1	The facilities are spacious, modern and clean		
A1.2	The port was neat and well organized		
A1.3	It is well located (with good transport links)		
A1.4	As a whole, all the necessary services are well ordered and organized		
A1.5	The distribution of the port space favors confidentiality and privacy		
A1.6	The port has modern equipment and new technologies		
A1.7	The material elements and documents that have to do with the service (information, plans, standards) are attractive and understandable		
<i>Staff</i>			
A2.1	The staff knows their job well		
A2.2	Your advice is valuable		
A2.3	They know the requested service		
A2.4	They are good professionals and are up to date on how to provide the service to meet the needs of the customers		
<i>Quality</i>			
A3.1	The service provided is well organized		
A3.2	Compared to the services provided by other ports, there is an acceptable level of quality		
A3.3	The quality of the service provided has been maintained throughout the time		
A3.4	The result of the service of this port was as expected		

**Table A1.**  
The independent variables linked to their different levels of latent and dependent variables are linked to loyalty

(continued)

Num.	Var.	Likert (1–5) independent variable
<i>Satisfaction</i>		
A4.1		My choice to use this port has been a correct one
A4.2		I did the right thing using this port
A4.3		The experience gained with this port was exactly what I needed
<i>Trust</i>		
A5.1		We can trust this port because they accomplish their promises
A5.2		We do not hesitate to do business with this port even when the situation is unclear
A5.3		I encourage other companies to do business with this port
A5.4		This port is reliable and trusted
<i>Commitment</i>		
A6.1		We intend to do business with this port in the future
A6.2		We are dedicated to continuing to do business with this port
A6.3		We are determined about our future intention to do business with this port
Num.	Var.	Likert (1–5) dependent variable
<i>Loyalty</i>		
B1.1		We say positive things to other companies about the port
B1.2		We recommend this port to companies looking for advice
B1.3		We encourage other companies to do business with this port
B1.4		We will do more business with this port in the coming years

**Source(s):** Authors' own elaboration

**Table A1.**

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